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## Physical Environment

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The City of Minneapolis enjoys one of the finest urban environments in the country. The physical environment section contains information on the condition of the city and also identifies efforts to protect and enhance the city's environment.

The order of Physical Environment chapter contents was modified for 1998 to more closely coincide with the Environmental Coordinating Team (ECT) Working Group categories of LAND & SOIL, WATER, and AIR.

Many sources contributed to this chapter including the following: Parks and Recreation Board; the Environmental Management Section of the Department of Operations and Regulatory Services; the Metropolitan Council; the Department of Public Works; the Metropolitan Airports Commission; and the Center for Energy and Environment.

This chapter can also be found on the city's web site at: [www.ci.minneapolis.mn.us/planning](http://www.ci.minneapolis.mn.us/planning)

### **Management of the Physical Environment**

**Land & Soil**

**Water**

**Air**

**Environmental Response**

**The Built Environment and Urban Character**



## Management of the Physical Environment

**“The chapter on the Natural Ecology focuses on the concept of sustainability and the need to frame decisions about development and growth in the context of their impact on future generations. . . . Minneapolis will manage the use of the city’s environmental resources (including air, water and land) in order to meet present needs while considering future concerns.”**

*The Minneapolis Plan (draft)*

There are numerous tools and strategies by which the city manages, protects, and sustains the Physical Environment. In some cases, federal, state, regional, or other mandates guide city action and policy. In others, the city has developed additional tools that help sustain a healthy physical environment that supports current and future social, economic, and ecological wants and needs.

### Environmental Coordinating Team

In 1994, the Mayor and City Council created the Environmental Coordinating Team (ECT). The ECT was directed to confront problems associated with past industrial and land use practices, to maintain and improve both the environmental and economic health of the city, and to develop programs that provide for a sustainable future. The ECT consists of the directors of the Department of Operations and Regulatory Services, the Planning Department, the Department of Public Works, the Department of Health and Family Support, the Minneapolis Parks and Recreation Board, the Minneapolis Community Development Agency (MCDA), and the City Attorney.

The ECT provides a framework for the regular exchange of information on environmental issues and a forum for the development of consensus. While the ECT is broadly concerned with the stewardship of the natural resources of the city, a working group structure allows targeting of priority issues of particular importance. The ECT’s four Working Groups and their dominant issues are land (focusing on contaminated sites), water (focusing on watershed management), air (focusing on energy efficiency), and sustainable development (focusing on land use compatibility). To further enhance the city’s environmental efforts, a Citizen’s Environmental Advisory Committee (CEAC) has also been formed with a principal focus on sustainable development.

Because of its coordinated, resource-based approach, the ECT has provided the city greater accountability on environmental matters. Previously, a department or agency dealt only with its piece of an environmental problem; none bore responsibility for the whole. The ECT approach offers the hope of significant enhancements of the soil, air, and water of Minneapolis, resulting in a cleaner environment and a healthier economy.

### Sustainable Development

The City of Minneapolis has endorsed sustainability through the ECT. The concept is also one of the key ideas incorporated into the city’s draft comprehensive plan, *The Minneapolis Plan*. The idea of sustainability has received broad bipartisan support. By embracing sustainability, the city joins with efforts at many levels of government, including the President’s Commission on Sustainable Development, the Minnesota Sustainable Development Initiative, and the Joint Center for Sustainable Development established by the National Association of County Organizations and the U.S. Conference of Mayors.

As defined by the United Nations, a sustainable society meets the needs of the present without sacrificing the ability of future generations to meet their own needs. The idea of sustainability implies that the city and its residents should be wise stewards of natural resources, wasting as little as possible.

Some of the city’s sustainable development strategies include the following:

- The city helps develop neighborhoods that include a mix of housing, employment and services to allow daily transportation needs to be met by fewer and shorter trips in vehicles and many trips to be completed by bicycle or on foot. The city believes that appropriate mixing of land uses will result in less reliance on the automobile, pedestrian and public spaces that encourage activity, a stronger sense of livability, and friendly density.
- The city strives to build a balanced and integrated public transportation system.
- The city stresses infill and adaptive reuse of buildings.
- City regulations, policies and practices protect ecologically sensitive areas.
- City policies and practices encourage the conservation of resources through its waste reduction and recycling programs and the maximization of energy efficiency.

### Smart Growth

A key to sustainable development is how we grow and what resources we use and conserve. Generally, development patterns in the metropolitan area indicate that the demand for housing, commercial and office space, parking, and shopping, results in the consumption of large expanses of land. Every day in Minnesota, an area larger than the Mall of America is paved over. Abandoning established communities to build new ones carries a huge price tag. It destroys wildlife habitat, wetlands, and our sense of community, and it is expensive to service. Urban sprawl is one of the most significant causes of resource consumption and pollution. Studies show that dense urban development is significantly more energy and resource efficient and far

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less polluting than sprawled development. When metropolitan growth occurs in Minneapolis, city growth strategies result in infill developments, increased density in underused areas, and adaptive reuse of existing older structures. Growth in the city means a more efficient use of the already built environment, a reinforcement of the urban fabric, and a strengthening of the entire region at its core. Minneapolis is a model of compact urban form.

In 1999, there was considerable attention at national, state and regional levels, to the Smart Growth movement. The ECT recommended, and the Mayor and City Council concurred, that the City of Minneapolis should become one of the charter members of the Minnesota Smart Growth Network, a diverse coalition of builders, non-profits, local governments and state agencies. There are several principles underlying Smart Growth that address issues from transportation choices to social justice. The heart of the movement is the belief that in order to avoid costly duplication of services and the costly consumption of land, society ought to make efficient and effective use of land resources and the existing infrastructure by encouraging development in areas with existing infrastructure or development capacity. Minneapolis hosted a major Smart Growth conference in 1999 that attracted participants from throughout the state, including Governor Jesse Ventura.

## Environmental Review

### Introduction

The Minnesota Environmental Review Program requires that environmental reviews be completed for projects which exceed certain thresholds that deal with size and with the nature of the project (e.g. large commercial, residential or industrial projects; hazardous waste facilities; and projects that impact historic resources). In most cases, the law requires the city to be responsible for the environmental review for projects located within Minneapolis. The law defines the content and scope of the review and the process and timeline for its completion.

The purpose of the environmental review is to disclose the potential environmental impacts of the project and identify ways to avoid or minimize them. Permitting agencies, including the city, rely on this information for their permitting decisions. The environmental review program has no authority of its own to require any response to the environmental effects disclosed, no matter how significant. It is left to the regulating authorities to implement the mitigative measures identified in the environmental review.

The three most common reviews are the Environmental Impact Statement (EIS), the Environmental Assessment Worksheet (EAW), and the Alternative Urban Areawide Review (AUAR). The EIS is a very thorough study of the potential environmental effects of the project and of

reasonable alternatives to the project. An EAW is a much briefer review that is intended to screen projects that may have the potential for significant environmental effects. If the EAW leads to the conclusion that a project may pose significant environmental risks, then an EIS must be prepared as well. The AUAR is a substitute form of review that blends the requirements of the EAW and the EIS. It merges the scope of an EAW with a level of detail that is closer to an EIS. Like an EIS, the AUAR includes alternative scenarios and a very specific mitigation plan. An advantage of the AUAR approach is that it involves not a particular project, but rather a generally larger area defined by particular opportunities or constraints. Therefore, its results have the potential to guide multiple projects and also to better assess the area's carrying capacity or ability to absorb development without significant degradation.

### 1999 Environmental Reviews

The city completed 30 Federal Environmental Assessments for projects that utilize federal funds and the following two major state-mandated environmental reviews in 1999:

#### **Review of the AUAR for the 800 and 900 Blocks of Nicollet:**

On 9/2/97, the city completed an AUAR for the proposed developments on the 800 and 900 blocks of the Nicollet Mall, and then revised the document on 7/2/98 when the proposed projects increased in size and scope. The 800 Nicollet project is the 31 story, 988,000 sq. ft. Piper Jaffrey Office Tower now under construction. The 900 Nicollet project will total 860,000 sq. ft. It will have 564,000 sq. ft. of office space in a 12-story tower that will sit atop 253,000 sq. ft. of retail that includes a two-story, 161,000 sq. ft. Target store. The project is now under construction. The final design of the 900 Nicollet project was slightly different than that studied in the AUAR. After extensive review of the relevant environmental impacts, the city concluded on 12/2/99 that the AUAR did not need to be revised.

**AUAR for the SEMI Area:** Late in 1997, the city initiated a major environmental review for the entire 300-plus-acre Southeast Minneapolis Industrial (SEMI) area using the AUAR process. The environmental review focuses on existing land uses, soil conditions, and groundwater pollution. It will include a revision of the adopted master plan for the area. When adopted, the AUAR will substitute for the preparation of any EAWs or EISs that would be required for specific projects within the SEMI area, provided the projects are consistent with the assumptions made in the AUAR. Specific projects also must not exceed the impacts described in a "maximum development" scenario, and the project developers must commit to implement any measures called for in the mitigation plan. The city expects to complete the AUAR by mid-2000.



## Travel Demand Management Plans

Transportation accounts for more than half of the air pollution and a significant amount of the soil and water pollution nationally. Travel Demand Management (TDM) plans serve as important tools for the city to minimize the polluting impacts of transportation. The city's new Zoning Code requires developments of over 100,000 sq. ft. to submit a TDM plan for approval by the Planning Director. TDM plans must disclose the expected transportation impacts and detail a mitigation plan. Mitigation measures to be considered include the following:

- Periodic survey of transportation behaviors and desires of the building users (completed generally every two years).
- Periodic status reports (generally every two years).
- Subsidies for users of the alternatives to the single-occupant vehicle (e.g. transit, car and van pools, bicycles and walking).
- On-site transit facilities and transit pass sales.
- Construction of downtown skyways.
- Preferential siting of car- and van-pool stalls.
- On-site facilities for bicycle storage and for showers and lockers.
- Tenant communication and education programs focusing on the alternatives to the single-occupant vehicle.
- Creation of flextime and telecommuting opportunities.

Since 1997, the city has stepped up its efforts to negotiate stronger TDM plans from 13 major projects. The city's estimate of the net present value of the private sector investments in the above mitigating measures for these TDM plans is over four million dollars. In October 1999, the city was presented a Commuter Choice Award for its work on TDM plans.

**The total area of the city is 59 square miles or 37,516 acres. Residential uses represent the single largest type of land use — slightly more than 53 percent of the city's total land area. Public and recreational uses rank second in land usage. The third largest land use is industrial land. Lakes, rivers and streams cover 6 percent.**

## Land Use

The Metropolitan Council provided land use information. The land use totals were developed from air photos. The information was digitized into the Metropolitan Council's computer using PC ArcInfo.

## Existing Land Use, 1990:

This and the 1998 State of the City reports includes a different land classification system than used in prior reports. The Metropolitan Council's land use coding of individual parcels is considered to be more reliable than the system used by the City of Minneapolis Assessor's Office. The Metropolitan Council information is also valuable because it includes data from as far back as 1970. The table below shows the number of acres of land in each classification for the years 1970, 1980, and 1990.

