

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Executive Summary*

---

### I. Executive Summary

**NOTE ABOUT THIS DRAFT:** The draft Annual Report is being distributed to neighborhood organizations, watershed organizations, the Citizens Environmental Advisory Committee (CEAC) and numerous other interested parties for their review and comment. A public hearing is being held on Tuesday, June 5 at 9:30 AM in Council Chambers of City Hall, 350 South Fifth Street, at the meeting of the Transportation & Public Works Committee of the City Council. Written comments are being accepted until Noon on Friday, June 22. After June 22 this annual report will be finalized, for submission to the MPCA on June 30, 2012.

#### **Report Objective**

This report is prepared in compliance with the requirements of NPDES (National Pollutant Discharge Elimination System) Permit No. MN0061018 issued on December 1, 2000. The Permit was reissued in January 2011, and a new Stormwater Management Program was submitted to the Minnesota Pollution Control Agency (MPCA) on September 28, 2011 as required under the new permit, however this Annual Report on 2011 activities is being submitted in compliance with the requirements of the December 2000 version of the Permit.

#### **Background**

The National Pollutant Discharge Elimination System (NPDES) program was created in 1990 by the United States Environmental Protection Agency (EPA) to safeguard public waters through the regulation of the discharge of pollutants to surface waters including lakes, streams, wetlands, and rivers. The Minnesota Pollution Control Agency (MPCA) is the local authority responsible for administering this program. Under this program, specific permits are issued to regulate different types of municipal and industrial activities.

This report is prepared in compliance with the requirements of the MPCA NPDES and State Disposal System (SDS) Permit MN0061018 which is a Municipal Separate Storm Sewer System (MS4) Phase I permit issued to City of Minneapolis (City) and the Minneapolis Park & Recreation Board (MPRB) as co-permittees on December 1, 2000. In January 2011, the MPCA re-issued Municipal Separate Storm Sewer System (MS4) NPDES Permit No. MN0061018 to the City of Minneapolis and the Minneapolis Park & Recreation Board (MPRB) as co-permittees in January 2011. The Permit requires the implementation of approved stormwater management activities, referred to as Best Management

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Executive Summary*

---

Practices (BMPs). A new Stormwater Management Program (SWMP), documenting the BMPs the City and the MPRB have or will put in place for the re-issued 2011 permit, was submitted to the MPCA for approval on September 28, 2011, as required.

The Minneapolis NPDES Stormwater Management program is developed and administered by the City and MPRB departments/agencies that are responsible for permit activities. Primarily included are the City's Public Works and Regulatory Services Departments and the MPRB. These stakeholders are jointly responsible for the completion of the required Permit submittals. Public Works provides program management and completes each Annual Report.

This Report provides documentation and analysis of the activities conducted during the previous year, 2011. Public input into the development of the priorities and programs is required, as is adoption by City Resolution of the Annual Report.

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Storm Drain System Operational Management and Maintenance*

---

### II. Storm Drain System Operational Management and Maintenance

#### **Program Objective**

The objective of the NPDES stormwater management program is to minimize the discharge of pollutants through the proper operational management and maintenance of the City's storm drain system.

Targeted pollutants include:

- Sediment
- Nutrients
- Floatable Garbage

#### **Program Overview**

The City's storm drain system is operationally managed and maintained by the Operations section of the Public Works Department Surface Water and Sewers Division. Design engineering and regulatory issues are managed by the division's Capital and Regulatory sections.

The current authorized staffing level of the Operations section is approximately 71 full-time employees. Of these, there are currently 64 permanent, full-time and 11 seasonal employees working directly within the operations and maintenance area, and the remainder work within the construction area. General operations and maintenance efforts include pump station and pipeline inspections, pipeline cleaning, system repairs, rehabilitation or reconstruction, inspection and operation of control structures, operation of pump stations, cleaning of water quality structures, and operational management of stormwater detention ponds.

The table below shows the base operational functions along with the corresponding staffing:

Crews	Staff/crew	Type	Tasks
4	2	Route Truck	Daily pipe line system inspections, complaint response, and resolution to minor system operational problems
6	2	Jet Truck	"As-requested" cleaning of storm system components, routine cleaning of sanitary system pipes, and "as-requested" cleaning of pump/lift stations. Hydro jet-wash technique.
3	2	TV Truck	Televise and inspect storm drain and sanitary sewer system components. Log and assess condition of televised lines to determine and prioritize rehabilitation and/or repair needs to storm drain and sanitary sewer system components.
2	2	Repair Truck	Perform medium-sized repairs, requiring minimum excavation, to storm drain and sanitary sewer system pipeline components. May assist in the repair or reconstruction of larger repair/ reconstruction jobs.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Storm Drain System Operational Management and Maintenance*

---

3	2	Vacuum Truck	Vacuum-cleaning of water quality structures, manholes, and catch basins within the storm drain system. Assist in sanitary sewer cleaning by vacuum removal of sludge and debris build-up. Assist in repair/ construction activities using vacuum excavation process. Assist in erosion control compliance using vacuum cleanup of eroded soils and/or cleaning of erosion control structures.
1	2	Rod Truck	Remove roots and foreign objects from sanitary sewer system. Remove large debris from storm drain pipes and free ice from frozen catch basin leads.
2	1	Pond & Pump	Operate, maintain, and repair sanitary lift station and stormwater pump stations. Operate and maintain stormwater detention basins.
1	1	Shop	Perform general maintenance and repair to specialty use vehicles and emergency response equipment. Fabricate, as needed, custom metal and wood objects for sewer and storm drain operations. Provide field deliveries of materials, tools, and equipment. Maintain material inventory and fleet management data.

### **Previous Year Activities**

Some of the noteworthy 2011 cleaning and repair statistics are summarized in the following list:

- Responded to 315 complaints of plugged or backed-up catch basins
- Responded to 37 complaints of cave-ins around catch basins and manholes
- Performed 211 minor repairs to storm drain lines, catch basins or manholes
- Cleaned 1.62 miles of storm drain utilizing hydro-jet washing
- Televised and condition assessed 2.65 miles of storm drain pipe line
- Performed baseline inspection of 84,172 feet of deep stormwater drainage tunnels
- Repaired 200 feet of storm tunnel

Work on the 10<sup>th</sup> Avenue SE tunnel continues, which will improve the condition of the structure and reduce erosion of the sandstone outside of the tunnel. This will decrease transport of Total Suspended Solids to the Mississippi River.

### **Performance Measures**

- Miles of storm drain televised in 2011: 2.65 miles
- Miles of storm drain cleaned in 2011 utilizing hydro-jet washing: 1.62 miles

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Structural Controls Operational Management and Maintenance*

---

### III. Structural Controls Operational Management and Maintenance

#### **Program Objective**

The objective of this NPDES MS4 stormwater management program is to minimize the discharge of pollutants through the proper operational management and maintenance of the City's storm drain system. Within the City's storm drain system are structural controls that affect system flow rates and water quality discharges.

#### Structural controls include:

- Grit Removal Chambers
- Outfall Structures
- Pump Stations and Level Control Weirs
- Stormwater Ponds, Stormwater Wetlands and Bio-(in)filtration (Rain Gardens)
- Catch Basins

#### Targeted pollutants include:

- Sediment
- Nutrients
- Floatable Garbage

#### **Program Overview**

Structural controls that are part of the City's overall storm drainage system are operationally managed and maintained by the Operations section of the Public Works Surface Water & Sewers Division. These components are routinely inspected and maintained to ensure proper operation and reliability. Frequency of inspections and assigned maintenance efforts are based on both operational experience and incurred environmental events. Structural controls are separated into five separate categories:

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Structural Controls Operational Management and Maintenance*

---

### **1. Grit Removal Structures**

These are devices that have been installed for sediment, debris, and oil collection. The City continues with its effort to increase the number of grit chambers installed. The devices are inspected in the spring and fall of each year, and then cleaned, if required. The amount of sediment removed, the presence of floatables, and the dates that devices were cleaned are recorded on log sheets, and then added to a database. Appendix A35 contains a list of these devices, and maintenance dates.

### **2. Storm Drain Outfalls**

These are the structural ends of system pipelines where conveyance of stormwater runoff is discharged into receiving water bodies. Outfalls are inspected on a 5-year schedule where 20% of the outfalls are inspected each year. Site inspections evaluate the general condition of structures, determine if any significant erosion has occurred and observe any contaminant discharges. When indications of illicit or otherwise contaminated discharges are observed, they are immediately reported to Minneapolis Regulatory Services for reporting to the Minnesota Duty Officer and for further investigation and resolution. Any identified structural repair or maintenance work is prioritized and scheduled within the constraints of available personnel, budget funding, and coordination with other essential operations. Appendix A36 contains maintenance information for these devices.

### **3. Pumps & Weirs**

These are structural devices that mechanically affect the flow of stormwater runoff through the storm drain system. Pump stations are inspected on a regular basis for routine operational checks and are inspected annually for detailed condition assessment. Maintenance and/or repairs are performed with routine items being completed as needed and larger items being coordinated into a budgeted pump station operation program. Weirs and outlet structures are inspected and repaired as needed to facilitate their proper operational working order.

### **4. Ponds and Bio-(in)filtration (Rain Gardens)**

These are structural devices that detain stormwater runoff and improve the water quality. They are regularly maintained for volume and functionality, and also for their park-like amenities including native plantings, turf grass, pathways, benches, and lighting. Based on current level of experience, the need for dredging of sediment buildup appears to be in a 15- to 20-year cycle. At present, only a few of the City's holding ponds are at or near this age such that the need for sediment removal from them is considerable.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Structural Controls Operational Management and Maintenance*

---

#### **5. Catch Basins**

These are structural devices located along the City's street system that provide entrance of stormwater runoff into the storm drainage system. There is no formalized inspection schedule, however Surface Water & Sewers crews and Street maintenance crews both routinely look for plugged or damaged structures. Reported damages and/ or plugs are given a priority for repair and/or cleaning. Cleaning catch basins, while ensuring proper runoff conveyance from City streets, also removes accumulated sediments, trash, and debris. Augmenting this effort is the street sweeping program carried out by the Street maintenance section that targets the pick-up of street sands, leaves, and debris prior to their reaching catch basins. Repair of damaged catch basins is also a priority, given their location in city streets and ultimate impact to the traveling public.

#### **Previous Year Activities**

- Monitored and maintained 25 pump stations.
- Performed 123 grit chamber inspections on 120 individual structures (some were inspected more than once). Performed 122 cleanings on 96 of the structures (some were cleaned more than once, some did not need cleaning). A total of 263.5 cubic yards of material was removed from grit chambers. The majority of the grit chambers are both maintained and owned/operated by Public Works, however some are owned and operated by others, but cleaned by Public Works under contract.
- Maintained 11 stormwater holding ponds
- Inspected 77 of 387 storm drain outfalls in 2011 inspection program. Of the 77 outfalls inspected, 5 were found to be in need of repair or maintenance.

