

2013 Annual Report



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Board of Managers

2013-2014

Manager	Position	Term Expires	City/County
Mr. Jack Lavold 6859 Ideal Avenue South Cottage Grove, MN 55016 651-459-8891	President	05/01/2014	Cottage Grove/Washington
Mr. Dennis Hanna, 9301 Grey Cloud Island Dr. St. Paul Park, MN 55071 651-459-2281	Vice-President	05/01/2016	Grey Cloud Island/Washington
Mr. Brian Johnson 4353 Dorchester Drive Woodbury, MN 55129 651-458-3739	Vice-President	05/01/2016	Woodbury/Washington
Mr. Don Pereira 8232 River Acres Road Cottage Grove, MN 55016 651-769-0429	Secretary	05/01/2015	Cottage Grove/Washington
Mr. Mike Madigan 2366 Hidden Lake Cove Woodbury, MN 55125 651-702-0488	Treasurer	05/01/2014	Woodbury/Washington

Introduction

The Cottage Grove Ravine Watershed Management Organization (WMO) was formed in 1984 to manage the resources of the watershed. This WMO was based on a joint powers agreement among the five cities in the watershed. A draft watershed management plan for the WMO was completed in April 1988; however, this plan was never approved or adopted by the WMO.

The WMO was later disbanded, and, in 1993, the Cottage Grove Ravine Watershed District was formed as the 42nd watershed district in Minnesota. The watershed district changed its name to the South Washington Watershed District (SWWD) in 1995. The SWWD was formed under, and operates in accordance with, Minnesota Statutes, Chapter 103B, "Metropolitan Surface Water Management Act", and Chapter 103D, "Watershed Districts."

The SWWD completed development of the watershed plan in 1996, approval of the plan was granted by the State Board of Water and Soil Resources in 1997, and later amended in 2002. Since that time the SWWD has focused its efforts on determining potential flood risk and developing a comprehensive flood relief system. The proposed system is designed in two phases; 1) reduce potential flood damages for existing developed areas of the watershed; 2) develop a comprehensive solution that provides stormwater management and flood control with capacity for the planned growth included in the 2000 comprehensive land use plans.

In April 2003, the SWWD petitioned the Minnesota Board of Water and Soil Resources to enlarge the boundary and include the East Mississippi Water Management Organization. The East Mississippi Water Management Organization included all or portions of Grey Cloud Island Township, Cottage Grove, Woodbury, St. Paul Park, and Newport. The enlargement was completed as a part of recommendations from the Washington County Water Governance Study (1999). The enlargement petition was approved on May 28, 2003 by the Board of Water and Soil Resources (BWSR). SWWD again petitioned BWSR in May 2010 to enlarge the SWWD boundary and include portions of the dissolved Lower St. Croix Watershed Management Organization (LSCWMO) which included all of Denmark Township and portions of Afton, Cottage Grove and Hastings. BWSR approved the enlargement in September 2010.

SWWD updated the Watershed Management Plan (WMP) through 2007, with BWSR approval in September of 2007, and SWWD Board adoption in November 2007. The updated plan lays out guidance on the management of water and natural resources through the year 2017. The WMP plan was amended in 2010 to include the new Coordinated Capital Improvement Program and three additional capital improvement projects. Another amendment to incorporate areas in its expanded boundary and the priorities and projects identified in the LSCWMO plan was completed in 2011.

The WMP complies with Minnesota Rules Chapter 8410, "Metropolitan Area Local Water Management," (May 27, 1992), the Metropolitan Surface Water Management Act, and Minnesota Statute 103D.

This report has been prepared in accordance with Minnesota Rules Chapter 8410.0150, Annual Reporting Requirements. Content of this report pertain to the calendar year 2012.

2013 Financial Report

The 2013 audit report is in Appendix A. Revenue and program expenditure summaries 2012-2014 are presented below.

