

Appendix B

Second Generation Management Plan
Self-Assessment

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Shingle Creek and West Mississippi
Watershed Management Commissions
Second Generation Watershed Management Plan
Accomplishments and Achievements
2003-2010

December 2010



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Executive Summary

The Shingle Creek Watershed Management Commission and the West Mississippi Watershed Management Commission are joint powers Watershed Management Organizations (WMOs) formed in 1984. The Commissions completed their first Watershed management Plans in 1990. Those plans were focused on controlling rates and volumes of stormwater runoff, both in the developing part of the watershed and the developed.

The Commissions initiated a joint Second Generation Management Plan in 2001 and completed that effort in 2003. The plan developed a wider array of goals and strategies addressing not only flooding and runoff volume management concerns but also water quality and biotic integrity in lakes and streams in the two watersheds.

The Commissions will initiate their Third Generation Watershed Management Plan in 2010, with the goal of having a final, approved plan by the end of 2012. In preparation for that planning effort, the Commissions conducted a self-assessment to identify achievements and areas that realized less success.

The Commissions have completed or will have completed by 2012 nearly all the work plan activities and strategies identified in the Second Generation Plan. The most successful achievements of the Second Generation Plan were:

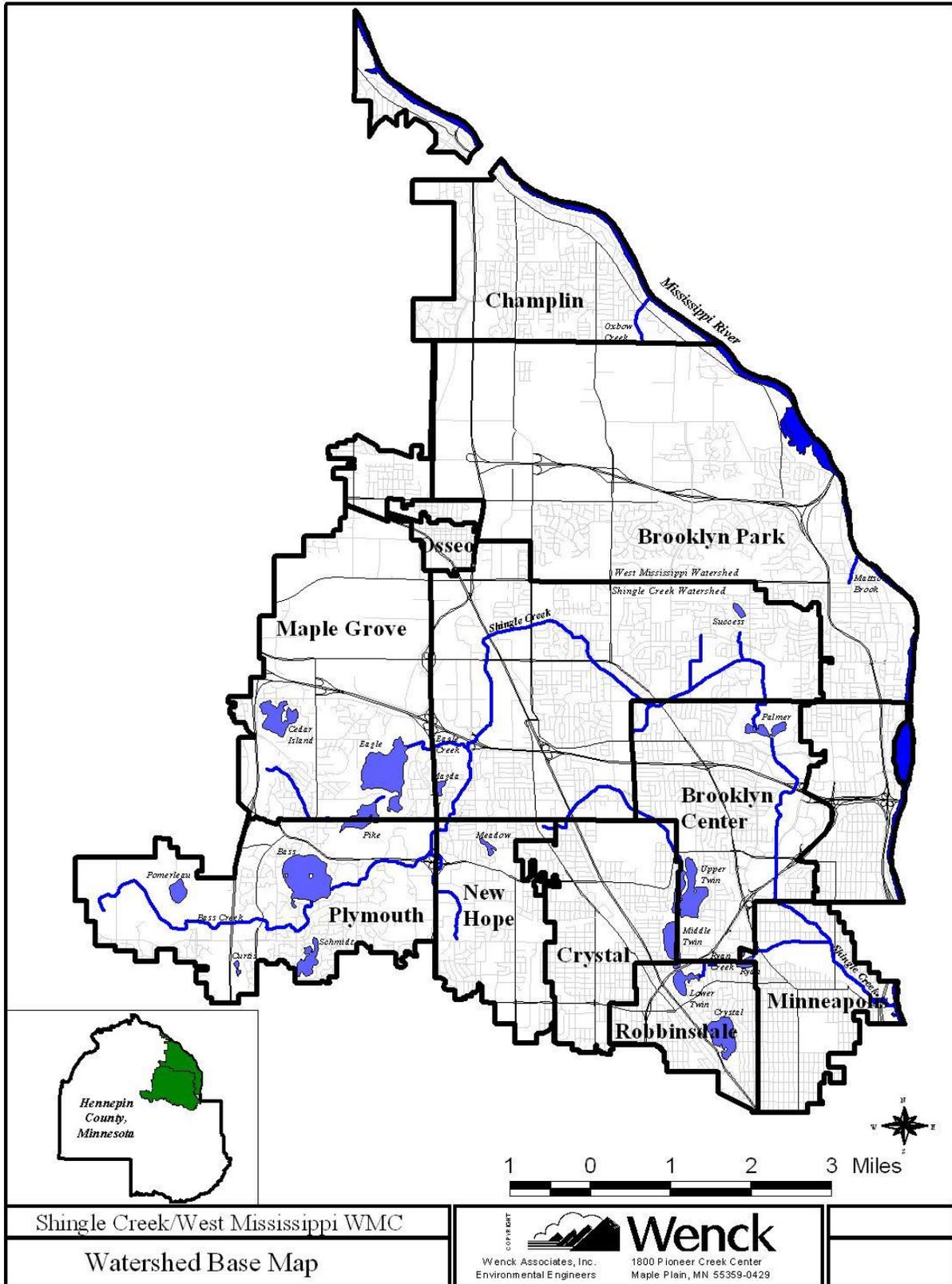
- Completion of approved nutrient TMDLs on 13 of the 16 lakes in the Shingle creek watershed; completion of an approved chloride TMDL for Shingle Creek and an Implementation Plan that won a national award; completion of management plans on the streams in the watershed, and completion of a biotic integrity and dissolved oxygen TMDL for Shingle and Bass Creeks that is currently in agency review.
- Expansion of the education and outreach program, highlighting the small education grants to schools, scouts, associations, and other groups to undertake education activities and demonstration and public service projects; a collaboration with Patrick Henry High School in Minneapolis on a three week summer school course on Shingle Creek; an opinion survey conducted of citizen knowledge and attitudes on water resources issues; and the initiation of the West Metro Water Alliance, a collaboration of five WMOs to jointly provide wider-scale education and outreach activities.
- The Shingle Creek Commission has been very successful at obtaining grants and other funding, totaling over \$2.2 million since 2003.
- As ongoing routine streamflow and water quality program has created a robust database of information about Shingle Creek, from which the Commission has prepared a calibrated XP-SWMM model for the watershed. P8 models for both watersheds are underway.

Executive Summary (Cont.)

- The Commissions and their consulting technical staff have been an invaluable resource to the member cities in managing their water resources.
- The joint powers Commissions have enhanced collegiality and collaboration between the cities in the two watersheds.

Areas that fell short of Second Generation expectations or which could be improved include:

- The Commissions have undertaken only minimal wetland management efforts. Some member cities have completed functions and values assessment of the wetlands in their jurisdictions, but limited data is available elsewhere. Wetland habitat enhancement projects identified in the Second Generation Plan were not pursued as a priority.
- While the Commissions were among the first WMOs in the Metro area to require volume management on development and redevelopment projects, there has been little or no active groundwater management.
- While there has been an increased level of awareness on the part of elected and appointed officials, advisory commissioners and non-engineering city staff, there continues to be a need to increase their knowledge about water resources issues.
- It has been difficult to sustain continued citizen participation in watershed issues. Each city maintains a citizen advisory commission that has been a source of input, and one-time stakeholder meetings have been well attended.
- The Shingle Creek Commission has relied on volunteers to collect surface samples of lake water quality, which has limited usefulness in evaluating improvements resulting from Best Management Practices in the watershed. Additional and more frequent monitoring data is necessary.
- While the member cities have made a significant investment in supporting the Commissions, the cost of operations and implementation actions exceeds the cities' ability and willingness to increase city apportionments.



1.0 Introduction

The Shingle Creek Watershed Management Commission and the West Mississippi Watershed Management Commission are Watershed Management Organizations (WMOs) formed in 1984 using Joint Powers Agreements developed under authority conferred to the member communities by Minnesota Statutes 471.59 and 103B.201 through 103B.251. The watersheds are located in the northwest portion of the Minneapolis-St. Paul seven county metropolitan area and are comprised of all or part of the following ten cities in Hennepin County:

Table 1.1. Cities in the Shingle Creek and West Mississippi watersheds.

Shingle Creek Watershed		West Mississippi Watershed		Combined
Cities	Area (sq mi)	Cities	Area (sq mi)	Area (sq mi)
Brooklyn Center	5.89	Brooklyn Center	2.47	8.36
Brooklyn Park	11.15	Brooklyn Park	14.20	25.35
		Champlin	5.12	5.12
Crystal	3.92			3.92
Maple Grove	7.73	Maple Grove	0.82	8.55
Minneapolis	3.15			3.15
New Hope	3.32			3.32
Osseo	0.45	Osseo	0.33	0.78
Plymouth	6.56			6.56
Robbinsdale	2.39			2.39
Total	44.56	Total	22.94	67.50

Each Commission is governed by a Board of Commissioners that consists of one member appointed from each community by their respective City Councils.

The Commissions' purpose is to preserve and use natural water storage and retention in the Shingle Creek and West Mississippi watersheds to meet Surface Water Management Act goals. Because many of the communities that are members of the Shingle Creek WMO are also members of the West Mississippi WMO the Commissions often work jointly on issues of interest to both, including this Second Generation Plan, and have adopted similar standards.

1.1 FIRST GENERATION WATERSHED MANAGEMENT PLAN

The Commissions adopted individual First Generation Management Plans in 1990. Those plans were focused on controlling rates and volumes of stormwater runoff, both in the developing part of the watershed and the developed. Soon after the first management plans were completed, both Commissions undertook stream water quantity and quality monitoring. West Mississippi discontinued monitoring after a few years but Shingle Creek continued a program of monitoring

at the Creek outlet and at a site mid-watershed. The Shingle Creek Commission began to participate in the Metropolitan Council's Citizen Assisted Lake Monitoring Program (CAMP) to obtain water quality information on the many of the 16 lakes in the watershed.

1.2 SECOND GENERATION WATERSHED MANAGEMENT PLAN

The Commissions initiated their joint Second Generation Management Plan in 2001 and completed that effort in 2003. That plan placed an increased emphasis on water quality and on public education and outreach. Many of the lakes and Shingle Creek had been designated Impaired Waters by the State of Minnesota because of noncompliance with state water quality standards. Shingle Creel was also designated an Impaired Water for excess chloride concentrations. The Second Generation Plan incorporated into its work plan the preparation of a Water Quality Plan to establish water quality goals, and to undertake management planning for the lakes, streams, and wetlands in the two watersheds.

