

City of Saint Paul's
Stormwater Permit Annual Report
2011 STORMWATER MANAGEMENT PROGRAM & 2010 ACTIVITIES



Minnesota Pollution Control Agency
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
Permit No. MN 0061263
September 28, 2011



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Background

The NPDES program was created in 1990 by the United States Environmental Protection Agency (USEPA) 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, construction and industrial activities.

The MPCA issued the first Municipal Separate Storm Sewer System (MS4) NPDES Permit to the City of Saint Paul on December 1, 2000. The City's MS4 Permit was reissued on January 21, 2011. The reissued permit requires submittal of a revised Stormwater Management Program on September 28, 2011.

The MS4 Permit requires the implementation of approved stormwater management activities, referred to as Best Management Practices (BMPs). These efforts must be documented in the form of a Stormwater Management Program and Annual Report. The Permit also requires public input in the development of the priorities and programs, and adoption by Council Resolution of the Annual Report. This Report presents the activities that will be implemented this year, and provides documentation and analysis of the activities conducted during the previous year.

The Saint Paul SWMP is developed and administered by the City departments that are responsible for permit activities. Included are the Public Works Department, Saint Paul Park and Recreation Department and the Department of Safety and Inspection. These stakeholders are jointly responsible for the completion of the required Permit submittals. Staff from the Department of Public Works and the Department of Safety and Inspections provides program coordination.

This report is prepared in compliance with the requirements of NPDES Permit MN 0061263 issued to the City of Saint Paul on December 1, 2000. This permit expired on January 1, 2004. An application for reissuance was submitted to the MPCA in July of 2003. As per federal and state law, the City is operating under the existing permit until the permit is reissued and the City's SWMP is approved.

MS4 Permit Coordinators

Anne Weber
Department of Public Works
651-266-6245
anne.weber@ci.stpaul.mn.us

Wes Saunders-Pearce
Department of Public Works
651-266-6245
wes.saunders-pearce@ci.stpaul.mn.us

I. Storm Sewer System Management

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 sewer system. Targeted pollutants include:

- Sediment
- Nutrients
- Floatable Garbage

Program Overview

The City's stormwater system includes 450 miles of storm sewers, 26,000 storm sewer catch basins, 28 storm water ponds, numerous water quality best management practices and 4 storm water lift stations. The Sewer Maintenance Division allocates substantial resources to cleaning, inspecting and maintaining the City's stormwater system. All installed stormwater facilities are maintained and operated in accordance with adopted policies and ordinances. All storm sewer pipes are cleaned and inspected in advance of City street reconstruction projects. Where defects are observed, repairs are made at the time of discovery or during the reconstruction project. The City also regularly inspects, cleans and maintains stormwater ponding areas. Storm sewer tunnels are inspected every two years.

In 1995, the city completed a ten-year sewer separation program by constructing 189 miles of storm sewer and 12 miles of sanitary sewer (some combined sewer was converted to storm sewer). In 1997, the city began a 20-year rehabilitation program for its storm and sanitary sewer system. The Sewer Utility complies with Mn/DOT's Standard Specifications for Construction, and has developed its own set of Standard Plates.

Activities

1. *Storm Sewer and Storm Tunnels*

- **St. Anthony Park Storm Tunnel System** - The 3.6 mile long St. Anthony Park Storm Tunnel System was originally constructed in the 1960s and 1970s. The tunnel liner is severely damaged with numerous holes and cracks. The damage is primarily caused by large rain events that pressurize the tunnel. When the tunnel liner is fractured or holes are present, stormwater is allowed to wash away friable St Peter Sandstone, resulting in large voids behind the liner. A three phase tunnel repair project was started in the fall of 2009 and is estimated to be complete in the spring of 2012 at an overall project cost of \$10.2 million. The project includes the following components: sealing cracks and holes in the tunnel liner, filling large voids behind the tunnel liner, replacing sections of tunnel liner too badly damaged to be repaired and installing stainless steel straps on the inside surface of the tunnel liner to reinforce the cracked liner.
- **Dodd Road Storm Sewer** – In December of 2009, the City hired a consultant to complete the Dodd Road Storm Sewer Modeling and Feasibility Study. The study is part of a Joint Powers Agreement with the City of West Saint Paul.

2. *Storm Drain Outfalls*

A storm drain outfall is the point where the storm sewer system discharges to a receiving water. 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 reported to the appropriate City staff for follow-up investigation and resolution and reported to the Minnesota Duty Officer as required. Any identified structural repairs or maintenance work is prioritized and scheduled within the constraints of available personnel, funding and coordination with other essential operations. The Appendix contains the outfall inspection information.

3. *Catch Basins*

A catch basin is an inlet to the storm drain system. A field survey of the City's catch basins using GPS equipment located all city owned catch basins. The total number of catch basins inventoried was 26,096. There is no formalized inspection schedule; however, Sewer and Street Maintenance crews routinely look for plugged or damaged structures. Catch basins that are reported as plugged or damaged are given a priority for repair and 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 Division. The street sweeping program targets the pick-up of street sediment, debris and leaves 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. Catch basin sumps are vactored prior to repair and in response to ponding or plugging.

4. *Stormwater Ponds*

Saint Paul's stormwater ponding areas are constructed to collect and detain flows from storm events and in some cases improve water quality. These ponds are designed to reduce peak flow rates in downstream storm sewers. A map showing the stormwater ponding areas in the City of Saint Paul is found in the Appendix. The Appendix also contains the tributary area and design capacity for each City ponding area and a list of stormwater ponding areas by watershed. The City's stormwater ponding areas are inspected by Sewer Maintenance staff after major rainfall events. Minor maintenance is completed as needed based on the inspection results.

The City implemented a program to evaluate its ponding areas for major sediment removal in 2002. This program involves an initial inspection, prioritization, survey, timber removal, sediment removal and inlet/outlet reconstruction. Major sediment removal took place in a majority of the city's ponds in the winters of 2002/2004 and 2003/2004. The estimated cycle for sediment removal from ponding area is 20 years. The summary of the work performed on the stormwater ponding areas is included in the Appendix.

5. *Pump Stations*

The City has four stormwater flood control pump stations that are located along the Mississippi River. These pump stations provide interior drainage during flood events on the Mississippi River. The stormwater flood control pump stations are inspected and operated twice per year. All of the stations are connected to the City's Supervisory Control and Data Acquisition system.

6. *Water Quality Best Management Practices*

The city constructs water quality and volume control BMP's as required by the MPCA Construction Permit and the Watershed District Rules. Since 2006, the City has constructed BMP's, including infiltration trenches and rain gardens, as part of the Residential Street Reconstruction Projects. Sewer Maintenance is cleaning and inspecting infiltration trenches the year after construction and then on an as needed basis. The trenches constructed as part of the Arlington/Pascal project upstream of Como are cleaned and inspected twice per year.