Revenue

Revenue Source	2012	2013	2014*
Ad Valorem Levy	\$ 711,043.00	\$ 718,224.32	\$ 746,292.96
Stormwater Utility			
25% Area	\$ 1,331,825.00	\$ 1,348,637.50	\$ 1,377,787.50
75% Area	\$ 1,080,975.00	\$ 1,091,812.50	\$ 1,085,962.50
E. Mississippi	\$ 262,000.00	\$ 270,365.00	\$ 277,865.00
Lower St. Croix	\$ 90,105.00	\$ 91,480.00	\$ 91,105.00
Total Revenue	\$ 3,475,948.00	\$ 3,520,519.32	\$ 3,579,012.96

*Anticipated Revenue

Program Expenditures

Program Area	2012 Budget	2012 Actual	2013 Budget	2013 Actual/Unaudited	2014 Budget
1.0 Floodplain Management	\$ 43,650	\$ 36,857.00	\$ 16,150	\$ 55,986.35	\$20,055
2.0 Stormwater Management	\$1,110,650	\$3,159,706.00	\$ 1,138,890	\$ 4,813,810.73	\$1,130,040
3.0 Water Quality	\$359,200	\$ 380,086.00	\$ 369,568.94	\$ 514,342.95	\$371,440
4.0 Wetlands	\$ 3,200	\$ 0.00	\$ 4,773.08	\$ 4,958.81	\$11,920
5.0 Natural Resources	\$ 42,800	\$ 12,502.00	\$ 42,800	\$ 51,349.85	\$46,420
6.0 Groundwater	\$ 87,400	\$ 2,487.00	\$ 87,400	\$ 4,684.37	\$88,440
7.0 Erosion and Sediment Control	\$ 3,200	\$ 2,638.00	\$ 3,200	\$ 3,131.81	\$9,460
8.0 Education	\$ 40,300	\$ 32,051.00	\$ 43,300	\$ 37,993.14	\$43,600
9.0 Long Range/Work Plan/Finance	\$ 560,505	\$ 335,170.00	\$ 585,505	\$ 417,590.55	\$590,605
10.0 Data Management	\$ 194,686	\$ 192,139.00	\$ 178,755.2	\$ 198,437.60	\$183,609.22
11.0 General	\$ 253,357	\$ 234,726.00	\$ 265,327.10	\$ 250,030.97	\$289,273.74
12.0 Debt Service	\$ 777,000	\$696,770.00	\$ 784,850	\$ 761,195.00	\$794,150
Total Budget	\$3,475,948.00	\$5,085,132.00	\$3,520,519.32	\$7,113,512.13	\$3,579,012.96

2013 Activity Report

Floodplain Management

- SWWD monitored potential floodplain impacts from projects as part of its development review process. Multiple projects within the floodplain were reviewed, none of which decreased floodplain storage.
- Multiple projects within the Wilmes Lake watershed were reviewed for potential downstream impact at Wilmes Lake which has exhibited past flooding. No projects reviewed in 2013 are expected to exacerbate existing flooding concerns.
- SWWD maintains extensive hydraulic and hydrologic modeling of the District. Staff continues to work with City staff to accommodate incoming developing while preserving critical floodplain storage in the District as identified in District models.

Stormwater Runoff Rate and Volume

- SWWD ensures compliance with rate and volume requirements by coordinating development reviews with Municipalities that have adopted a local surface water management plan and updated official controls. Staff conducts full development reviews of projects in Municipalities that have yet to adopt their plan and update controls. In Municipalities with an adopted plan and updated controls, SWWD reviews projects for regional impact. Staff reviewed 19 projects in 2013.
- SWWD continued to operate an extensive stormwater monitoring network. Data collected as part of the program is used to identify trends in water quality which are largely driven by changes in stormwater runoff. Monitoring reports are made available on the SWWD website at www.swwdmn.org. Reports for 2013 are expected to be available in mid-summer. A new interactive, web-based dataset was completed in 2013. The database allows users to access District data and performs basic statistical and plotting functions.
- SWWD continued coordination with the City of St. Paul Park, Cottage Grove, Washington County and the Minnesota Department of Transportation to solve a drainage problem at 70th Street and Highway 61. In early 2013, SWWD held neighborhood meetings to receive information regarding the Clear Channel pond project. The project includes ponding and ravine stabilization work which required SWWD to acquire flowage easements in some locations. In October 2013, after easements for the lower portion of the project were acquired, Minnesota Native Landscapes began construction and that will isolate the lower ponds from the ravine to allow for stabilization in the Spring of 2014. SWWD will continue to work with landowners to acquire the remaining easements to begin construction on the upper portion of the ponds in 2014. The Grey Cloud Slough is a side channel of the Mississippi River in southern Washington County. This section of the River is within the Mississippi National River and Recreational Area and is a designated State water trail. Unfortunately, the slough is severely degraded.