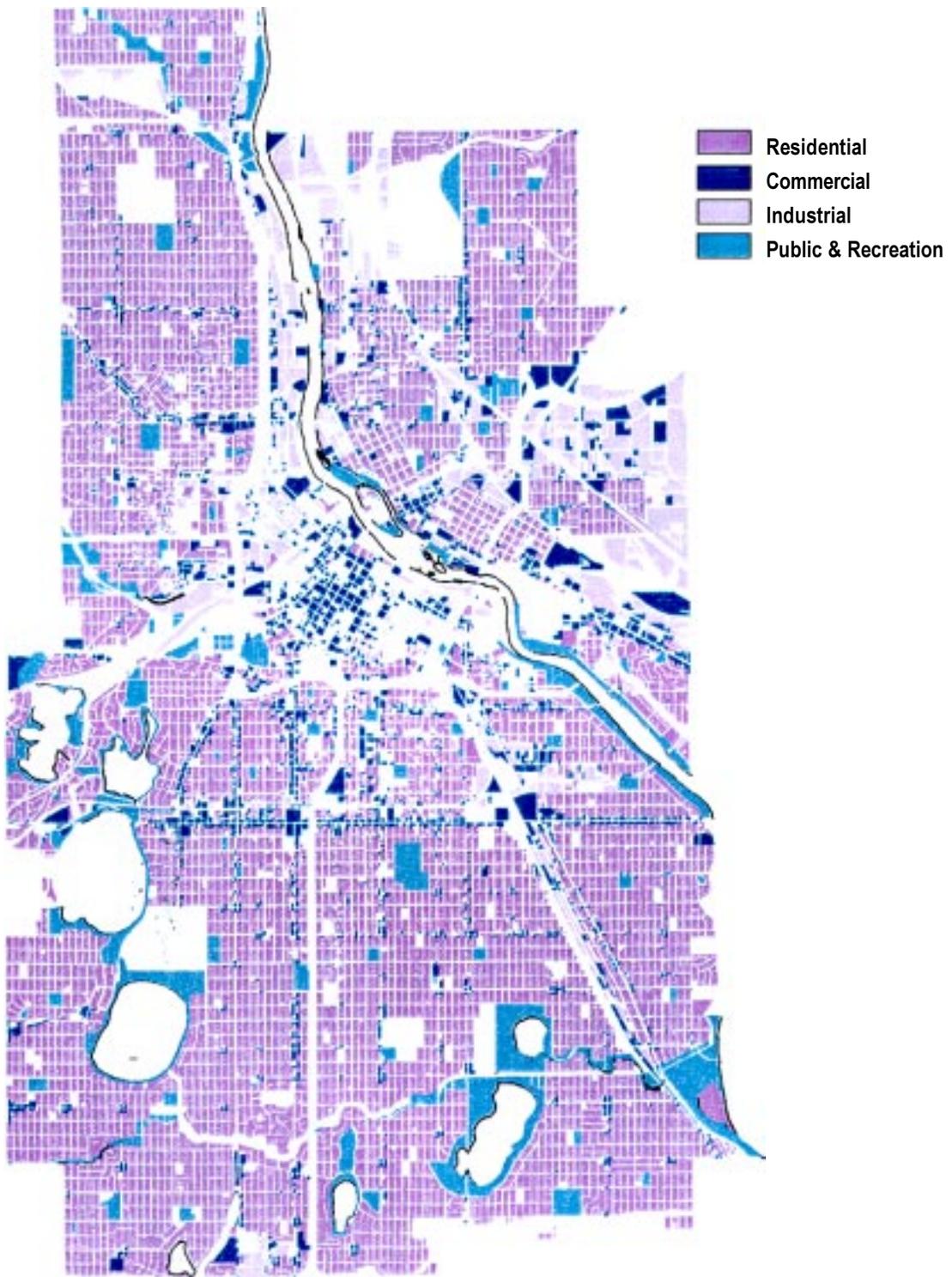
**MINNEAPOLIS LAND USAGE - 1970 TO 1990**  
(In Acres)

	1970	1980	1990	% of Total	Change 1970-90
Residential	19,583	19,567	19,676	53%	+ 93
Commercial	1,887	1,887	1,909	5%	+ 22
Industrial	5,448	5,503	5,460	15%	- 64
Public & Recreational (Parks)	5,913	5,935	5,986	16%	+ 73
Lakes and Streams	2,248	2,248	2,271	6%	+ 23
Highways					
>200' R.O.W.	748	1,006	1,298	3%	+ 550
Non-Urbanized	1,504	1,185	769	2%	- 735
<b>Total</b>	<b>37,331</b>	<b>37,331</b>	<b>37,369<sup>1</sup></b>	<b>100%</b>	<b>+ 38<sup>1</sup></b>

<sup>1</sup>The Ryan Lake annexation occurred between 1980 and 1990.

The preceding table shows that the area of the city increased slightly between 1970 and 1990 because of the addition of the Ryan Lake Annexation in the north-west corner of the city. This property was annexed by the City of Minneapolis at the request of the City of Robbinsdale.

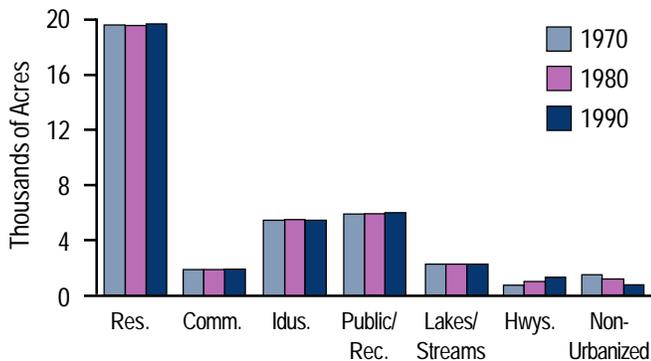
Residential uses account for more than half of all land use in the city. The next largest category of uses is Public and Recreational. This classification includes all the schools, hospitals, cemeteries, and parks in the city. The use 'Highways' had the greatest 20-year increase. Land was converted to allow the freeway system and Hiawatha Avenue to be built. The amount of Non-Urbanized Land (land that is vacant or wetlands) decreased by more than one square mile between 1970 and 1990. Only about one square mile in scattered locations throughout the city remains vacant.



**LAND USE - 1992  
(In Acres)**

Community	Residential	Commercial	Industrial	Trans., Comm. and Utilities	Social/Cultural	Undeveloped and Unused	Total
Calhoun Isles	1,014	1,401	23	954	612	73	4,077
Camden	1,393	121	135	972	326	119	3,066
Central	131	274	156	990	110	1,844	3,505
Longfellow	1,252	149	122	858	405	18	2,804
Near North	1,192	160	194	998	237	107	2,888
Nokomis	2,027	42	8	1,895	701	9	4,682
Northeast	1,585	179	444	1,705	537	190	4,640
Phillips	335	101	45	417	92	52	1,042
Powderhorn	1,486	139	21	1,075	196	35	2,952
Southwest	2,518	127	42	1,442	667	35	4,831
University	606	364	655	1,331	323	154	3,433
<b>Total</b>	<b>13,539</b>	<b>3,057</b>	<b>1,845</b>	<b>12,637</b>	<b>4,206</b>	<b>2,636</b>	<b>37,920</b>

**LAND USE: 1970, 1980 AND 1990**



- **Athletic Fields:** Grass in areas designated and used for scheduled athletic areas is maintained at a height of 2.5 -3 inches.
- **General Park Lands:** Grass in neighborhood parks, parkways, and active use areas may exceed 5 inches but will be cut back to three inches on a regular basis.
- **Maintenance and Natural Areas:** The remaining turf areas of the park system, including steep hillsides, wet areas and shorelines, are cut at least once a year to maintain an open landscape and minimize noxious weeds.

**Natural Areas:** Many of the larger regional parks contain areas that are kept in a wild state. These areas add a variety of color and texture to the landscape, create wildlife habitat, improve water quality, protect shoreline areas from erosion, provide places where people can experience and understand ecological principles, and reduce maintenance costs and the use of chemicals and fossil fuels. Sites such as the Roberts Bird Sanctuary, the Quaking Bog, the Eloise Butler Wildflower Garden and Bird Sanctuary, and the three remnant prairies, are actively managed through a series of practices including prescribed fires, mowing, and removal of exotic species such as buckthorn.

**Conversion Program:** Recognizing the many benefits of natural areas and native plants, the MPRB has converted a number of sites to native species. Although most of these sites involved conversions from turf grass to prairie grasses and wildflowers, there have been a number of wetland, savanna and forest restoration projects. Since these conversions take many years, the MPRB will continue to monitor and manage the sites to enhance their overall integrity and appearance. Examples of conversion projects include the Cedar Meadows Wetland, the Lake Nokomis Wet Prairie, the

**Vegetation Management**

The wide range of vegetation found throughout the city creates a beautiful, functional and diverse landscape for city residents and visitors to use and enjoy. There are large expanses of turf grass and formal flower gardens. Tall stately trees grace many of the streets, boulevards and other public spaces. Many natural areas contain native prairie, wetland and forest species. The Minneapolis Parks and Recreation Board (MPRB), responsible for managing park land and significant portions of the urban forest, uses a comprehensive and integrated approach to vegetation management. This approach ensures that impacts and opportunities associated with maintaining existing vegetation and planning new projects are addressed in a balanced manner that maximizes public benefit.

**Turf Management:** Park areas covered by turf grass are found in a variety of locations and are used in many different ways. Three turf management standards have been developed for these areas:

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Powderhorn Park Shoreline, the Children's Forest along Shingle Creek, the Minnehaha Park Savanna, and the Ridgeway Parkway Prairie.

### Urban Forest

Mature, healthy trees in the city provide many pleasures and serve many purposes. Strategic tree planting is a proven complementary approach to conserving energy because trees and other foliage provide shade and form windbreaks. Trees clean the air, help transform pollutants, and convert carbon dioxide into oxygen. Interception and storage of rainfall by trees helps to lower storm water runoff volume and rate. Mature trees buffer noise and beautify the city in simple and effective ways. Boulevard trees that extend their leafy canopies over streets also help calm traffic.

Plantings: During 1998, Minneapolis Parks and Recreation Board Forestry staff planted over 3,700 new trees in public locations throughout Minneapolis including the following:

- As part of the Department of Public Works re-paving projects, the Forestry Section planted more than 805 trees. Staff from the Forestry Section and the Department of Public Works and Engineering continue to work together to lessen damage to trees and tree roots in these project areas, and to adopt standards and specifications that will improve the longevity and vigor of urban trees planted in pits.
- In response to the devastating storms of 1998, the 1999 Minneapolis Arbor Day celebration took place at Lake Nokomis. Over 500 volunteers helped with the planting of 173 trees and the creation of the "Oak Park Arboretum." Funding for this project was provided by MnReLeaf, the Nokomis East Neighborhood Association, and the Neighborhood Revitalization Program (NRP). This Arbor Day celebration marked the city's national award as a Tree City USA for the 21<sup>st</sup> consecutive year. In the fall, over 100 Americorps volunteers spread 20 flatbed loads of mulch for the trees to prepare them for winter.
- The Forestry Section partnered with many neighborhoods to plant over 1,200 trees with funding from the NRP. Neighborhood volunteers ensure the success of each project. This program currently accounts for the majority of new plantings in Minneapolis. Since 1992, 9,717 trees have been planted using NRP funds.
- The Concerned Citizens of Marshall Terrace (CCMT) has been working in tree planting partnership projects with the MPRB Forestry Section the past several years. A few examples of these partnership projects include the following:

- Planting trees and shrubs along Trunk Highway 47 near St Anthony Boulevard;
- Creating a neighborhood nursery where small trees are planted and nurtured until ready for transplanting to neighborhood boulevard and park sites; and
- Reviving Gluek Park which is located along the Mississippi River at Marshall and 19th St. NE.