7. *Water Quality Initiatives Program*

The City's Water Quality Initiatives Program (see Appendix) includes the following components:

- **Volume Reduction Inventory** - Development of a long term strategy to construct storm water improvements on opportunity sites. Draft completed in 2010. Report to be finalized in 2011.
- **Storm Water Modeling** - Identify the hydraulic/hydrologic properties of the City's existing storm sewer system and locations where improvements are needed. The modeling of three subwatersheds was completed in 2010. A summary of the Mississippi River Boulevard, St. Anthony Hill and Riverview Stormwater Modeling Reports are found in the Appendix.
- **2010 RSVP Storm Water Study** - Identify potential water quality BMPs to be constructed as part of the 2010 RSVP projects.
- **Water Quality Improvement Feasibility Studies** - Identification of feasible options to provide water quality treatment in specific locations within the City.

The following is a list of projects and studies that were completed under the City's Water Quality Initiative Program:

- **Arundel Water Quality Improvements Project** - The Arundel site has a total drainage area of 4.89 acres. Currently, untreated stormwater from this drainage area is conveyed through the existing storm sewer system to the Mississippi River. To improve stormwater quality and reduce the volume of stormwater runoff from this drainage area, a below grade infiltration system has been constructed in Arundel Street between University Avenue and Aurora Avenue. The total storage volume of the BMP is 4443 cu-ft. The BMP is anticipated to infiltrate 12,327 cu-ft of stormwater runoff during a 2"/24hr rainfall event. This project was completed in the fall of 2010 at a cost of \$50,000.
- **Victoria Street Water Quality Improvements Project** - The Victoria Street site has a total drainage area of 19.11 acres. Currently, untreated stormwater from this drainage area is conveyed through the existing storm sewer system to the Mississippi River. To improve stormwater quality and reduce the volume of stormwater runoff from this drainage area, a below grade infiltration system has been constructed in the westerly boulevard of Victoria Street between Orchard Avenue and Jessamine Avenue. The total storage volume of the BMP is 16,901 cu-ft. The BMP is anticipated to infiltrate 48,834 cu-ft of stormwater runoff during a 2"/24hr rainfall event. This project was constructed in conjunction with the 2010 Front/Victoria RSVP project and completed in the fall of 2010 at a cost of \$130,000.
- **2010 Page/Woodbury RSVP Feasibility Study** - This effort was completed in the summer of 2010 and identified a number of potential stormwater volume reduction projects which would meet the stormwater management goals of the watershed management agency and the City. Potential projects identified in the report include the following:
 1. Bluff Park Ravine
 2. Boys and Girls Clubs of America Athletic Fields
 3. Brown Avenue Right-of-Way
 4. Woodbury Street Right-of-Way
 5. Our Lady of Guadalupe Church Overflow Parking Area
 6. Holman Field Airport Wetland

Stormwater management techniques proposed at these sites include infiltration, filtration, stormwater reuse, alum treatment, wetland enhancement and conventional sedimentation.

- **Hillcrest Knoll Park Water Quality Improvements Project** - Hillcrest Knoll Park was constructed to serve as a flood reduction project for the neighborhood. The park has been identified as an ideal location to reduce stormwater runoff volumes and improve the water quality of receiving waters. The preliminary stormwater design includes the following components:
 1. Bypass system from the Flandrau Street storm sewer that directs flows to the proposed Hillcrest Knoll Park system.
 2. Water reuse / irrigation facility including underground concrete reservoir, irrigation pump, control panel, irrigation system for the Hillcrest Knoll site and overflow structure directed to infiltration facility.
 3. Infiltration facility including perforated pipe gallery and overflow to existing storm sewer.
 4. Erosion control and restoration activities associated with proposed improvements.

The Hillcrest Knoll Water Quality Improvement Project is tentatively scheduled to be constructed in 2012. The potential credit volume of stormwater runoff is calculated to greater than 70,000 cu-ft.

- **College Park Water Quality Improvements Project** - The College Park site has a total drainage area of 81.7 acres. Currently, untreated stormwater from this drainage area is conveyed through the existing storm sewer system to the Mississippi River. To improve stormwater quality and reduce the volume of stormwater runoff from this drainage area, a below grade infiltration system will be constructed in a portion of College Park. The total storage volume of the BMP is 99,457 cu-ft. The BMP is anticipated to infiltrate 199,347 cu-ft of stormwater runoff during a 2"/24hr rainfall event. This project is scheduled to begin in the fall of 2011 with completion in the spring of 2012 at a cost of \$950,000.

- **St. Albans Water Quality Improvements Project** - The St. Albans site has a total drainage area of 22.19 acres. Currently, untreated stormwater from this drainage area is conveyed through the existing storm sewer system to the Mississippi River. To improve stormwater quality and reduce the volume of stormwater runoff from this drainage area, a below grade infiltration system has been constructed in St. Albans Street between University Avenue and Aurora Avenue. The total storage volume of the BMP is 23,042 cu-ft. The BMP is anticipated to infiltrate 65,210 cu-ft of stormwater runoff during a 2"/24hr rainfall event. This project will be completed in the fall of 2011 at a cost of \$290,000.

Performance Measures

- Inspected 12 miles of storm sewer
- Continued a major tunnel rehabilitation project.
- Inspected 86 of 106 storm drain outfalls.
- Cleaned 1600 catch basins.
- Cleaned 218 storm sewer manholes
- Inspected 25 and repaired 143 storm sewer manholes
- Inspected and maintained stormwater ponding areas.
- Inspected and maintained pump stations.
- Constructed water quality BMPs.
- Completed feasibility studies.

Work Plan

Management and maintenance of the City's storm sewer system will continue as in prior years including implementation of the City's Water Quality Initiative Program.

II. Disposal of Removed Substances

Program Objective

The objective of this 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. 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

Material is collected from catch basin sumps, the storm sewer system, ponding areas and water quality BMPs. Removed substances are screened for visual or olfactory indications of contamination. If contamination of the material is suspected, representative samples are selected for an environmental analysis. Contaminated substances are disposed of in a landfill or another site that is approved by the Minnesota Pollution Control Agency. Uncontaminated sediments are disposed in the same manner as street sweepings, as reported in Section IV Street Management Program. During cleaning operations, erosion control measures are applied as needed to prevent removed material from re-entering the storm drain system.

Work Plan

Disposal of removed substances will continue as in previous years.