Flow from the Mississippi River into the slough was cut off following construction of an earthen embankment and roadway across the mouth of the slough in the 1960s. As a direct result, the slough exhibits stagnation, poor water quality, and severely degraded backwater aquatic habitat. Water quality and habitat restoration in the slough has long been a priority for the region and draws significant interest from local, state, and federal agencies, non-profit organizations, and area

residents. That interest is evidenced by a high level of participation in a Technical Advisory Committee (TAC) to explore options to restore the slough. That TAC included representatives from Denmark Township, Washington County, Minnesota Department of Natural Resources, U.S. Army Corps of Engineers, National Park Service, and U.S. Fish and Wildlife Service.

The South Washington Watershed District (SWWD) formed its Grey Cloud TAC in 2011 to provide a formal setting to engage all interested parties, coordinate agency efforts, and tap technical expertise in identifying cost-effective solutions to achieving SWWD water quality and habitat goals for the slough. The consensus of the TAC was that reconnecting the slough to the main channel of the Mississippi River was the essential first step to restore water quality and habitat. Through use of an engineering consulting firm, the TAC examined several options for that making that reconnection. Ultimately, the TAC came to the consensus that constructing a bridge or bottomless culvert in place of the existing earthen embankment was the best of several options explored due to the following reasons: 1) Most importantly, a bridge fully restores hydrologic connectivity to the slough over other options (e.g. culverts) and will immediately improve water quality to match that of the main channel and restores sediment transport; 2) The bridge offers improved fish passage, provides boating



access to the slough, and dramatically improves boater and roadway safety. The SWWD Board of Managers accepted the TAC consensus and is proposing to construct a bridge or bottomless culvert as a first step toward the goal of restoring water quality and backwater aquatic habitat in the Grey Cloud Slough.

In 2013, SWWD Staff and its consultants continued to provide information to both the Township and County regarding potential crossing options for the Grey Cloud Slough project. Once the Township has made a decision, SWWD can review its role in the project and better define project timelines with the County. Staff continues work to develop both public and private partnerships and seek supplemental funding sources to fill the gap between SWWD and Washington County funds and the total project costs.

- In 2011 Washington County included in the County Capital Improvement Plan, a safety and mobility project for County State Aid Highways #19, 20, and 22 in Cottage Grove. This has provided an opportunity for the SWWD to begin construction of the watershed overflow within the County Road corridor. The SWWD prepared ROW maps for the acquisition process and which will place the overflow pipe just inside the new roadway east of CSAH 19 and in the existing ROW west of CSAH 19. In 2013, The SWWD constructed Phase I of the overflow along the re-aligned CSAH 19-20-22 project during the summer of 2013. Subsequent Phases II-V will be completed through Cottage Groves East Ravine Neighborhood II over the next 4-6 year timeframe. Construction of Phase I included installation of 5778 lineal feet 72-inch concrete pipe at times 45-feet deep. Two pipe jacking were installed one 390-feet long. Other coordinated elements of the project constructed 150+ A.F. of regional stormwater storage and connected the

system to existing Cottage Grove storm sewer system providing limited outlet capacity. Total project cost \$7.7 million \$3.1 million is the SWWD share for the overflow portion. Cost effectiveness/cost savings increased from partnering with County/City improvements. The ultimate goal of the project is to provide flood control protecting infrastructure, homes, and businesses.



- Central Draw Overflow Phase II-V EAW. In 2013, SWWD and its consultants began to develop a voluntary Environmental Assessment Worksheet (EAW) for the remaining phases of the overflow project. This task will coincide with the development of the overflow stabilization strategies. The goal of the EAW will be to work through agency concerns prior to any formal permitting process.
- In 2012, SWWD and Cottage Grove reached an agreement to make improvements to the City's Central Draw storm sewer system to accommodate future connection to SWWD's CDSF. In 2013, construction of the re-routing of the watermain, and the box culvert at the 80th Street crossing were completed. The CDSF connection to the Central Ravine system was made, in conjunction with phase I of SWWD's CDSF overflow.
- Cottage Grove East Ravine. After years of negotiation and development, the City of Cottage Grove and the SWWD entered into an agreement for the common use SWWD property for flood control, stormwater management, parks and open space, the conveyance of regional floodwaters through the City's Central Draw storm sewer system, and development of a combined local/regional storm sewer (Central Draw Overflow) system through the planned East Ravine neighborhood. The purpose of this Agreement is to integrate local and regional management efforts resulting in a combined Stormwater Management system to convey local and regional runoff in a controlled and efficient manner and to improve the quality of surface water.