- Funding has come from private donations, such as the Minnesota Department of Transportation's (MnDOT) Community Enhancement Partnership Program, and grants. The objectives of these projects include planting trees for beauty, restoring riverfront wildlife habitat, and greening open spaces for the health of the community and environment. This fall, this partnership continued with the transplanting of over 100 trees donated from the CCMT tree nursery to Cavell Park, Luxton Park, Hi-View Park, and Dickman Park.
- The MPRB Forestry Section, working together with staff and students from Wenonah School, the Committee on Urban Environment, Nokomis East Neighborhood Association staff, neighborhood volunteers, and city officials, celebrated Arbor Day at Wenonah School. Over 350 students, with direction from MPRB staff, planted 59 trees throughout the school grounds.
- Over 100 volunteers from the Phillips Neighborhood and MPRB Forestry Section planted over 160 trees in the Phillips Neighborhood with funding provided from a \$10,000 UNITREE Grant.
- With great teamwork and enthusiasm, over 40 volunteers from the Bryn Mawr neighborhood, along with Boy Scout Troop 46 from Fulton School, joined MPRB Forestry staff with the planting of 20 Crabapple trees in Bryn Mawr Park. This project was funded through NSP's "Power of Working Together Grant" which encourages the planting of appropriately-sized trees under power lines. Forestry staff also planted Crabapple trees under power lines on boulevards throughout the Bryn Mawr Neighborhood.
- The Lynnhurst and Nokomis East Neighborhoods were the recipients of 260 new trees valued at \$17,500 from the MnReLeaf Grant projects.
- In 1999, 98 trees were planted through a collaboration with the People For Parks (PFP) Urban Reforestation Project. Also, individuals have donated many beautiful trees throughout the park system as commemorations or celebrations of significant events.

The many partners that provided crucial funding and collaboration during 1999 included the Neighborhood

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Revitalization Program, the Minnesota Legislature's MnReLeaf program, the Minnesota Tree Trust, and the Committee on Urban Environment (CUE).

The MPRB Forestry Section received an "Outstanding Community Forestry Maintenance Award" from the Minnesota Shade Tree Advisory Committee for the clean-up efforts after the devastating storms in 1998.

**Dutch Elm Disease:** Minneapolis continues to combat Dutch Elm Disease (DED) with a 1999 loss of 2,445 elm trees. This is a 50 percent increase over the 1998 loss of 1,213 trees. The four major storms in 1998 caused a greatly increased amount of broken branches in elm trees throughout Minneapolis. This provided an increased number of breeding sites for the Elm Bark beetles, which carry the DED fungus. Forestry crews maintain an active sanitation program consisting of trimming dead wood in elm trees. This program, together with a new Minneapolis ordinance declaring it unlawful to store elm wood, should reduce DED to lower levels in 2000. Since 1963, over 128,000 diseased elm trees have been removed citywide.

**Pest Alert:** The U.S. Department of Agriculture declared a pest alert for the Asian long-horned beetle. Federal officials determined that the beetle made its way from China by stowing away in untreated wood crates. Unlike many beetles, Asian long-horned beetles are not particular about their hosts. No occurrences were noted in the city in 1999.

### **Environmental Education Programs**

**J. D. Rivers Discovery Center:** Demand for the environmental and horticultural programs offered at the J.D. Rivers Outdoor Discovery Center in Theodore Wirth Regional Park and the community outreach sites has increased from 270 participants in 1996 to 3,440 participants in 1999. In spite of the significant increase in demand for programs and activities, the Discovery Center will continue to emphasize and offer excellent programs free of charge. However, with this growth and interest, the current facilities are inadequate to meet the full demand for resources.

**Interpretive Program:** Each weekend from April 15th through October 31<sup>st</sup>, seasonal Interpretive staff offer a wide variety of interpretive programs primarily in Theodore Wirth Park utilizing the Quaking Bog and the Eloise Butler Wildflower Garden and Bird Sanctuary. In 1999, the MPRB expanded interpretive programming to Neighborhood Recreation Centers. The program, referred to as the Neighborhood Naturalist Program, targets six-to-twelve-year-olds, adults, and seniors and provides them with environmental activities and education. The expansion of programs and improved marketing greatly increased attendance during the 1999 season.

### **Land Recycling**

The soil of the city is a valuable natural resource. During the Pleistocene Period, glaciers scoured the earth's surface and deposited a fertile loam across the city. This soil is not only the foundation for structures, it provides valuable nutrients for lawns, gardens and purifies groundwater. Pollution threatens these important functions.

Since the city draws its drinking water from the Mississippi River, most polluted sites do not pose an immediate threat to the health and safety of the public. The contamination of these sites does, however, pose a threat to the economic viability of the city.

Often, parties responsible for contaminating the land have moved on and are no longer available to finance its cleanup. As a result, tracts of vacant land sit idle and become targets for vandalism, illegal dumping, and blight resulting in an eroded tax base.

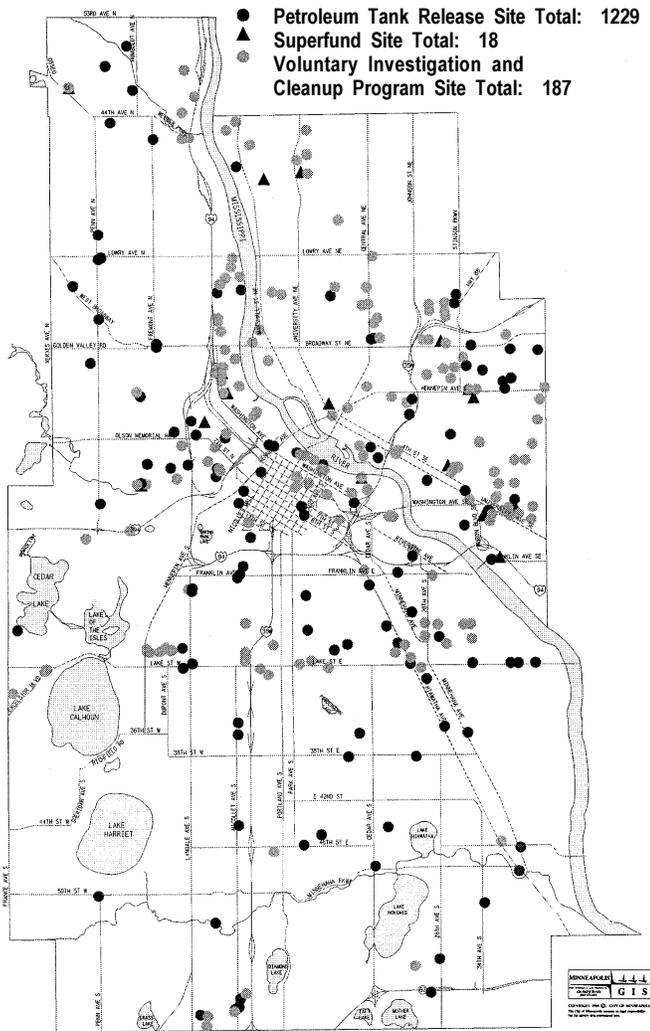
The Environmental Management Section of the city's Inspection Division is responsible for regulatory authority over contaminated sites in the city. The city's Contaminated Sites Working Group, composed of city staff, has been instrumental in the cleanup of contaminated land. This group has also been instrumental in developing new cleanup standards, applying cleanup technologies, and developing legislation to finance remediation efforts. The city is a national model in reclaiming industrial sites.

**Superfund Site Cleanup:** Minneapolis has had 25 federal- or State-designated Superfund sites where past contaminant releases threaten public health or the environment. These sites are the focus of Superfund laws such as the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Minnesota Environmental Response and Liability Act (MERLA). Perhaps the most significant contribution of the environmental legislation is the creation of environmental awareness by industries. Industries now operate under strict environmental friendly operational guidelines.

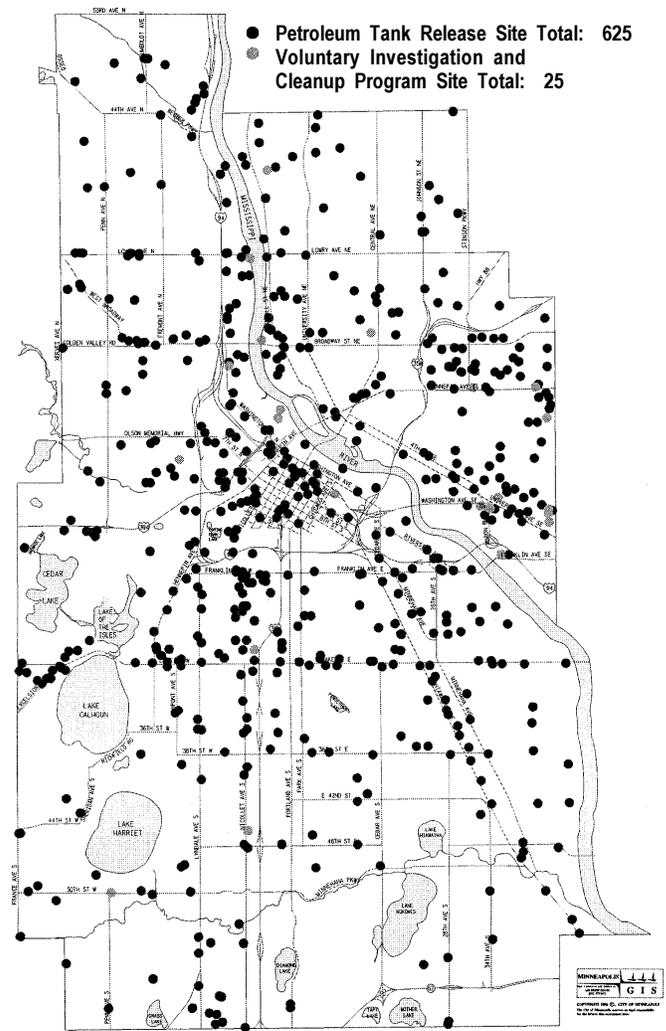
Of these 25 Superfund sites, six have been cleaned and had their Superfund designation removed. Included among these is the Whittaker site in northeast Minneapolis which was de-listed this past year.

Other sites that are still "open," such as the Minneapolis Gas Works (Minnegasco Company) and B. J. Carney sites, have undergone significant cleanup and redevelopment in the past couple of years. Doc's Auto in North Minneapolis recently underwent significant cleanup and two additional sites, Martin Bush and Shafer Metal are expected to undergo cleanup in the near future. Many of the remaining sites continue in their cleanup phase and are regularly monitored for progress.