Performance Measures

- Quantity of materials removed: 6,741 cubic yards

III. New Development and Construction

Program Objective

The objective of this NPDES stormwater management program is to minimize the discharge of pollutants through the regulation of construction projects and new developments. Regulation of stormwater runoff includes erosion and sediment control requirements. Targeted pollutants include:

- Phosphorus
- Sediments

Program Overview

Saint Paul Code of Ordinances, Part II – Legislative Code, Title VI - Building and Housing, Chapter 52 Stormwater Runoff contains erosion and sediment control requirements, and stormwater management requirements for new developments and other land-disturbing construction activities. Construction activities and new development projects are reviewed through the City's Site Plan Review process. This review provides comments that are integrated into a final plan submittal that is subsequently routed to the City's Departments for approval. The Department of Safety and Inspections reviews projects for compliance with the erosion & sediment control requirements and water quality requirements. The Sewer Utility reviews projects for rate control, flood protection and capacity issues.

Activities

Site Plan Review

During 2010, the City Departments reviewed 124 preliminary site plans. Of those 124 sites, 98 site plans received final approval with the appropriate permits issued. Continued attention to erosion and sediment control plan submittals, along with increased awareness in the industry, provided for better compliance during site inspections.

Erosion and Sediment Control

Requirements

The ordinance addresses development sites, utility excavations, demolition projects and all other land disturbing activities of 1 acre or more. For disturbances less than 1 acre, erosion and sedimentation control practices must be installed and inspected before land disturbing activities begin. Sites disturbing more than 10,000 square feet need to submit an erosion and sediment control plan as part of the City's Site Plan Review process. City Zoning Code Chapter 33 requires a grading permit for the placement, movement and removal of fifty cubic yards of fill and to incorporate stabilization methods on soil stockpiles greater than 10 cubic yards, if left for more than 10 days.

Inspection and Enforcement

Ongoing site inspections are performed by Public Works ROW and DSI inspectors. The City of Saint Paul utilizes standard forms for both public and private construction sites. The standard form utilized for documenting field inspections for street reconstruction projects is intended to be handwritten in the field and included in the project file. The forms were developed in 2010 and implementation is planned for 2011. The standard form utilized for documenting field inspections on private projects is found in the Appendix. The forms supplement a database which tracks multiple levels of information including inspections for erosion control.

Inspectors may issue a warning notice citation or a "Stop Work Order". Failure of the permittee to comply with the ordinance will constitute a violation and will be considered a nuisance pursuant to the laws of the State of Minnesota. If there is a demonstrated failure to comply, the City reserves the right to terminate a 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. Increased awareness of the ordinance, improving plan submittals and a continued compliance based inspection program resulted in a continued rise in compliance. Inspections were coordinated with the Capitol Region and Ramsey-Washington Metro Watershed Districts. During 2010, Public Works Construction inspectors continued to work with internal forces on erosion and sediment control compliance.

Ongoing Stormwater Management

Redevelopment of existing sites provides an opportunity to lessen the impacts of urbanization on the Mississippi River and other Saint Paul water resources. During 2010, Stormwater Best Management Practices (BMPs) were installed on sites reviewed through the Site Plan Review process. BMP types that were constructed include:

- Rain gardens
- Pervious pavement
- Infiltration areas
- Stormwater ponds
- Underground infiltration/filtration and detention facilities

Plan Review

Stormwater management plans are required for all construction projects, which disturb one acre or more of land. These plans are reviewed through the Site Plan review process and approved by the Department of Safety and Inspections and the Saint Paul Public Works Sewer Utility. Sites disturbing less than one acre are also required to provide runoff rate control, if the project disturbs greater the 10,000 square feet. In addition, sites under one acre are encouraged to incorporate green infrastructure stormwater BMPs into their design as a means of satisfying other city codes, such as parking requirements. The City updated its Off-Street Parking Code to include stormwater landscaping requirements in June of 2010. In July of 2010, the City began implementation of the green building policy requirements for city building projects and private projects receiving more than \$200,000 in City funding to facilitate design and construction of stormwater quality practices. The parking and green infrastructure requirements are including in the Appendix.

A description of the site plan review process is accessible on the City's website (www.stpaul.gov/index.aspx?NID=1073). This provides subsequent links describing requirements, review process, and submittals

Goals

- Reductions of sediment and nutrient discharges to receiving waters
- Controlled rate of runoff
- Provision of on-site, off-site or regional stormwater facilities
- Maximizing infiltration by minimizing the amount of impervious surface
- Employing natural drainage and vegetation

Standard Operating Procedures and Checklists

The City has developed the following standard operating procedures (SOPs) and checklists for Erosion and Sediment Control (ESC) on public and private construction sites:

- The City of Saint Paul utilizes a standard form for both public and private construction sites.
- Public Works Right-of-Way Division a form when ROW inspectors inspect Utility Installation work. This was implemented in late summer 2009 with revisions made for the 2010 Construction Season. This form was distributed at the annual Utility review meeting. (See Appendix.)

Staff Training

- ESC information was distributed at the City's Annual Utility Project Review meeting in February 2010.
- The City's Water Resource Work Group held a training in January 2010 with 69 staff from Parks and Recreation, Safety and Inspections, Public Works and Contract Services. The instructor was from the University of Minnesota Erosion and Stormwater Certification Program. (See Appendix)
- City of Saint Paul inspectors are trained and certified through the University of Minnesota's Erosion and Stormwater Management Certification Program. This includes Department of Public Works Street Construction inspectors as well as Department of Safety and Inspections Building inspectors. The certification includes a recertification component within a 3-year period, which ensures training stays current with techniques and regulations.

Performance Measures

- Tracking all erosion control plans and inspections in City's AMANDA system.
- Handouts and worksheets to be distributed to all relevant applicants.

Work Plan

Site Plan Review

DSI and Public Works staff will continue their detailed review of site plans and a tracking process to identify stormwater management opportunities and to review all site plans from a sustainable water quality perspective.

Erosion Control

New public and private developments and other projects that disturb one acre or more will be inspected for Erosion and Sediment Control. This effort will lead to a continued awareness of the problems associated with construction site sediment. This will also result in a continuing increase in the overall rate of compliance citywide. The City will continue to study options to increase compliance, and to help limit the amount of erosion and sediment loss associated with construction projects.

Data Collection and Analysis

City staff will continue to develop performance measures and to improve data collection, tracking and analysis. The City will also pursue means of measuring and understanding water quality impacts.

Standard Operating Procedures and Checklists

- Continue to improve SOPs and checklists and distribute to appropriate parties.

Staff Training

- City staff has and will continue to be trained and certified as required by the MPCA's General Construction Permit.
- Review Erosion Control requirements at the annual Utility Coordination Meeting.