The Second Generation Plan set forth a number of priority goals and strategies:

Priorities:

- 1) Control flooding
- 2) Improve public information and education
- 3) Protect wetlands
- 4) Improve water quality in lakes, streams, and rivers
- 5) Improve fish and wildlife habitat
- 6) Restore wetlands
- 7) Research and encourage development strategies that minimize impervious surface and encourage infiltration
- 8) Research and encourage innovative and sustainable maintenance and improvement practices

Strategies:

- a) The Commissions will continue to control peak runoff rates at management sector boundaries and city boundaries, requiring development and redevelopment of certain sizes to adhere to a stormwater management plan that provides rate control and water quality improvements and adding an infiltration requirement. The watershed model will be maintained and the creek's 100 year profile will be reevaluated.
- b) The Commissions' more active education and public outreach program will provide regular information to cities and local media for distribution, useful information on the Commissions' web site, opportunities for participation, and more interaction with schools.
- c) The Commissions' education and public outreach program will meet minimum requirements for NPDES Phase II and the Commissions will help facilitate other NPDES activities, such as facilitating training in good housekeeping methods for city staff, as requested.
- d) Over the first five years of the Second Generation Plan the Commissions will prioritize water resources and develop management plans for those resources by priority or as opportunity provides. These plans will include goals for maintaining or improving water quality based on practical use and implementation strategies that may include maintenance or capital improvements.

- e) The Commissions will promote Shingle Creek and other streams and rivers as greenways, emphasizing streambank improvements and habitat restoration where possible.
- f) The Commissions will prioritize wetlands for preservation and wetlands for potential restoration. Buffers will be required adjacent to wetlands and watercourses as development or redevelopment occurs. Cities that are the LGUs for WCA will perform functions and values analyses on their wetlands in accordance with Commission standards. For those cities where the Commissions are the LGU, the Commissions' engineer will perform those analyses at the city's cost.
- g) The Commissions will create a Construction/Matching Grant Fund that will be used to: match grants for resources management projects or capital improvements; construct capital improvements that are of high watershed priority, are demonstration projects, or have otherwise been designated by the Commissions for construction by the Commissions; and as match or "seed money" to encourage local improvements.

1.3 MANAGEMENT PLAN AMENDMENTS

The Second Generation Plan has been amended several times since 2003 (Table 1.2). Most of those revisions were to revise the Capital Improvements Program, however, there were other significant amendments. In 2007 the Commissions adopted a Cost Share Policy whereby the Commissions agreed to fund 25% of a qualifying project's cost, up to \$250,000. The Technical Advisory Committee (TAC) developed a process for cities to submit projects for TAC and Commission review. Several projects, as will be described below, have received Commission funding, which is levied by Hennepin County as an ad valorem tax across all the property in the respective watershed.

The Commissions' Rules and Standards regulating development and redevelopment, which were significantly revised and updated as part of the Second Generation Plan, were again revised in 2008 and adopted by Minor Plan Amendment.

Table 1.2. Shingle Creek and West Mississippi Second Generation Plan record of plan revisions.

Number	Type	Date of Adoption	Summary of Revisions
1	Minor	9/8/2005	Increase cost share for Brooklyn Park Stream Restoration Project, and refine project description
2	Major	5/10/2007	Adopt Cost Share Policy, revise amendment procedure, adopt Water Quality Plan, revise CIP
3	Major	9/11/2008	Add Crystal Twin Oak Pond project to CIP
4	Minor	10/9/2008	Adopting revised rules and standards
5	Major	9/10/2009	Add Shingle Creek Restoration project to CIP
6	Major	9/9/2010	Add projects to CIP

2.0 Second Generation Plan Achievements

Water resources in the two watersheds are managed through actions at both the watershed and member city or other agency level. The Watershed Management Commissions generally provide a regulatory framework; operate programs such as monitoring and education and outreach; undertake special studies such as resource management plans or Total Maximum Daily Load (TMDL) studies; and assist member cities with financing capital improvement projects. The member cities (and to a lesser extent Hennepin County and Mn/DOT which manage highway facilities in the watershed) provide routine maintenance; operate programs such as targeted education and outreach; enforce water resource-related ordinances; approve and inspect private construction; and construct repair and capital improvement projects. These activities and the achievements during the 2003-2010 period are described in Sections 2.1 to 2.3 below.

Local activities are set forth in an approved Local Water Management Plan that is consistent with the Second Generation Watershed Management Plan. Activities and achievements that the member cities wish to highlight are described in Section 2.4 below.

In addition to watershed and local water management planning, all the member cities in the two watersheds (as well as Hennepin County and Mn/DOT) also operate Municipal Separate Storm Sewer Systems (MS4s) that are regulated under the federal National Pollutant Discharge Elimination System (NPDES) as set forth in Minnesota's NPDES General Permit. Each MS4 has in place a Storm Water Pollution Prevention Plan (SWPPP) that incorporates elements of the Second Generation Plan and the Local Water Management Plan as well as other, more specific NPDES-required activities. Each MS4 prepares an annual SWPPP report. Those activities are not reflected in this Self Assessment but information can be obtained from the MS4s.

2.1 REGULATORY PROGRAM

The Commissions do not issue permits but do require development and redevelopment projects to meet Commission requirements for runoff rate control, treatment, and volume management. Those requirements as well as others relating to wetlands, floodplains, erosion control, buffers, and stream crossings are set forth in Rules and Standards. The Commissions first adopted standards soon after they were formed in 1984. The standards were significantly revised in 2002 and issued jointly in 2003 as part of the Second Generation Management Plan, and then reviewed and revised again in 2008. The Commissions act as the Local Government Unit (LGU) for Wetland Conservation Act (WCA) administration for about half the member cities.

The Commissions were among the first watershed management organizations in Minnesota to require runoff volume management, incorporating into the 2003 standards a requirement to

infiltrate ½” of runoff from impervious surface. The 2008 revisions redefined that requirement as an abstraction requirement, providing for alternate volume management techniques such as storage and re-use or enhanced evapotranspiration.

Development and redevelopment projects that meet certain size and other criteria are required by city ordinances to incorporate into their developments Best Management Practices (BMPs) sufficient to meet the Commissions’ Rules and Standards. Engineering plans, hydrologic calculations, wetland delineations, and other supporting material is submitted to the Commissions’ Engineer, who conducts a Project Review and discusses the proposal and any necessary revisions with the developer.

The Engineer submits an Engineer’s Report with findings to the appropriate Commission. The Commission will either approve the plans as submitted or with minor modifications or will reject the plans. A final, approved Engineer’s Report is forwarded to the member city in which the development is located for its use in considering the proposed development or redevelopment for approval. Table 2.1 summarizes the projects reviews that have been completed during 2003-2010. These project reviews include private development and redevelopment as well as public projects such as street and highway projects.

Table 2.1. Project reviews considered by the Shingle Creek and West Mississippi Commissions 2003-2010.

Year	Shingle Creek		West Mississippi	
	Project Reviews	Wetland Only	Project Reviews	Wetland Only
2003	10	0	12	0
2004	16	0	9	0
2005	19	1	6	5
2006	15	1	3	4
2007	7	0	5	5
2008	10	1	1	3
2009	4	2	0	2
2010	8	0	2	1
TOTAL	89	5	38	20

2.2 OPERATING AND MANAGEMENT PROGRAMS

The Commissions conduct a number of operating and management programs, including routine and special flow and water quality monitoring, hydrologic/hydraulic modeling, an education and outreach program, and a series of resource evaluation and management plans. The Commissions have actively pursued grants and have been successful in obtaining funding for both programs and capital projects.

2.2.1 Monitoring

Stream Monitoring. The Shingle Creek Commission has conducted an active monitoring program since 1995. Flow and water quality is routinely monitored at two locations, SC-0 near the outlet into the Mississippi River and SC-3 at Brooklyn Boulevard mid-watershed. The Commission also partners financially with the USGS to operate a third monitoring site, SC-1, at

Queen Avenue in Minneapolis. That site is part of the USGS's National Water Quality Assessment (NAWQA) Program nationwide network, and flow and some parameters are available real-time at <http://waterdata.usgs.gov/mn/nwis/uv?05288705>.

Additional flow and water quality monitoring in Shingle Creek and some of its tributaries has also been conducted for the chloride TMDL and the Dissolved Oxygen TMDL.

In 2010 the West Mississippi Commission monitored flow and water quality at some Mississippi River outfalls and in Mattson Brook. That work will likely be replicated in 2011 and the results compared to the 1990-1992 monitoring. Significant areas of Brooklyn Park and Champlin have developed since that time, and the current monitoring provides an opportunity to evaluate the effectiveness of the development rules and standards.

Lake Monitoring. There are 16 lakes in Shingle Creek and none in West Mississippi. The Commission relies on citizen volunteers to conduct routine water quality monitoring of lake surface conditions through the Metropolitan Council's Citizen Assisted Lake Monitoring Program (CAMP). Surface and water column monitoring has been conducted on some lakes as a result of special studies but is not routinely performed. Three Rivers Park District conducts routine detailed monitoring of some lakes and makes that data available to the Commission. As a follow-up to the lakes TMDLs, the Commission has performed some lake sediment core analysis of actual phosphorus release rates as well as some aquatic vegetation surveying.

Biologic Monitoring. The Commission collaborates with Hennepin County Environmental Services on macroinvertebrate monitoring in Shingle Creek and Mattson Brook. High school teachers and students perform monitoring and help classify the organisms as part of the RiverWatch program.



Figure 2.1. A northern captured on Bass Creek in 2010.

The Commission has performed more detailed macroinvertebrate collections as part of the chloride and biotic integrity TMDLs and the Shingle Creek Corridor Study. Fish monitoring was conducted in 1999 and 2010 on Shingle Creek and Bass Creek.

2.2.2 Education

The Commissions significantly expanded their education and public outreach activities in the Second Generation Plan. The Commissions' education and outreach program serves as the "backbone" for nine of the member cities' NPDES Phase II Permit Education and Public Outreach requirements (Minneapolis is a Phase I city). Cities supplement the Commissions' activities as necessary or desired. The Commissions' Education and Public Outreach Committee (EPOC) meets monthly to implement an Education and Outreach Plan that is established annually. The Committee has no specific membership and is open to all interested parties.

The Commissions are members of the WaterShed Partners, a coalition of agencies, educational institutions, WMOs, Watershed Districts, and Soil and Water Conservation Districts that coordinate water resources education and public outreach planning in the Metro area. The Commissions are also members of BlueThumb, a consortium of agencies, vendors, and others partnering to increase outreach and awareness. The Commissions took the lead in developing the West Metro Alliance of Water (WMWA), a collaboration with Elm, Bassett, and Pioneer-Sarah Creeks, Three Rivers Park District and Hennepin County.