## CONTAMINATED LAND CLEANUP: OPEN SITES



## CONTAMINATED LAND CLEANUP: CLOSED SITES



**Petroleum Tank Release Cleanup:** Since 1979, there have been more than 825 confirmed petroleum tank leak sites in the city. Since 1987, 685 have been cleaned to standards set by the Minnesota Pollution Control Agency (MPCA). Tank owners who perform cleanups in accordance with MPCA guidelines are eligible for reimbursement up to 90 percent of the total cost of cleanup through the state-funded Petrofund program.

**Effective December 1998, federal law mandates that underground storage tanks (with some exceptions) must meet EPA regulatory requirements. Included are requirements for leak detection, corrosion protection, and spill and overflow prevention. Tanks not meeting state and federal standards must be excavated and removed. Tanks that have not been in service for more than one year must also be removed in accordance with the State's Uniform Fire Code and Minnesota Rules.**

**Voluntary Investigation and Cleanup Program:** The MPCA created this program to encourage voluntary participation, investigation, and cleanup of contaminated land. A few of the wide range of possible contaminants include lead, pesticides, and wood preservatives.

Participants are required to meet MPCA standards to receive a certificate of completion. The certificate is a written guarantee providing protection to property owners from future liability. Since 1986, over 200 properties within the city have entered the voluntary program, and over 25 sites have received completion certification.

**Brownfield Redevelopment:** The term 'brownfields' refers to properties that were contaminated by a prior use and that were subsequently abandoned or under-used. When cleaned up, brownfields are suitable for redevelopment. Most of these sites cause serious concerns regarding environmental liability for potential developers, but are not contaminated enough to immediately threaten public health or the environment. Because there is no known immediate threat, these sites are not identified as Superfund sites, and neither the MPCA nor the United States Environmental Protection Agency (USEPA) will act to clean them up. Without assistance or incentives, few developers are interested in doing so due to environmental liability concerns.

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Minneapolis was among the first cities in the country to reclaim brownfields for productive uses. The MCDA is actively involved in remediating polluted sites for redevelopment. The Public Works Department cleans up properties owned by the city that may have been contaminated in the past and the Parks and Recreation Board restores brownfield sites for a variety of open space uses.

During 1999, the Minneapolis Community Development Agency (MCDA) was awarded \$2.9 million in pollution cleanup grants under the Contamination and Metropolitan Livable Communities Grant Programs for the following projects:

- **Martin Bush Iron and Metal:** The city received a grant of \$1 million for lead and petroleum cleanup on the Martin Bush Iron and Metal site in North Washington Industrial Park (NWIP). The site will be sold to DHL Courier for a light manufacturing facility that will help retain 32 jobs and create 15 new jobs over the next five years.
- **Marquette Plaza:** The city received a grant of \$1 million for asbestos removal in the Old Federal Reserve Bank project downtown. The costs for the renovation and expansion of the building are estimated to be a total of nearly \$58 million including \$5.9 million for clean up. About 2,000 employees are expected to work in the building, which will be renamed the Marquette Plaza Building, with 500 of these workers representing new employment in the region.
- **Washburn-Crosby Milling Complex:** The city's grant of nearly \$722,000 was to deal with asbestos, lead-based paint, and soil remediation at the Washburn-Crosby Milling Complex. This complex is an essential component of Minneapolis' riverfront development activities and is expected to be developed as a mixed-use project. The lower four floors of the south one-half of the mill will house the new 50,000 sq. ft. St. Anthony Falls Heritage Center and Museum at a cost of \$24 million.
- **Block 49:** The smallest grant of \$212,000 was received to cleanup lead and petrochemicals from Block 49 in the NWIP. ASI Sign will purchase Property 100 to build a 16,000 sq. ft. facility that will create 24 new jobs over the next five years.

Since 1994, the city has secured a total of \$14.54 million in grants under these contamination programs.

### **Illegal Dumping**

Sites used for illegal dumping often include abandoned industrial, residential, or commercial buildings; vacant lots on public or private property; and alleys or roadways. Illegal dumping can occur at any time of day but is more common at night or in the early morning hours during warmer months. If not addressed, illegal dumps often attract more waste, potentially including hazardous wastes such as asbestos, household chemicals and paints, automotive fluids, and commercial or industrial wastes.

The health risks associated with illegal dumping are significant. Areas used for illegal dumping may be easily accessible to people, especially children, who are vulnerable to the site hazards that can be both physical (protruding nails and sharp edges), and chemical (harmful fluids or dust). Rodents, insects, and other vermin attracted to dump sites may also pose health risks. Dump sites with scrap tires provide ideal breeding grounds for mosquitoes which can multiply 100 times faster than normal in the warm, stagnant water pooled in scrap tires. Severe illnesses, including encephalitis and dengue fever, have been attributed to disease-carrying mosquitoes originating from scrap tire piles.

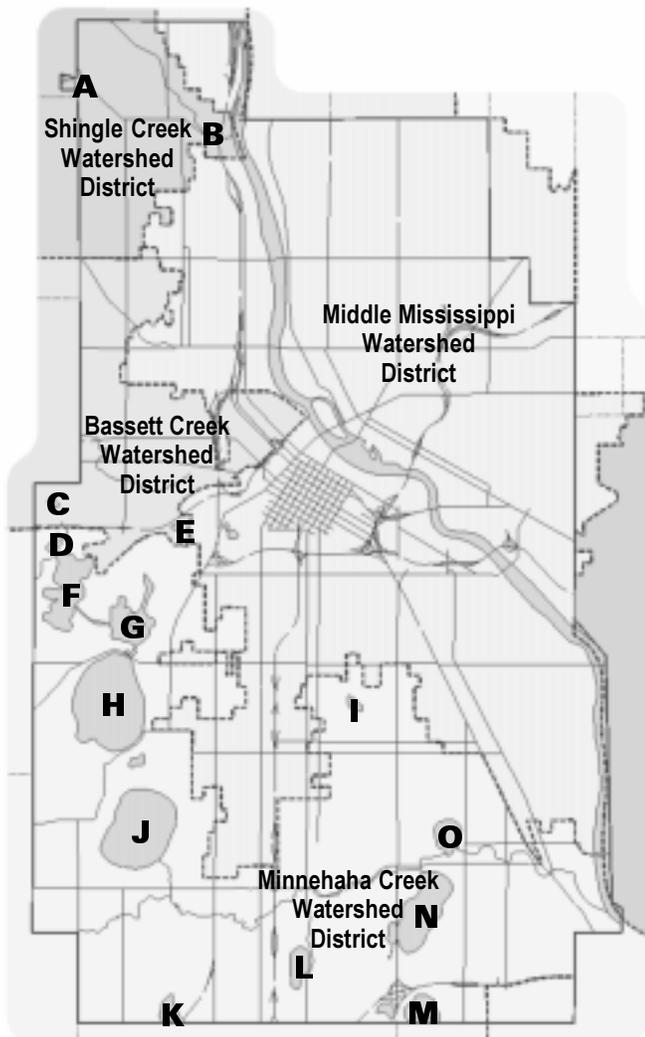
The problem of illegal dumping has grown. It affects every ward in the City of Minneapolis. Many of these dumpings are difficult and often result in lengthy investigations. Successful prosecution requires eyewitness identification and material evidence. Illegal dumping also strikes at the heart of neighborhood livability. No one wants to live near a site that is the target of illegal dumping. The city's Housing and Environmental Inspections and Solid Waste and Recycling Departments have implemented an aggressive joint enforcement of the illegal dumping ordinance.



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

- The Mississippi River;
- Bassett 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 Pond, the Lake in Lakewood Cemetery; and
- Five unnamed wetlands.

## WATERSHED MANAGEMENT ORGANIZATIONS



- |                      |                    |
|----------------------|--------------------|
| A. Ryan Lake         | I. Powderhorn Lake |
| B. Webber Pond       | J. Lake Harriet    |
| C. Birch Pond        | K. Grass Lake      |
| D. Brownie Lake      | L. Diamond Lake    |
| E. Spring Pond       | M. Mother Lake     |
| F. Cedar Lake        | N. Lake Nokomis    |
| G. Lake of the Isles | O. Lake Hiawatha   |
| H. Lake Calhoun      |                    |

## Watershed-Based Management

In order to best manage its water resources, the city has adopted a watershed management perspective, using these natural drainage patterns of the land to better understand how all activities within our watersheds affect the health of our water resources. Keeping our river, lakes, creeks, wetlands and groundwater clean and healthy involves planning on a watershed basis to prevent nutrients, pollutants and sediments from entering our waters. Prevention is the preferred approach because once a water body has been damaged it is expensive, if not impossible, to restore.

Four watershed management organizations participate in the administration of water resources within the city: The Middle Mississippi Watershed Management Organization, the Bassett Creek Watershed Management Organization, the Shingle Creek Watershed Management Organization, 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.

## The Mississippi River

The Mississippi River is essential to the ecological health of the region. It is an invaluable cultural, historic, and recreational resource. 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.

1999 saw the development of two draft planning documents that hold the promise of positive change for the city’s portion of the Mississippi River corridor: The Middle Mississippi River Watershed Management Plan (MMRWMO Plan) and the Upper Mississippi River Master Plan. The MMRWMO Plan is a document that includes watershed management techniques and an implementation schedule for its policies, programs, and projects. This Plan has been formally reviewed by regional, state, and federal agencies and is currently being modified to reflect the comments of those agencies. The Upper River Master Plan sets forth a dramatic new vision of revitalization for the Upper River which includes significant new open space and residential additions to the river corridor. It is the result of an extensive collaboration between the city, the MPRB, Hennepin County, residents, and businesses.

The importance of the river corridor is recognized by its 1998 presidential designation as a National Heritage River, as well as earlier designations by the National Park Service (Mississippi National River and Recreation Area), and the State of Minnesota (Mississippi River Critical Area). The city consolidated in its Critical Area

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Plan (currently under revision), its policies and implementation strategies adopted to protect the natural, cultural, historic, commercial, and recreational value of the river corridor.

River Corridor Goals: The City of Minneapolis intends to guide the use and development of the Mississippi River corridor to achieve the following goals:

- **Natural Resources:** Preserve, enhance and interpret natural resources. Protect and preserve the biological and ecological functions of the corridor.
- **Visual Quality:** Protect and enhance the views to and from the river, and up and down the river so that people may enjoy the natural beauty of a major waterway in an urban setting.
- **Cultural Resources:** Preserve, enhance and interpret the archaeological, ethnographic and historic resources of the river corridor.
- **Economic Resources:** Provide for continued economic activity and development in a manner consistent with the other goals. Protect and preserve the river as an essential element in the systems of transportation, water supply and recreation.
- **Neighborhood Revitalization and Stabilization:** Leverage the natural beauty, recreation and economic development features of the river as a means of sustaining the quality of nearby neighborhoods and the city as a whole.
- **Outdoor Recreation and Tourism:** Enhance opportunities for outdoor recreation, education and scenic enjoyment. Continue to make the river an important part of any visitor's appreciation and understanding of Minneapolis. Continue to build the riverfront as a major element of the local and regional parkway systems.
- **Public Understanding:** Improve the public's understanding of the river and promote public stewardship of its resources. Recognize and strengthen people's relationships with the river as a dynamic part of this community's heritage, quality of life and legacy for future generations.