#### **Performance Measures**

Structures operated and maintained annually:

- 25 pump stations
- 11 stormwater holding ponds
- 123 grit chamber cleanings

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Disposal of Removed Substances*

---

### IV. Disposal of Removed Substances

#### **Program Objective**

The objective of this NPDES MS4 stormwater management program is to minimize the discharge of pollutants through the proper operational management and maintenance of the City's storm drain system. A key component is the collection and disposal of targeted pollutants in a manner that will prevent pollution and that will comply with applicable regulations. Targeted pollutants include:

- Sediment
- Nutrients
- Floatable Garbage

#### **Program Overview**

Targeted pollutants are collected from grit removal structures, catch basins, system piping, detention ponds, and deep drainage tunnels. Removed substances are screened for visual or olfactory indications of contamination. If contamination of the material is suspected, the Engineering Laboratory will select representative samples for an environmental analysis. Contaminated substances are disposed of in a landfill or another site that is approved by the Minnesota Pollution Control Agency (MPCA). Non-contaminated targeted pollutants are disposed of the same way as street sweepings, as reported in **Section VI. Roadways**. During cleaning and disposing operations, erosion control measures are applied when needed to prevent removed material from re-entering the storm drain system.

#### **Previous Year Activities**

Approximately 263.5 cubic yards of sediment and debris were removed from storm drain system facilities by Minneapolis Public Works crews in 2011. Minneapolis Public Works maintains the city's system and also facilities for other agencies, such as Hennepin County and the Minnesota Department of Transportation. The removed material consisted primarily of sand and vegetative matter collected from grit removal chambers. See **Section III. Structural Control Operational Management and Maintenance** for operation and maintenance details.

#### **Performance Measures**

- Quantity of materials removed: 263.5 cubic yards
- Surface Water & Sewers Operations responded to, and subsequently mitigated, zero contaminated substance/ hazardous waste spills in 2011.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Stormwater Management for New Developments and Construction*

---

## V. Stormwater Management for New Developments and Construction

### **Program Objective**

The objective of this stormwater management program is to minimize the discharge of pollutants through the regulation of construction projects and new developments. Regulation includes erosion and sediment control, and approval of stormwater management including ongoing operation and maintenance commitments. Targeted pollutants include:

- Phosphorus
- TSS<sup>1</sup>

### **Program Overview**

Minneapolis Code of Ordinances, Title 3, Air Pollution and Environmental Protection, Chapter 52 (Erosion and Sediment Control and Drainage) and Chapter 54 (Stormwater Management), contain erosion and sediment control requirements and stormwater management instructions for new developments and other land-disturbing construction activities.

### ***Site Plan Review***

Construction activities and new development projects are reviewed through the City's site plan review process. The Minneapolis Development Review (MDR) section of the Regulatory Services Department facilitates this process where a Development Coordinator directs a preliminary, multi-disciplinary review of the submitted plans. This review provides comments that are integrated into a final plan submittal that is subsequently routed to the City's Licensing, Building Plan Review, Fire, and Community Crime Prevention units, and to the Public Works Department (Street, Traffic, Sidewalk, Water, Right of Way, and Surface Water & Sewers sections), for review of compliance issues. The Surface Water & Sewers Division reviews project plans for compliance with the Minneapolis Erosion & Sediment Control Ordinance (Minneapolis Code of Ordinances [MCO] Chapter 52), Stormwater Management Ordinance (MCO Chapter 54), and flooding and capacity issues.

---

<sup>1</sup> Total Suspended Solids

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Stormwater Management for New Developments and Construction*

---

#### ***Erosion Control***

##### **Ordinance**

In 1996 the Minneapolis City Council amended Title 3 of the Minneapolis Code of Ordinances relating to Air Pollution and Environmental Protection by adding Chapter 52, entitled *Erosion and Sediment Control for Land Disturbance Activities* (now *Erosion and Sediment Control and Drainage*). The ordinance was designed with the intent of regulating topsoil disturbances, thus limiting soil from entering the storm drain system.

##### **Requirements**

The ordinance addresses development sites, demolition projects, and other land disturbing activities. Sites disturbing more than five cubic yards, or 500 square feet, are required to have an erosion control permit. Erosion & Sedimentation Control (ESC) Permits must be acquired prior to commencement of work, and must be obtained before a building permit will be issued for the site. If there will be a disturbance of greater than 5,000 square feet, demolition and construction sites also require an approved erosion control plan before the ESC Permit can be issued.

##### **Enforcement**

Ongoing site inspections are performed by Regulatory Services inspectors. Inspectors may issue citations. Failure by the permittee to comply with the ordinance will constitute a violation (pursuant to Section 52.300). If there is a demonstrated failure to comply, the City reserves the right to terminate an ESC permit at any time. The City then has the option of proceeding with the necessary restoration of the site. This restoration would be done at the expense of the owner/permittee.

#### ***Ongoing Stormwater Management (following completion of construction projects)***

##### **Ordinance**

In 1999 the Minneapolis City Council amended Title 3 of the Minneapolis Code of Ordinances (relating to Air Pollution and Environmental Protection) by adding Chapter 54, which is entitled *Stormwater Management*. The ordinance establishes requirements for permanent stormwater management for projects on sites that are greater than one acre.

##### **Plan Review**

Stormwater management plans are required for all construction projects on sites greater than 1 acre in size. These plans are reviewed through the Minneapolis Development Review (MDR) process and approved by the Minneapolis Public Works Surface Water & Sewers Division. Sites less than 1 acre are also encouraged to incorporate stormwater BMPs in their design as a means of satisfying other city codes such as green space requirements.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Stormwater Management for New Developments and Construction*

---

#### **Registration**

Stormwater devices are registered with the City of Minneapolis Department of Regulatory Services, with an annual permit required for each stormwater device registered. An annual maintenance and inspection program is included in the permitting process.

#### **Goals**

The Minneapolis Stormwater Ordinance specifies that stormwater management standards be set according to the receiving water body. These standards include but are not limited to:

- Reductions of TSS for discharges to all receiving water bodies
- In addition to TSS, controlled rate of runoff for discharges to streams, areas prone to flooding, and areas with infrastructure limitations
- In addition to TSS, a reduction in nutrients for stormwater that discharges to lakes and wetlands
- Provision for on-site, off-site, or regional stormwater facilities
- Maximizing infiltration by minimizing the amount of impervious surface
- Employing natural drainage and vegetation

#### **Previous Year Activities**

##### ***Site Plan Review***

During 2011, Minneapolis Public Works took part in the preliminary review of 109 site plans. Of those 109 site plans, 77 received final approval with the appropriate permits issued. Continued attention to erosion control plan submittals along with increased awareness in the industry provided for better compliance during site inspections.

##### ***Erosion Control***

Increased awareness of the ordinance, improving plan submittals and a continued compliance-based inspection program resulted in a continued rise in compliance. A summary of the 2010 inspections is as follows:

- 367 permits issued
- 2300 site inspections completed
- Successfully responded to all public complaints (number not tracked)

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Stormwater Management for New Developments and Construction*

---

- 142 enforcement actions issued for site compliance on 128 sites
- 83 Code Violations
- 32 citations for non-compliance after enforcement action
- Coordinated inspections with Minnehaha Creek Watershed District (MCWD)

#### ***Ongoing Stormwater Management***

Redevelopment of existing sites provides an opportunity to lessen the impacts of urbanization on the Mississippi River and other Minneapolis water resources. During 2011, 88 Stormwater Best Management Practices (BMPs) were installed on sites reviewed through the Minneapolis Development Review process. BMP types included:

- Rain gardens
- Pervious pavement
- Infiltration areas
- Ponds
- Green roofs
- Underground infiltration chambers/pipe galleries
- Underground storage/detention chambers
- Proprietary filter chambers
- Vegetated swales

These BMPs will provide rate control and water quality for approximately 100 acres of land, including 60 acres of impervious area.

#### **Performance Measures**

Current performance measures include:

1. Number of sites captured in 2011 under Stormwater Management Ordinance: 37
2. Number of erosion control inspections in 2011: 2300
3. Number of sites with permanent stormwater devices registered for annual compliance program: 250

*Roadways*

---

## VI. Roadways

### **Program Objective**

The objective of this stormwater management program is to minimize the discharge of pollutants through the proper operation and maintenance of public streets, alleys, and municipal equipment yards.

Targeted pollutants include:

- TSS<sup>2</sup>
- BOD<sub>5</sub><sup>3</sup>
- COD<sup>4</sup>
- Phosphorus
- Chlorides

### **Program Overview**

#### ***Street Sweeping***

Minneapolis employs several street sweeping approaches in Minneapolis. Some are citywide, and some vary by area or land use. Curb-to-curb sweeping operations occur citywide every year in the spring and fall. At those times, all City streets and alleys are swept systematically, and temporary parking bans are enforced to aid with sweeping operations. Operational routines and special methods are employed to address seasonal conditions, and to optimize cleaning. Flusher trucks apply pressurized water to the streets in an effort to push sediment and debris to the gutters. Street sweepers follow behind the flusher trucks and clean the gutters. During the fall, leaves are first bunched into piles, and then the leaves are picked up before flushing and sweeping occurs. During the summer, between the spring and fall sweep events, sweepers are assigned to maintenance districts for periodic area sweeping. Downtown and other high traffic commercial areas are swept at night on a weekly basis. In addition, summer sweeping in the Chain of Lakes drainage areas has occurred since 1995 as part of the Clean

---

<sup>2</sup> Total Suspended Solids

<sup>3</sup> Biochemical Oxygen Demand of wastewater during decomposition occurring over a 5-day period

<sup>4</sup> Chemical Oxygen Demand

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Roadways*

---

Water Partnership project. Two sweepers are dedicated to cleaning drainage areas around the Chain of Lakes, and one sweeper is devoted to the Minneapolis Parkway System.

The materials collected from Street Sweeping are received at two different locations, based on time of the year and nature of the material. The inorganic materials go to a construction demolition landfill site in Becker, Minnesota, to be used as daily cover. A five-year 2008 contract states that the organic materials, which are collected mostly in the fall of the year, go to Carver County Minnesota to be composted and converted to a retail mulch material that is then distributed by a company called Organic Technologies.

#### **Snow and Ice Control**

The Street Maintenance section applies salt and sand to City roadways every winter for snow and ice control. Efficient application of de-icing materials is sought to reduce costs, required maintenance, and environmental impact. The most obvious cost savings is realized in a reduction of the overall amount of materials used. Salt is harmful to groundwater and to most plant and tree species. Salt causes corrosive damage to bridges, reinforcement rods in concrete streets, metal structures and pipes in the street, and vehicles. Sand harms lakes and streams by disturbing the ecosystems, and in depositing pollutants that bind to sand particles in lake bottoms and streambeds. An accumulation of sand calls for more frequent cleaning of catch basins and grit chambers. In 2007, the EPA approved a Total Maximum Daily Load (TMDL) study that places limits on chlorides (salt) discharged to Shingle Creek which had been assessed as impaired for chlorides. Consequently, the City developed improved snow and ice control practices, and they are being implemented not only in the Shingle Creek drainage area but also citywide. Maintenance supervisors are trained in winter maintenance techniques through sessions that are sponsored by the Local Road Research Board (LRRB), a training partnership of Mn/DOT and the University of Minnesota. Specific topics covered include guidelines for sand and salt application rates that are based on weather conditions, application techniques, and spreader calibration. Plans for future training sessions will include those actual equipment operators. Material spreaders are calibrated annually before the winter season. Maintenance yard housekeeping practices are designed to minimize salt/sand runoff. The materials that are used are tallied on a daily basis.