Significant activities undertaken since 2003 include:

Opinion Survey Implementation. In 2008 Shingle Creek and West Mississippi collaborated with Elm Creek and Bassett Creek to contract for a professional opinion survey on knowledge and attitudes about water resources. The results are used to craft the annual education and outreach plans.

Educational Materials. The committee developed and disseminated various education materials, including "A Low Salt Diet for Shingle Creek," "Manage Your Property the Watershed Friendly Way," and "10 Things You Can Do to Improve Minnesota's Lakes and Streams."

Patrick Henry High School Summer Program. The EPOC has worked for three years with Patrick Henry High School in Minneapolis to provide programming for the schools' three-week summer program in water quality. Commission staff, Three Rivers Park District, and Hennepin County Environmental Services staff partnered to provide a hands-on learning experience for about 30 high school students who learn about the effects of urbanization on water quality and biotic integrity in Shingle Creek. The students perform monitoring activities on the Creek. They also spend time at the North Mississippi Regional Park to learn about Mississippi River issues.

Water Quality Education Grants. The Commissions operate a program to provide grants of up to \$1,000 to qualifying groups undertaking education and outreach activities. Grants have been used to support activities such as: class field trips to natural resources centers; demonstration projects such as rain gardens; lake association newsletters; acquisition of water resources curriculum materials; and Eagle Scout projects.

2.2.3 Grants

The Commissions and the member cities have been very successful at obtaining grant and other funds to undertake studies, provide programming, and construct implementation projects. Table 2.2 shows that since 2003 nearly the Commissions have obtained over \$2.2 million to further the goals of the Second Generation Plan.

Table 2.2. Recent grants and other funding obtained by the Commissions and member cities.

Project	Amount	Source	Benefitting Cities	Year
Schmidt Lake Watershed Revival (Schmidt Lake Assn recipient)	\$7,700	DNR Environmental Partners	Plymouth	2003
Twin Lake Shoreline Restoration	\$10,000	DNR Shoreline Habitat Grant	Brooklyn Center	2003
Lake TMDLs Phase I	\$85,339	MPCA	Multiple	2003-2004
Shingle Creek Corridor Study	\$20,000	DNR Conservation Partners	Brooklyn Park, Brooklyn Center, Minneapolis, Robbinsdale	2004
Lake TMDLs Phase II	\$65,000	MPCA	Multiple	2005
DO/Biotic Integrity TMDL	\$213,000	MPCA	All	2008
Chloride TMDL prewetting implementation	\$238,000	MPCA, CWLA	Hennepin County, Plymouth, Brooklyn Park, Maple Grove	2007
Using Chloride Alternatives (New Hope recipient)	\$15,000	MPCA, CWLA	New Hope	2007
Shingle Creek Stream Restoration	\$16,025	BWSR Challenge Grant	Brooklyn Park	2007
Wetland 639W Feasibility	\$60,000	MPCA Section 319	New Hope, Brooklyn Park, Crystal, Brooklyn Center	2008
Twin Oak Pond	\$73,080	BWSR CWLA	Crystal	2008
Twin Oak Pond (Crystal recipient)	\$347,000	PFA	Crystal	2009
Pervious Pavement Paired Intersection Study	\$282,000	MPCA Section 319 DER	All, Robbinsdale	2008
Wetland 639W Construction	\$300,000	MPCA Section 319	New Hope, Brooklyn Park, Crystal, Brooklyn Center, Robbinsdale	2009
Crystal Lake Alum Treatment	\$82,500	MPCA Section 319	Robbinsdale	2009
Wincrest Pond (New Hope recipient)	\$55,155	CWLA	New Hope	2009
45th Avenue Pond	\$160,000	BWSR CWLA	New Hope	2010
Modular Green Roof Study	\$28,140	MPCA Section 319 DER	All, Robbinsdale, 3 Rivers	2010
Shingle Creek I94 to CR10	\$105,237	BWSR CWLA	Brooklyn Center	2010
Crystal Lake Retrofit BMPs	\$50,000	MCD Landscape Restoration	Robbinsdale	2010
TOTAL	\$2,213,176			

2.2.4 Special Studies

One of the focus areas of work to be completed in Second Generation Plan period was the assessment of conditions of the water resources in the two watersheds. This information would then be used to identify and prioritize actions to protect and improve those resources. The Commissions have successfully completed nearly all the desired special studies and management plans, which will then be used to set forth a detailed work plan in the Third Generation Plan. These studies include:

Chloride TMDL. The Shingle Creek Commission completed the first chloride TMDL in the state of Minnesota, and the Implementation Plan for the TMDL received a national Excellence in Snow and Ice Control award from the American Public Works Association. The Commission subsequently received a \$238,500 Clean Water Legacy Act grant to implement pre-wetting equipment on salt trucks in watershed to reduce use of sodium chloride. Hennepin County, Plymouth, Maple Grove, and Brooklyn Park received funding from this grant to purchase equipment. The Commission and the City of Robbinsdale received a \$282,000 Section 319 DER grant from the MPCA to complete a paired intersection study to evaluate the cost-effectiveness of porous pavement in reducing intersection ice buildup. Intersections at two sites in Robbinsdale have been repaved with porous asphalt pavement, and various monitoring instruments have been installed to monitor effectiveness. These sites will be studied for three years, with completion expected in 2013.

Lake TMDLs. Thirteen of the sixteen lakes in the Shingle Creek watershed have been designated Impaired Waters by the MPCA for excess nutrients. The Commission and member cities completed TMDLs and Implementation Plans for all thirteen lakes, which have been approved by the MPCA and EPA. Improvement actions are now being undertaken.

Other Stream TMDLs. Shingle Creek and Bass Creek have been designated Impaired Waters by the MPCA for Impaired Biota, Shingle Creek for an impaired macroinvertebrate community and Bass Creek for an impaired fish community. Shingle Creek has been designated an Impaired Water for low levels of dissolved oxygen. A Stressor Identification has been completed and incorporated into a Biota and Dissolved Oxygen TMDL, a draft of which is currently in agency review.

Shingle Creek Corridor Study. This study assessed conditions on Shingle Creek, defined a long-term vision, and developed general stream restoration design and corridor maintenance guidelines. Parts of this study were used in the biota and DO TMDL. The design guidelines have been incorporated into several stream restoration projects on Shingle Creek.

Stream Assessment Phase II: The balance of streams in the Shingle Creek watershed and Oxbow Creek and Mattson Brook in West Mississippi were also assessed and potential improvements identified.

Wetland Management Plan. The Commissions currently manage wetlands in accordance with the Wetland Conservation Act (WCA) standards. In 2010 and 2011 the Commissions will review wetland functions and values assessments prepared by the member cities to determine if they wish to adopt more stringent wetland management standards.

Other Studies. The Commissions have undertaken several other special studies over the years, often in conjunction with monitoring programs (Table 2.3).

Table 2.3. History of monitoring and special studies in the Shingle Creek and West Mississippi watersheds.

Year	Activity
1990	<ul style="list-style-type: none"> Stream monitoring program at 14 sites, SC and WM
1991	<ul style="list-style-type: none"> Stream monitoring program at 14 sites, SC and WM CAMP: Twin (Met Council monitored) and Eagle
1992	<ul style="list-style-type: none"> Stream monitoring program at 14 sites, SC and WM Historical water quality summary for Twin Lake Twin Lake storm sewer mapping
1993	<ul style="list-style-type: none"> Upper Twin Lake storm sewer reconnaissance Twin Lake volunteer shoreline erosion mapping <u>Field Investigation and Storm Sewer Mapping of Palmer Lake Subwatershed</u>: A short field investigation to evaluate possible sources of high solids concentrations observed at the Palmer Lake monitoring site in the 1990-1992 water quality monitoring. CAMP: Eagle and Twin Lake Eagle and Twin Lake data analysis
1994	<ul style="list-style-type: none"> CAMP: Crystal and Bass Lakes Crystal and Bass Lakes data analysis Water quality basin inspection checklist development Aquascaping seminar
1995	<ul style="list-style-type: none"> Water quality basin inspections CAMP: Schmidt and Cedar Island Lakes Schmidt and Cedar Island Lakes data analysis WOMP stream monitoring Outlet monitoring: funded but delayed until 1997 <u>Report on Existing Water Quality Data for Crystal Lake</u>: An evaluation of current and historic water quality in Crystal Lake.
1996	<ul style="list-style-type: none"> CAMP: Twin (Met Council) and Eagle, Meadow, Pike, Pomerleau, Ryan, Success WOMP and Upper watershed stream monitoring Macroinvertebrate monitoring <u>Eagle/Pike/Cedar Island Lake Reconnaissance</u>: visual reconnaissance to identify any potential point and nonpoint source pollution problems within the subwatershed. <u>Shingle Creek Inspection Report</u>: inspection to identify areas where blockages to flow, bank erosion, or other conditions that could potentially cause flooding or water quality problems. <u>Rapid Bioassessment Sampling</u>: Performed to develop baseline information on the abundance and diversity of invertebrate species and relative abundance of fish species found in two stream reaches of Shingle Creek. Three sites were sampled, including the USGS monitoring site at Queen Avenue in Minneapolis, and stream habitat and biologic diversity were evaluated. USGS NAWQA sampling at the Queen Avenue site
1997	<ul style="list-style-type: none"> CAMP: Bass, Crystal, Eagle, Pike, and Middle Twin WOMP and Upper watershed stream monitoring Macroinvertebrate monitoring: West Broadway; Park Center HS
1998	<ul style="list-style-type: none"> CAMP: Eagle, Pike, Ryan, Schmitt, Upper and Lower Twin WOMP and Upper watershed stream monitoring Macroinvertebrate monitoring: West Broadway; Park Center HS <u>Shingle Creek Channel Profile Survey</u>: surveyed creek profile and cross sections and generally identified problem areas <u>Stormwater Basin Field Inspection</u>
1999	<ul style="list-style-type: none"> CAMP: Bass, Magda, Meadow, Pomerleau, and Middle Twin Outlet and upper watershed stream monitoring