Source: Mississippi River Critical Area and MNRRA Plan, Preliminary Draft, September 15, 1998

### The Lakes

Lake scientists have monitored the city's lakes on a biweekly basis since the early 1990s as a part of the Clean Water Partnership program. By studying long-term trends in basic water chemistry, nutrient levels,

overall water quality, and biological communities, lake managers can determine the most effective actions to improve the biological health and overall recreational quality of the lakes. In 1999, lake scientists from the MPRB monitored 13 of the city's most heavily used lakes. The results were used primarily to estimate the fertility or trophic state of the lakes. By assessing lake fertility, managers can determine if algae and water plants are likely to be problems, or if a lake will be clear and beautiful. Lakes that are determined to be very fertile, or eutrophic, can then be managed by reducing nutrient levels to prevent algae blooms.

Scientists estimate lake fertility, or trophic state, by using water quality measurements and a mathematical formula called a Trophic State Index, or TSI. Three different lake measurements comprise a TSI score: water transparency, chlorophyll content and phosphorus levels.

- Water transparency is measured with a black and white disk called a Secchi disk. The Secchi disk is lowered slowly into the water until it can no longer be seen. The depth at which it disappears is called the Secchi depth.
- A test of Chlorophyll-a indicates how much algae is in a lake. Algae are the tiny one-celled plants that can turn lakes green. Chlorophyll is the green pigment that plants use to capture the sun's energy. By measuring the amount of chlorophyll in lake water, scientists can estimate the amount of algae. Most of the city lakes sampled had moderate levels of algae during 1999.
- Phosphorus is the most important type of "fertilizer" for most algae. By measuring the amount of phosphorus in the lakes, scientists can get a good idea of how much algae can grow, and if algae blooms will be likely.

TSI scores range from 0 to 100, with higher numbers indicating more fertility. Lakes with TSI scores below 25 often look like sandy swimming pools, while lakes with TSI scores above 75 will be more like pea soup for much of the summer or will have very dense aquatic plant growth. In the Twin Cities, it is recommended that a TSI score of 59 or lower be maintained at lakes used for swimming. This recommendation is based upon the potential for degraded aesthetic appeal, not public health risks.

In addition to serving as a tool for rating water quality, the TSI is also used to classify lakes according to their trophic status. All lakes fall into one of three trophic states: mesotrophic, oligotrophic, or eutrophic. By knowing which fertility category a given lake falls under,

lake managers can predict which problems, if any, are likely to occur and what management strategies will probably be the most effective.

Eutrophic lakes have a TSI value greater than 55 and are considered highly fertile, or productive. They often have an abundance of algae due to high phosphorus nutrient supplies. This high algal growth decreases the transparency of the water and gives the water a greenish or brown color. Mesotrophic lakes have a TSI value from 40 to 55. Due to lower nutrient availability in mesotrophic lakes, they are less productive. This decreased fertility results in less algae growth and clearer water. Oligotrophic lakes have a TSI value of less than 40. They are the least productive of the lakes and have the clearest water.

The following table gives the average TSI values for each of the lakes monitored in 1999.

#### 1999 MEAN TSI (MAY-SEPTEMBER)

	Secchi	TP	Chla	AVG
Lake Calhoun	38.39	48.65	52.66	46.57
Cedar Lake	41.09	46.09	47.34	44.84
Diamond Lake		71.48	61.77	66.62
Lake Harriet	42.83	50.57	55.63	49.68
Lake Hiawatha	54.41	61.00	60.25	58.55
Lake of the Isles	48.48	54.47	62.91	55.29
Loring Pond	65.28	73.99	73.08	70.78
Lake Nokomis	51.41	61.91	66.69	60.00
Powderhorn Lake	64.73	77.28	75.50	72.51
Webber Pond		48.19	43.41	45.80
Wirth Lake	55.06	59.91	65.22	60.06

The following table shows the average annual growing season TSI values for given lakes over the past six years.

#### MINNEAPOLIS LAKES TROPHIC STATE INDEX SCORES

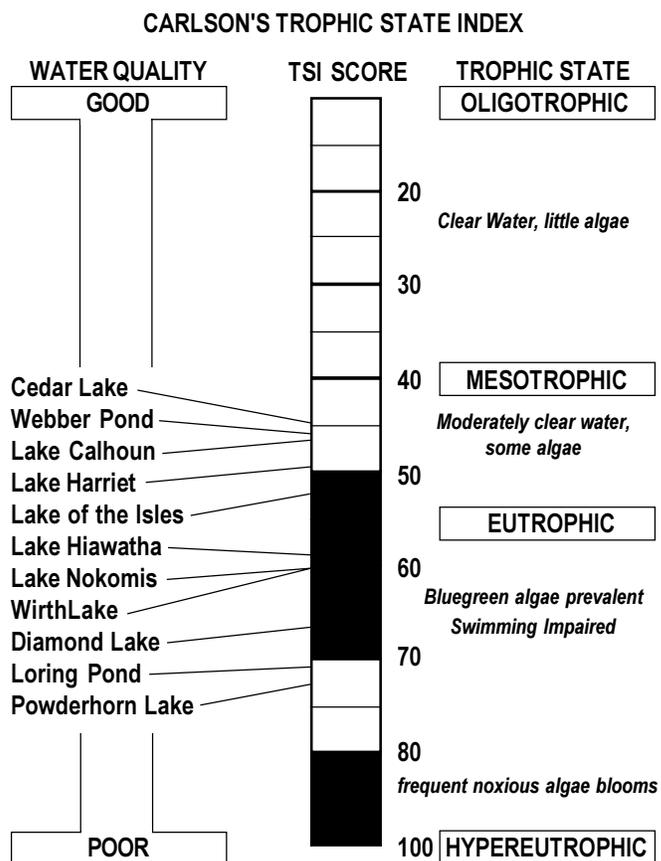
Lake Name	1994	1995	1996	1997	1998	1999
Brownie Lake	57	62	54	58	NA	NA
Lake Calhoun	47	57	43	45	48	46
Cedar Lake	54	64	47	45	43	43
Diamond Lake	67	73	40	67	73	65
Lake Harriet	49	58	49	45	47	49
Lake Hiawatha	57	59	59	59	58	59
Lake of the Isles	58	59	55	52	56	53
Loring Pond	61	65	65	NA	63	71
Lake Nokomis	60	58	61	61	58	59
Powderhorn Lake	66	68	69	76	73	72
Webber Pond	58	58	59	50	51	42
Wirth Lake	64	61	57	59	62	60

Aquatic Plant infestation by Eurasian Water Milfoil (*Myriophyllum Spicatum*) in Minneapolis lakes was first detected in 1987. Since that time, this invading species has spread to all of the major recreational lakes in

Minneapolis, affecting 300 acres of our waters. Eurasian milfoil displaces native vegetation and forms dense surface mats that interfere with recreational activities and reduce the aesthetic value of lakes. In order to alleviate the problems associated with milfoil infestation, the Parks and Recreation Board periodically harvests milfoil from a total of 164 acres in Cedar Lake, Lake of the Isles, Lake Calhoun, and Lake Harriet. The staff of the MPRB is working with the University of Minnesota to develop biological control methods for Eurasian milfoil.

In the summer of 1998, the MPRB conducted a comprehensive survey of the aquatic plants in the Chain of Lakes and Lake Nokomis, as well as a visual survey of Diamond Lake. Milfoil was the most frequently occurring species in Lake Nokomis and Cedar Lake, although high densities were noted in all of the lakes surveyed. Native species such as Bushy Pondweed (*Najas Flexilus*) and Sago Pondweed (*Potamogeton Pectinatus*) were recorded in greater abundance in the shallower depths where milfoil tends to be less tolerant of wave action. Coontail (*Ceratophyllum Demersum*), another native species, remains competitive with a higher or equal frequency of occurrence to milfoil in both Lake Calhoun and Lake of the Isles.

The following figure shows where each of the lakes monitored in 1999 rank based on average TSI score and overall trophic state.



## Water Quality Management

During their lifetime, many lakes will undergo an increase in their trophic status. In a natural setting, the process of eutrophication usually proceeds slowly, occurring on a time scale of centuries. Urbanization, or development of a lake's watershed, often results in a rapid increase in its trophic state. This process, called cultural eutrophication, prematurely ages lakes, turning clear lakes into very fertile ones in decades. Several of the lakes in the metro area have been undergoing this accelerated process of eutrophication.

In the Minneapolis area, stormwater runoff is the leading cause of cultural eutrophication. All storm drains in Minneapolis flow directly to a lake, stream, or the Mississippi River. With its high levels of phosphorus and sediment, stormwater runoff is very detrimental to water quality. Much of the current management focuses on reducing the amount of sediment and nutrients flowing into the lakes as street runoff.

This year the city adopted a Stormwater Management Ordinance. The primary purpose of the ordinance is to minimize the negative impacts of stormwater runoff rates, volumes and quality on Minneapolis lakes, streams, wetlands and the Mississippi River. The ordinance establishes standards and specifications for construction and maintenance of stormwater controls for all construction projects one acre and greater in area. The ordinance will bring the city into compliance with the Metropolitan Council's stormwater management regulations required as a part of the city's comprehensive plan.

Cost of compliance will vary based on the relative percentage of building, parking lot and green space of a proposed development. Estimated increase in construction costs range from zero costs for a downtown project with no surface parking, \$10,000 for a medium-sized project, and up to \$150,000 for a large commercial project. Estimates for annual maintenance costs range from \$1,000 to \$10,000 per year (the larger cost for sweeping programs). In cases where on-site stormwater treatment is impossible, the owner would have the option of contributing a comparable amount to one of the regional stormwater ponds being constructed by the city.

Chain of Lakes Clean Water Partnership: 1999 marked year five of the Chain of Lakes Clean Water Partnership (CWP). The partnership's goal is to significantly improve water quality in the five lakes that comprise the 7,000-acre sub-watershed of the Chain of Lakes (Brownie Lake, Cedar Lake, Lake of the Isles, Lake Calhoun and Lake Harriet). The partnership consists of the City of Minneapolis, the MPRB, the City of St. Louis Park, the Minnehaha Creek Watershed District, Hennepin County, and the Minnesota Pollution Control Agency. An important component of CWP activities is public education and information that describes specific actions area residents and businesses can take to improve water quality.

In June of 1999, the CWP completed construction on a three-pond stormwater wetland near the southwest corner of Lake Calhoun. Located near West Calhoun Parkway, Zenith Avenue and 38th Street, the wetland ponds act as filters to remove sediments, nutrients and bacteria from stormwater runoff before it flows into Lake Calhoun. The Lake Calhoun detention system will treat runoff from an 897-acre watershed draining from the southwest. This watershed currently contributes 37percent of the total phosphorus load to Lake Calhoun. Modeling for the southwest Lake Calhoun watershed detention system indicates the system will remove 48 percent of the watershed phosphorus load and 13 percent of total Lake Calhoun watershed phosphorus load.