#### **Storage of De-icing Materials**

Salt stockpiles are stored under cover to minimize potential groundwater contamination and runoff. Opened in Summer 2010, a new maintenance facility constructed at Hiawatha Avenue and E. 26<sup>th</sup> St. consolidated some stockpile activities. The storage shed at the 44<sup>th</sup> St. E. & Snelling Ave. maintenance yard is closed. For its permanent facilities, the new maintenance yard employs runoff

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Roadways*

---

collection systems installed around salt and sand stockpiles. Two temporary storage locations are scheduled to be eliminated when funding is available from the sale of several city facilities.

#### **Previous Year Activities**

The 2011-2012 winter season was warmer, with numerous minor snow events. There were 17 notable events with 22.2 inches for the season, as compared to an average of 48 inches. The most snowfall was observed in February. There were zero declared snow emergencies, as compared to an average of 3, and there were 115 days of snow and/or temperatures below freezing. The quantities of salt and sand used in snow and ice control are tracked by recording amounts that are delivered by suppliers, and also by estimating the quantities that are on-hand on a daily basis. Street sweepings are scaled at the disposal site and reported to the City for record purposes only. Leaves picked up are weighed at certified scales that are located at City facilities in Minneapolis. The statistics for last year's program are as follows:

- 7,832 tons of salt applied to roadways
- 7,933 tons of sand applied to roadways
- 18,800 tons of materials reclaimed during spring and summer street sweeping operations
- 4,232 tons of leaves collected for composting during the fall City-wide sweeping
- 22 staff members attended an eight-hour refresher for the 40-hour hazardous materials training class
- 51 staff members attended training on the use of salt as presented by LTAP MnDOT trainers
- All division shift-staff attended the annual review of procedures. The review covers the recognition and response to hazardous materials or situations.

#### Performance Measures

- Amount of materials recovered as a percentage of materials applied: 119%
- Amount of salt and sand applied relative to total snowfall: 710 tons/inch

## VII. Flood Control

### **Program Objective**

The objective of the Minneapolis stormwater management program is to design flood control systems that manage stormwater quantities so that the runoff does not exceed the capacity of the existing facilities while minimizing the impacts on the water quality of the receiving water body. Targeted pollutants include:

- Phosphorus
- Total Suspended Solids (TSS)

### **Program Overview**

In July 1997, Minneapolis experienced torrential rainstorms that exceeded the capacity of the City's existing storm drain system and caused flooding throughout the City, causing physical damage to homes, businesses & vehicles. In response, Minneapolis Public Works established the Flood Mitigation Program to develop potential solutions and a plan for implementation for each of 39 areas that experienced flooding and/or property damage as a result of the 1997 storms.

The Flood Mitigation Program began in 1998 and was originally scheduled to run through 2009. However, due to the state of the City's available finances, this Program was temporarily suspended. New flooding areas continue to be identified by residents, or through continued analysis of the system. These additional project areas will be considered for future implementation. The design storm is unchanged. Storm drains are still designed to accommodate open channel flow during a 10-year, 24-hour design<sup>5</sup> and provide protection to homes from the 100-year, 24-hour design event. However due to ever-increasing emphasis on water quality and Total Maximum Daily Load (TMDL) standards, flood mitigation strategies have changed. The mitigation techniques have a much different priority now. Anticipated TMDL standards require a new type of flood management project. The new type of project tries to achieve the three R's or the three **REDUCTIONS** of **VOLUME**, **LOAD** and **RATE**.

With this current strategy, the designer first looks for **VOLUME REDUCTION**. This is a successful approach for responding to TMDL targets, because these volume reducing techniques do not concentrate the phosphorus or suspended solids, so there is a corresponding **LOAD REDUCTION**. Next

---

<sup>5</sup> City of Minneapolis 10-year design based on 4.2" of rainfall in a 24-hour event and 100-year design based on 5.9" of rainfall in a 24-hour event.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Flood Control*

---

the designer looks for **RATE REDUCTION**. This too is a successful approach for responding to TMDL targets, because the techniques slow the water down at its source, thereby reducing the initial amount of sediment that reaches the stormwater system. This is a dramatic change in design development and a departure from past strategies of enlarging pipes to drain more stormwater faster. New techniques focus on green initiatives that treat stormwater where it falls and this approach develops options that eliminate or at least minimize the need for new or larger pipes. Examples of the new **Three “R”** techniques include:

- A proposal to use street right-of-way for infiltration is a **Three “R”** project because phosphorus-laden suspended solids would be filtered by porous media and then infiltrate into the soil
- Another proposal to use street right-of-way in areas with heavy soil is a **Three “R”** project because, once again, phosphorus-laden suspended solids would be filtered by porous media to an underground reservoir that feeds tree roots for evapotranspiration
- When volume-reducing strategies are precluded by soil conditions, rate control systems such as underground storage are used

In many cases, adding catch basins or augmenting inlet capacity has the negative effect of increasing the runoff rate. New strategies would look for volume-reducing techniques upstream so the existing system would then have capacity for existing flows. Here are other strategies to help control flooding:

- Installation of backup generators for existing pump stations
- Increased inspection and maintenance of catch basin inlets and storm drains that are located within flood-sensitive areas
- Inclusion of various Best Management Practices (BMPs), including grit chambers, rain gardens, permeable pavers, etc.

### **Previous Year Activities**

In 2011, the city completed a new flood control project in north Minneapolis, called Flood Area 5 – North 37<sup>th</sup> Avenue Greenway - for which construction started in December 2009. The project mitigated an area roughly bounded by 36th Avenue N., Dowling Avenue N., Knox Avenue N., and Penn Avenue N., and created the 37<sup>th</sup> Avenue Greenway which replaced an 5-1/2 block stretch of existing street with (a) filtration rain gardens alongside a bike/pedestrian trail for three blocks, (b) filtration rain gardens alongside a narrowed one-way roadway for two blocks, and (c) replacement of ½ block with roadway of the same dimensions as in its previous layout. Underneath the trail and roadways, for the distance of 5-1/2 blocks,

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Flood Control*

---

underground storage vaults were installed, approximately 20 feet wide and 10 feet deep. This project mitigated an approximately 50 acre area constituting the first Phase of Flood Area 5.

The entire Flood Area 5 drainage area encompasses approximately 450 acres and is the part of Minneapolis that drains to Crystal Lake in Robbinsdale. The area is roughly bounded by Lowry Avenue N., Dowling Avenue N., Humboldt Avenue N., and Victory Memorial Drive. In the first phase as in the remainder of Flood Area 5, after a large event the city's stormwater conveyance system was backing up, causing water to overtop curbs, and in some cases rise to a level that allowed flow to enter homes through window wells or across thresholds. The condition occurred primarily because this area is underlain by heavy clay soils that do not allow much water to soak into yards and other green spaces. Rather, most of the water that falls on the ground, even on the planted, runs off into the street, due to the impermeability of the soils.

The original concept for Flood Area 5 under the 1997 Flood Program was to enlarge the pipe system, so that the area could drain faster. Subsequently, Crystal Lake was classified as an impaired water, with an approved TMDL for nutrients. To drain the area faster by simply enlarging pipes would not be appropriate as it could negatively impact Crystal Lake. Therefore the City's Phase 1 Flood Area 5 Project – 37<sup>th</sup> Avenue Greenway - was to use primarily underground storage, with some filtration basin (rain garden) storage, to detain the water until the system can convey it downstream. The storage was designed to also remove pollutants, thus improving the water quality of the runoff before it is discharged to the lake. Other project components included changes to size and location of storm drains, installation of a large hydrodynamic separator-type grit chamber, and backflow preventers to minimize alley flooding.

The remaining mitigation for the balance of the 450 acre flood area is only tentatively scheduled at this time. It is envisioned as a continuation of the approach described above, using underground storage vaults, filtration rain gardens, grit chambers, and additional “greenway” work.

### **Performance Measures**

While most citizens will measure success by whether there is reduced neighborhood flooding, the Flood Control work now also targets water quality. Many of the projects are intended to determine and demonstrate technology that works specifically for this City. Continuing the objectives of previous years, the goal is increased water quality of lakes, river and streams in Minneapolis. The Flood Mitigation Program Projects now focus more on treating stormwater where it falls and making **VOLUME REDUCTION** the common element of systems, because volume-reducing systems provide for reduction of TSS, nutrients, litter, and other pollutants, as well as providing some **RATE CONTROL**.

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Pesticides and Fertilizer Control*

---

### VIII. Pesticides and Fertilizer Control

#### **Program Objective**

The objective of this stormwater management program is to minimize the discharge of pollutants by controlling the application of pesticides and fertilizers. Targeted pollutants include:

- Pesticides (insecticides, herbicides, fungicides etc.)
- Nutrients (phosphorus, nitrogen etc.)

#### **Program Overview**

##### ***Integrated Pest Management (IPM) Policy and Procedures***

The Minneapolis Park and Recreation Board's (MPRB) IPM policy, used for golf courses and general park areas, is included in the MPRB's General Operating Procedures. Specific areas where IPM is heavily used include the Cowles Conservatory, the Minneapolis Sculpture Garden, and the major display gardens at Lyndale Park, Loring Park, and Minnehaha Falls Park. Plant Health Care/Integrated Pest Management Action Forms are filed when there are specific plant health problems for these garden areas. These forms document the specific problems and the recommended course of corrective action.

The golf course foremen, along with other select maintenance staff, attend the annual Minnesota Green Expo in January. There they receive updated information on the newest turf and other related research as it applies to fertilizers, pesticides, biocontrols, etc.

##### ***MPRB Staff Pesticide Applicator Licensing and Continuing Education***

All recent hires for position of park keeper, Mobile Equipment Operator (MEO), gardener, golf course park keeper, and arborist are required to obtain their Minnesota Non-Commercial Pesticide Applicator license within one year of being hired. Every two years, as mandated by the Minnesota Department of Agriculture, staff attends re-certification training, offered and coordinated by the University of Minnesota. This effort is in conjunction with the Agronomy Services Division of the Minnesota Department of Agriculture.

##### ***Use of Pesticides and Fertilizers on Park Lands***

The MPRB manages 6,400 acres of park land in the City of Minneapolis (approximately 18% of the City's 35,244 total land acres).

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Pesticides and Fertilizer Control*

---

#### Pesticide Use

Use of pesticides to control turf weeds is not a regular practice of park maintenance. Weed control pesticides may be used when a park is being renovated, or when athletic fields and surrounding areas are being sodded/seeded. It may also be used when weeds exceed 50% of the ground "turf" cover. These procedures for general grounds and athletic fields are included in the MPRB's General Operating Procedures.

The MPRB actively manages Eurasian watermilfoil and purple loosestrife, which are two non-native invasive plant species. Eurasian watermilfoil, an aquatic weed, is harvested mechanically on Lakes Harriet, Wirth, Cedar, Isles and Calhoun throughout the summer months. In its General Operating Procedures, the MPRB has established that no chemical application will be used to control aquatic weeds. Eurasian watermilfoil harvesting is permitted through the Minnesota Department of Natural Resources, Division of Ecological Services. Coordination of control programs for Eurasian watermilfoil are determined and supervised by the Environmental Operations Section.