IV. Street Management Program

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:

- Sediment
- Nutrients
- BOD
- Chloride
- Floatable Garbage

Program Overview

Street Sweeping

The City of Saint Paul conducts a street and alley cleaning program to promote the health and welfare of its citizens and to reduce the amount of pollutants to receiving waters from stormwater discharges. Sweeping is a major operation for the Street Maintenance Division and is done every month of the year, day and night. Elgin Pelican mechanical sweepers handle the vast majority of the sweeping. An Elgin Crosswind Regenerative air sweeper is utilized downtown. A second Crosswind was purchased in 2005 and is now in use.

In recent years, the target date for completion of spring sweeping has moved up from Memorial Day to May 15th. The primary material swept in the spring is debris from winter months. Fall sweeping is done during the last week of October and the first half of November. The fall sweep is timed so that a majority of the leaves are down and enough time is allowed to sweep all Saint Paul streets before the November snows. Currently, the wide variety of trees with varying leaf drop times makes it impossible to wait for all of the leaves to drop. To compensate for this, touch up sweeping continues most years through November and early December. In the interest of continued improvement to our sweeping program, workers attend training and best management practices are implemented.

Snow and Ice Control

Minnesota weather requires ice control from late September through early May. Frost forming on bridge decks is usually the first and last ice control event of the winter season. From early November through mid-April, the need for pavement treatment is determined by temperature and precipitation. Frequency of snow events through the winter season influences amounts of material used. The City's foremost objective is to maintain safe roads for all users. The consequences of icy roads are longer travel times, adverse economic impact, accidents and injuries.

Salt is the primary material used to melt snow and ice. Salt is effective to -6°F, but factors such as darkness, continuing snow, temperatures below 10°F or type and quantity of precipitation all reduce melting performance. Sand is sometimes used in conjunction with salt to enhance traction, usually when temperatures are below 0°F and snowfall amount is likely to be greater than 3 inches. Specific application rates are decided upon for each snow event and adjusted to the minimum amount necessary to achieve the desired results.

Saint Paul uses treated salt for temperatures below 15 °F and regular salt for temperatures between 15°F and 32 °F. Salt brine is used to pretreat salt from the salt spreaders, making the salt more effective. The benefits of pretreated salt are better melting performance, less bounce, residual value and reduction in amount of salt used. Twelve sander trucks are presently fitted with salt pre-wetting equipment.

Storage of De-icing Materials

Salt and mixed piles of sand and salt are covered year round to eliminate runoff. Storage facilities are located at the following locations:

873 N. Dale Street
310 South Victoria Street

Activities

Street Sweeping

Streets and alleys are divided into classes, each of which receives a different level of service as defined below:

Class I-A & B Downtown or Loop streets

Downtown or loop streets are within the following boundaries: Kellogg on the south, 12th on the north, Broadway on the east and Main on the west. These streets are swept approximately two times per week during the spring, summer, fall and winter as weather allows. All routine maintenance, including patching and repairing of street surfaces, is performed on an as-needed basis.

Class II - Outlying Commercial and Arterial Streets

These streets, which have business or commercial properties fronting on them, are the City's major arteries. They have heavy volumes of both vehicular and pedestrian traffic. Typical examples are University, Snelling, West 7th, East 7th, Rice, Payne, Arcade, Summit and Grand. Class II streets are swept or cleaned eight to ten times annually on the following schedule: every two weeks in April, May, October and November for spring and fall cleanup and every three weeks in June through September for litter, tree debris and sediment. Occasional winter sweeping is also done. All routine maintenance, including patching and repairing of street surfaces, is done on a scheduled or as-needed basis.

Class III - Residential Streets

In the spring, all residential streets, including oiled, paved and intermediate streets, receive a thorough sweeping. Patching and repairing is done on a scheduled or as-needed basis. All existing paved and oiled streets are on the 10-year cycle chip seal list. Approximately 72 miles of paved streets were chip sealed in 2009. Oil and sand sealing of oiled streets is no longer done. The City recycles reclaimed sand and seal rock. These materials are no longer hauled to the landfill. In the fall, streets are swept for leaf pickup. All material swept up during the fall cleanup is hauled to a commercial composting facility.

Class IV - Oiled and Paved Alleys

All oiled and paved alleys are swept during the late spring. All routine maintenance, including patching and repairing of the alley surfaces, is performed on a scheduled or as-needed basis. All existing paved and oiled alleys are on the 10-year cycle chip seal list. Oil and sand sealing of oiled alleys is no longer done.

Class V and VI - Unimproved Streets and Alleys

Unimproved streets and alleys are right-of-ways that have not been developed. There are approximately 50 miles of unimproved streets and approximately 288 miles of unimproved assessed alleys in the City. Because they are City right-of-ways, the City has the responsibility to perform minimal repairs and maintenance work on them to make them passable and to reduce hazards. The maintenance and repair of these streets and alleys consists of patching, minor blading, and placing of crushed rock or other stabilized material.

Disposal

The materials collected from street sweeping are delivered to the City's Pleasant and View yard. The City's hauling contractor hauls the material away to have it screened and disposed of properly. The contractor composts the organic materials, which are mostly collected in the fall sweep.

Street Maintenance has a Hazardous Waste Disposal Policy in place. Any hazardous materials collected from city streets are disposed of in environmentally acceptable means. In 2001, the sweepings collected from city streets and alleys were tested and found to be within EPA (Environmental Protection Agency) guidelines for recycling purposes after screening out waste and debris. Only 7 to 10% of swept up material are disposed of in a landfill. Street Maintenance also services over 360 trash receptacles and disposes of refuse from neighborhood cleanups each year.

2010 Street Sweeping Quantities (Cubic Yards)

Class	Spring	Fall
I & II	4,200	7,630
III	5,810	13,874
Totals	10,010	21,504

Snow and Ice Control

The 2010 winter season was quite severe, with severe storms in late December 2009 through February 2010. Seven snow emergencies were declared in 2010, typically 3 or 4 are declared. It is anticipated that 2011 may see an increase in salt use from 2010, based on winter conditions in early 2010. The following ice control materials were used in 2010:

17,097 tons salt
88 tons sand
1,697 tons treated salt

Employee Training

Saint Paul Public Works is an advocate of networking and regularly attends events such as the American Public Works Association North American Snow Conference and the Fresh Water Society Road Salt Symposium. All operators attended a Snow and Ice Control training session in November of 2008. A total of 70 employees attended a training session on Sensible Material Application for Snow and Ice Control in 2009. The main purpose of this session is to train employees to get the most out of every application, maintaining the safest roads possible in the most economical way, while protecting the environment. The session addressed the following: abrasives, salt, pre-wetting, anti-icing, equipment calibration and material storage. The Minnesota Snow and Ice Control Handbook is available to all employees and is used as a guide in our best practices.