The following table summarizes the specific actions being taken on each lake by the Chain of Lakes Clean Water Partnership (parentheses indicate CWP future actions and total costs reflect project to completion):

Lake	Grit Chambers	Alum Treatment	Wetland/Ponds
Cedar		1996	1996
Brownie Isles	one in 1994 (three in 2000)	1997	
Calhoun	one in 1995 two in 1998	2000	1998-99
Harriet	two in 1996 (one in 2000)	2000	1998 (MPOSC)
Total Costs	\$700,000	\$296,000	\$4,713,000

Cedar Lake: In 1998, Cedar Lake had some of the clearest water in recent history, as confirmed by 30 years of monitoring data. Although many factors affect water quality, this dramatic improvement is most likely due to the watershed management practices of the Chain of Lakes Clean Water Partnership during the past four years. Measures included alum treatments, construction of a stormwater wetland system at Cedar Meadows and Twin Lakes, implementation of a watershed education program, and increased street sweeping.

Lake Harriet Watershed Awareness Project: This project, managed by the MPRB, the Minnesota Department of Agriculture, and the University of Minnesota Extension Service, has two purposes: to inform urban homeowners about living in a watershed area and to help them learn how their lawn care habits can affect the quality of urban water. Most past outreach efforts have involved printed materials. In 1998, an educational video and slide presentation was developed, entitled "Every Curb Is A Shoreline: Urban Watershed Awareness - Lawn Care Practices to Protect Water Quality."

Loring Park Pond: In 1997, the MPRB drained Loring Park Pond and installed a geotextile liner to reduce loss of water due to exfiltration and an aeration system to improve water quality. The shoreline was vegetated with native wetland and prairie species to reduce erosion and geese usage. During 1998, it was con-

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firmed that exfiltration losses have been reduced to near zero and anaerobic conditions during the summer months have been eliminated.

Blue Water Commission, Lakes Nokomis and Hiawatha: The Blue Water Commission (BWC) was a citizens advisory committee that met from November 1997 through May 1998 to evaluate and develop recommendations regarding water quality concerns of Lake Nokomis and Lake Hiawatha. Three Minneapolis neighborhood associations created the BWC: Hale Page Diamond Lake, Nokomis East, and Standish Ericsson. The Blue Water Partnership, the City of Minneapolis, the Parks and Recreation Board, and the Minnehaha Creek Watershed District started implementing and funding the BWC recommendations. Construction activities will start in 2000.

### **Lakeshore Restoration**

The Legislative Commission on Minnesota Resources (LCMR) awarded the MPRB a \$300,000 grant for lakeshore restoration in the Chain of Lakes using bioengineering approaches. The grant had to be matched by \$150,000 in local funds.

The lake shore areas of the Minneapolis Chain of Lakes have been impacted by soil compaction, shoreline erosion, urban runoff and loss of riparian plant communities and littoral wetlands. All these impacts have reduced the quality of the park areas and can have a negative impact on lake water quality. This project will undertake lake shore restoration through the use of bioengineering design principles. Bioengineering is a distinct approach to shoreline stabilization and restoration. Bioengineering uses living plant materials in combination with engineering design criteria (such as hydrology, hydraulics, geotechnical and plant ecology) to foster natural processes that reestablish a natural plant community and make it more resistant to stress. Bioengineering solutions provide broad, environmentally responsible products which provide baseline stability and grow stronger and more diverse with age.

The MPRB converted the southwest corner of Lake Harriet, previously a storm sewer outfall delta, into a wildlife area. Staff vegetated the delta islands, installed nesting platforms and perching towers, and planted the eroded lakeshore in native vegetation. Cedar Lake shoreline construction was completed in the Fall of 1999 on the area near the southwest fishing dock. Included in the shoreline restoration was a landing for the milfoil harvesting operations on Cedar Lake.

Planting and site preparation work for wetland and shoreline areas in 1999 included the following:

- Loring Park: With funds donated from Citizens for Loring Park to match a Minnesota Department of Natural Resources (DNR) Conservation Partners Grant, the shoreline at Loring Pond was planted this summer with emergent and wet prairie vegetation. In order to protect these plantings from the large geese and duck popula-

tion at the pond (exacerbated by citizen feeding of these birds), cages were constructed with black poly fencing and installed along the shoreline prior to the plant installation. Depending on the establishment of these plants next season, the fences will be removed either late summer 2000 or early summer 2001.

- Lake of the Isles: A donation to People for Parks funded a wetland garden and shoreline planting. Installed in the fall by volunteers from the University of St. Thomas, this wetland garden featured a selection of wetland edge and wet prairie wildflowers interplanted with sedges.
- Cedar Meadows Wetland: A crew from the Loring-Nicollet-Bethlehem Community Center installed additional plants at the Cedar Meadows Wetland in June 1999.

### **Water Quality Education**

Ongoing education outreach activities included publishing in the local Southwest Journal newspaper, a monthly column entitled, "Think Globally, Act Watershed," that dealt with water quality and environmental education concerns. The column highlighted several CWP project activities and issues and informed residents how their actions can affect water quality. With the newspaper's circulation of 40,000 households in the Chain of Lakes watershed, the column provides an excellent educational opportunity. In addition, monthly news releases focusing on environmental and water quality problems were mailed to more than 250 local media resources including newspapers, radio and television stations.

As part of the CWP's efforts to involve citizens in reducing the amount of trash and litter entering local lakes and streams, the sixth annual Earth Day Watershed Clean-Up was held on Saturday, April 25. More than 1,300 participants cleaned up shoreline and open space areas along the Minneapolis Chain of Lakes, Shingle Creek, the Minnehaha Creek corridor, the Mississippi River corridor, Lake Nokomis and Lake Hiawatha. This marked the first year the CWP partnered with the Mississippi Corridor Neighborhood Coalition to clean up a large area of the Mississippi River watershed area in Minneapolis.

The MPRB continued to lead water quality education activities throughout the city. Staff created and distributed informational materials, attended neighborhood festivals and events, and began a very successful outreach program to Minneapolis schools.

The Minneapolis Parks and Recreation Board was also a partner in two water quality improvement projects: the Lake Harriet Watershed Awareness Project and the Chain of Lakes Clean Water Partnership. Education programs for both of these projects focussed on promoting actions area residents and businesses can take to help improve water quality.



**In 1999, the City of Minneapolis created the Minneapolis Air Quality Management Authority. Toxic air pollutants emerged as a priority for environmental regulators at all levels of government. The city continued to work to address global climate change by promoting energy efficiency and reducing emissions of carbon dioxide and other greenhouse gases.**

### Air Quality

Our air is a resource in the city just as our water and soil. Because air is invisible, most of us take it for granted until we have a problem with odors, emissions or smoke. Three major activities affect air quality in Minneapolis: transportation, energy production, and industry. The annual air quality reports issued by the EPA indicate the city's airshed has seen improvements in all three areas in recent years. This has led to an overall improvement in air quality.

#### Minneapolis Air Quality Management Authority

The city created the Minneapolis Air Quality Management Authority (MAQMA) in 1999 as part of the effort to update the city's forty-year-old air pollution ordinance. The MAQMA is the municipal entity charged with preventing, controlling and regulating sources of indoor and outdoor air pollution within the City of Minneapolis. The MAQMA has developed a highly responsive air quality program that focuses on reasonable regulations; flexible permitting procedures; and an emphasis on pollution prevention, compliance assistance, and proactive enforcement. The MAQMA is 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.

### Air Toxics

Air toxics are a type of air pollution that are of great environmental concern because they are toxic, persistent and they bio-accumulate. Air toxics are chemicals that are known or suspected causes of cancer, neurological changes and reproductive problems. Air toxics may also impair the body's immune function and disrupt endocrine functioning. In addition to human health impacts, air toxics may cause damage to natural ecosystems by negatively affecting population survival, bio-diversity and the sustainability of ecosystems. Since these pollutants are known to have the potential to cause ecological and biological damages, they are worthy of control and regulation.

It is believed that over 60,000 chemicals are currently in commercial use, with approximately 1,000 being added each year. Of these, at least 500 are of great environmental concern due to their:

- toxicity;
- tendency to bio-accumulate;
- presence in detectable quantities in various environmental media; and,
- persistence in the environment.

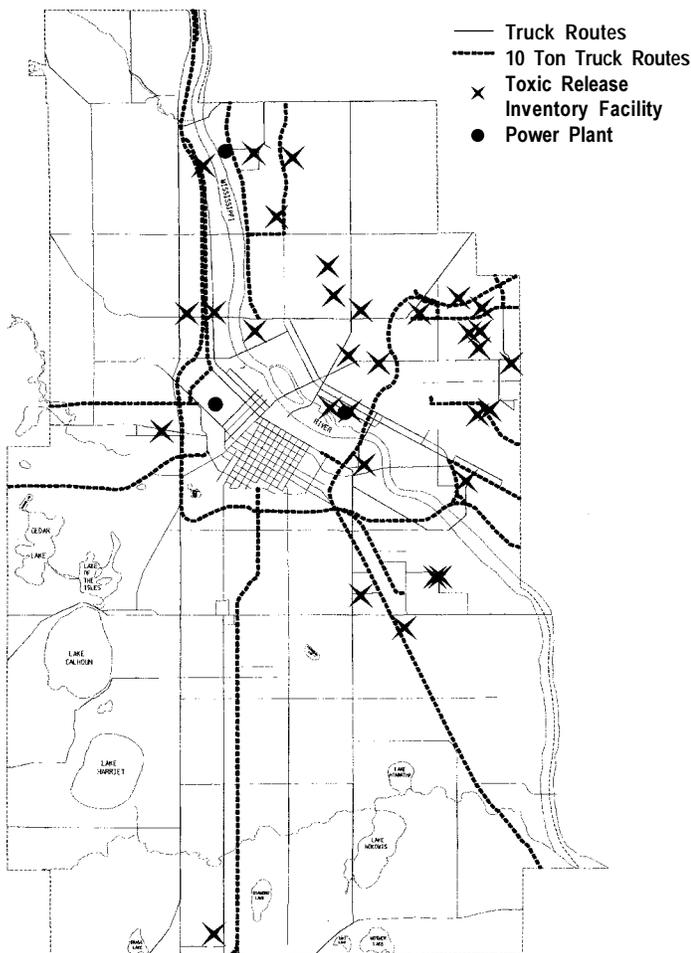
Like Criteria Pollutants (carbon monoxide, nitrogen oxide, sulfur dioxide, particulate matter, lead and ozone), air toxics are emitted from a variety of sources including mobile, stationary and area sources. Since a national, long-term, monitoring-and-emissions-tracking program similar to that for criteria pollutants does not exist for air toxics, little is known about their emissions and ambient air concentrations. The development of comprehensive data on air toxics is complicated by several factors: the number of chemical compounds involved; the number and variety of sources emitting the compounds; the low concentration of some toxics; and the potential for secondary formation of one toxic from other, often less-toxic, compounds.

In the past, federal, state and local environmental agencies focused most of their attention on reducing emissions of Criteria Pollutants from stationary sources such as manufacturing facilities, utilities and waste incinerators. However, recent studies indicate that cars, trucks and other very small sources are responsible for much more of the air toxics pollution problem than was previously believed. For this reason, smart growth and public transportation will be strategies for controlling and reducing toxic air emissions.

EPA annually tracks toxic chemicals emitted by facilities across the country. Individual facilities provide the EPA information regarding the amount and type of air toxins in accordance with the Clean Air Act. In addition to compiling data on the Criteria Pollutant emissions, the EPA updates its Toxic Release Inventory (TRI) of hundreds of toxic chemicals and makes it available to states and cities for strategic planning and resource distribution purposes.