The MPRB does use biocontrols and herbicides to control certain problem invasive species in natural areas. Purple loosestrife, an invasive emergent plant in wetlands, is controlled using a leaf-feeding beetle. Purple loosestrife is the only invasive plant where a biocontrol agent has been successful at controlling the spread of the invasive species. In particular situations where the biocontrol agent is not as effective in controlling purple loosestrife, spot-spraying or hand-pulling is done by park maintenance staff. Common and glossy buckthorn are two woody invasive species controlled in woodlands through herbicide applications. Control of these species is done on a limited basis by Environmental Operations staff and by Forestry staff. Park Maintenance, Forestry and Environmental Operations staff document chemical applications made through our electronic database "PF Manager".

MPRB staff produce and maintain the necessary records of all pest management activities as required by the Minnesota Department of Agriculture. Annual records are kept by the District or Golf Course office.

Since the 1980s, golf course foremen and park maintenance staff have documented the type, amount, and locations of the chemicals that are stored at park storage facilities. These chemical inventories provide detailed information to the Fire Department as to how to deal with a possible fire at these sites. The plans identify how the fires are best extinguished, and how to protect surface water in the surrounding area. The plans were put into place in the early 1980's, following a chemical company fire in north Minneapolis that resulted in the contamination of Shingle Creek.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Pesticides and Fertilizer Control*

---

#### Fertilizer Use

In September 2001, the Minneapolis City Council amended Title 3 of the Minneapolis Code of Ordinances (relating to Air Pollution and Environmental Protection) by adding Chapter 55, Lawn Fertilizer. Under the ordinance, since January 1, 2002 the use of fertilizer containing any amount of phosphorus or other compound containing phosphorus, such as phosphates, is prohibited in Minneapolis, except as allowed by Minnesota Statute 18C.60 Phosphorus Turf Fertilizer Use Restrictions. The Minnesota Statute allows the use of phosphorus turf fertilizer if:

- An approved and recent test indicates that the level of available phosphorus in the soil is insufficient
- The fertilizer is being applied to newly established turf, and only during the first growing season

The fertilizer is for use on a golf course under certain conditions specified in the Statute

Fertilization of turf on Minneapolis Park & Recreation Board Property is performed for golf courses, around athletic fields, and in areas of heavy traffic. Golf course managers and maintenance foremen are instructed that no phosphorus can be used for turf fertilization unless a current soil test has demonstrated the need for this nutrient. MPRB staff is required to complete a report for every turf fertilizer application. These records are maintained for a period of 5 years, per state law.

#### **Previous Year Activities**

##### ***Staff Pesticide Applicator Licensing and Continuing Education***

Currently 200 MPRB employees hold pesticide applicator licenses, through the Minnesota Department of Agriculture (MDA).

##### ***Use of Pesticides and Fertilizers on Park Lands***

#### **Pesticide Use**

MPRB maintenance and environmental staff continue to maintain the purple loosestrife control program. Populations of released beetles in Minneapolis parks continue to maintain themselves at most sites, thereby reducing the need for chemical spraying.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Pesticides and Fertilizer Control*

---

#### **Fertilizer Use**

The MPRB included zero phosphorus turf fertilizers beginning with the 2002 fertilizer bid. This was done in response to the City/state regulation changes regarding phosphorus turf fertilizers. A wide range of fertilizers was offered to allow park maintenance and golf course foremen to pick the highest performing fertilizer (based on soil test results).

#### ***Audubon Cooperative Sanctuary Program (ACSP) for Golf Courses***

Audubon International provides comprehensive conservation and environmental education assistance, to golf course superintendents and industry professionals, through collaborative efforts with the United States Golf Association (USGA). The ACSP seeks to address environmental concerns while maximizing golf course opportunities thereby providing open space benefits. An important component of this program is the implementation of IPM procedures, and the reduction of chemical and fertilizer use to protect water quality and provide a healthier habitat for wildlife.

Participation in the program requires that golf course staff address environmental concerns related to the potential impacts of water consumption, and chemical use on local water sources, wildlife species, and native habitats. Additionally, the program provides assistance in comprehensive environmental management, enhancement and protection of existing wildlife habitats, and recognition for those who are engaged in environmentally responsible projects.

Audubon International provides information to help golf courses with:

- Environmental Planning
- Wildlife and Habitat Management
- Water Conservation
- Water Quality Management
- Outreach and Education

By completing projects in each of the above, the golf course receives national recognition as a Certified Audubon Cooperative Sanctuary. MPRB Operations staff, working with Theodore Wirth and Meadowbrook Golf Course foremen, received the ACSP certification for both courses. MPRB staff conducts yearly water quality and aquatic vegetation monitoring at the courses.

#### **Performance Measures**

- Number of MPRB staff with pesticide applicator licenses: 200

## IX. Illicit Discharges and Improper Disposal to Storm Sewer System

### **Program Objective**

The objective of this program is to minimize the discharge of pollutants to lakes, creeks, wetlands and the Mississippi River by appropriately responding to spills and to detect, investigate and resolve illegal dumping and disposal of unpermitted, non-stormwater flows in the city's stormwater drainage system including pipes, gutters, swales and other conveyance infrastructure. Targeted pollutants include:

- All pollutants

### **Program Overview**

#### ***Typical Hazardous Spill Response***

The immediate goals of response are safety, containment of the spill, recovery of hazardous materials, and collection of data for use in assessment of site impacts. Motor vehicle collisions and electrical transformer overloads are examples of accidental releases, and results can include untreated waste and hazardous materials including heavy metals, toxics and solvents.

The life cycle of an event requires personnel from various departments and agencies to work as a team, utilizing available resources to protect people, the environment, and property. Training and response procedures are coordinated among the Regulatory Services, Public Works, and Fire Departments. The Regulatory Services Hazardous Materials Manager is responsible for coordinating recovery efforts. Events are followed by post-action debriefings to determine the causes of the events, to identify measures to improve the City's response, and to determine the means to limit future occurrences. As the assessment of the event progresses, other departments and/or outside agencies or contractors may become involved. Full procedures are documented in the City of Minneapolis Emergency Action Plan.

For small spills of petroleum products or other vehicle fluids, personnel are dispatched with appropriate equipment to apply sand. Once the sand has absorbed the spill, it is removed and then deposited in a leak-proof container. For large or extremely hazardous spills, a Hazardous Materials Response Team is also mobilized and augmented with staff from additional departments, outside agencies and/or contractors if warranted as the event progresses. For spills that reach the Mississippi River or Minneapolis lakes, boats are available for spill response and personnel are trained in boom deployment.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Illicit Discharges and Improper Disposal to Storm Sewer System*

---

Spills are reported to the MPCA Public Safety Duty Officer, 911 Emergency Communications and, for qualified spills, to the National Duty Officer as required by law.

The protocol used by the Street Maintenance section for handling spills is documented in Appendix 32: Standard Operating Procedure for Vehicle Related Spills (VRS).

#### ***Emergency Response Program***

The Department of Regulatory Services operates a boat for use on the Mississippi River and other Minneapolis water bodies, to be able to respond to spills that could impact our valuable water resources. The presence of a properly equipped boat facilitates addressing these events on the Mississippi River as well as on City lakes. Regulatory Services and Public Works staff are trained in the river deployment of booms, have field experience in placement of both containment and absorbent types of booms, and have years of experience on the water. These skills, coupled with an extensive level of knowledge of the Mississippi River, City lakes, landings and outfalls, provide a high level of protection for our precious natural resources.

Additionally, Regulatory Services uses the boat for the placement of monitoring and sampling equipment used for tracking water quality, identifying points of illegal discharges, illegal sewer connections, infiltration from a sanitary sewers or water mains, assessment of outfalls, and investigation of complaints that are inaccessible from shore.

#### ***Unauthorized Discharges***

Regulatory Services personnel are responsible for pollution prevention and control. Results are achieved through educational efforts, inspections, and coordinated community outreach events. These activities may include enforcement, pursuant to Chapter 48<sup>6</sup> and other applicable City codes, and coordination with other regulatory agencies at the county, state and federal levels. Enforcement yields identification of the responsible party, documentation of clean-up activities, and also endeavors to reduce the flow of pollutants from illegal dumping and disposal. Response is made to reports of unauthorized discharges and illicit connections. Complaints are received from the public, City and private contractors, City staff and other government agencies, by the following means:

- [Environmental Management Complaint Form](#)
- Confidential calls to Minneapolis Information & Services. Within Minneapolis, the phone number is 311. Outside of Minneapolis, the phone number is 612-673-3000
- Reports from sewer maintenance crews, plumbing inspectors, and other City personnel

---

<sup>6</sup> Minneapolis Code of Ordinances, Chapter 48 Minneapolis Watershed Management Authority.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Illicit Discharges and Improper Disposal to Storm Sewer System*

---

- Direct contact to Environmental Services staff at 612-673-3867

#### ***Non-Stormwater Discharges***

Environmental Services reviews non-stormwater permits and renewals while working with the MPCA permitting authority to address local concerns. Environmental Services also reviews alleged violations to a permit or code. If permits are violated, or if conditions indicate that the permit should be revised, Environmental Services staff will assist MPCA permitting staff in updating or revoking the permit.

#### ***Detection and Removal Screening Program***

The field screening program to detect and investigate contaminated flows in the storm drain system is an integral part of Sewer Operations and Regulatory Services daily operations. Sewer Maintenance crews routinely inspect and clean storm drain structures throughout the City. In addition, inspections of flows that generate unusual odors, stains, and deposits are included in the annual tunnel inspection, outfall inspection, and grit chamber inspection and cleaning programs. Any suspect flows are then reported to Regulatory Services inspectors for further investigation. Regulatory Services personnel also receive reports of alleged illicit discharges to the storm drain system from the public, other City departments, and various agencies. These combined efforts result in an annual screening of more than 20% of City drainage areas. The City partners with the Mississippi Watershed Management Organization to conduct a joint sampling program of the storm drainage system that drains to the Mississippi River. The intent of this partnership is to detect illegal discharges, and to establish a baseline of chemical, physical, and biological parameters. The best avenue for a continued effective screening program in the City of Minneapolis, without duplication of services, is to continue to use current practices, and to explore the development of certain aspects of the program to improve enforcement results.

#### ***Facility Inspection Program***

Inspectors perform site visits of facilities that store large quantities of regulated and hazardous materials. In addition, site plan inspections yield the following information:

- Drainage patterns from the site to the nearest drain or water body
- Watershed destination and outlet location
- Handling, storage, and transfer procedures as they relate to the site

#### **Previous Year Activities**

- Addressed 109 calls for emergency response (containment of spills, chemical dumping, illegal disposal or handling of regulated or hazardous materials)

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Illicit Discharges and Improper Disposal to Storm Sewer System*

---

- 42 direct connections (registrations) to the storm drain (NPDES Permits)
- 307 permanent stormwater management devices at 244 sites were registered
- Investigated 837 water and land pollution complaints (illegal dumping, improper storage of material, and chemical storage)
- Inspected 118 contaminated soil complaints
- Approved installation of 1 contaminated soil and ground water remediation systems and temporary storage of contaminated soil, resulting in 24 active systems on 18 sites
- Approved 20 limited duration sanitary sewer and storm drain discharge permits
- Approved 79 storage tank permits:
  - Above ground, 1 abandoned-in-place, 18 installed, 23 removed
  - Underground, 14 abandoned-in-place, 4 installed, 57 removed
- Conducted 18 outfall sampling days on the Mississippi River

### **Performance Measures**

- Resolution of reported or discovered non-compliant activities in previous year: 1,209 of 2011's 1,584 cases have been resolved along with an additional 48 cases from 2010
- Erosion control permit non-compliance incidents that were addressed: 142 enforcement actions on 128 sites

## X. Storm Sewer Design for New Construction

### **Program Objective**

There is a continuing effort to minimize the discharge of pollutants to public waters. This section describes the current focus and outlines the design measures used to control the discharge of pollutants by controlling the volume, loading or rate of stormwater discharged.