Water Quality

- In 2013 SWWD continued its performance based cost share program. Instead of reimbursing land owners for a specific percentage of total project cost, SWWD reimburses land owners based on the amount of phosphorus that their project is expected to retain. SWWD's 2013 reimbursement rate was \$5,000.00 per pound of phosphorus retained with reimbursement capped at total project cost. SWWD allocated \$81,604.00 to 17 projects in 2013. Together, the projects funded by SWWD in 2013 are expected to capture 24 lbs of phosphorus. Projects with higher funding levels typically treated runoff from several properties.
- Included in the 2012 cost share grants, was SWWD Colby Lake raingarden projects. The Colby Lake neighborhood raingarden project is an initiative led by the SWWD in partnership with the WCD and the City of Woodbury to provide education, design assistance, and project oversight to help homeowners around Colby Lake install raingardens in priority locations. Funding for the raingardens was divided between State Clean Water Funds (from the Clean Water, Land and Legacy Amendment) and SWWD. As of 12/31/2013, all 26 raingardens were complete and the project was closed out.



Colby Lake Raingarden (before)



Colby Lake Raingarden (after)

- State Clean Water Fund Re-Use Systems. SWWD, working in partnership with the City of Woodbury and Washington County, secured a Clean Water Land and Legacy Grant to fund construction of water re-use systems at Eagle Valley and Prestwick Golf Courses. Work on the two systems began in 2013. When the two systems are completed, the immediate watershed load reduction necessary to restore Colby Lake will be met. Additional work will still be required upstream (Wilmes Lake) and in-lake.
- The SWWD Board of Managers awarded \$239,584.00 through its Coordinated Capital Improvement Program (CCIP). \$100,000.00 was awarded to the City of Woodbury for pond maintenance for treatment of both sediment and nutrients. \$139,584.00 was awarded to the City of Cottage Grove for Public Works improvements, Cottage Grove Middle School improvements, and a new street sweeper. Together, the projects were estimated to reduce phosphorus in stormwater runoff by 1933.28 lbs/yr.
- In 2013, SWWD continued to work with the Washington Conservation District to develop the Wilmes, Armstrong, and Markgrafs Lakes retrofit assessments. The retrofit assessment follows a protocol developed by the Metro Association of SWCDs to systematically identify the most cost

effective projects for reducing the target pollutant. All three assessments focus on growing season phosphorus loading.

- SWWD secured a FY 2012 Clean Water Fund grant for installation of priority BMPs throughout the Trout Brook watershed which were identified through Washington Conservation District's Top50P! projects. Two projects were approved in 2013. WCD continues to develop additional projects. All projects should be ready for installation in the Spring of 2014. Work under the grant must be complete by the end of 2014.
- In 2012, SWWD began in-lake management of Colby Lake in partnership with the City of Woodbury and Minnesota DNR. Those efforts continued in 2013 with ongoing stocking with channel catfish and winter aeration. The catfish reduce the number of bullheads in the lake, which helps improve the water quality of the lake. Aeration prevents winter kill of the fish.
- As part of the Colby Lake improvements, SWWD worked with Great River Greening and City of Woodbury to develop a retrofit concept for the canoe launch at Edgewater Park (Colby Lake). The project will remove existing turf grass and restore native buffer at the launch while maintaining canoe/kayak access to the lake. In 2013, SWWD approved 50% cost share funding for the project. Construction is underway and will be completed in early 2014.
- Restoration of Trout Brook was identified as a local priority by the former Lower St. Croix Watershed Management Organization which previously managed SWWD's Trout Brook watershed. Throughout 2013, Staff worked with MnDNR and Afton Alps Ski Area to develop a restoration plan for Trout Brook. Once a plan is complete, MnDNR and SWWD will then be positioned to seek grant funding throughout 2014. Ultimately, a restored Trout Brook would provide habitat to support a cold water fishery while also reducing sediment and phosphorus loading to the impaired Lake St. Croix.