Year	Activity
	<ul style="list-style-type: none"> • Twin Lake Study • Watershed reconnaissance: collected digital base map data • Creek Biomonitoring: This report updated the 1997 Rapid Bioassessment Sampling report except that no fish sampling was performed.
2000	<ul style="list-style-type: none"> • CAMP: Upper and Lower Twin (Met council), Eagle, Magda, Pike, Ryan, and Upper Twin • Outlet and upper watershed stream monitoring • Macroinvertebrate monitoring: West Broadway; Park Center HS • Regional Pond Investigation: identified subwatersheds with little or no water quality treatment facilities. • Water quality basin inspections
2001	<ul style="list-style-type: none"> • CAMP: Bass, Cedar Island, Crystal, Pomerleau, Schmidt • Outlet and upper watershed stream monitoring • Macroinvertebrate monitoring • <u>Second Generation Management Plan</u>
2002	<ul style="list-style-type: none"> • CAMP: Eagle, Meadow, Ryan, Upper Twin • Outlet and upper watershed stream monitoring • <u>Second Generation Management Plan</u> • Macroinvertebrate monitoring • <u>Chloride TMDL</u>
2003	<ul style="list-style-type: none"> • CAMP: Bass, Cedar Island, Magda, Pomerleau, Ryan, Success, Middle and Lower Twin • Outlet and upper watershed stream monitoring • Macroinvertebrate monitoring • Water Quality Plan • Chloride TMDL • Lake Nutrient TMDLs Phase I: Upper, Middle, Lower Twin; Crystal; Ryan
2004	<ul style="list-style-type: none"> • CAMP: Schmidt, Upper Twin • Outlet and upper watershed stream monitoring • Macroinvertebrate monitoring • <u>Water Quality Plan</u> • <u>Chloride TMDL</u> approved • Lake Nutrient TMDLs Phase I: Upper, Middle, Lower Twin; Crystal; Ryan • <u>Shingle Creek Corridor Study</u> • Water quality basin inspections
2005	<ul style="list-style-type: none"> • CAMP: Bass, Crystal, Eagle, Middle & Lower Twin, Meadow • Outlet and upper watershed stream monitoring • Macroinvertebrate monitoring • Chloride TMDL implementation • Lake Nutrient TMDLs Phase I: Upper, Middle, Lower Twin; Crystal; Ryan • Shingle Creek Restoration, Brooklyn Park • Water quality basin inspections
2006	<ul style="list-style-type: none"> • CAMP: Upper Twin, Magda, Success, Cedar Island • Outlet and upper watershed stream monitoring. The upper watershed monitoring site will be moved from Zane Ave to Brooklyn Blvd. Data will be collected at this site to develop a level discharge relationship. • Macroinvertebrate monitoring • <u>Water Quality Plan</u> and CIP start Major Plan Amendment process • Lake Nutrient TMDLs Phase II: Bass, Schmidt, Pomerleau, Cedar Island, Pike, Eagle, Magda, Meadow

Year	Activity
	<ul style="list-style-type: none"> • Lake management plans: Upper, Middle, Lower Twin; Crystal; Ryan • Stream Assessments Phase II : Bass, Eagle, Pike, Twin, and Oxbow Creeks and Mattson Brook
2007	<ul style="list-style-type: none"> • CAMP: Bass, Pike, Schmidt • Three Rivers: Pomerleau • Outlet and Brooklyn Blvd stream monitoring • Macroinvertebrate monitoring at four sites • Wetland monitoring at four sites • Chloride TMDL approved by EPA 2/14/07 • Twin and Ryan lakes TMDL approved by EPA 11/9/07 • Begin DO/Biotic TMDL for Shingle and Bass Creeks • Longitudinal DO survey on Shingle and Bass Creeks • Aquatic vegetation survey in Twin and Ryan Lakes
2008	<ul style="list-style-type: none"> • CAMP: Upper and Middle Twin, Ryan, Crystal, Meadow, Success • Outlet and Brooklyn Blvd stream monitoring • Macroinvertebrate monitoring at four sites • Wetland monitoring at four sites • Wetland functions and values at seven sites for the <u>Wetland Management Plan Phase I</u> • Continue DO/Biotic TMDL for Shingle and Bass Creeks • High and Low flow dye studies and synoptic water quality surveys, Shingle and Bass Creeks
2009	<ul style="list-style-type: none"> • CAMP: Bass, Cedar Island, Schmidt, Eagle, Pike, Magda • Outlet and Brooklyn Boulevard stream monitoring • Macroinvertebrate monitoring at four sites • Wetland monitoring at four sites • Sediment core samples: Meadow, Upper Twin, Pike • Continue DO/Biotic TMDL for Shingle and Bass Creeks • Begin Stressor ID for Shingle and Bass Creeks • Crystal Lake TMDL approved by EPA on 3/25/09 • Schmidt, Pomerleau, Bass TMDL approved by EPA on 9/25/09
2010	<ul style="list-style-type: none"> • CAMP: Upper, Middle, and Lower Twin; Ryan, Crystal • Outlet and Brooklyn Boulevard stream monitoring • Macroinvertebrate monitoring at four sites • Wetland monitoring at four sites • Fish sampling at three sites, two on Bass Creek and one on Shingle Creek above Palmer Lake • Sediment core samples: Bass, Schmidt • Meadow Lake TMDL approved by EPA on 3/23/10 • Cedar Island, Pike, Eagle TMDL approved by EPA on 4/14/10 • Lake Magda TMDL approved by EPA on 9/30/10 • Complete Stressor ID and DO/Biotic TMDL for Shingle and Bass Creeks and submit for MPCA/EPA review

2.3 PROJECTS

The Commissions do not undertake construction projects themselves, but they do share in the cost of certain qualifying projects. Under the authority provided by Minn Stat 103B.251 Section VIII, Subd. 5, the Commissions can certify for payment by the county all or part of the cost of an approved capital improvement. Each year the Commissions consider projects submitted by the member cities for its Capital Improvement Program. The Commissions' Technical Advisory

Committee (TAC) reviews the projects, and recommends which projects meet the Commissions' requirements for funding. The Commissions receive feasibility reports and hold public hearings on the projects before ordering projects and certifying a levy to the county. Projects are constructed by member cities through a cooperative agreement with the appropriate Commission. Table 2.4 below shows the projects that have been completed under this program.

Table 2.4. Commission Capital Improvement Projects.

Project	Year	Commission Share	Local Share	Grants	Total Cost
Brooklyn Park Shingle Creek Restoration, Brooklyn Boulevard to Candlewood	2005	\$75,000	\$673,440		\$748,440
New Hope Wincrest Pond	2007	\$72,500	\$217,500		\$290,000
Maple Grove Pond P-51	2007	\$250,000	\$1,209,000		\$1,459,000
Wetland 639W Feasibility Study	2008	\$30,000	\$30,000	\$60,000	\$120,000
Crystal Twin Oak Pond	2008	\$77,500	\$1,002,420	\$420,080	\$1,500,000
Robbinsdale Crystal Lake Water Quality	2009	\$100,000	\$900,000	\$82,500	\$1,000,000
Crystal Wetland 639W Outlet modifications	2010	\$142,500	\$127,500	\$300,000	\$570,000
New Hope 45th Avenue Pond	2010	\$82,500	\$87,500	\$160,000	\$330,000
Brooklyn Center Shingle Creek Restoration I-94 to CR 10	2010	\$127,500	\$254,263	\$128,237	\$510,000
Minneapolis 37 th Avenue Greenway	2011	\$250,000	\$3,750,000		\$4,000,000
TOTAL		\$1,207,500	\$8,251,623	\$1,150,817	\$10,527,440

2.4 CITY ACTIVITIES

The ten member cities in the two watersheds undertake the bulk of water resources management activities in the watersheds. Best Management Practices are routinely included in city street reconstruction and other projects. Several cities have undertaken large capital improvement projects and invested in costly new equipment incorporating the latest technology such as regenerative air sweepers and plow trucks outfitted with computerized road temperature readers and application controls and prewetting spreaders. Citizens are engaged through education and outreach, and each city has an advisory commission charged with making recommendations to the City Council about water resources and other environmental concerns.

Each city was asked to identify their notable achievements since 2003, which are described below.

2.4.1 Brooklyn Center

Brooklyn Center has undertaken a variety of activities to protect and improve water resources, including:

- Installed 11 storm drainage ponds as part of street reconstruction projects

- Installed 24 residential rain gardens as part of street reconstruction projects
- Installed 16 sump manholes as part of street reconstruction projects
- Installed 9 grit chamber systems as part of street reconstruction projects
- Installed 11,650 square feet of pervious concrete as part of a street reconstruction project
- Started the Great Shingle Creek Watershed Cleanup Event



Figure 2.2. Volunteers attaching "No Dumping" markers at a catch basin.

- Constructed new salt storage building
- Implemented a volunteer storm drain stenciling/marketing program
- Purchased equipment for a brine truck
- Constructed biofiltration system on Bass Lake Road along with 5 large rain gardens
- Participated with Watershed in hosting a Salt Applicator Workshop
- Conducted annual in-house BMP training with Public Works staff
- Public Works staff attended LTAP Snow and Ice Control Material Application training
- Upgraded ice control equipment to Force America Sanders for more accurate application
- Over the last 10 years Brooklyn Center has reduced annual salt usage
- Increased the frequency of street sweeping cycles

Brooklyn Center also collaborated with Hennepin Community Works to complete the “Daylighting Shingle Creek: Framework Plan” evaluating options for incorporating

improvements to Shingle Creek into redevelopment in the city’s commercial core. The city also participated in a similar Hennepin Community Works study of Shingle Creek in Brooklyn Park and Brooklyn Center called ”Connections at Shingle Creek.”

The recommendations of the Framework Plan and the Shingle Creek Commission’s Shingle Creek Corridor Study are being incorporated into a city 2010-2011 project that would improve about 5,400 feet of Shingle Creek from I-94 to County Road 10.



Figure 2.3. Installing an underground treatment device in Brooklyn Center.

2.4.2 Brooklyn Park

Brooklyn Park has constructed several restoration projects on Shingle Creek as city projects or as public-private partnerships. About 7,600 feet or about 1.4 miles of Shingle Creek in Brooklyn Park have been reconstructed using design standards developed in the Shingle Creek Corridor Study. The City has collaborated with Hennepin Community Works and the City of Brooklyn Center to complete the “Connections at Shingle Creek” study exploring ideas for improving an additional 3,600 feet of Shingle Creek and linking the newly restored segments at the Village Creek redevelopment to Palmer Lake and Brookdale Parks and the Shingle Creek Regional Trail.

Other Brooklyn Park accomplishments include the following:



Figure 2.4. Installing a brush mattress on Shingle Creek to narrow the overwidened channel.

- Constructed a new salt storage building, installed a brine system, and installed pre-wetting equipment on 15 plow trucks
- Incorporated pretreatment and infiltration BMPs as feasible on street reconstruction projects
- Are using more low-maintenance and native vegetation on construction projects
- Acquired a property adjacent to River Park on the Mississippi River, and collaborated with Great River Greening to restore the turfed site with native plants, trees and shrubs. Much of the restoration work was assisted by community volunteers
- Conduct an annual Shingle Creek Cleanup event
- Are working with the DNR to monitor groundwater levels and have implemented conservation measures such as conservation pricing and public education about conservation
- Worked with the Lake Success Association to investigate changes in lake levels
- Much of Brooklyn Park is in the Anoka Sand Plain, and stormwater ponds often go dry unless they had been lined. City works with homeowners associations to provide advice about pond maintenance and buffer vegetation to improve the appearance and functionality of the ponds.