Currently, the Environmental Management Section of the Department of Operations and Regulatory Services uses the TRI report in conjunction with the MN Toxicity Index, developed by the MPCA in 1993, to compare the relative potential effects of chemicals released. By comparing relative toxicity, decisions can be made regarding the best ways to initiate better methods of pollution prevention.

**TOXIC RELEASE INVENTORY FACILITIES  
COMPILED BY THE MPLS. ENVIRONMENTAL SECTION**



While the EPA has the responsibility for developing regulations to control toxic air pollutants from facilities, the Environmental Management Section has adopted new methods for dealing with these facilities. By targeting the chemicals with the greatest potential for harm, the city is placing resources where it has the best chance for significant pollution prevention. In developing pollution prevention partnerships with industrial facilities, Minneapolis is providing educational and technical resources that will result in lower toxic air emissions.

In addition to hazardous or toxic air emissions, the city is also responsible for investigating and resolving complaints regarding nuisance odors and smoke. These problems can arise from many sources including poorly maintained buses and mechanical equipment, restaurant exhaust, industrial processes, and construction activity.

**Energy**

Urban CO<sub>2</sub> Reduction Project Update: In 1991, an agency of the United Nations called the International Council for Local Environmental Initiatives (ICLEI), selected Minneapolis and St. Paul to participate in the Urban CO<sub>2</sub> Reduction Project. The purpose of the

project was to postpone the adverse effects of global climate change. Carbon dioxide (CO<sub>2</sub>) emissions are the primary contributor to global warming, the “greenhouse effect.” The other cities participating in the project included Portland, Oregon; Denver, Colorado; San Jose, California; Dade County (Miami area), Florida; Helsinki, Finland; Copenhagen, Denmark; Hanover and Saarbrucken, Germany; Toronto, Canada; Bologna, Italy and Ankara, Turkey. The chief product of the project was the development of CO<sub>2</sub> reduction plans. In December 1993, the Minneapolis and St. Paul City Councils adopted such a plan, titled A Framework for Developing Strategies to Reduce CO<sub>2</sub> Emissions, Save Taxes, and Save Resources. The plan calls for reducing by 2005 carbon dioxide emissions by 20 percent from 1988 levels, with an intermediate goal of 7.5 percent by 1997.

The plan broke down the CO<sub>2</sub> reduction goals according to the following sectors:

**2005 CARBON DIOXIDE REDUCTION GOALS  
BY SECTOR (TONS OF CO<sub>2</sub>)**

Municipal strategies	117,861	Energy efficiency	2,239,912
Transportation	1,209,223	Energy supply strategies	468,357
Urban reforestation	9,923	Solid waste and recycling	5,954

Total reduction goal: 4,051,230

In response to the Urban CO<sub>2</sub> Project Plan, the Minneapolis City Council adopted the Minneapolis Energy Plan in 1996. The Energy Plan stressed implementation of energy efficiency measures with a payback of ten years or less as the primary implementation tool to postpone the effects of global climate change, save money, and conserve scarce energy resources.

The Environmental Management Section has evaluated some of the measures the city has taken to implement the CO<sub>2</sub> Reduction Plan and the Energy Plan.\* The following describes the reductions in pollutants and the cost savings associated with three of the above sectors from the CO<sub>2</sub> Reduction Plan:

1. Municipal Strategies: A key strategy in the Urban CO<sub>2</sub> Project Plan is for municipalities to serve as examples to the private sector. Currently, the city has three programs to maximize energy efficiency and three additional programs under development:
  - Municipal building and street light retrofits: In conjunction with NSP, the city retrofitted 104 buildings as part of a five-year program to maximize energy efficiency (1994 to 1998).

\* Sources: The city relied on its own consultants for estimates of CO<sub>2</sub>, energy and air pollution reductions for the municipal strategies. For the solid waste and transportation sectors, the city used software developed by the International Council for Local Environmental Initiatives. Estimates are subject to change as new information becomes available

- Minneapolis Public Housing Authority (MPHA): The MPHA strengthened its operational efficiency beginning in May 1997 by improving energy efficiencies at 32 buildings.
- Minneapolis Public Schools (MPS): the MPS has worked in conjunction with the Honeywell Corporation since 1993 to track and increase energy efficiency in city schools.

Summary of Municipal Strategies:

CO <sub>2</sub> Sector Goal	117,861 tons
City Status	51,917 tons
Percent of Goal	290%
Annual Savings	\$5,490,112

2. Transportation Sector: The transportation sector is responsible for the greatest amount of CO<sub>2</sub> emissions. The following describes private and public sector strategies to reduce emissions:

- Street light timers: The city saved substantial amounts of energy when, in 1983, it computerized semaphores throughout the downtown to smooth commuter traffic.
- Car and vanpooling: People who commute primarily via car and van pools comprise about 11 percent of the Minneapolis workforce.
- Public transit: People who commute primarily via transit comprise about 17 percent of the Minneapolis workforce.
- Commuter biking: Approximately 1,000 people commute via bicycle.

Summary of Transportation Sector:

CO <sub>2</sub> Sector Goal	1,209,223 tons
City Status	71,797 tons
Percent of Goal Met	6%
Annual Savings	\$16,152,023

3. Solid Waste and Recycling: City operated and managed solid waste and recycling efforts have contributed to a substantial decrease in CO<sub>2</sub> emissions.

Summary of Solid Waste and Recycling Sector:

CO <sub>2</sub> Sector Goal	5,954 tons
City Status	240,711 tons
Percent of Goal Met	4,043%

Summary of the Three Sectors:

CO <sub>2</sub> Total Goal	4,051,230 tons
City Status	364,425
Percent of Goal Met	9%
Annual Savings	\$21,642,135

Air Pollution Reductions: The above-listed energy efficiency measures have resulted in the following reductions in air pollution in Minneapolis:

Nitrogen oxides (NO <sub>x</sub> ):	586 pounds
Sulfur oxides (SO <sub>x</sub> ):	527 pounds
Volatile organic compounds (VOC):	145 pounds
Carbon monoxide (CO):	1,447 pounds
Particulate matter (PM-10):	42 pounds

Crown Mill Hydropower Project at St. Anthony Falls: On March 1, 1999, the Federal Energy Regulatory Commission (FERC) issued a 50-year license to the Crown Hydro Company to construct, operate and maintain the Crown Mill Project. With the cooperation of the Crown Mill Company, the Minneapolis Parks and Recreation Board is considering municipalizing the Crown Mill Project. The Park Board estimates its use of electricity at a cost of \$1,170,000 for 12.8 million kWh per year. Projected generating capacity for the Crown Mill Project is between 13-17 million kWh per year, enough to cover the MPRB's energy needs at wholesale prices. If this project is enacted, an estimated ten percent of the city's energy portfolio would be renewable. After the 20-year revenue bond is repaid, the city could realize an annual profit between \$500,000 - \$600,000 per year.

**Noise**

Residents who live and work in urban environments are subjected to noise from many sources, generally categorized as construction, mechanical, transportation, and domestic.

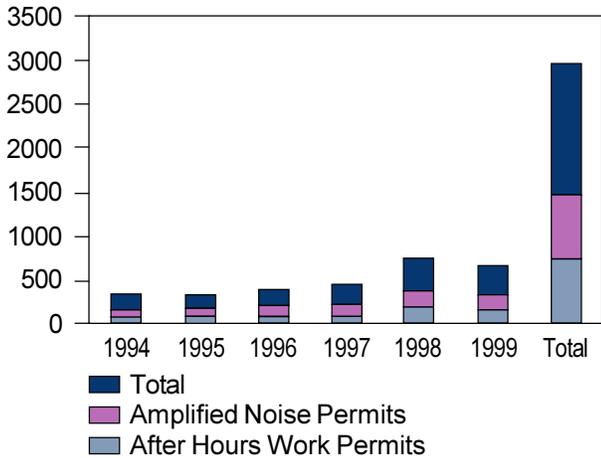
Environmental Management Section Responsibilities: With the exception of airport noise, the Environmental Management Section of the Department of Operations and Regulatory Services monitors noise in the city, responds to complaints involving noise, and works to prevent sources of noise from becoming neighborhood problems.

To address construction and amplified noise, Environmental Management staff issue permits for work done outside of regular business hours. This permit system places controls on noise sources by limiting the level and duration of noise and by imposing other mitigating conditions depending upon the circumstances. Inspectors monitor work and take steps to revoke permits when necessary.

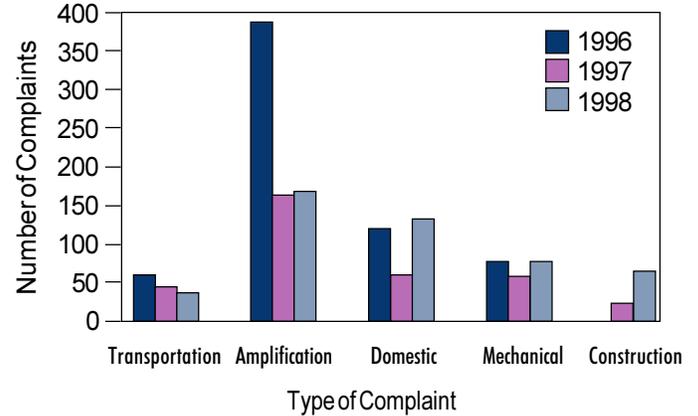
In 1999, the city dedicated a full time Environmental Inspector to develop a comprehensive Noise Control Program working with the Police and Regulatory Services Departments. The program will focus on preventing noise in the first instance, and controlling or moderating it where necessary.

The following chart describes recent trends in noise-related permits.

### NOISE PERMITS



### 1996 - 98 NOISE COMPLAINTS



Mechanical noise complaints generally involve problems with roof or ground mounted mechanical equipment, such as air handling equipment or exhaust systems. These problems are mitigated through regulatory orders. Corrective action varies by situation, but most commonly involves adjustment or relocation of equipment or installation of sound barriers. When necessary, equipment usage hours are restricted.

Transportation complaints are among the most difficult to resolve due to the mobility of the noise source and the complexity of intergovernmental relations. Complaints generally involve motorcycles, trucks and buses, but can also involve automobiles. These problems are resolved through contact with owners and appropriate agencies, such as MnDOT, Metro Transit, and the city's Public Works, and Licenses and Consumer Services Departments. Typical domestic noise issues arise over radios and stereo systems, dog barking, chainsaws, leaf blowers, lawnmowers, and snow blowers.

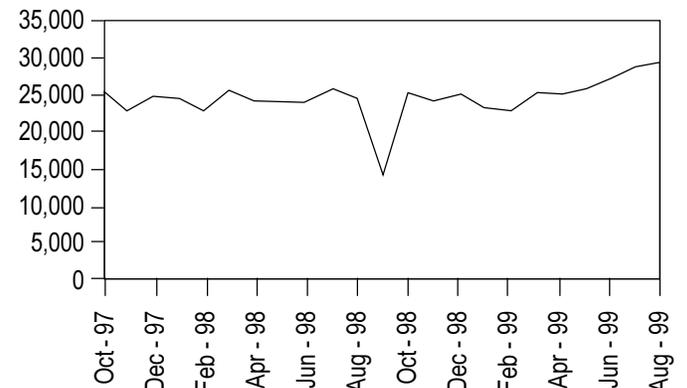
In 1998, the Minneapolis City Council passed amendments to the 1997 noise ordinance to more adequately address the problem of noise pollution. Staff worked on gathering information from throughout the country. The ordinance states that it is unlawful for any person to make, continue, permit, or cause to be made or continued within the city, any loud, disturbing or excessive noise which would be likely to cause significant discomfort or annoyance to a reasonable person of normal sensitivities present in the area.