Performance Measures

- Amount of materials recovered
- Amount of salt and sand applied

Work Plan

Ongoing activities to fulfill permit requirements will continue. Additional education opportunities will be explored for management and maintenance workers. Management will keep abreast of new technologies for snow and ice control and street sweeping, as they become available. Promising technologies will be tested on a pilot basis before implementation.

V. Pesticide and Fertilizer Management

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
- Nutrients

Program Overview

In November of 2001, the Saint Paul City Council passed an ordinance regulating the use of lawn fertilizer containing phosphorus in the City of Saint Paul. The ordinance bans the use of fertilizer containing phosphorus in the City with the exception of establishing a new lawn or if a soil test shows that phosphorus is needed. The ordinance also requires retailers to clearly label fertilizer containing phosphorus and post a notice advising that the use of such fertilizer is restricted within the City. In addition, the City amended an ordinance regulating commercial applicators in Saint Paul. The amendment requires commercial fertilizer applicators to be licensed by the City in addition to the pesticide applicators. The state passed legislation that sets a 0% phosphorus ban on fertilizer for the metro area effective in 2004.

The City has strict requirements that are followed for applications on all City facilities. All city programs for pesticide use shall be reviewed and approved by the city council prior to any application upon city property. Each use of pesticide or fertilizer is documented and reported to the City Clerk and to the District Council in which the application occurred. City policy was developed upon the recommendations of a report done by the City Council Investigation & Research Center in May of 1990. In addition, all City staff that applies pesticides and fertilizers must be licensed in accordance the City Ordinance, which requires commercial applicators to be licensed by the City.

Activities

Pesticide and Fertilizer Use on City Facilities

The City will continue to apply pesticides and fertilizer, document and report use in accordance with these requirements. The Department of Parks and Recreation follows an Integrated Pest Management program with the goals of decreasing pesticide use and replacing synthetic herbicides with organic alternatives when feasible.

Public Education

The City distributed over 80,000 “Green up Your Lawn, Not Your Lakes and Rivers” brochures with the Storm Sewer Service Charge Mailing. The City continues to participate in the Watershed Partners, Minnesota Water Media Campaign. Part of this effort was to update the Phosphorus fertilizer information brochure. Additional information on public education and outreach is found in that section of the report. Copies of the brochures are found in the Appendix.

Performance Measures

- Number of staff with pesticide application licenses.
- Amount of materials applied.
- 80,000 “Green up Your Lawn” brochures distributed with the Storm Sewer Service Charge Mailing.

Work Plan

- Continue to certify employees as pesticide applicators
- Continue to track applications of pesticides on city property.
- Continue to implement Integrated Pest Management on park property.
- Continue to coordinate with existing education efforts, such as WaterShed Partners, to develop and distribute educational pieces.

VI. Prohibited Discharges to the Storm Sewer System

Program Objective

The objective of this stormwater management program is to minimize the discharge of pollutants by implementing a program to detect and mitigate prohibited discharges, and to encourage that an NPDES General Industrial Stormwater Permit or other such permit be obtained for non-stormwater discharges, if applicable. Targeted pollutants include:

- All pollutants

Program Overview

Spill Response

The Sewer Maintenance section of the Sewer Utility and the Saint Paul Fire Department personnel typically serve as the first responders to a spill event. The immediate goals of this response are safety, containment of the spill, recovery of hazardous materials and collection of data for use in assessment of site impacts. Recovery efforts can take several forms, but typically fall into two broad categories: recovery for disposal and the use of absorbents or other media to collect hazardous waste for disposal.

The life cycle of an event requires City personnel to work as a team, utilizing all available resources to protect residents, the environment and property. Each event is followed by a post-action debriefing to determine the cause of the event, to identify measures to improve the City's response, and to determine the means to limit future occurrences. Outside agencies and private emergency response contractors are incorporated as needed. Spills that fall within the minimum reporting requirements are reported to the Minnesota Pollution Control Agency (MPCA) Public Safety Duty Officer. For these spills, an Oil and Hazardous Materials Spill Data form must be completed within 24 hours, or by the next business day. The completed forms are used to document the type of spill, as well as the response to the spill.

Prohibited Discharges

Pollution prevention and control is achieved through educational efforts, inspections and coordinated community outreach. These activities may include enforcement, pursuant to 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 efforts to reduce the flow of pollutants from illegal dumping and disposal. Complaints are received from the public, City staff and other government agencies. Department of Safety and Inspections and Public Works staff respond to reports of unauthorized discharges and illicit connections.

The City is in process of developing of an ordinance defining allowable discharges to the storm sewer system. Meetings were held in 2010 with staff from the Safety and Inspections, Public Works and the City Attorney's Office. The ordinance was also discussed at meetings of the City's Interdepartmental Water Resource Work Group. The City will continue to develop this ordinance in 2011.

Non-Stormwater Discharges

The following non-stormwater discharges are not a significant source of pollutants and no additional control measures are needed for these discharges:

- NPDES permitted non-stormwater discharges
- Water line flushing and other discharges from potable water distribution system
- Landscape irrigation and lawn watering
- Irrigation water
- Diverted stream flows
- Rising ground water
- Foundation and footing drains
- Water from basement sump pumps
- Air conditioning condensation
- Springs
- Individual residential and fund raising car washings
- Flows from riparian habitats and wetlands
- Swimming pool discharges
- Flows from fire fighting

Detection and Removal Screening Program

The field screening program to detect and investigate contaminated flows in the storm drain system is part of the City's 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 outfall inspection program. Any suspect flows are then reported to appropriate City staff for further investigation. These combined efforts result in an annual screening of more than 20% of City drainage areas. The City has an agreement with the Capitol Region Watershed District to conduct a stormwater monitoring program in Saint Paul. The intent of this partnership is to establish a baseline of chemical, physical and biological parameters. The best avenue for a continued effective screening program in the City of Saint Paul, 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.

Activities

The City investigates prohibited discharges as part of its regular outfall and pond inspection program. The City also investigate complaints and issues identified in the monitoring program. The materials from the July 2010 training, including the presentation and the workbook, and the Center for Watershed Protection IDDE Manual are used for implementation of this program. The development of a targeted approach will be included in the City's updated SWMP for the reissued MS4 Permit.

The Department of Safety and Inspections carries out enforcement on property code violations. Under Chapter 45 of City Code, the City is authorized to collect via assessment its cost of abating property-related health and safety problems when an owner has failed to perform the work following notice by the City. The City may assess property owners to recover unpaid city charges.