2.4.3 Champlin

Champlin has achieved many accomplishments related to the environment and public education since the development of the West Mississippi Watershed Management Commission Second Generation Plan. In addition the City has developed minimum control measures and procedures for our MS4 Storm Water Pollution Prevention Program.

Public Education. Provided various environmental and conservation articles in quarterly newsletters to residents. Information included: spring clean up tips, disposal of pet waste, recycling of house hold products / appliances; grass clippings and other various environmental information. An estimated 8,615 households receive this information.

The Environmental Resource Commission sponsors an environmental education booth at the Champlin Farmers Market. Also, the City partners with West Mississippi WMC Rain Garden Workshops.

Environmental Resource Commission. The Champlin Environmental Resource Commission (ERC) has taken a key role in providing incentives to residents though a grant program to construct rain gardens and native landscapes to improve water quality for storm water runoff. Since 2005, 42 grants have been given to Champlin residents estimated at \$500 each. Other grants have been provided for environmental studies and projects at Jackson Middle School and Champlin Park High School.

The Champlin ERC sponsors environmental events including: Environmental Expos, Spring Clean –up Day; Recycle pick-up, Earth Day Event, and Arbor Day. These events are held over a one week period and are tied-in with the Great River Clean-up sponsored by the West Mississippi/ Shingle Creek WMC’s. The first year of the event the City collected 96 bags of garbage and cleaned 2 miles of river /stream shore line.



Figure 2.5. A rain garden planted by a Champlin resident assisted by an ERC grant.

Public Works and Parks. The Parks and Public Works Department has developed programs that include the following: Adopt-a- Park, Adopt –a- Pond and Storm Water Catch Basin Stenciling Programs. In addition the City works with Boy Scouts to develop Eagle Scout projects that provide environmental benefit. Public Works has developed procedures to track the use of chemicals used by Public Works Crews as part of the lawn maintenance program.

Surface Water Management Plan. The City has developed and implemented an overall Surface Water Management Plan that is consistent with the water management plans for both Elm Creek and West Mississippi WMCs. The City has identified and mapped all drainage districts, sub-watersheds; storm sewer pipes, ponds, and outfalls.

Since the implementation of the Storm Water Management Plan, Champlin has developed a CIP for the development of storm water detention and water quality ponds. The construction of the facilities has been through either public improvements or private development. The City has overseen the construction of 22 NURP ponds that will provide storm water treatment and infiltration; all are tributary to the Mississippi River.

A Functional Assessment of Wetlands has been completed for all wetlands in the city. Currently Champlin is working with Hennepin County to improve water quality in Elm Creek and Mill Pond. Projects will include riparian restoration and stream stabilization improvements that will reduce pollutants tributary to the Mississippi River.

Street and Storm Sewer Maintenance. In accordance with our MS4 permit the City has developed a storm sewer inspection program to ensure that 25% of the City's storm sewer is inspected each year. Inspections identify maintenance needs and will identify any illicit discharge into the storm sewer system. The City has inspected 92 outfalls and 64 ponds each year. In 2009, the City repaired 2 storm sewer outfalls to the Mississippi River. Last year the City conducted 22 maintenance actions on the storm sewer system from our inspection program. The City also required the construction of one water quality pond for private property under our illicit discharge inspection program.

The City has adopted a street sweeping program and de-icing program. Streets are swept City wide 2 times per year. Critical areas are swept more often. The City is controlling the deicing in sensitive areas. Sand and salt use is monitored through this program

City Campus Improvements. The City expanded its Municipal Campus Facilities in 2008. Three rain gardens and one NURP pond were constructed to improve water quality of storm water runoff. In addition, a covered salt/sand storage building was constructed to provide added protection for storm water run-off.

2.4.4 Crystal

Crystal has constructed or is preparing to construct some capital improvement projects that will make a significant improvement to water resources. In 2010-2011 the City will, in collaboration with four other cities, construct outlet modifications to Wetland 639W adjacent to the MAC Crystal Airport. This wetland discharges a high load of phosphorus to Upper Twin Lake.

In 2010 Crystal undertook the Twin Oak Pond project. A trunk stormsewer on Bass Lake Road collects runoff from the north 25% of the City, including a small portion of New Hope, and discharges untreated into Upper Twin Lake. The Twin Oak Pond operates by intercepting the "first flush" of rainfall flowing down the Bass Lake Road storm sewer, treating it as it flows through the pond, and then pond is located on the former site of four blighted four-plexes that were acquired and demolished by the City. The pond has wetland vegetation around its perimeter along with a walking trail.

Together these two projects will provide almost half the nutrient load reduction required in the twin Lake TMDL and should help to improve water quality in the lake.

Crystal has installed about 25 residential boulevard rain gardens in the last two neighborhood street reconstructions and rain gardens will be offered to the residents in the next neighborhood street reconstruction this summer. Three public rain gardens were installed in parks during the street reconstructions. All of these rain gardens (public and residential) take runoff from the street and infiltrate it into the ground. In addition Crystal incorporated a public rain garden into a recent city hall parking lot resurfacing project to treat runoff from the parking lot.

The City's Environmental Commission has put up an information sign along Twin Lake

Shoreline Park that educates shoreline property owners about the importance of a 10 foot "No Mow" zone along the waters edge. The Environmental Commission has requested city maintenance staff to keep a "no mow" zone along the storm water ponds in the city.

In addition, the city has accomplished the following:

- Since 2004 three Stormceptor-type water treatment manholes have been installed in critical locations upstream of receiving waters.
- In 2002 the City replaced a traditional street sweeper with a regenerative air type sweeper.
- In the last three years the City has greatly reduced the usage of road salt by installing brine solution spray bars on the salt auger boxes on five of the six single axle dump truck snow plows.
- On-site brine making equipment was installed in 2009 to supply both Crystal and a neighboring suburb.
- The City continues to have an aggressive street sweeping program.
- The City continues to require on-site treatment of parking lot runoff from all new commercial redevelopment projects.

2.4.5 Maple Grove

Maple Grove has undertaken a number of activities to protect and improve water resources. These include:

- Purchased one tandem truck fitted with an Epoke unit suited for pre-wetting and computerized road salt delivery system. This system significantly reduces salt application rates and improves salt effectiveness.
- Created a detailed salt application map and an intensive salt tracking system to determine and compare application rates for individual operators and locations throughout the City. From this adjustments in salt application methodologies can be made operators informed how to apply salt in a more efficient manner.
- Staff has invested time in biannual training for new road salt application technologies.
- The City is currently constructing a salt shed at the new Public Works facility, to keep stored salt dry so that it can be applied more efficiently even when applied in a pre-wetted form.
- The Lake Quality Commission advises the City on actions that can be considered for managing the City's lakes. Eagle and Cedar Island Lakes received City support for rough fish removal, water quality studies and aquatic plant management.
- Retrofitted streets with hydrodynamic separators.
- Sponsored evaporation and infiltration studies to develop a better understanding of methods to mitigate the effects of development by recharging the groundwater and controlling runoff.
- Created a mitigation bank for groundwater infiltration. The City has invested in developing infiltration fields within the Gravel Mining Area to reduce the impact of the increased impervious surface associated with the developing area.
- City ponds have been oversized and fitted with infiltration benches to achieve water quality removals exceeding Commission minimum standards.

- All wetlands in the city have been comprehensively evaluated and classified to protect highly valued natural resources while affording flexibility for development.
- Completed an inventory and mapping project of all ponds and stormsewer outfalls within the City. Each year the City inspects and makes functional assessment of each facility in the watershed and develops a list prioritizing the facilities maintenance schedule.

2.4.6 Minneapolis

Minneapolis constructed storm sewer improvements and a large pond at the north end of Crystal Lake Cemetery to address local flooding concerns and to provide water quality treatment of runoff.



Figure 2.6. Victory Neighborhood residents planting on the shoreline of Ryan Lake

The Minneapolis Park and Recreation Board planted a native buffer around Webber Pond, and the Victory Neighborhood Association is undergoing a multi-phase project to plant the shoreline of Ryan Lake with a native buffer. The Victory and Cleveland neighborhoods collaborated with Metro Blooms to plant about 40 residential rain gardens in the two neighborhoods.

Minneapolis will undertake a large improvement project in the neighborhood just south of Crystal Lake cemetery, part of what the City calls Flood Area 5. The 37th Avenue Greenway project will remove pavement from part of a cross street – 37th Avenue – and replace it with a bikeway and a series of biofiltration basins. Underground storage units will be installed under the greenway to detain stormwater that is now overloading the storm sewer system and causing significant localized flooding. Similar improvements as well as installation of underground treatment devices are planned for the future elsewhere in Flood Area 5 as funding allows.

2.4.7 New Hope

New Hope has undertaken several activities since 2003. These include:

- Dorothy Mary Park Pond – Cleaned and expanded flood storage

- Meadow Lake – installed pre-treatment cell, 4 grit chambers, partial drawdown and sediment removal and installed a rain garden
- Wincrest Pond – Improved treatment efficiency and increased flood storage
- Victory Park Wetland – Added pre-treatment cell and expanded wetland area and channel cleaning
- Elm Grove Park – Created dry pond for flood relief
- Winnetka Green – Constructed storm water pond and grit chamber
- Pet Hospital Ponds – Constructed two storm water ponds and created channel to efficiently manage flows
- 49th Avenue Ball field – Installed pre-treatment cell
- Ericson Drive Wetland – Removed debris from two pond inlets

2.4.8 Plymouth

Plymouth has completed several improvements in the Schmidt Lake watershed, including four lakeshore restorations, three large rain gardens to treat runoff prior to being discharged into the lake, and additional targeted street sweeping in the watershed. Lake monitoring suggests that water quality is improving in Schmidt Lake since these actions were taken. Elsewhere in the Shingle Creek watershed, the city has installed five rain gardens near Bass Lake and routinely sweeps streets three times annually. Prewetting equipment for the majority of our fleet is used to minimize salt application.

Plymouth has a very active education and outreach program, including a periodic environmental Quality newsletter. Each year the City works with an elementary school to host an Environmental Quality Fair, which increases public awareness of environmental issues including Plymouth watersheds.



Figure 2.7. Rain garden across from Schmidt Lake in Plymouth.