The dramatic reduction in noise complaints from 1996 to 1997, as shown in the following chart, is attributable to a significant decrease in 'boom car' complaints that resulted from greater Police enforcement activity. 'Boom car' noise had been increasing over a number of years, not only in Minneapolis but across the country, and became a major issue in the city in 1996. Environmental Management staff held many meetings with representatives of the Police Administration, the Police Precincts, 911 program administrators, and the Park Police, and worked closely with the City Council to target this type of noise. This collaboration resulted in greater enforcement and a major reduction in complaints.

**Airport Noise:** Airport noise is a significant problem for Minneapolis residents. However, the City of Minneapolis has no direct regulatory authority related to airport noise and therefore has only a limited role in its control. The city's primary role is as an advocate for measures to reduce noise impacts.

A 1998 pilot's strike against Northwest Airlines caused a considerable increase in reports of outdoor activities induced by quieted skies, juxtaposed with stories of delays, hardships, and severe economic consequences.

### MSP AIRPORT: ARRIVALS AND DEPARTURES (major airlines only)

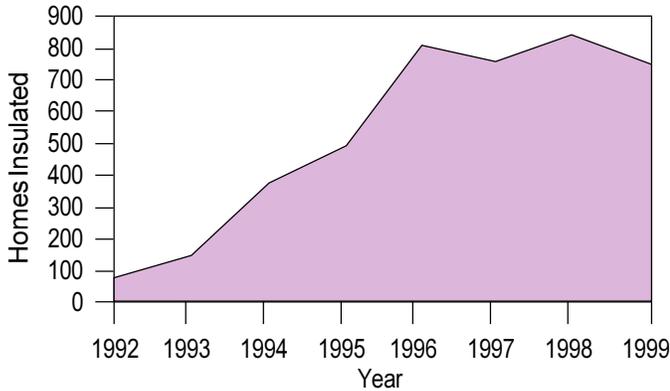


**Sound Insulation Program:** One strategy for ameliorating airport noise is sound insulation of structures. The city is participating in the Part 150 Sound Insulation Program for residential structures in the high impact noise area close to the airport. The program is meant to preserve and improve neighborhoods while making the internal environment of a home more compatible with exterior aircraft noise. Treatment methods address noise infiltration through doors, windows, walls and roofs. The goal is a five-decibel reduction in sound for habitable rooms, approximately equal to doubling the distance of the aircraft from the home's roof. Eligibility for the program is determined on the basis of a periodically updated, five-year projected day/night noise level. Funding for the program is from airport and airline generated funding sources. No general, property or income taxes are used for the program.

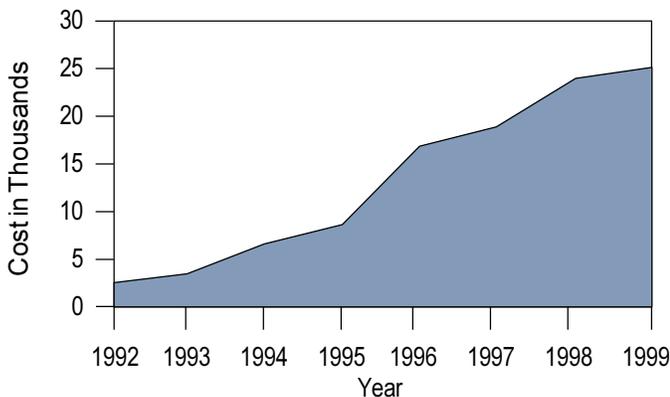


In Minneapolis through 1999, a total of 4,282 homes have been completed at a cost of \$105.5 million as follows.

**MAC PART 150 SOUND INSULATION PROGRAM:  
MINNEAPOLIS**



**MAC PART 150 SOUND INSULATION PROGRAM:  
MINNEAPOLIS**



The totals for other affected cities are as follows by 1999:

City	No. of Homes Completed	Cost
Richfield	641	\$ 13.4 million
Eagan	185	\$ 3.7 million
Bloomington	158	\$ 3.2 million
Mendota Heights	86	\$ 1.8 million
Subtotal	1,070	\$ 22.1 million
Minneapolis	4,282	\$105.5 million
<b>TOTAL</b>	<b>5,352</b>	<b>\$127.6 million</b>

**Nationally, most attention and resources tend to focus on preparedness and response, because of perceptions regarding imminent, dramatic threats to public safety. The City of Minneapolis, in addition to maintaining highly developed preparedness and response functions, has been moving toward a prevention strategy by providing education, technical assistance, facilitation and regulatory oversight.**

### Minneapolis Emergency Plan

The City of Minneapolis has a well-developed and effective emergency plan that details the city's planned responses to a range of emergency scenarios. In 1998, the city responded to incidents involving straight-line winds, flooding, hail storms, and chemical accidents. As recently as ten years ago, the city experienced a major drought.

For every natural disaster, environmental emergency or accident, it is helpful to identify four stages that constitute the "life cycle" of the event: prevention, preparedness, response and recovery:

- **Prevention:** Prevention activities are those that either prevent the occurrence of an emergency or reduce the community's vulnerability in ways that minimize the adverse impact of a disaster or other emergency.
- **Preparedness:** Preparedness activities, programs, and systems are those that exist prior to an emergency and are used to support and enhance response to an emergency or disaster. Planning, training, and exercising are among the activities conducted under this phase.
- **Response:** Response involves activities and programs designed to address the immediate and short-term effects of the onset of an emergency or disaster, reduce casualties and damage, and speed recovery. Response activities include direction and control, warning, evacuation, and other similar functions.
- **Recovery:** Recovery is the phase that involves restoring systems to the normal state. Short-term recovery actions are taken to assess damage and return vital life-support systems to minimum operating standards. Long-term recovery actions may continue for many years.

### Hazardous Materials

Although the State of Minnesota bears direct regulatory responsibility for toxic chemicals by agreement with the U.S. Environmental Protection Agency (MN Department of Agriculture for pesticides, MN Pollution Control Agency and Department of Public Safety for others), local governments also play an important role in the regulatory process through city codes regulating zoning, environmental matters, and fire.



The city faces relatively fewer threats from toxic chemicals than other more industrialized areas of the country. Yet, there is potential threat to public safety. The focus tends toward commercial and industrial users of pesticides and other toxic chemicals, but domestic consumers are frequently the eventual markets for products made through chemical processes. The cumulative impact of hazardous product use by households is enormous. Exposure from accidental or permitted releases from toxic chemicals, including pesticides, ought to be prevented or minimized as a matter of public policy. It is important to realize toxic chemicals used in the community must be safely used and stored, and when possible, replaced with safer alternatives.

**People enjoy the urban environment in Minneapolis for the high quality of all of the features discussed earlier in this chapter, and also for its built environment and urban character.**

Two important organizations are actively involved in improving the quality of the city's built environment through efforts related to design and heritage: the Heritage Preservation Commission (HPC) and the Committee on Urban Environment (CUE). They provide assistance and recommendations and are involved in educational and outreach efforts to increase awareness of preservation, stewardship, and improvement of the urban environment.

### **Heritage Preservation Commission**

The Minneapolis Heritage Preservation Commission (HPC) is a ten-member, citizen advisory body to the Minneapolis City Council. The primary duties of the HPC are to evaluate the architectural and historic significance of buildings, landscapes, districts, and sites; recommend buildings, districts, and sites for local historic designation; review all building, sign, awning, and demolition permits for designated buildings; and increase public awareness about preservation.

Between 10/1/98 and 9/31/99, the HPC reviewed 51 building permits, 12 sign permits, 10 demolition permits, 1 moving permit, and 10 pre-permit reviews. The HPC also recommended two use variances. In the same period, HPC staff approved 87 Certificates of No Change (CNC) for minor repair work and approved 479 demolition permits. The number of building permit reviews and CNCs were up considerably from previous years.

In 1999, the HPC continued to offer its many educational and outreach programs. In May, the HPC sponsored Heritage Preservation Week. Activities included walking tours, lectures, a luncheon, and the annual Preservation Awards Ceremony. Additionally, the HPC hosted summer walking tours and winter home tours. The HPC obtained a grant from the State Historic Preservation Office to research and develop historic contexts for downtown and the southern half of the city. The HPC recommended approval of the Nokomis-Knolls Historic District, which was listed on the National Register of Historic Places in August, 1999.

### **Committee on Urban Environment**

The Committee on Urban Environment (CUE) was formed in 1968 to foster improvement of the natural and built environment in Minneapolis. CUE is a citizen advisory committee with 29 members appointed by the Mayor, City Council President, and various agencies. CUE's role is to assist the Minneapolis Arts Commission and the Heritage Preservation Commission and advise and inform both public and private entities.

In 1999, CUE launched a campaign to support and promote the Minneapolis Beautiful Initiative, a new program intended to invigorate the city by celebrating the high quality of life in Minneapolis, and stimulate innovative and exemplary projects.

CUE continues to be a leader in encouraging beautification and stewardship. 1999 activities included a record number of nominations for Blooming Boulevard Awards, Winter Wonder Awards, Arbor Day, and Minneapolis Blooms! Day.

CUE Awards are intended to promote and support design excellence.

### 29<sup>TH</sup> ANNUAL CUE AWARDS (1998)

#### Project

Anodyne Coffeehouse  
 Basilica of Saint Mary Restoration  
 Blooming Boulevards Awards Program  
 W. Paul Farmer, former Director of the  
 Minneapolis Planning Department  
 David Fisher, former Superintendent of the  
 Minneapolis Parks and Recreation Board  
 Fourth Avenue Bridge  
 Grand Re-Opening of the Crystal Court at the IDS Center  
 Great River Road Completion  
 Lake Calhoun and Lake Harriet Improvements  
 Lakewood Cemetery Chapel Restoration  
 Linda Mack, Staff Writer, Minneapolis Star Tribune  
 Loring Park Formal Garden and Superintendent's Office  
 Minneapolis Police Department Fifth Precinct Building  
 R.F. Jones (Longfellow) House  
 Rebecca Yanisch, former MCDA Executive Director  
 Thomas Lowry Park  
 University of Minnesota Preservation Plan

#### Location

4301 Nicollet Avenue South  
 88 North 17<sup>th</sup> Street  
 Neighborhood Environment Committee  
  
 Fourth Avenue South & 29<sup>th</sup> Street  
 80 South 8<sup>th</sup> Street  
 West River Parkway  
 Lake Harriet/Calhoun  
 3600 Hennepin Avenue  
  
 Loring Park  
 3101 Nicollet Avenue  
 Minnehaha Park  
  
 Lowry Hill  
 Master Planning Office, University of Minnesota-Twin Cities/  
 Landscape Research/Hokanson-Lunning Assoc.