The following is a summary of complaints and follow-up actions that took place in 2010:

- East Kittsondale Subwatershed - The monitoring data from this storm sewer showed high levels of bacteria. The PW Sewer Utility hired a consultant to investigate the high bacteria levels identified in the monitoring data. The sewer system was investigated and tests were taken to track down the

source. The source was identified, the property owner was notified and corrective action was taken. The East Kittsondale Report is found in the Appendix.

- Plato Boulevard – The City received a complaint of a flow onto Plato Avenue, which was creating a nuisance. A sample was taken and it was determined not to be chlorinated water. Further investigation determined that the source was an abandoned well on private property. The Department of Safety and Inspections will follow up with the property owner to stop the flow into the right-of-way.
- Phalen Recreation Center - On July 26, 2010, the City received a complaint that water and field debris (agrillime) runoff was getting into the sewer system located at the Phalen Recreation Center. In August, the Parks Department made arrangements to begin a Tree Trust project that would include building a containment system around the two ball fields, where runoff had occurred. The system consists of a wood posts anchored to the ground lining the outside of the backstops. When it rains, this acts as a barrier significantly limiting the amount of agrillime escaping the field. In addition, a containment sock was placed in the catch basin. This helps keep unwanted material from entering. After rainfalls, the catch basin is inspected and cleaned as needed.

Standard Operating Procedures and Checklists

- The Parks Department uses a Spill Reporting form and instructions (Appendix). These forms are completed by Parks and Recreation staff in the event of a spill (petroleum or hydraulic spills greater than five gallons, and other materials spills of any size). The Minnesota Duty Officer is notified, as required, in the event of a reported spill.
- The Parks Department and the Department of Public Works have Clean Water Policies which are distributed, reviewed, and signed by all field staff. (See Appendix)

Staff Training

- On July 29, 2010 the City held an Illicit Discharge Detection and Elimination Training in partnership with the Capitol Region Watershed District (CRWD) and the University of Minnesota Extension. A total of 57 people attended from the Saint Paul, Roseville, Ramsey County, CRWD and the University of Minnesota. The City of Saint Paul had 46 people in attendance from the following City Departments: Mayor's Office, Public Works, Parks and Recreation, Safety and Inspections, Police, Planning and Economic Development and Saint Paul Regional Water Services. Each person in attendance received a copy of the University of Minnesota Extension Illicit Discharge Management Work Book. The flyer for the training, workbook cover table of contents, attendee list and the presentation are included in the Appendix.

Performance Measures

- Resolution of reported or discovered prohibited discharges in previous year.
- Development and implementation of SOPs.
- Staff training held.

Work Plan

Continue existing programs as outlined in the program overview, and continue to develop and improve documentation of program activities. GIS mapping will be implemented as a tool to support various activities. Information that is gained through the inspection program will be used to compile data on non-stormwater discharges, storage of hazardous materials, and activities or operations that may be potential water pollution point sources. The City will continue to develop an ordinance defining allowable discharges to the storm sewer system.

The City will continue to investigate prohibited discharges as part of its regular outfall and pond inspection program. The development of a targeted approach will be included in the City's development of an updated Stormwater Management Plan for the reissued permit.

VII. Public Education Program

Program Objective

The objective of this stormwater management program is to educate the public regarding stormwater pollution. Targeted pollutants include:

- All pollutants

Program Overview

The City of Saint Paul implements its 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 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 on the City of Saint Paul Stormwater web site: <http://www.ci.stpaul.mn.us/index.aspx?NID=2686>

Activities

Storm Drain Stenciling Education Program

The City of Saint Paul has been conducting a successful storm drain stenciling education program since 1993. For the past several years the Friends of the Mississippi River (FMR) has coordinated this program. FMR is the leading citizens' organization working to protect the Mississippi River and its watershed in the Twin Cities area. The 2010 Stenciling Program Report and a copy of the door hanger are in the Appendix.

The storm-drain stenciling project is designed to meet the following three objectives:

- To stencil storm drains with the message “Please Don’t Pollute Drains to River,” and distribute multi-lingual educational door-hangers to residents and businesses in the stenciled neighborhoods within the City of Saint Paul.
- To involve community residents in hands-on learning experiences about urban runoff pollution and ways to prevent it.
- To facilitate school service learning initiatives that include storm drain stenciling as a key component.

The 2010 program objectives were implemented through the following activities:

- Coordinated the stenciling of storm drains and distribution of door hangers in partnership with volunteers from school groups, community groups, and residents of the City of Saint Paul.
- Provided a 30 to 60 minute educational orientation to each volunteer group.
- Provided 9 extra educational presentations on urban runoff pollution to volunteers, classrooms and other community members.
- Coordinated 4 litter clean-ups with school and community groups.
- Presented 2 community workshops on urban runoff pollution and ways to prevent it around the yard and home.
- Presented 2 community rain garden workshops and 1 tour on small site rain gardens.
- Coordinated the purchase, maintenance and storage of all stenciling and workshop supplies.

Stenciling Program Quantities

Year	Door Hangers	Storm Drains	Volunteers
1993- 1997	21,439	4,913	---
1998	12,359	2,653	1,303
1999	15,259	2,951	880
2000	12,454	3,153	1,318
2001	10,564	3,236	1,215
2002	6,880	2,760	1,300
2003	8,332	2,272	1,328
2004	9,192	2,431	925
2005	6,386	2,795	1,073
2006	10,216	2,524	1,349
2007	10,169	2,926	1,223
2008	10,953	2,951	2,799
2009	10,458	2,952	1,174
2010	13,586	3,448	1,498
Total	158,247	41,965	17,385

Metro WaterShed Partners

Saint Paul has been an active Metro WaterShed Partners since 1997. Metro WaterShed Partners is an innovative, dynamic coalition of over 40 public, private and non-profit organizations in the Saint Paul/St. Paul metropolitan area that, through collaborative educational outreach, teaches residents how to care for area waters. This partnership has leveraged grant dollars and staff time to develop educational literature and a nationally recognized interactive display. The WaterShed exhibit was at schools and events in and around Saint Paul in 2010. The WaterShed is also at the Minnesota State Fair in the Department of Natural Resources Building each year. The Partners staff it during this time.

Metro Clean Water Campaign

To assist cities with educational efforts, Metro WaterShed Partners is conducting the Metro Clean Water Campaign. This type of collaboration allows for the development of a consistent message, which is distributed cost effectively. A City of Saint Paul staff person is a member of this committee. The campaign was funded in 2010 with money raised from local units of government. St. Paul contributed \$5,000 in 2010 and plans to contribute \$5,000 in 2011. The 2010 report for the Metro Clean Water Campaign is found in the appendix.