2.4.9 Robbinsdale

In 2010-2011 Robbinsdale is constructing several projects to improve Crystal Lake. Lakeview Terrace Park is being reconfigured to improve the recreation facilities and to incorporate three treatment ponds. A system to withdraw and treat water from Crystal Lake is also being installed, and an alum treatment will be applied to the lake. The City had previously partnered with the DNR to plant a native buffer in Hollingsworth Park on the north shore of the lake

Robbinsdale has retrofitted a number of stormwater treatment BMPs, usually as part of a city street or county or Mn/DOT highway reconstruction project. Several stormwater treatment ponds have been installed, including Nummer Ponds, Spanjers Park pond, six ponds as part of the TH 100 third lane project, and three ponds as part of the CSAH 81 reconstruction project. Four underground treatment units have been installed, and 17 “draining manholes” that provide for treatment and infiltration. The City has installed rain gardens at City Hall and the Public Works garage and in a traffic island at 41st Avenue and Beard Avenue North. The City has hosted Metro Blooms rain garden classes.

Robbinsdale has collaborated with the Shingle Creek Commission on the Paired Intersection Study. Two street sections in Robbinsdale were repaved with porous asphalt pavement and various monitoring equipment installed to evaluate its effectiveness in reducing the need to apply road salt.

Other activities include:

- Construction of a new salt storage shed, installation of a brine making system, and addition of prewetting on four plow trucks to minimize road salt application.
- Wetland functions and values were assessed on wetlands in the Shingle Creek watershed
- The yards of three homes on Ryan Lake were regraded to prevent flooding.

3.0 Evaluation of Second Generation Goals and Strategies

A goal is a desired end toward which the management strategies are directed. Section 5 of the Second Generation Plan identified eight goals to guide water resources planning and management functions in the two watersheds:

1. Maintain the existing 100-year flood profile throughout the watersheds.
2. Protect and improve water quality based on practical use.
3. Strive to provide water quality that supports recreation, fish and wildlife based on practical use.
4. Establish an education and public outreach program.
5. Develop an appropriate management strategy for Hennepin County Ditch #13.
6. Protect and improve groundwater quality and promote groundwater recharge.
7. Protect and improve wetlands.
8. Reduce erosion and sedimentation.

Section 6 of the Plan presented strategies and policies for each of the above goals to serve as a management framework over the ten years of the plan. In addition, Section 7 and Appendix G set forth a Work Plan and Capital Improvement Program to implement these strategies. Member cities supplement and complement these goals and strategies with additional policies and programs tailored to their unique priorities and needs.

3.1 EVALUATING SUCCESS IN ACHIEVING GOALS AND STRATEGIES

Table 3.1 shows the various strategies from the Plan, describes the accomplishments to date, and uses an assessment tool used by several other WMOs to evaluate progress and success in achieving planned results. This tool evaluates the relative progress made toward each of the identified strategies or work plan actions.

Less than 25% success (rank=1): There is minimal activity or little or no activity relative to completing the action item. Activity and projects being completed in the watershed are largely being done by others and tend to be only marginally related to achieving the Commissions' goals. If collaboration exists, efforts have not moved beyond a planning or discussion stage.

25% - 50% success (rank=2): Projects or programs have been initiated or are in the early planning stages. Proposals for preliminary engineering reports, feasibility studies,

implementation plans, or related materials are being or have been developed, and that work may have been initiated. Funding options are being explored. Stakeholder input is being secured. Collaboration is being planned or discussed.

50% - 75% success (rank=3): Steady and observable activity towards the completion of the action item is evident. Preliminary engineering reports, feasibility studies, implementation plans, or related materials are in progress or completed and the processes necessary to implement the recommendations are identified or in place. Permits and/or grant applications may be pending. Stakeholder approvals may be in progress to authorize action. Activity and projects being completed within the watershed are largely being done by the stakeholder identified in the management plan and are directly related to achieving the Commissions' goals. If collaboration exists, efforts have moved beyond a planning or discussion stage.

Greater than 75% (rank=4): The action item is nearing completion or has been completed. Construction is in progress or has been completed. Programs have achieved a stable, mature state. Funds are committed. Implementation plans are nearing completion or have been completed.

Table 3.1. Progress towards accomplishing the Second Generation Plan goals and strategies.

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
1. Maintain the existing 100-year flood profile throughout the watersheds.			
Strategy 1.1.1 The Commissions will maintain a calibrated hydraulic model of the watersheds.	A calibrated SWMM model is maintained for Shingle Creek. A P8 model is being developed for West Mississippi and updated for Shingle Creek.	4	
Strategy 1.1.2 Local plans must demonstrate that the member cities do not exceed the discharge rates established by the watershed plan.	Discharge rates distributed to cities in memo describing local plan update requirements. This item is reviewed as part of local plan update reviews.	4	
Strategy 1.1.3 The Commissions will maintain management standards for new development, redevelopment, or additions to existing developments.	Commissions have Rules and Standards in place and periodically review and revise them. Local plans and local controls are reviewed for conformance with standards.	4	
Strategy 1.1.4 Member cities may not make land use amendments to their Comprehensive Plan that would result in development that is inconsistent with the Second Generation Plan and the member city's approved Local Plan without first advising the Commission and soliciting comments from the Commission as to the effect said land use amendment would have on the management of stormwater within the city, the watershed management sector, and the watershed.	Cities proposing major revisions to or updating their Comp Plans have submitted them to the Commissions for review.	4	
Strategy 1.2.1 Local plans must demonstrate that member cities have identified key flood storage areas and developed measures to be employed to protect wetlands, ditches, drainageways, and stormwater storage areas.	Key storage areas locations distributed to cities in memo describing local plan update requirements. This item is reviewed as part of local plan update reviews.	4	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
Strategy 1.2.2 The Commissions discourage the diversion of water from natural drainage areas. When such diversion is requested and becomes necessary the downstream impacts on water quantity and quality need to be addressed. The Commissions will review these on a case-by-case basis and will establish conditions to meet the goals of the management plan, promote water quality, and regulate the control of water quantity to protect the public safety and welfare.	Review as necessary.	4	
Strategy 1.3.1 The Commissions will periodically conduct site surveys of BMPs approved in project reviews to determine if they have been constructed in accordance with the approved plan and are functioning as required. Member cities notified by the Commissions that an improvement was not constructed or is not functioning in accordance with the approved plan must take corrective action and report back to the Commissions as to the outcome.	Completed pond inspections 2000, 2004. Action is now completed by NPDES permit inspection requirements.	4	
Policy 1.4 Public easements or other methods of control are required to preserve wetlands, drainageways, floodplains and open waterbodies used for stormwater storage	This item is reviewed as part of project reviews, local plan update reviews.	4	
Policy 1.5 The Commissions will maintain a watershed monitoring system to record stream flow and precipitation	The Commissions' annual monitoring program includes stream flow monitoring at three locations on Shingle Creek, and other locations as necessary. Precipitation is recorded at a network of NWS sites, as well as at the Crystal Airport and at various city garages. Flow monitoring was conducted at some sites in West Mississippi in 2010.	4	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
Policy 1.6 Member cities shall adopt floodplain management ordinances that require as a minimum one foot of freeboard above the 100-year profile	This item is reviewed as part of local plan update reviews.	4	
Strategy 1.6.2 The Commissions will consider FIS Map Revisions on a case-by-case basis.	This item is considered on a case-by-case basis.	4	
Policy 2.1 Through the development of lake and resource management plans the Commissions will refine their rules and standards for new development to prevent further degradation of water quality	Commissions considered and approved a rules and standards revision in 2008.	4	
2. Protect and improve water quality based on practical use.			
Strategy 2.2.1 A water quality monitoring program will be maintained to identify existing and changing conditions and potential problems. The program will include volunteer monitoring such as CAMP as well as Commission monitoring.	The Commissions' annual monitoring program includes stream flow and water quality monitoring at three locations on Shingle Creek, and other locations as necessary. Lakes are monitored by volunteers through CAMP, and stream macroinvertebrate and wetland monitoring are performed by volunteers through HCES.	4	
Strategy 2.2.2 Data collection and analysis will be coordinated with agencies involved in water quality monitoring	One of the Shingle Creek monitoring stations is operated by the USGS, with cost sharing by the Commission. Water quality data are routinely entered into STORET.	4	
Strategy 2.2.3 The Shingle Creek Commission will complete a TMDL study of chloride levels in Shingle Creek and develop an implementation strategy in cooperation with other agencies	Completed and approved by the EPA February 14, 2007.	4	
Strategy 2.2.4 The Shingle Creek Commission will complete other TMDLs as required by the	TMDLs and Implementation Plans completed and approved for 13 lakes. Shingle/Bass Creeks Dissolved	4	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
MPCA	Oxygen and Impaired Biota TMDLs under way.		
Policy 2.3 The Commissions will determine cost-effective long-term practical use of lakes and streams by preparing use attainability-type studies	This item has been superseded by TMDLs.	1	Superseded by TMDLs
Strategy 2.4.1 The Commissions will classify and prioritize water resources based on watershed significance	Lakes and wetlands classified based on watershed significance in the 2006 Water Quality Plan, adopted by Major Plan Amendment in April 2007.	4	
Strategy 2.5.1 Until such time as the Commission reviews and establishes water quality goals, the Commission adopts water quality goals established by the member cities.	Lake water quality goals adopted in the 2006 Water Quality Plan.	4	
Policy 2.6 The Commissions' public information and education program will include components specifically focused on maintaining and improving water quality	The Education and Public Outreach Committee has developed publications, articles, and activities focused on water quality. Education grants must include water quality education component. Funded rain garden workshops through Metro Blooms.	4	
Policy 2.7 The Commissions will maintain regulations regarding the treatment of stormwater discharges.	Commissions considered and approved a rules and standards revision in 2008.	4	
Strategy 2.8.1 Member cities shall adopt a shoreland management ordinance in accordance with DNR requirements and timeline.	This item is reviewed as part of local plan update reviews.	4	
3. Strive to provide water quality that supports recreation, fish and wildlife based on practical use.			
Policy 3.1 Water resource management plans and studies prepared for water quality management will also include evaluations of recreation, fish	Lake and stream TMDLs include assessment of recreation, fish, and wildlife. Stream corridor studies also evaluated biotic and recreation conditions.	4	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
and wildlife impacts.			
Policy 3.2 In establishing wetland and water quality management standards and strategies, the Commissions will take into account impacts on recreation, fish and wildlife	Lake and stream TMDLs include assessment of recreation, fish, and wildlife. Stream corridor studies also evaluated biotic and recreation conditions.	4	
Strategy 3.4.1 The Commissions encourage member cities to promote and pursue development of the Shingle Creek corridor as a greenway	Brooklyn Park has completed improvements to four reaches (2 city project, 2 developer projects) and another city project is underway in 2010. Brooklyn Center will complete a stream project in 2010-2011. Both Brooklyn Park and Brooklyn Center have participated with Hennepin County Community Works to develop Visioning Plans for creek restoration complementary to redevelopment.	4	
Strategy 3.4.2 The Commissions encourage member cities to strive to achieve the Mississippi National River and Recreation Area (MNRAA) Tier II voluntary management standards to preserve and improve recreation and natural resources along the Mississippi River corridor	Champlin and Brooklyn Park have developed Mississippi River Management Plans.	3	Not all cities have achieved these standards.
4. Establish an education and public outreach program.			
Strategy 4.1.1 The Commissions will conduct an evening annual meeting and Open House to review past year activities and solicit comment on upcoming activities.	Commissions now hold an annual meeting at their regular meeting times at which the past years' activities are reviewed and the coming year's work plan is considered.	3	Has been difficult to get interest by the general public.