Targeted pollutants include:

- Total Suspended Solids (TSS)
- Phosphorus
- Chloride
- Fertilizers

### **Program Overview**

In 2010 the City of Minneapolis continued its program to reduce sanitary sewer inflow (stormwater and other clear water sources connected directly to the sanitary sewer) and infiltration (groundwater that enters the sanitary sewer usually through pipe and system defects). The program is continuing a focus that the city has had since the 1960s when the city began a 40-year residential paving program.

The principal work is elimination of known public and private stormwater inlets or rainleaders connected to the sanitary sewer. Additionally the City is using a targeted sanitary sewer flow metering program to identify other sources. The flow metering program includes follow-up smoke testing where a smoke-like vapor is blown into the sanitary sewer in order to expose openings where inflow is entering the sanitary sewer.

The City's success with reducing I & I is transferring a problem from the sanitary sewer system to the stormwater management system, because there is rarely storm sewer capacity for the inflow removed from the sanitary sewer. Management techniques are required for volume reduction or rate reduction, and the techniques vary with each project. Most projects range from the equivalent area of one lot to a 2.5-acre drainage area. By themselves, these inflow areas may not be serious problems but cumulatively, the runoff becomes significant.

At this time, mitigation begins with an effort to reduce the volume of runoff. Options that reduce volume must have space within the right-of-way or must have an off-site area, with suitable soils for volume reduction in either case. Next, load reduction options are investigated, using recognized Best

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

### *Storm Sewer Design for New Construction*

Management Practices (BMPs) such as prefabricated swirl-type grit chambers, bio-filtration or ponds. Space constraints in fully developed urban areas like Minneapolis limit many projects to use of compact prefabricated BMPs for load reduction.

For street renovation or reconstruction projects, whenever storm drain upgrades are required, installations of volume reduction systems are considered first, load-reducing facilities next, and finally rate reduction BMPs.

#### **Previous Year Activities**

The storm drain project areas for 2010, and associated water quality impacts, are referenced in the following table:

PROJECT AREA	PROJECT DESCRIPTION	STORMWATER RUNOFF BENEFITS
CSO Area 075 (Grand St NE, 26 <sup>th</sup> to 27 <sup>th</sup> Av NE)	Redirected catch basins from the sanitary sewer to the storm sewer	Eliminated CSO area of 1.43 acres
CSO Area 120 (Grand St NE, 28 <sup>th</sup> to 29 <sup>th</sup> Av NE)	Redirected catch basins from the sanitary sewer to the storm sewer	Eliminated CSO area of 1.51 acres
CSO Area 097 (Lowry St NE, Jackson to Central Av NE)	Redirected catch basins from the sanitary sewer to the storm sewer	Eliminated CSO area of 0.13 acres
CSO Area 125 (Fillmore St NE, 34 <sup>th</sup> to 35 <sup>th</sup> Av NE)	Redirected catch basins from the sanitary sewer to the storm sewer	Eliminated CSO area of 1.01 acres
CSO Area 134 (38 <sup>th</sup> St E, Nicollet to 1 <sup>st</sup> Av S)	Redirected catch basins from the sanitary sewer to the storm sewer	Eliminated CSO area of 3.48 acres
CSO Area 135 (35 <sup>th</sup> St W, Blaisdell Av S to Pillsbury Av S)	Redirected catch basins from the sanitary sewer to the storm sewer	Eliminated CSO area of 8.76 acres
CSO Area 146 (Queen Av N & 42 <sup>nd</sup> Av N)	Eliminate storm overflow connection	Eliminated CSO area of 69.48 acres
CSO Area 147 (36 <sup>th</sup> St E and 3 <sup>rd</sup> Av S)	Redirected catch basins from the sanitary sewer to the storm sewer	Eliminated CSO area of 0.40 acres

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Storm Sewer Design for New Construction*

---

#### **Performance Measures**

- At end of 2011, cumulative total of approximately 41 green infrastructure<sup>7</sup> regional stormwater facilities<sup>8</sup> on 22 sites
- At end of 2011, cumulative total of approximately 156 pre-treatment grit chambers
- At end of 2011, progress continued toward GIS system that will (among many other benefits) allow calculations of watershed acres in the City of Minneapolis that are receiving water quality treatment

---

<sup>7</sup> "Green infrastructure" refers generally to stormwater ponds, stormwater wetlands, major bioretention facilities ("rain gardens"), mini-reservoirs for underground detention with water quality treatment, and the like. Not included in this figure are three major dry basins that were built for flood control. Although not designed for volume control or water quality, they do provide some infiltration..

<sup>8</sup> "Regional stormwater facilities" refers to treatment of runoff from multiple areas including some portions of right-of-way

## XI. Public Education

### **Program Objective**

The objective of this stormwater management program is to educate the public regarding point and non-point source stormwater pollution. Targeted pollutants include:

- All pollutants

### **Program Overview**

In addition to work done by watershed organizations, Hennepin County and other entities, the City of Minneapolis and the Minneapolis Park & Recreation Board (MPRB) implement their Public Education Program to promote, publicize, and facilitate the proper management of stormwater discharges to the storm sewer system. The program's focus is to educate Minneapolis residents, business owners, employees and visitors about stormwater. The program's goals include showing how *everyone's* actions affect the quality of our lakes, wetlands, streams and the Mississippi River, and how to control pollutants at the sources to reduce the discharge of pollutants to our receiving waters. The desired result is to change behavior in ways that will improve water quality. Many of the components of the program can be found at the following City of Minneapolis Stormwater web site:

<http://www.ci.minneapolis.mn.us/publicworks/stormwater/>.

### **Previous Year Activities**

#### **Metro Blooms Rain Garden Workshop Program**

A. Ongoing Program: In 2011, the City and others again sponsored a multi-part stormwater education workshop program conducted by Metro Blooms, a non-profit organization that grew out of the City's Committee on the Urban Environment (CUE). The goals of the workshop program are to reduce stormwater runoff, prevent stormwater pollution that damages our watersheds and improve the environmental and visual quality of the urban landscape. The two-part workshops serve to inform, coach and offer consultation to Minneapolis residents protecting the upper Mississippi River watershed by installing properly designed bio-infiltration areas (rain gardens), redirecting downspouts and using native plants. The **Part A** workshop focuses on watershed education, various types of rain garden design, and native plant choices. Attendees can then attend a **Part B** workshop, which offers practical, hands-on design sessions where participants bring pictures, measurements and sketches of their sites and receive

DRAFT as of May 30, 2012 (in preparation for submission to MPCA on June 30, 2012)

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Public Education*

---

plant and one-on-one design advice. One of the means of publicizing the workshops is a utility bill insert that reaches most of the approximately 100,000 households in Minneapolis. In 2011, 78 **Part A** and 7 **Part B** workshops were held within Minneapolis, attended by a total of 462 Minneapolis residents.

B. Powderhorn Lake “Neighborhood of Rain Gardens” Project: 2011 was the final year of a three-year project carried out by Metro Blooms, in partnership with the City of Minneapolis, Minneapolis Park and Recreation Board, and the Minnehaha Creek Watershed District, and funded primarily by a grant from the Environment and Natural Resources Trust Fund of the Minnesota Legislative-Citizen Commission on Minnesota’s Resources (LCCMR). The project was to (a) work with residents in one of the subwatersheds that drains to Powderhorn Lake to install up to 150 residential rain gardens, and (b) before, during and after installation of the rain gardens, monitor both the quantity and quality of water being conveyed from the subwatershed to the lake through storm pipes, in order to study the impact of the project on water quality in Powderhorn Lake. The monitoring data from the “test” subwatershed will be compared with monitoring data from a “control” subwatershed (one without the rain garden initiative) of similar size and land use characteristics. A total of 130 rain gardens were installed during the program – 122 in 2010 and 8 in 2011. Monitoring data is being compiled. Additional monitoring is being carried out by in 2012.

### **Minneapolis Park & Recreation Board Education Activities and Events**

In 2011 Minneapolis Park & Recreation Board (MPRB) staff provided water quality education programs throughout the City. Environmental Operations naturalist staff participated in 58 Minneapolis community festivals, neighborhood events<sup>9</sup>, as well as concerts at Lake Harriet, Father Hennepin Park (along the Mississippi River) and Minnehaha Park. An incredibly rainy season forced the cancellation of an additional 17 events. Hands-on water quality educational displays focused on neighborhood watersheds and how human activities impact local water bodies. Printed materials, bookmarks, and water bottles with educational messages were distributed to adults and children.

---

<sup>9</sup> Neighborhood event sites (several sites had multiple events): Parks: Armatage (1), Beltrami (1), Bryant Square (5), Creekview (1), Diamond Lake/Pearl (1), Dowling School (1), Folwell (1), Keewaydin (1), Kenny (1), King(1), Lake Harriet (8), Linden Hills (1), Loring (3), Luxton (1), Lyndale Park (1), Lynnhurst (1), McRae (2), Minnehaha ( 8), Morris (1), Nicollet Island (8), Nokomis (1), Pershing (2), Sibley (2), Victory Memorial Parkway (2), Windom NE (1), and Windom S (1).



**Canines for Clean Water**

More than 100,000 dogs reside in the City of Minneapolis and **each day** they generate an estimated 41,000 pounds of solid waste. This water quality education program targeting dog owners was initiated in 2009.

*Canines for Clean Water* combined recreational activities with education to change the actions of dog owners to improve water quality. The project goals were to inform dog owners about the impacts that improperly disposed pet waste has on water bodies and on the people who swim, sail, and fish; and then to change the behavior of dog owners so they always pick up after their pooch. In 2009, *Canines for Clean Water* offered a 5-part series of dog-themed movies at Minneapolis Parks where dog owners and their pets were invited to attend and to commit to the “clean water pledge”. Dog owners signed the pledge form, and dogs left a paw print on it.

In 2011, the concept of engaging dog owners continues to have a ripple effect. Photographs of volunteer dogs – and their human’s legs – were the stars of a new educational campaign to get owners to pick up after their pooch.

Public Education



These posters were deployed in MetroTransit buses and LRT rail cars for 12 weeks in June, July and August. Based on ridership numbers, the banners were subject to over 8 million views on buses, and over 6 million views on the LRT.

DRAFT as of May 30, 2012 (in preparation for submission to MPCA on June 30, 2012)

Public Education



This figure shows the LRT route. Note that the route parallels the Mississippi River, crosses Minnehaha Creek, and ends in the Bassett Creek watershed (Bassett Creek is underground in downtown Minneapolis). These watersheds are impaired for the bacteria *E. coli*. Due to the *Canines for Clean Water* campaign, large portions of the metro have received education that should help to change behavior and lower the *E. coli* load to our impaired waters.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Public Education*

---

#### **Greening Teen Teamworks**

MPRB Environmental Operations staff provided water quality education to almost 300 Teen Teamworks site supervisors and teenagers participating in the MPRB's summer youth employment program. Environmental Education staff met with each crew at its home park and engaged the youth in hands-on storm water education activities. Throughout the summer the crews were responsible for removing debris from storm drains along the parks' perimeters and at park sites with a water amenity. Crews also cleaned up around storm water outlets. Each crew developed an end-of-the-season presentation about stormwater. The crew with the best presentation won a pizza party. This educational series was funded by the Mississippi Watershed Management Organization.