Wetlands

- In 2012, SWWD became the Local Governmental Unit (LGU) for wetland permits within the SWWD boundary. In 2013, SWWD reviewed 8 applications, two violations, and four project sites. SWWD staff conducted development reviews to ensure compliance with SWWD wetland standards and participated as part of the Washington County Technical Evaluation Panel (TEP) to evaluate wetland impacts of proposed projects.

Natural Resources

- In 2013, SWWD contracted Great River Greening to complete prairie restoration and maintenance at its Central Draw regional infiltration basins. The contract includes proposed work through June 2017 and includes prairie/savanna establishment and maintenance, development and coordination of volunteer events, development and oversight of a simulated grazing (i.e. haying) program, and development of research opportunities with the University of Minnesota. This work will partially be funded through LCCMR funds through Great River Greening. Once restored, the basins will provide regional water quality treatment and flood control while also serving as public open space and providing key connections in regional greenway and trail corridors.

Groundwater

- SWWD staff worked with Washington Conservation District and the Minnesota Department of Health to continue development and operation of a groundwater quality regional assessment program. The program consists of collecting seasonal water quality samples from wells existing around the CD-P85 and CD-P86 regional infiltration basins and Bailey Lake. Collected data are included in the SWWD monitoring report and will be used to monitor groundwater quality and serve as an indicator of potential impacts resulting from use of regional infiltration facilities. This effort is part of a larger initiative by State agencies to evaluate potential effects of large scale infiltration.
- SWWD began collaboration with the Minnesota Department of Natural Resources to install additional monitoring wells on SWWD property as part of an effort to expand the State's groundwater monitoring network.

Erosion and Sediment Control

- SWWD standards require projects to meet NPDES requirements for erosion and sediment control. SWWD standards also require Municipalities to identify an inspector and conduct regular inspections. In addition to City inspections, SWWD staff conducts four inspections annually to ensure that the City inspection programs are promoting compliance as intended. SWWD works with City staff to enforce compliance on issues identified in inspections.

Education

- SWWD continues to participate and support the Metro Watershed Partners program, Blue Thumb, and Project NEMO.
- The Colby Lake neighborhood raingarden project is an initiative led by SWWD along with the City of Woodbury and the Washington Conservation District. The purpose was to provide education, design assistance, and project oversight to help homeowners around Colby Lake install raingardens. After all 26 raingardens were installed; the SWWD, City of Woodbury, and the Washington Conservation District sponsored a raingarden tour and ice cream social held at Pioneer Park.



- Again in 2013, SWWD participated in the East Metro Water Resource Education Program (EMWREP). The EMWREP annual activities report is in Appendix B.

Long Range Work Planning and Finance

- SWWD continued collecting stormwater utility fees in the East Mississippi management unit. Revenue will be used to fund water quality projects only within the East Mississippi, including stabilization of the Newport Ravine, construction of a stormwater pond to relieve capacity problems at the clear channel pond, and flow restoration to the Grey Cloud Island Slough.
- In 2011, SWWD amended its WMP to establish the Lower St. Croix management district and incorporate priorities and projects identified in the LSCWMO WMP. In 2013, SWWD continued collecting stormwater utility fees in the Lower St. Croix management unit. Revenue will be used to fund water quality projects only within the Lower St. Croix.

Data Management

- SWWD staff continues to collect and organize all SWWD monitoring data from the Washington Conservation District. In 2013, SWWD completed an online database for accessing monitoring data through the SWWD website. Data will be uploaded to one database in one format.

General

- The SWWD maintains a general fund for daily operations of the district. General fund operations include, staff, managers, office expenses, insurance, audit and legal services.

Debt Service

- The SWWD maintains a debt service fund for the purpose of retiring current debt. In 2002 the SWWD issued general obligation bonds for the purchase to property. The property provided the necessary downstream capacity for existing flood control conditions. Debt was issued on a 15 year term. In 2011, the SWWD issued general obligation bonds for the construction of three projects within the East Mississippi management area.

2014 Workplan

Floodplain Management

Floodplain management is an integral element of stormwater management in the South Washington Watershed. The watershed exhibits many large depressions in the landscape that are land locked. Preservation of locally identified floodplains provides adequate storage and flood protection for future development. Federal Emergency Management Agency recently completed a floodplain restudy of Washington County.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	37,500	43,650	16,150	20,055	\$117,355

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(1) Floodplain Management			\$20,055.00
Hydrologic Modeling			
Project Management	\$2,110.00		
Data Collection	\$2,500.00		
Model Development Calibration	\$5,000.00		
Assessment and Evaluation	\$3,360.00		
Reporting	\$3,360.00		
Flood Damage Reduction			
FDR Grant Program			
Project Management	\$860.00		
Legal	\$2,865.00		

Management Area Goal

Opportunistically manage floodplains for multiple, non-development uses.