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
Section 4.2.1 The Commissions will maintain a Web site that will communicate the education and public outreach program as well as other information such as summaries of management standards and strategies and information regarding upcoming project reviews.	Commissions' website is www.shinglecreek.org . Site is kept updated with reports, minutes, news releases, etc.	4	New website design will roll out in 2011.
Section 4.2.2 The Commissions will establish a standing Education and Public Outreach Committee from member city representatives and other interested parties to advise the Commission and implement the education and outreach program	The EPOC meets monthly (except summers). Monthly reports are provided to the Commissions.	4	
Strategy 4.2.3 The Commissions will coordinate with and participate in organizations such as WaterShed Partners as well as other standing or ad hoc organizations to obtain and disseminate information on general or specific topics	Commissions are members of WaterShed Partners and Blue Thumb, and have taken the lead in developing the West Metro Water Alliance with Bassett, Elm, and Pioneer-Sarah Creek WMOs, Hennepin County, and three Rivers Park District. The WMWA meets quarterly.	4	
Policy 4.3 The Commissions will establish ad hoc advisory committees as necessary regarding specific topics of interest.	Completed as necessary.	4	
Policy 4.5 The Commissions will publish an annual report that contains information required by law as well as a review of progress towards meeting goals and objectives.	Completed annually.	3	The annual report format has been revised to be in compliance with the statutory deadline for submittal.

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
Policy 4.6 The Commissions will develop and administer an education and public outreach program that fulfills NPDES Phase II requirements, and encourage member cities to adopt this program as one part of their NPDES Phase II permit requirements	Education and outreach program developed and reviewed annually, assisted by an Education and Public Outreach Committee. An annual report of activities is submitted to the cities to incorporate into their annual NPDES reports.	4	
5. Develop an appropriate management strategy for Hennepin County Ditch #13.			
Policy 5.1 The Shingle Creek Commission will develop an appropriate management strategy for Ditch #13.	The Shingle Creek Commission discussed options for Ditch #13 and concluded that the appropriate management strategy was to continue county jurisdiction over the ditch.	4	
6. Protect and improve groundwater quality and promote groundwater recharge.			
Policy 6.1 The Commissions will maintain regulations regarding groundwater recharge by infiltration	The Commissions' rules and standards includes a requirement that new development and redevelopment abstract or infiltrate 0.5" runoff from new impervious surface.	4	
7. Protect and improve wetlands.			
Policy 7.1 Where the Commissions are the LGU, the Commissions will administer Wetland Conservation Act (WCA) rules.	The Commissions act as LGU for Brooklyn Center, Brooklyn Park, Osseo, Robbinsdale, and Champlin.	4	
Strategy 7.2.1 A functions and values analysis will be completed for wetlands identified by the Commissions as high priority, according to the schedule identified by the Commissions at the time of prioritization. All other wetlands will be evaluated as opportunities arise.	Commissions completed Phase I of the assessment by defining required information and performing "reference" functions and values assessments. Cities now undertaking assessments of priority wetlands (Phase II), and will report that data to Commissions in 2011.	2	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
Strategy 7.2.2 The Commissions will conduct functions and values analyses at the member city's cost where the member city has designated the Commission to act as the LGU, and will expect cities that are the LGU to conduct their own functions and values analyses. All functions and values analyses conducted after adoption of this Plan shall use MnRAM version 2.0 or higher	Commissions completed Phase I of the assessment by defining required information and performing "reference" functions and values assessments. Cities now undertaking assessments of priority wetlands (Phase II), and will report that data to Commissions in 2011.	2	
Strategy 7.2.3 The Commissions will identify high priority areas and establish management strategies and priorities for wetlands based on watershed significance	High priority wetlands defined in 2006 Water Quality Plan. Cities now undertaking assessments of priority wetlands, and will report that data to Commissions in 2011 for use in wetland management plan.	2	
Policy 7.3 The Commissions will evaluate the need for wetland banking within one year of adoption of the Second Generation Plan	Has been periodically discussed, and the Commission have in the past expressed no desire to bank wetland credits in the watersheds.	1	
8. Reduce erosion and sedimentation.			
Policy 8.1 Member cities shall adopt an erosion control ordinance as required by the Metropolitan Council within one year of adoption of the Second Generation Plan	This item is reviewed as part of local plan update reviews.	4	
Policy 8.3 The Commissions will maintain management standards for the control of erosion for new development, redevelopment, or additions to existing developments	The Commissions' rules and standards require development requiring project reviews to meet NPDES Construction Permit erosion control standards.	4	
Strategy 8.3.1 Project reviews within the Mississippi River Critical Area shall be coordinated with Critical Area requirements	To date no projects have been considered within the Critical Area.	1	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
Second Generation Work Plan Items			
1. Expand educational program	Ongoing Education and Public Outreach Committee (EPOC); founded the Joint EPOC with Bassett Creek, Elm Creek, and Pioneer-Sarah Creek WMCs; sponsor annual Shingle Creek Watershed Cleanup; prepared and distributed several brochures; sponsored rain garden workshops; sponsored chloride applicator workshops; appearances at education fairs and community gatherings; completed joint opinion survey; awarded education and outreach grants	4	
2. Resource management plans: Second Generation Plan, Chloride TMDL, Twin Lake Homeowner Education Project, Twin Lake Management Plan	All completed and approved	4	
3. Pike Creek bank stabilization	Cities of Maple Grove and Plymouth completed joint project	4	
4. Update and calibrate model	Completed XP-SWMM model of Shingle Creek watershed (part of chloride TMDL); completed gross P8 models for lake TMDLs; refining and compiling P8 model for Shingle Creek; building new P8 model for West Mississippi; completed QUAL2K model for Shingle Creek DO study	4	
5. NPDES permit education and outreach program	Commissions' education and outreach program meets NPDES permit Education and Outreach minimum measure for 9 of 10 cities (not Minneapolis, which is a Phase I city)	4	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
6. Education grants	Awarded 20 grants totaling \$11,474. Three additional grants totaling \$3,000 are currently underway. Supported schools, school groups, scouts, associations, neighborhood organizations, citizen commissions	4	
7. Water Quality Plan	Completed Water Quality Plan; established goals for lakes, streams, and wetlands; classified lakes; identified high-priority wetlands. Revised annual budget and annual water quality report to follow the report format	4	
8. Identify watershed significant wetlands for functions and values and preservation	WQP included an identification of priority wetlands for functions and values analysis. Member cities are completing F & V assessments for those wetlands in 2010, and data will be compiled into 2011 Wetland Management Plan.	4	
9. Twin Lake wetland (639W) restoration	Completed additional monitoring; feasibility study; and preliminary plans and specifications. Developing final plans and specifications and obtaining permits for construction in 2011	3	
10. Opinion/attitude survey	Hired Decision Resources to complete telephone survey, jointly with Elm and Bassett Creek WMOs. Disseminated results to cities; using results to refine education and outreach program	4	
11. Additional water quality monitoring	Added additional parameters to stream monitoring related to chloride, DO; added volunteer wetland health monitoring; completed some lake aquatic vegetation monitoring	3	TMDLs identified need to expand monitoring program to increase biological monitoring, and to conduct more in-depth lake monitoring.
12. Review updated local plans	All 10 cities have updated their Local Water Management Plans	4	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
13. TMDL Implementation Plan	Chloride TMDL Implementation Plan approved in 2007 won a 2008 APWA Snow and Ice Control Award; implementation plans for 13 lake TMDLs approved.	4	
14. Shingle Creek Corridor Plan	Completed corridor studies for Shingle, Bass, Eagle, Pike, Twin, Ryan, and Oxbow Creeks and Mattson Brook; completed improvement and maintenance recommendations; established design standards; served as “preTMDLs”	4	
15. Practical Use & Goals Plan	Superseded by TMDLs	1	Superseded by TMDLs
16. Wetland Management Plan	Water Quality Plan identified priority wetlands for functions and values; Phase I of WMP reviewed existing data, completed “example” wetlands, and outlined report. Cities undertaking functions and values assessments in 2010	2	Just underway
17. BMP evaluation	Most BMP evaluation being completed by other agencies or the St Anthony Falls Lab. Obtained \$238,000 grant to completed Paired Intersection Study to evaluate the effectiveness of porous pavement in reducing ice buildup thus requiring less road salt	2	
18. Shingle Creek greenway and channel improvements	Shingle Creek Corridor Study design standards used by cities and private developers to complete Shingle Creek improvements.	4	
19. Review MNRAA Tier II status & Mississippi River plans	Cities have completed Mississippi River Corridor Plans	3	

Planned Actions or Results	Accomplishments to Date	Success Rank	Comments
20. Wetland/habitat restoration	None to date.	1	
21. Update HEC-2 model and evaluate creek 100 year elevation	Superseded by SWMM model	1	Superseded by SWMM model
22. Review classifications and five year progress towards water quality goals	Superseded by TMDLs	1	Superseded by TMDLs
23. Match for local improvement project (in progress)	Major Plan amendment completed in 2007 to revise CIP and to add a Cost Sharing Policy to the Plan providing for Commission participation in up to 25 percent of the cost of qualifying capital projects.	4	

4.0 Self-Assessment

A self assessment goes beyond a summary of activities or a checklist documenting whether an action in the Management Plan was undertaken or a goal achieved. The Commissioners conducted a self-assessment to evaluate their accomplishments and to identify areas where they fell short or could use improvement.