#### **Earth Day Watershed Clean-Up Event**

Earth Day is a collaborative effort between the City of Minneapolis and the Minneapolis Park & Recreation Board. The 2011 Minneapolis Earth Day Watershed Clean Up was held on a very cold Saturday April 17, from 9:30 to Noon at 40 locations throughout Minneapolis. Approximately 1,500 volunteers participated in this event and removed more than 15, 000 pounds of trash.

This event involved cleaning major watersheds and waterbodies in the City of Minneapolis including: the Chain of Lakes, Lake Nokomis, Lake Hiawatha, Powderhorn Lake, Diamond Lake, Shingle Creek, Minnehaha Creek, Bassett Creek, and the Mississippi River. The goals of the Minneapolis Earth Day Watershed Clean Up include preventing trash and debris from entering local waterbodies, providing a rewarding volunteer experience, and sharing environmental information to Minneapolis residents and park users who participate in the event.

#### **Storm Drain Inlet Stenciling**

Stenciling of storm drain inlets, also called catch basins, educates the people painting stormwater messages on the storm drains, and also shares an environmentally friendly message for people passing by. A great team building exercise, it allows volunteer organizations to educate people about simple steps they can take to help improve the quality of Minnesota's lakes, rivers and streams.

In 2011, the City continued the program using four self-contained stenciling kits, each containing everything needed to stencil storm drains: stencils, map with catch basin locations, stenciling paint, traffic cones, facemasks, a broom for prepping the site, gloves and trash bags, safety vests and glasses, and

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Public Education*

---

door hangers to explain the stenciling to nearby residents. By providing educational stormwater door hangers to distribute to residents, dialogue is encouraged between the stencilers and people who live nearby.

The stencils vary by the type of receiving waterbody, thus referring to “Mississippi River”, “lake”, or “creek” as the case may be. The City has three versions of the “Mississippi River” stencils: in English, Spanish and Somali languages. The “lake” and “creek” stencils are only in English.

PLEASE DON'T POLLUTE



DRAINS TO  
MISSISSIPPI RIVER

**POR FAVOR, NO CONTAMINE!  
EL AGUA DEL ALCANTARILLADO PLUVIAL**



**VA A PARAR  
EN EL RIO MISSISSIPPI**

**HA WASAKHEYN HALKAAN!**



**WAXAY KU SHUBTAA WEBIGA MISSISSIPPI**

Safety is important, so we include traffic cones, and suggest to groups that they stencil on low volume streets to provide a safe environment. If children are part of the group, we request at least one adult be present to supervise. Trash bags and gloves are provided to pick up trash in the areas around the storm drain inlets, especially on the upstream side. Efforts of the organizations doing the stenciling are tracked, including the locations of the stenciled catch basins, the number of volunteers, and the number of door hangers distributed. In 2011, the City furnished the kits for \_\_\_ stenciling events, with \_\_\_ participants painting approximately \_\_\_ catch basins.

Volunteers can visit the following web site:

<http://www.minneapolismn.gov/publicworks/stormwater/stenciling>

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Public Education*

---

#### **Web sites**

**STORM & SURFACE WATER MANAGEMENT** – The City provides the following primary web site for information about Storm and Surface Water Management:

<http://www.ci.minneapolis.mn.us/publicworks/stormwater/index.htm>

**2011 statistics for the above web location (multiple pages and topics are included):**

Total visits: **54,892**

Number of pages: **430**

**ENVIRONMENTAL MANAGEMENT** – The Department of Regulatory Services maintains the following web site for additional information about its initiatives and programs:

<http://www.ci.minneapolis.mn.us/environment/index.htm>

**ANNUAL NPDES REPORT** – The City and MPRB work with local watershed organizations, internal agencies, and other government agencies to partner with these organizations as a requirement of the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit. The current and prior annual reports that can be reviewed at the following web site provide education to interested parties about the City's authorization to discharge stormwater via its NPDES MS4 Permit:

[http://www.ci.minneapolis.mn.us/publicworks/stormwater/stormwater\\_npdesannualreportdocuments](http://www.ci.minneapolis.mn.us/publicworks/stormwater/stormwater_npdesannualreportdocuments)

**LOCAL SURFACE WATER MANAGEMENT PLAN** – The City's comprehensive approach can be reviewed at the following web site:

[http://www.ci.minneapolis.mn.us/publicworks/stormwater/stormwater\\_local-surface](http://www.ci.minneapolis.mn.us/publicworks/stormwater/stormwater_local-surface)

**REGULATORY CONTROLS OF SURFACE WATER MANAGEMENT** – The City of Minneapolis provides information regarding pesticides, fertilizers, illicit discharges, improper disposal and other water quality issues via the following City web site:

[http://www.ci.minneapolis.mn.us/publicworks/stormwater/stormwater\\_regulatory-controls](http://www.ci.minneapolis.mn.us/publicworks/stormwater/stormwater_regulatory-controls)

**STORMWATER MONITORING PROGRAM** – The MPRB provides the following web site to educate interested parties regarding their Stormwater Monitoring Program:

<http://www.minneapolisparcs.org/default.asp?PageID=833>

**FLOOD CONTROL INFORMATION** – The City web site provides educational information regarding flood control. For information on flooding and safety precautions, the following web site can be viewed by interested parties: <http://www.ci.minneapolis.mn.us/publicworks/stormwater/flood/index.htm>

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Public Education*

---

**COMBINED SEWER OVERFLOW (CSO) PROGRAM** – The City maintains a web site to educate Minneapolis residents and property owners about the City’s CSO program to eliminate Combined Sewer Overflows: <http://www.minneapolismn.gov/publicworks/stormwater/cso/>

**STORMWATER UTILITY FEE and BEST MANAGEMENT PRACTICES (BMPs)** – As a component of the City’s Stormwater Utility Fee, the City web site encourages the implementation of various Best Management Practices (BMPs) such as rain gardens, rain swales and pervious pavement that would reduce the overall amount of impervious surface area throughout the City. These practices would also filter and cleanse stormwater. The City also maintains a link to the following Metropolitan Council and MPCA BMP web sites, where numerous BMP suggestions are available for small scale implementation:

***Urban Small Sites Best Management Practice Manual:***

<http://www.metrocouncil.org/environment/watershed/bmp/manual.htm>

***Minnesota Stormwater Manual:***

<http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/stormwater-management/minnesota-s-stormwater-manual.html>

**PUBLIC EDUCATION & OUTREACH** – Additional information about how the City and MPRB advance stormwater education activities can be found at the following web sites:

City of Minneapolis – [http://www.ci.minneapolis.mn.us/publicworks/stormwater/stormwater\\_outreach](http://www.ci.minneapolis.mn.us/publicworks/stormwater/stormwater_outreach)

Minneapolis Park & Recreation Board – <http://www.minneapolisparcs.org/home.asp>

**Erosion and Sediment Control Education for Contractors and Developers**

During Minneapolis Development Review and the Site Plan Review processes, and during on-site inspections, Public Works and Regulatory Services personnel provide Erosion and Sediment Control (ESC) education and guidance to contractors and developers. This education includes information regarding the City’s ordinances, and local, state and federal regulations.

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Public Participation Process*

---

## XII. Public Participation Process

### **Program Objective**

The objective of this stormwater management program is to maximize the effectiveness of the City's NPDES program by seeking input from the public. Targeted pollutants include:

- All pollutants

### **Program Overview**

The City of Minneapolis and the MPRB are the joint holders of the NPDES MS4 Permit, and the Annual Report is a coordinated effort by various City departments and the MPRB. The Permit requires an opportunity for public input in the development of the priorities and programs necessary for compliance. The MPCA re-issued Municipal Separate Storm Sewer System (MS4) NPDES Permit No. MN0061018 to the City of Minneapolis and the MPRB as co-permittees in January 2011. The Permit requires the implementation of approved stormwater management activities, referred to as Best Management Practices (BMPs). A new Stormwater Management Program (SWMP), documenting the BMPs the City and the MPRB have or will put in place for the re-issued 2011 permit, was submitted to the MPCA for public comment and approval on September 28, 2011. This Annual Report for 2011 activities is prepared in compliance with the previous version of Permit No. MN0061018, issued in December, 2000. Information in the Annual Report provides documentation and analysis of the activities conducted in the previous year. The Annual Report is due June 30.

Each year, the City holds a public hearing at a meeting of the Transportation & Public Works Committee of the City Council. The hearing provides an opportunity for public testimony regarding the Program and Annual Report prior to report submittal to the Minnesota Pollution Control Agency. The hearing is officially noticed in the Finance and Commerce publication, and also publicized through public service announcements on the City cable television channel. This year's public hearing date [is] June 5, 2012 at 9:30 AM in Council Chambers, Room 317 City Hall, 350 S 5<sup>th</sup> Street, Minneapolis, MN.

A notice of the availability of the draft Report for review and public comment was sent to all 81 Minneapolis neighborhood organizations, to the governmental entities that have jurisdiction over activities relating to stormwater management, and to other interested parties. The notice was sent by e-mail on May 30, 2012, announcing the web site link to the draft Report, and informing that written comments [are being] accepted until Noon on June 22, 2012.

DRAFT as of May 30, 2012 (in preparation for submission to MPCA on June 30, 2012)

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Public Participation Process*

---

The notice explained that emails or faxes were the preferred methods for submitting written comments, rather than conventional mail due to the additional time involved. The contact information for written comments was listed as:

City of Minneapolis, Department of Public Works  
Surface Water & Sewers Division c/o Lois Eberhart  
NPDES MS4 REPORT COMMENTS  
300 City of Lakes Building, 309 2nd Avenue S, Room 300  
Minneapolis MN 55401-2268  
Phone: 612-673-3260                      Fax: 612-673-2048  
E-mail: [lois.eberhart@minneapolismn.gov](mailto:lois.eberhart@minneapolismn.gov)

The draft Annual Report is made available for viewing or downloading at [http://www.minneapolismn.gov/publicworks/stormwater/stormwater\\_npdesannualreportdocuments](http://www.minneapolismn.gov/publicworks/stormwater/stormwater_npdesannualreportdocuments) prior to finalization. Once finalized, the Annual Report is also made available on the web site for viewing or downloading. The City Clerk's office also keeps copies of the Annual Report on hand for examination by the public, prior to the public hearing date and for a period thereafter.

All testimony presented at the public hearing, and all written comments received, are recorded and given due consideration. A response to those public comments is then included with the Annual Report as Appendix C. A copy of the council resolution adopting the Stormwater Management Program and Annual Report Activities is included each year with the submission to the Minnesota Pollution Control Agency

### **Performance Measures**

- Number of interested parties that were directly notified of public hearing and Annual Report availability: 97 (includes 81 neighborhood organizations)

### XIII. Coordination with Other Governmental Entities

#### **Program Objective**

The objective of this Stormwater Management Program is to maximize stormwater management efforts through coordination and partnerships with other governmental entities.