Storm Sewer Service Charge Mailing

In July of 2010, the “Green Up your Lawn not Your Lakes and Rivers” brochure was mailed out with the Storm Sewer Service Charge. Brochures went out to 80,000 households and businesses. The brochure is included in the Appendix.

Annual Spring Parks Clean-Up and Neighborhood Litter Campaign

St. Paul Parks and Recreation hosts an Annual Spring Parks Clean-Up every year during the month of April. The City provides clean-up supplies, trash removal, recycling services and a “thank you” celebration. During this event volunteers remove litter from Saint Paul's Parks and Recreation Centers. Without the help of volunteers during the cleanup, trash accumulates in these natural areas harming wildlife, polluting lakes and rivers and detracting from the beauty of our community. This event is a fun and effective way to improve the environment in our community.

Waterfest

The City of Saint Paul is a sponsor of Waterfest, which is a family festival put on each May at Lake Phalen by the Ramsey-Washington Metro Watershed District. The Watershed District estimates that 1000 people attend this free family festival. The Parks Department assists in coordinating this event. The Public Works Department provides a street sweeper to be on display for this event. The poster for the event is included in the Appendix.

Performance Measures

- Tracking of number of participants, flyers, storm drains stenciled etc.

Work Plan

Identifying additional opportunities and methods for education and outreach will continue. The City will maintain and strengthen partnerships with multiple agencies, including the LMWMO, MWMO, CRWD, RWMWD, Friends of the Mississippi River, Ramsey County, WaterShed Partners, the MPCA, the DNR, neighborhood groups, private citizens and business owners.

- Continue our broad-based approach to public education and outreach for Saint Paul residents, workers and visitors, to increase environmental knowledge, watershed awareness and source control of pollutants that will result in less pollution of our surface water resources.
- Continue the storm drain stenciling and education program.
- Continue web site development.
- Carry out Earth Day Watershed Clean-Up and stormwater education activities

VIII. 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. Targeted pollutants include:

- All pollutants

Program Overview

The City of Saint Paul coordinates with many entities in all aspects of managing stormwater. Each project, event or activity listed involves the contribution of numerous entities. By its nature, water does not follow political boundaries therefore cooperation is necessary to effectively manage stormwater. The limited resources that are available must be used efficiently with minimal duplication of efforts. The main area of coordination on these issues is with Saint Paul's watershed management organizations.

Activities

Water Resource Work Group

In December of 2008, the Saint Paul City Council passed a resolution (Appendix) committing the City to the stewardship and protection of valuable water resources and establishing a Water Resource Working Group. This group, made up of staff members from multiple City Departments, meets monthly to discuss and work on water resources issues in the City including planning and implementation of the Stormwater Management Program for the City's Stormwater Permit. This group regularly meets with the watershed organizations and other entities to coordinate projects and programs.

Saint Paul Local Surface Water Management Plan

The City of Saint Paul's Local Surface Water Management Plan was developed to meet the requirements of Minnesota Statute 103B.235, Minnesota rules 8410.00160 and 8410.0170 and with the Watershed Management Plan's of Saint Paul's watershed management organizations. The Metropolitan Council also reviews the local water plans in the Metro Area. The plan was approved by the Capitol Region WD, Ramsey-Washington Metro WD, Lower Mississippi River WMO and Mississippi WMO. The City Council adopted the plan in December of 2006. This plan will be updated in response to the Watershed Management Plan updates of the City's watershed organizations.

Water Chapter of the City's Comprehensive Plan

In February of 2010, the City completed its Comprehensive Plan as required by the Metropolitan Council. This update includes a water resources chapter, which addresses municipal water supply, surface water management and the sanitary sewer system. The water resources chapter of the Comprehensive Plan can be found on the City's website at <http://stpaul.gov/DocumentView.aspx?DID=11886>.

Minnesota Cities Stormwater Coalition

Saint Paul is a member of the Minnesota Cities Stormwater Coalition (MCSC), which was formed in 2006. A city staff person serves on the steering committee for this organization. The mission of the MCSC is to protect Minnesota's water resources by ensuring that the policies, permits, procedures, rules, and legislation adopted by state water resource management agencies and other regulatory entities are both meaningful and manageable from the perspective of the regulated parties.

Watershed Organizations

The following briefly describes each organization and provides some of the cooperative efforts between the City and its watershed management organization. Many examples of coordination can be found throughout this report. A map of St. Paul's watershed management organizations is found in the Appendix.

Mississippi Watershed Management Organization (MWMO)

The MWMO is a joint powers organization, which lies mainly in Saint Paul. Members include the Saint Paul Park and Recreation Board, Saint Paul, St. Anthony Park, Lauderdale and St. Paul. A small area in the northwest corner of St. Paul is within the MWMO boundary.

Lower Mississippi River Watershed Management Organization (LMWMO)

The LMWMO is a joint powers organization. Members include St. Paul, West St. Paul, Mendota Heights, Inver Grove Heights, South St. Paul, Lilydale and Sunfish Lake. The West Side of St. Paul lies within the LMWMO boundary.

Ramsey-Washington Metro Watershed District (RWMWD)

The Ramsey-Washington Metro Watershed District is located in eastern Ramsey and western Washington County. The watershed district is approximately 53 square miles and includes parts of White Bear Lake, Vadnais Heights, Gem Lake, Little Canada, Maplewood, Landfall, North St. Paul, St. Paul, Oakdale and Woodbury.

Capitol Region Watershed District (CRWD)

The Capitol Region Watershed District was formed in 1998. The watershed includes parts of St. Paul, Roseville, Maplewood, Lauderdale, Falcon Heights, the State Fairgrounds and the University of Minnesota. The watershed is considered urban and the majority of the area drains to the Mississippi River through storm sewer systems. The City contracts with CRWD to conduct the stormwater permit monitoring program. The City collaborates with the CRWD on projects and programs in the City of Saint Paul.

Performance Measures

- Projects and programs completed in partnership with other entities.

Work Plan

Coordination and partnerships on capital projects, water quality programs and studies will continue. Participation with other governmental entities in Total Maximum Daily Load (TMDL) studies and implementation plans will be a significant component. The City will develop an updated Stormwater Management Program that includes coordination with other entities in order to eliminate duplication and to leverage joint resources to protect the City's critical water resources.

IX. Public Participation Process

Program Objective

The objective of this stormwater management program is to maximize the effectiveness of the City's Stormwater Program by seeking input from the public.