2014 Action Items

- Maintain adequate floodplain protection in newly developing areas.
- Ensure correct floodplain freeboard for newly built structures in developing areas.
- Provide assistance to County, Cities and Townships with application of updated FEMA Map FIRM's.
- Provide general assistance to watershed residents regarding floodplain information.

Stormwater Runoff Rate and Volume

A primary focus of the SWWD since creation in 1993 has been the management of stormwater runoff. Since the Northern Watershed is essentially land locked, the watershed is volume sensitive, therefore additions of stormwater runoff volumes due to development requires rigorous management. The major component of this management area is the planning, design and construction of the watershed overflow. The overflow will provide overflow capacity for excess runoff during extreme hydrologic events from the northern watershed to the Mississippi River.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$1,260,000	\$1,110,650	\$1,138,890	\$1,130,040	\$4,639,580

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(2) Storm Water Runoff Rate and Volume			\$1,130,040.00
Flood Damage Reduction			
Project Management	\$1,250.00		
Legal	\$1,800.00		
Modeling/Mapping/Protection			
Project Management	\$1,720.00		
Data Collection	\$0.00		
Model Development Calibration	\$0.00		
Assessment and Evaluation	\$860.00		
Reporting	\$1,720.00		
Overflow Design			
Project Management	\$8,440.00		
Data Collection	\$10,000.00		
Feasibility/Preliminary Design	\$20,000.00		
Final Design	\$23,440.00		
Final Plans and Specs	\$15,000.00		
Legal	\$17,265.00		
Watershed Overflow Implementation Fund			
Project Management	\$11,720.00		
Data Collection	\$10,000.00		
Appraisal	\$10,000.00		
Survey	\$10,000.00		
Legal	\$17,265.00		
Land Acquisition		\$370,000.00	
Implementation Fund		\$400,000.00	
Hydrologic Modeling/Project Design			
Project Management	\$11,055.00		
Data Collection	\$20,860.00		
Model Development Calibration	\$28,985.00		
Assessment and Evaluation	\$23,360.00		
Meetings/Correspondance	\$13,790.00		
Reporting	\$21,915.00		
Legal	\$4,775.00		
Hydrologic Modeling/Project Design			
Project Management	\$2,500.00		
Data Collection	\$5,000.00		
Feasibility/Preliminary Design	\$3,750.00		
Final Design	\$6,250.00		
Final Plans and Specs	\$5,000.00		
Legal	\$1,910.00		
Sub Watershed Implementation Fund			
Project Management	\$1,250.00		
Data Collection	\$1,250.00		
Appraisal	\$5,000.00		
Survey	\$5,000.00		
Legal	\$1,910.00		
Implementation Fund		\$36,000.00	

Management Area Goal

Minimize existing and future potential damages to property, public safety, and water resources due to flood events.

2014 Action Items

- Maintain implementation fund for the watershed overflow project.
- Maintain and update watershed models to provide best available information to guide SWWD programs and projects.
- Work cooperatively with the City of Cottage Grove and St. Paul Park to provide stormwater control for the Clear Channel Pond project in the EMW.
- Work cooperatively with the Grey Cloud Island Township to secure funding and support for implementation of the Grey Cloud Channel project in the EMW.
- Work cooperatively with the City of Cottage Grove on the East Ravine improvements.
- Planning and implementation for phase II of the overflow project.