#### **Program Overview**

Coordination and partnerships of the City and the MPRB with other governmental entities include the four watershed organizations in Minneapolis: Bassett Creek Water Management Commission, Mississippi Watershed Management Organization, Minnehaha Creek Watershed District, and Shingle Creek Watershed Management Commission. Coordination activities and partnerships with other governmental entities also include MnDOT, MPCA, neighboring cities, the Metropolitan Council, the University of Minnesota and various other entities.

The coordination and partnership activities can include the joint review of projects, joint studies, joint water quality projects, stormwater monitoring, water quality education, and investigation or enforcement activities.

#### **Coordination with the Bassett Creek Water Management Commission (BCWMC)**

The BCWMC approved its Second Generation Watershed Management Plan in September 2004, and has commenced its Third Generation planning efforts. Under the current plan, required are stormwater management, erosion control practices and floodplain management for redevelopment projects that are greater than 5 acres. Minneapolis provides yearly financial contributions to the BCWMC annual operations budget. The City and the MPRB are also stakeholders with other BCWMC joint power cities in development of several Total Maximum Daily Load (TMDL) studies and implementation plans.

#### **Coordination with the Mississippi Watershed Management Organization (MWMO)**

The MWMO adopted its Third Generation Watershed Management Plan in 2011. The City and MPRB participated in its planning committees. The MWMO delegates stormwater management requirements for new developments to its member cities and does not provide separate project review and approval. The MWMO receives revenue through direct taxation against properties within its jurisdiction.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Coordination with Other Governmental Entities*

---

#### **Coordination with the Minnehaha Creek Watershed District (MCWD)**

The MCWD adopted its Third Generation Plan in 2006. The District administers state mandated wetland protection rules and Department of Natural Resources regulations, as well as District rules relating to erosion control (land disturbance of 5,000 square feet or greater), floodplain alteration, wetland protection, dredging, shoreline & stream bank improvements, stream and lake crossings and stormwater management. The MCWD receives revenue through direct taxation against properties within its jurisdiction. The City of Minneapolis and the MPRB are stakeholders in development of TMDL studies and implementation plans, in collaboration with the MCWD and other stakeholders.

#### **Coordination with the Shingle Creek Watershed Management Commission (SCWMC)**

The SCWMC adopted its Second Generation Watershed Management Plan in August 2004, and is carrying out its Third Generation planning efforts. SCWMC reviews plans of any land development adjacent to or within a lake, wetland, or a natural waterway, within the 100-year floodplain, 15 acres or larger (for single-family detached housing use) and 5 acres or larger for all other land uses. SCWMC requires these developments to provide erosion protection during construction, in addition to on-site detention and treatment. Developments also have the option of demonstrating that adequate detention and treatment is available via a regional facility. Minneapolis provides yearly financial contributions to the SCWMC annual operations budget. The City of Minneapolis and the MPRB are stakeholders with other SCWMC joint power cities in development of TMDL studies and implementation plans.

### **Previous Year Activities**

#### **Ongoing Coordination Efforts**

The Minneapolis Park and Recreation Board (MPRB) and the City of Minneapolis coordinate stormwater management efforts, and coordinate with the watershed management organizations, the watershed district, and other governmental agencies on a number of water quality projects. Minneapolis Public Works maintains communications with all watershed management organizations and the watershed district within the City boundaries. Interactions take several forms to facilitate communication and provide support:

- Attend selected local board and special issues meetings
- Attend selected education and public outreach committee meetings
- Take part in Technical Advisory Committee (TAC) meetings
- Inform the organizations of upcoming City capital projects in an effort to identify projects that may benefit from partnerships

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Coordination with Other Governmental Entities*

---

- Provide developers (who submit projects for site plan review) with information and contacts to meet watershed requirements
- Share information and data regarding storm drainage system infrastructure, watershed characteristics, flooding problems, modeling data, etc.

The Environmental Services Division of the Minneapolis Regulatory Services Department coordinates with the MPCA and the MCES regarding investigations and enforcement for incidents of illegal dumping or illicit discharges to the storm drain system.

The MPRB coordinates with the watershed organizations and the MCES on watershed outlet monitoring. The MPRB and the City coordinate and partner with the watershed organizations on capital projects and water quality programs. The MPRB also works with the DNR and surrounding suburbs on various capital projects and programs. The City and the MPRB coordinate with the MPCA, the watershed organizations and stakeholders for Total Maximum Daily Load (TMDL) studies and implementation plans.

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Stormwater Monitoring – Results and Data Analysis*

---

### XIV. Stormwater Monitoring - Results and Data Analysis

#### **Stormwater Runoff Monitoring Results**<sup>10</sup>

Storm event samples were collected from May through November. Two snowmelt grab samples were collected in 2011 from each site. Snowmelt was collected at Sites 6, 7, and 9 on 2/14/11, 2/15/11 and at site 8a on 3/17/11, 3/22/11. Most snowmelt samples were brown to dark brown and very turbid except Site 8a which was relatively clear.

If a sample was not taken one month, more than one sample was taken the next month to catch up. The required number of samples was met or exceeded for the year. The total volume sampled at each site and the total recorded volume is given in **Table 23B of Appendix A** along with the percentage sampled per season. For detailed information on sampling events see **Table 23C of Appendix A**. The parameters listed in the Limits and Monitoring Requirements section of the permit were monitored and analyzed for the samples collected. Bacteria grab samples were taken throughout the season using standard protocols.

Sampled data for 2011 were similar to typical urban stormwater data (**Tables 23H and 23I of Appendix A**, respectively). **Table 23H** shows median values for residential sampled sites. Results were similar or less than reported NURP values with the exception of TP and TKN values. Most MPRB land use category values collectively were similar to NURP values. All metals monitored were well below NURP levels.

Most 2011 parameters were comparable or lower to the data from 2001-2010. Exceptions in 2011 where the data were higher than previous years were the residential TSS and metals, and composite land use Cu and Zn. In 2011 all three land use categories saw a decrease in median TP and TKN concentrations from the previous comparative years. It is important to note that the new sites monitored in 2005-2010 are located in different watersheds and have similar but not identical land uses to those monitored in 2001-2004.

Data from MPRB Sites 1–5a (2001–2004) and 6–9 (2005–2011) were generally similar to Sites 6–9 in 2011. All measured compared parameters were roughly equal to or lower in 2011, with the exception of Cl, TDS, and Cu.

---

<sup>10</sup>For tables referenced in this section, see Appendix A4 of this report. This section, as well as Appendix A4, are adapted from the 2010 Water Resources Report, which is produced by the Minneapolis Park & Recreation Board. These annual reports can be found at this [Minneapolis Park & Recreation website](#).

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Stormwater Monitoring – Results and Data Analysis*

---

### **Best Management Practices Monitoring Results<sup>11</sup>**

Best management practices (BMPs) include procedures and structures designed to help reduce pollutants in stormwater runoff. In 2011 the MPRB monitored two of the City of Minneapolis' stormwater ponds located at Heritage Park in north Minneapolis. Heritage Park is a 140 acre large redevelopment project which was formerly public housing and a public park. It is now a mix of public and private housing, a public park and an innovative collection of stormwater treatment systems designed to create high quality ponds as a neighborhood amenity.

The treatment-train approach at Heritage Park using grit chambers, trench forebays or sedimentation ponds, infiltration or filtration galleries, and stormwater ponds was designed for hydraulic mitigation purposes, to help reduce pollutants discharged to the Mississippi River and to create high quality amenities in an amenity-poor area of the City. Level spreaders and flow splitters are engaged to distribute flows.

The stormwater ponds located north of the intersection of Olson Memorial Highway and Van White Memorial Boulevard are referred to as Heritage Park Pond and Heritage Commons Pond, respectively. Following construction, Heritage Park Pond outlet grab sample dates were 7/30/07–11/7/07 and auto-monitoring sampling dates were, 5/8/08–9/1/08, 5/18/09–11/13/09, 5/20/10–11/17/10, and 5/17/11–11/7/11. Heritage Park Pond outlet samples were collected by flow weighted auto-monitoring. At Heritage Commons in 2007 only grab samples were collected. Heritage Commons outlet auto-monitoring was performed from 6/3/08–8/5/08, 9/7/08–9/27/08, 5/19/09–11/17/09, 4/27/10–11/17/10, and 5/12/11–11/4/11. The brief break in 2008 was caused by equipment failure.

In 2007-2011, 53 storm events were sampled at the Heritage Park Pond outlet; see Table 14-1.

**Table 14-1. Events collected for Heritage Park Pond outlet systems from 2007-2011.**

<b>Year</b>	<b>Snowmelt Events Collected</b>	<b>Storm Events Collected</b>	<b>Grab Samples Collected</b>
2007			15
2008	1	6	
2009	1	13	
2010	1	8	
2011	3	5	
Total	6	32	

---

<sup>11</sup> For tables referenced in this section, see Appendix A5. This section, along with Appendix A5, are adapted from the 2007 Water Resources Report, which is produced by the Minneapolis Park & Recreation Board. These annual reports can be found at this [Minneapolis Park & Recreation website](#).

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Stormwater Monitoring – Results and Data Analysis*

---

In 2007-2011 at Heritage Commons Pond 48 storm events were sampled at the Heritage Commons Pond north outlet; see Table 14-2.

**Table 14-2. Events collected for Heritage Commons Park systems from 2007-2011.**

Year	Snowmelt Events Collected	Storm Events Collected	Grab Samples Collected
2007			11
2008	1	8	
2009	1	9	
2010	1	10	
2011	3	4	
Total	6	31	

These data will be used to assess and give an indication of the baseline efficacy of the Heritage Park and Heritage Common BMPs and will be compared to data collected in later years. The dates and lab results are presented in **Table 24A of Appendix A**. Statistics were calculated and are presented in **Table 24B of Appendix A**. Lab values reported below detection were divided in half for statistical calculations. Mean outlet values in **Table 24B** show the results for many water quality parameters. The fact that these data were collected with construction ongoing should be interpreted as a baseline of these “disturbed” systems and not as how these systems will ultimately work.

At Heritage Park Pond outlet the geometric mean TKN, VSS appear to be decreasing over time. The TP, NH<sub>3</sub>, TSS, TDS, Cu, PB, and Zn appear to be holding steady. The TDP and NO<sub>2</sub>NO<sub>3</sub> appear to be increasing over time. This also may be the result of the pond/wetland system having time to chemically and biologically stabilize or may simply be due to the variable nature of stormwater. This system was significantly changed with the removal of the outlet weir 9/3/08 so the data must be interpreted cautiously. But it appears that the TDP increased following the removal of the weir structure.

At Heritage Commons north outlet the mean TP, NH<sub>3</sub>, and cBOD and appear to be decreasing over time. The TDP, NO<sub>2</sub>NO<sub>3</sub>, Cl, TSS, TDS, and Pb appear to be holding reasonably steady. This may be the result of the pond/wetland system having time to chemically and biologically stabilize or may simply be due to the variable nature of stormwater.

Complete inlet data are not available from either Heritage Park or Heritage Commons to perform a mass balance comparison and make definitive conclusions as to the pond/wetland systems effectiveness.