4.1 ACCOMPLISHMENTS

The Commissioners identified the following as their top accomplishments of the second Generation Management Plan:

4.1.1 Resource Management Planning

Completing TMDLs and other resource management plans was a significant effort, but the Commissions enjoy a much more thorough understanding of conditions in the watersheds than was known 10 years ago. Since 2003 the Commissions have conducted diagnostic studies and assessments of thirteen of the sixteen lakes, and used those findings to prepare implementation plans that identified the most effective actions to take to improve the lakes. The Shingle Creek Corridor Study and Phase II Study evaluated conditions on the streams in the watersheds and developed appropriate design standards to improve water quality and biotic integrity. These standards were used in the design of four stream restoration projects in Brooklyn Park and Brooklyn Center that are currently underway or have been completed. They also provided valuable assessment information in the preparation of the Shingle and Bass Creeks Biotic and Dissolved Oxygen TMDL.

These resource management plans help the Commissions and the member cities target their improvements and tax dollars to the actions that will have the most benefit. They also have helped City Councils understand and grow to support the inclusion of Best Management Practices on public improvement projects, not only road and highway projects but also parks, public buildings, and parking lot projects.

Shingle Creek is seen as a state and even national leader in chloride TMDL implementation. This TMDL and other work performed by the MPCA and other agencies has raised awareness of the issue of chloride pollution from road salt application, and many cities and counties across the Metro area and the state are implementing salt management practices. Public Works staff and private applicators are receiving more training on new technologies and new methods, and City

Councils are more supportive of funding the additional cost for the more advanced equipment and materials.

The Commissions' proactive approach to TMDLs and management plans have helped regulatory agencies such as the MPCA to better understand impacts to waters in urban watersheds and the types of implementation efforts that are possible so that they can refine their approaches to regulating and managing urban water resources.

4.1.2 Education and Outreach

The education and outreach program was significantly expanded in the Second Generation Plan. The Commissions created an Education and Outreach Committee (EPOC) to develop and implement programming, make recommendations to the Commissions, and provide technical assistance and NPDES education and outreach programming support to the member cities. The Commissions took the lead in developing the West Metro Alliance of Water (WMWA), a collaboration with Elm, Bassett, and Pioneer-Sarah Creeks, Three Rivers Park District and Hennepin County.

The new activities have paid off in increased awareness by the public about water resources issues. The opinion survey conducted by the two Commissions in collaboration with Elm Creek and Bassett Creek not only showed a surprising level of awareness, but also a willingness to pay on average about \$5 more per month to support programs and projects to address water quality. This opinion survey provides valuable information to help focus and target education and outreach programming, and will be repeated in the next several years to measure change in attitudes and behaviors. Commissioners and city staff report that they already notice that more residents seem more aware of the watershed commissions and knowledgeable about the causes of pollution in lakes and streams and the actions they can take.

The Education Grants program has been a key component of the education and outreach program and has encouraged a wide variety of activities. These small grants of up to \$1,000 have been used by schools to acquire new curriculum and to take field trips to nature centers, the Coon Rapids Dam, and the Metro Children's Water Festival. Scout groups and individual scouts have received grants to undertake public service projects. Neighborhood groups and associations have received grants to help fund demonstration projects such as rain gardens. Lake associations have used grant funds to prepare newsletters and to mail them to all residences in the lakeshed.

The Commissions are proud of their partnership with Minneapolis Public Schools and Patrick Henry High School to provide a three week summer program about Shingle Creek and the Mississippi River. This program teaches high school students from traditionally under represented groups about urbanization impacts to water resources and culminates with student teams designing stream restoration projects. As part of the program students learn about hydrology and water quality, take water quality samples and measure streamflow, collect macroinvertebrates, and go fishing. They have also taken a guided canoe trip on the Mississippi River.

4.1.3 Successful Grant Acquisition

As shown in Table 2.2 above, the Commissions have been very successful in obtaining grant and other funding to supplement member city funding. Nearly \$500,000 of the \$2 million in grant funding was for TMDLs, management plans, and other special studies in Shingle Creek that would otherwise have to be paid for by the member cities from the Commission's budget. Shingle Creek budgets \$300-400,000 annually for operations and programming. Without the supplemental funding the Commission would not have been able to undertake all the resource assessments it has completed.

4.1.4 Monitoring Program

The stream monitoring program has resulted in a robust database of flow and water quality data. This data has been used to prepare and update a calibrated XP-SWMM model of the Shingle Creek watershed. That data and 2010 monitoring data in West Mississippi are being used to develop more detailed P8 models of the two watersheds.

Data collected from the various monitoring programs is presented in an annual Water Quality Report that assesses both current conditions and trends in lake and stream water quality and biotic integrity.

4.1.5 Technical Assistance

The Commissions' consulting technical staff has served as an important resource to the Commissions and the member cities. The technical staff is up to date in new technologies, methods, and regulations, and are a source of expertise that individual member cities could not afford to have on staff. Commission technical staff has also worked together with city staff to explore new BMPs and to undertake research projects such as the paired intersection study and the upcoming modular green roof project.

4.1.6 Collegiality

When the two Commissions were formed in 1984, the ten cities with land in the watersheds deliberately chose a joint powers type of organization to maintain local control over watershed activities. The ten member cities have always worked well together, and participation in the Commissions has heightened collaboration and collegiality. The two Commissions agreed to undertake a joint Second Generation Plan, and to collaborate on identical development rules and standards.

Projects such as the Wetland 639W feasibility study and the upcoming Wetland 639W Outlet Modification Project relied on the collaborative focus of the Commissions. In addition, the cost share policy developed in 2005 highlighted the "we're all in this together" watershed approach as the member cities agreed to finance certain projects, even if they were located in one city, through an ad valorem levy across all property in the watershed. The rationale behind this Major

Plan Amendment was that there was a public benefit across the watershed from achieving or striving to achieve goals for each water resource

4.2 AREAS FOR IMPROVEMENT

While the Commissions have accomplished nearly all the goals and strategies set forth in the Second Generation Plan, there are some areas that have fallen short, or where the Commissioners believe there is room for improvement or expansion.

4.2.1 Wetlands

Nearly all the focus of the Commissions and the member cities in the past several years has been on lakes and streams. Cities with significant wetland resources – Plymouth, Maple Grove, and Brooklyn Park – have prepared assessments of some or all of the wetlands in their jurisdictions, but other cities have not. The Second Generation Plan called for the assessment of the functions and values of all priority wetlands in the two watersheds, and that has had only sporadic compliance. The Plan also identified wetland habitat restoration as a priority for projects, and none has occurred except as incidental to other projects. Half the member cities have requested that the Commissions serve as the responsible Local Government Unit (LGU) for the administration of wetland Conservation Act (WCA) requirements. The Commissions enforce the WCA standards and have no requirements to go above and beyond those requirements. The Commissions’ rules and standards do require that development and redevelopment projects incorporate a minimum 20 foot native buffer between development and wetlands and streams.

4.2.2 Groundwater

The Commissions were among the first watershed organizations to require volume management for development and redevelopment. The 2003 rules and standards required that ½” of runoff from new impervious surface be infiltrated on site within 72 hours. In 2008 that requirement was revised. The infiltration requirement became an abstraction component to allow other types of volume management, and the drawdown time was reduced to 48 hours. The Commissions have also coordinated volume management requirements with wellhead protection requirements to protect groundwater drinking water sources.

However, the Commissions have not otherwise been active in managing groundwater resources in the two watersheds. A number of wetlands in West Mississippi have seen hydrologic regime changes to the point where some have lost wetland hydrology altogether. There is some suggestion that changes in surficial groundwater levels may have played a role in this phenomenon, but the specific cause or causes is unclear and could be a combination of several changed conditions. This should be further investigated to assist West Mississippi and the member cities in managing the remaining wetland resources.

Changes in groundwater recharge have also played a role in base flow conditions in the streams in the watersheds. Whole reaches of Shingle Creek often go dry for months, making improvement to its biotic integrity difficult or impossible. An assessment of groundwater conditions is necessary to determine if increased groundwater recharge can help reestablish an ecological baseflow in the streams.

4.2.3 Elected and Appointed Officials Education

While awareness about water resources issues has been improving, elected officials and other key persons such as City Managers, Planning Commission members, and city planning staffs need more information about Commission goals, strategies, and achievements. In addition, a key player in water resources management in Shingle Creek – the Minneapolis Park and Recreation Board – is not represented on the Commission and rarely participates in the Technical Advisory Committee or stakeholder groups.

4.2.4 Citizen Participation

Even with the expanded education and outreach plan and the heightened public awareness of water resources in the watersheds, it has been difficult to obtain ongoing public participation in watershed and water resources management. The Commissions have not been able to establish a Citizens Advisory Committee to complement the Technical Advisory Committee, and has not had good attendance at evening open houses held as an annual meeting. One-time stakeholder meetings for a specific purpose such as a TMDL have had good attendance.

Each of the member cities has a citizen advisory committee charged with making recommendations to their City Council on water resources and other environmental concerns. The Commissions have relied on those groups to provide citizen and stakeholder input. Groups such as lake associations, neighborhood associations and volunteer monitors are underused and could provide additional education, outreach, and programming assistance. These active participants could help bring in new volunteers as well as model ideal behaviors for emulation by their neighbors.

4.2.5 Additional Data

The TMDLs will require additional data collection to successfully evaluate the impact of implementation actions. More detailed lake data, including water column data, aquatic vegetation, zooplankton, and fish community, is necessary and the cost exceeds the Commissions' current budget for monitoring. Some of this data can be collected by trained volunteers, but much of it requires specialized costly equipment or must be completed by a certified lab.

The Commissions should undertake more frequent fish and macroinvertebrate surveys on the streams in the two watersheds. Limited data reduced the ability to assess biotic conditions for the Shingle and Bass Creeks Stressor ID and Impaired Biota TMDL.

4.2.6 Funding

The Commissions have been a significant investment by the member cities, and will continue to be as implementation activities continue to grow. The Commissions have been successful in obtaining grant and other funds, but the competition for those supplementary funds continues to grow as other organizations complete TMDLs and resource assessments. The Commissions will become more reliant on member cities to finance operations, programming, studies, and capital improvements.

While the West Mississippi Commission maintains an adequate fund balance, the Shingle Creek Commission maintains an inadequate fund balance. The Commission has been slowly gaining ground at increasing reserves, but operations and programming demands continue to outpace the ability and willingness of the member cities to increase the city apportionments. This reduces the Commissions' flexibility to respond to changing conditions, or to assemble matching funds for research or other special studies.

The Commissions do not have a specific assessment mechanism in place to determine the value of the Commissions' work to the member cities. The Second Generation Plan did not incorporate a requirement for periodic self-assessment, so the only formal review of Commission activities has been the performance review and assistance program (PRAP) assessment of the two commissions by the Board of Water and Soil Resources.