Targeted pollutants include:

- All pollutants

Program Overview

The Annual Report is a coordinated effort by various City departments. The Permit includes an opportunity for public input in the development of the priorities and programs necessary for compliance. Information in the Annual Report covers the activities that will be implemented for the current year, and provides documentation and analysis of the activities conducted in the previous year.

Each year, the City holds a public meeting to provide an opportunity for public input regarding the Program and Annual Report. A notice of the availability of the Report for review and public comment is sent to all Saint Paul neighborhood organizations, to the governmental entities that have jurisdiction over activities relating to stormwater management, and to other interested parties.

Once finalized, the Annual Report is also made available on the web site for viewing or downloading. All testimony presented at the public hearing, and all written comments received, are recorded and given due consideration. The public comments, response to comments and a copy of the council resolution adopting the Stormwater Management Program and Annual Report Activities are submitted each year to the Minnesota Pollution Control Agency.

Work Plan

The City will continue to seek and respond to public input for the Stormwater Management Program. City staff will continue to maintain and update the Stormwater website.

X. Stormwater Monitoring and Modeling

History

As part of the two part application for the NPDES permit, the City of Saint Paul conducted stormwater monitoring at 5 sites for one season. From 2001 through 2004, the Cities of Saint Paul and Minneapolis and the Minneapolis Park and Recreation Board participated in a joint stormwater monitoring program, as required by the stormwater permit. Minneapolis Park Board staff conducted the monitoring program. The Stormwater Monitoring Program Manual was completed by Minneapolis Park Board staff and submitted separately to the MPCA in April of 2001. The joint monitoring agreement was submitted to the MPCA in 2002.

Sampling sites were identified in the Stormwater Monitoring Program Manual. The sampling sites were selected from the sites used in the stormwater permit application monitoring program. Five sites were chosen, representative of the following land use types: two residential sites, two industrial/commercial sites and one mixed use site. Two sites were located in Minneapolis and three were in Saint Paul. The permit required two years of mercury monitoring, which was conducted in 2002 and 2003.

Beginning In 2005, the City began a partnership with the Capitol Region Watershed District, to conduct the stormwater permit monitoring program for Saint Paul as part of CRWD's overall monitoring program. CRWD established a monitoring program in 2004 to collect stormwater data from the major subwatersheds and stormwater best management practices (BMPs).

Activities

2010 Monitoring Program

In 2010, CRWD operated 16 stormwater monitoring stations. Ten of the stations were full water quality monitoring stations. 2010 was a record-breaking year for precipitation year based on historical normal rainfall averages. Compared to other monitoring years, 2010 had the highest recorded rainfall totals. In general, CRWD major subwatersheds had greater flow and higher phosphorus and sediment loads and yields in 2010 than in previous years. Because of the extremely wet monitoring season, all four lakes experienced increased total phosphorus and chlorophyll-a concentrations.

CRWD's annual 2010 *Water Resources Report* is a comprehensive technical reference of water quality information. The "Capitol Region Watershed District 2010 Monitoring Report" is available on the district website at www.capitolregionwd.org.

Stormwater Runoff and Water Quality Modeling

In 2010, the City completed the first phase of a program that includes stormwater modeling, a citywide volume reduction inventory and plan to address stormwater on the 2010 Residential Street Reconstruction Program (See Appendix). The modeling includes the development of an XPSWMM and P8 modeling and uses the CRWD monitoring data for calibration. Three major subwatersheds, as well as the 2010 street reconstruction subwatersheds, were modeled. The model will be used by the City in the development of future stormwater programs and projects.

Pollutant Loading Calculations

The average concentrations and annual loading results for the outfalls monitored by the CRWD can be found in the "Capitol Region Watershed District 2010 Monitoring Report". This includes East Kittsondale, Phalen Creek, St. Anthony Park and Troutbrook outfalls. The stormwater modeling summaries for three major subwatersheds including Mississippi River Boulevard, St. Anthony Hill and Riverview are found in the Appendix.

Work Plan

The monitoring requirements in the City's reissued MS4 Permit were developed in partnership with the MPCA, the City of Minneapolis, Mississippi Watershed Management Organization, Capitol Region Watershed District and Ramsey Washington Metro Watershed District. The City's Preliminary Stormwater Monitoring Program, as required under the City's reissued MS4 Permit, is included in the Appendix. This program will include a Memorandum of Agreement for any monitoring that will be conducted by another entity. This agreement will include the City's oversight of the sampling, analysis, interpretation and reporting requirements of the City's permit.

XI. Storm Drain System and Drainage Areas Inventory

Storm Drain System Infrastructure

Approximately 150 years ago, Saint Paul first constructed portions of a sewer system that today comprises approximately 450 miles of storm sewers and 26,000 catch basins. The system was designed to satisfy the City's obligation to provide reasonable drainage of stormwater and to prevent street flooding, which satisfied the City's responsibility to protect neighboring properties, allow for normal traffic flows, and prevent damage to streets, sidewalks and boulevards.

The Department of Public Works is developing a computer based asset and infrastructure management system. This system will include both the storm and sanitary sewer networks. When the asset and infrastructure management system is complete, the City will have the data and systems necessary to accurately determine the sub-watershed for each of the outfalls. The Sewer Utility is in the process of converting its hand drawn sewer maps to an electronic format. All of the converted sewer data was checked for accuracy and is now going through a QA/QC process.

Watershed and Storm Sewer Outfall Inventory

An inventory of Saint Paul's storm sewer outfalls is found in the Appendix. This inventory includes the outfall identification number, outfall name, watershed name, size of pipe and drainage area. The following information is provided in the Outfall Inventory found in the Appendix for each of the 23 watersheds in St. Paul: drainage area, land use types and distribution, population, percent impervious surface area, and the runoff coefficient. The following table shows the total number of discharge points to each water body in Saint Paul.

Discharge points to receiving waters

Receiving Water	Total Discharge Points
Bridal Veil Creek	1
Mississippi River	59
Upper Lake	1
Crosby Lake	3
Fairview North Pond	2
Lake Como	11
Loeb Lake	1
Lake Phalen	5
Beaver Lake	4
Suburban Pond	2
Little Pig's Eye Lake	1
Pig's Eye Lake	5
Battle Creek	11

Stormwater Ponds

A map showing the stormwater ponding areas in the City of Saint Paul is found in the Appendix. The Appendix also contains the tributary area and design capacity for each City ponding area and a list of ponding areas by watershed.

NPDES Permitted Facilities

Facilities in Saint Paul that area issued NPDES permits by the MPCA are found in Appendix.

Industrial Land Use

Industrial land uses may generate higher concentrations of hydrocarbons, trace metals, or toxicants than are found in typical stormwater runoff. Maps showing the areas of industrial land use in St. Paul and pollutant source locations are included in the Appendix.