Both Heritage Commons and Heritage Park systems had some functionality issues. Some of the infiltration basins/trench forebays at Heritage Park appear to be silting in. The design engineer was made aware of these issues and is investigating and initiating repairs. Sediment also appears to be circumventing upstream treatment where silt is being deposited in front of the level spreaders.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Stormwater Monitoring – Results and Data Analysis*

---

In comparing the two system 2007-2011 data sets, the Heritage Park Pond outlet had higher median values for NO<sub>2</sub>NO<sub>3</sub>, *E. coli*, TSS, Cu, Pb and Zn. It is unknown why Heritage Park outlet had significantly higher NO<sub>2</sub>NO<sub>3</sub>, *E. coli*, and TSS. Possibilities include a larger watershed, different land use, or biological activity within the wetland/pond system.

In comparing the two system 2007-2011 data sets, Heritage Commons Pond outlet north had higher median values for TP, Ortho-P, TDP, TKN NH<sub>3</sub>, Cl, Sp. Cond, F. coli, Hardness, and TDS. It is unknown why Heritage Commons outlet had higher values for many parameters since it is a much smaller watershed. The higher NH<sub>3</sub> and Cl values may be the result of large goose and seagull populations defecating in the final ponds.

It is difficult to draw solid conclusions from this limited data set which included grab samples, limited inlet data and a dynamic system under construction. Further comprehensive study will be needed to explore and answer some of the questions raised. The most important missing piece is complete inlet data which are not available to perform a mass balance comparison and make definitive conclusions as to the pond/wetland systems effectiveness.

#### **Other Monitoring**

Minnehaha Creek at Xerxes Avenue South was monitored in 2011. Xerxes Avenue South crosses Minnehaha Creek at the border of Minneapolis and Edina. The station should allow Minneapolis to determine what is coming into the City from the upstream areas and help determine the impact of Minneapolis's stormwater on Minnehaha Creek.

The watershed discharge at Xerxes and Minnehaha Creek results from three sources. The initial runoff source is from the immediate watershed. The second runoff source is the watershed between the station and Lake Minnetonka. The third runoff source is baseflow when the dam discharges at Gray's Bay into Minnehaha Creek. The third source is intermittent because the outlet to Lake Minnetonka (at Gray's Bay) is adjustable so discharge rates vary.

2011 was the third year of comprehensive monitoring at the Xerxes-Minnehaha Creek station. In 2011, significant spring flooding delayed installation until early July. Stream stage (level) and discharge (cubic feet per second -cfs) fluctuated widely over the sampling season. The average 2011 stage was approximately two feet. In 2011 peak stage was 47.5 inches on July 16, and the lowest stage was 13.5 inches on November 1. The creek bed never went dry in 2011.

The field equipment instrumentation was an ISCO 4150 datalogger, 3700 sampler and low profile A/V (area velocity) probe. The sampler was flow paced and the level feature of an A/V probe was used to obtain stage at the Xerxes station. Initially discharge was calculated with a weir discharge equation,

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Stormwater Monitoring – Results and Data Analysis*

---

approximating the relatively flat stream bottom, and the Xerxes bridge vertical cement wall restrictions, approximating as a broad crested weir with end contractions. When enough stage discharge readings were developed by stream gauging, a datalogger look up table was used as the rating curve.

In 2011, four snowmelt events, five storms of varying intensity (minimum 0.35 in, maximum 3.71 in storms), and eleven baseflow samples were taken to determine conditions in the stream throughout the sampling season. The events were triggered on both stage and volume.

2011 baseflow conditions in the stream were markedly different from storm events. Baseflow samples generally had the same or lower concentrations of nutrients and metals than storm event or snowmelt samples. Baseflow had the highest geometric mean values for hardness. But baseflow appeared to have a higher background for many parameters and seems to chemically contribute more than expected when comparing the geometric mean data to storm or snowmelt events.

The majority of Minnehaha Creek storm events are from urban stormwater. The 2011 storm events show the single highest individually measured TSS value.

Spring snowmelt is a unique event where winter pollutants (accumulated over 4 to 5 months) are released over a short period of time. 2011 snowmelt samples had the highest geometric mean values for TP, TDP, Ortho-P, TKN, NO<sub>2</sub>NO<sub>3</sub>, NH<sub>3</sub>, Cl, TDS, and *E. coli*. As expected the spring snowmelt did show the highest individually event measured TP, Ortho-P, NO<sub>2</sub>NO<sub>3</sub>, and VSS. The source of the Cl in Minnehaha Creek is unknown but it may simply be road salt applied in winter that is continuously leaching from the soil. The MPCA chronic stream Cl standard is 230mg/L for 4 days and an acute standard of 860 mg/L for 1 hour. With the exception of snowmelt, the Xerxes Cl concentrations appear to be well below the chronic stream standard. The increased Cl is likely the cause for the elevated TDS.

### **Minneapolis Lake Trends**

In 2011, MPRB scientists monitored 13 of the city's most heavily used lakes. The data collected were used to calculate a Trophic State Index (TSI) score for each of the lakes. Changes in lake water quality can be tracked by looking for trends in TSI scores over time. These values are especially important for monitoring long-term trends (5-10 years). Historical trends in TSI scores are used by lake managers to assess improvement or degradation in water quality.

All the lakes in Minneapolis fall into either the mesotrophic or eutrophic category. Calhoun, Cedar, Harriet, and Wirth Lakes are mesotrophic with moderately clear water and some algae. Brownie, Isles, Hiawatha, Nokomis, Spring, Loring and Powderhorn Lakes are eutrophic with higher amounts of algae. Webber Pond fluctuates between these two categories. Trends in lake water quality can be seen by using the annual average TSI score over the last 20 years.

---

## NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

### *Stormwater Monitoring – Results and Data Analysis*

---

<b>Lakes with increasing water quality indicators</b>	<b>Lakes with stable trend</b>	<b>Lakes with decreasing water quality indicators</b>
➤ Lake Calhoun	➤ Brownie Lake	➤ Diamond Lake
➤ Cedar Lake	➤ Lake of the Isles	➤ Loring Pond
➤ Lake Harriet	➤ Lake Nokomis	➤ Spring Lake
➤ Powderhorn Lake	➤ Webber Pond	
➤ Wirth Lake	➤ Lake Hiawatha	

### **2011 Water Resources Report**

The Minneapolis Park & Recreation Board's annual **2011 Water Resources Report** is a comprehensive technical reference of water quality information for the citizens of Minneapolis. Due to the length of this document, only the NPDES stormwater runoff monitoring and BMP monitoring sections are included in Appendix A of this NPDES MS4 Annual Report. Electronic copies of the *2011 Water Resources Report* <http://www.minneapolisparcs.org/default.asp?PageID=791> are available on the MPRB web page at [www.minneapolisparcs.org](http://www.minneapolisparcs.org). The whole report can be found in the "Caring for Our Parks - Lakes & Water Resources- Water Quality" section of the website. Reports are also available to be checked out from Minneapolis public libraries.

## XV. Storm Drain System and Drainage Areas Inventory

### **Storm Drain System Infrastructure**

The City of Minneapolis storm drain system handles runoff from approximately 50 square miles, and is the key element in ongoing efforts for flood protection and programs to improve and maintain water quality for the City's wetlands, lakes and streams.

#### **History**

From 1870 to 1922, all sewers built in Minneapolis were combined sewers intended to convey both sanitary sewage and stormwater runoff. In 1922, the City began construction of a separate storm drain system in newly developing areas of the City. In older previously developed areas, combined sewers continued as the only drainage system until 1960, when the City began actively separating combined sewers. From 1961 to 1984, construction of new storm drain piping proceeded in conjunction with the City of Minneapolis Residential Paving Program. In 1984, storm drain construction for sewer separation was accelerated because of development of a formalized Combined Sewer Separation program, called CSO Program, Phase I. There are currently approximately 600 miles of main line storm drain piping and 17 miles of deep drainage storm tunnels within the City of Minneapolis. This total does not include the State of Minnesota Department of Transportation, Hennepin County, the University of Minnesota or other agency systems. Approximately 91% of the City's storm drain system is constructed of reinforced concrete pipe (RCP). Service connections to catch basin inlets and private drains are mainly constructed of Polyvinyl Chloride (PVC). In 2003, the Minneapolis Public Works Department (MPW) was assigned to take over the storm drain system of the Minneapolis Park and Recreation Board (MPRB). This added roughly 17 miles of mainline piping and approximately 100 outfall control structures to the Minneapolis system (the exact number and delineation of areas drained is to be determined by a field survey). The total replacement cost of the City's storm drain system exceeds \$860 million (based on year 2000 dollars). In addition to the main line piping, MPW also maintains approximately 151 miles of catch basin runs.

#### **Structural Controls**

The City of Minneapolis owns and operates 25 stormwater pump stations, 156 sedimentation (grit removal) structures, 387 outlets (exclusive of the added MPRB outlets noted above), and 30 stormwater ponds and wetlands. Grit removal structures, stormwater ponds, stormwater wetlands and outfall locations are displayed in Appendix B.

---

# NPDES MS4 PHASE I PERMIT ANNUAL REPORT FOR 2011 ACTIVITIES

---

## *Storm Drain System and Drainage Areas Inventory*

---

### **Drainage Areas and Discharges**

**Drainage Areas Inventory:** The City of Minneapolis contributes stormwater runoff to Minnehaha Creek, Bassett Creek, Shingle Creek and Mississippi River watersheds. A map of the drainage areas that have been delineated according to topographic contours and the storm drain system is included in Appendix B. The population, size of drainage area, land uses, distribution, and runoff coefficients by body of receiving water are listed in Appendix A1.

### **Event Mean Concentration and Annual Pollutant Loadings**

Calculated event mean concentrations and annual pollutant loading are included in Appendix A7. The following formula was used to calculate the total annual pollutant load:

$L = [(P) (P_j) (R_v) (C/1000) (A*4046.9)]$ , where:

**L** = seasonal pollutant load, kilograms/season

**P** = seasonal precipitation, inches/season (meters/season)

**P<sub>j</sub>** = correction factor for storms which do not produce runoff = 0.85

**R<sub>v</sub>** = runoff coefficient

**C** = median event mean concentration of pollutants, mg/L

**A** = area, in acres

Conversion factors were used to convert acres to square meters, and to adjust the concentration data units. Conversion factors are as follows:

- 4,046.9 for acres → square meters
- 1,000 for liters → cubic meters

The Flow Weighted Mean Concentration (FWMC), expressed as a mean of all sites, was used for the annual load estimation calculations. The FWMC most accurately reflects stormwater loading on an annual basis. The seasonal loads were calculated from the pooled data using the median event mean concentration, as there were too few data points from each watershed. The median of the data set is a better representation of the runoff data than the mean values (Bannerman, et al, 1992). The annual load, and a summation of the seasonal loads, will not be equal due to this difference in calculation methods.

- Seasonal loads were calculated on the following basis:

Season	Inclusive dates	Precipitation, National Weather Service
Winter/snowmelt	01/01/11 - 03/31/11	4.18 inches (0.106 meters)
Spring	04/01/11 - 05/31/11	6.84 inches (0.174 meters)
Summer	06/01/11 - 08/31/11	13.54 inches (0.344 meters)
Fall	09/01/11 - 12/31/11	2.35 inches (0.060 meters)

[end of document]