Water Quality

Water quality improvement is a primary focus of the SWWD 2007 watershed management plan. The SWWD has established water quality standards and rules to reduce pollutant loading and improve water quality throughout the watershed. The overall goal of work under this fund is to identify water quality impacts and implement projects to correct impacts. Over time this strategic approach will meet future TMDL requirements.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$314,620	359,200	369,569	371,440	\$1,414,829

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(3) Water Quality			\$371,440.00
Loading Assessment			
Project Management	\$5,000.00		
Data Collection	\$15,000.00		
Model Development Calibration	\$15,000.00		
Assessment and Evaluation	\$15,000.00		
Reporting	\$10,000.00		
Lake Assessment (TMDL/Impaired Waters/Non-Degradation)			
Project Management	\$6,720.00		
Data Collection	\$8,360.00		
Watershed Evaluation	\$10,080.00		
Modeling Water Quality Physical/Chemical	\$27,580.00		
Lake Biological Assessment	\$11,720.00		
Feasible Remedial Alternatives Analysis	\$16,720.00		
Lake Management Plan/Report	\$21,720.00		
Sub-watershd implementation		\$85,000.00	
Loading Assessment			
Project Management	\$860.00		
Data Collection	\$1,720.00		
Model Development Calibration	\$1,720.00		
Assessment and Evaluation	\$1,720.00		
Reporting	\$3,440.00		
Water Quality Cost Share Program			
Cost share to projects	\$20,000.00	\$70,000.00	
Administration	\$2,150.00		
Project Management	\$860.00		
Plan Review	\$2,580.00		
Site Evaluation	\$3,440.00		
Site Monitoring	\$860.00		
Site Review	\$860.00		
Correspondance	\$2,150.00		
Meeting	\$1,720.00		
Project Management	\$2,580.00		
Assessment and Evaluation	\$2,580.00		
Final Design	\$2,580.00		
Reporting	\$1,720.00		

Management Area Goal

Maintain, or where practical improve, the water quality of wetlands and water bodies within the District.

2014 Action Items

- Continue water quality BMP cost share program watershed wide.
- Develop watershed water quality model for one sub-watershed.
- Define loading capacity on a sub-watershed and water body scale.
- Construction will continue on the water reuse systems at Eagle Valley and Prestwick golf courses, in cooperation with the City of Woodbury and Washington County as part of the 2013 Clean Water Grant awarded to SWWD.
- SWWD is working with Afton Alps and Minnesota DNR to identify and implement priority projects throughout the Afton Alps property with the goal of improving habitat in Trout brook and reducing runoff volume and phosphorus load to Trout Brook and Lake St. Croix.

Wetlands

Provide for management of the watersheds wetland resources. The SWWD works with the Washington Conservation District and Local Government Units to effectively management the Districts wetland resources. The SWWD is the LGU for the Wetland Conservation Act and has established standards for management of the wetlands, including water quality, water quantity, buffers, and mitigation of impacts.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$16,250	3,200	4,773	11,920	\$36,143

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(4) Wetlands			\$11,920.00
Wetland Assessment			
Project Management	\$860.00		
Data Collection	\$430.00		
Model Development Calibration	\$430.00		
Assesment and Evaluation	\$430.00		
Meetings/Correspondance	\$1,720.00		
Reporting	\$430.00		
Wetland Conservation Act Administration			
Administration	\$5,000.00		
Project Management	\$500.00		
Plan Review	\$520.00		
Site Evaluation	\$200.00		
Site Monitoring	\$200.00		
Site Review	\$200.00		
Correspondance	\$500.00		
Meeting	\$500.00		

Management Area Goal

Manage the quantity and quality of wetlands within the watershed for their best function in a rapidly urbanizing environment.

2014 Action Items

- Serve as Local Government Unit (LGU) for implementation of the Wetland Conservation Act.
- Provide administration as the LGU for the Wetland Conservation Act.
- Apply wetland standards across the watershed to ensure future functions and values of wetland resources.

Natural Resources

This management area provides for the improvements to the natural resource of the watershed. The SWWD has developed a greenway plan to establish a multi-use green corridor through the watershed. This corridor utilizes planned green space by the Municipalities and natural features protected from development.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$20,400	42,800	42,800	46,420	\$152,420

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(5) Natural Resources and Recreation			\$46,420.00
Greenway Implementation			
Construction		\$20,000.00	
Site Monitoring	\$2,700.00		
Project Management	\$2,700.00		
Maintenance		\$10,000.00	
Replacement		\$5,000.00	
Greenway Implementation			
Site Monitoring	\$860.00		
Project Management	\$1,720.00		
Project Management	\$1,720.00		
Site Evaluation	\$1,720.00		

Management Area Goal

Participate in conservation or creation of key natural areas with respect to habitat, wildlife, or recreation.

2014 Action Items

- Manage CD-P86 prairie restoration.
- Manage restoration activities in cooperation with Great River Greening
- Pursue grant opportunities for further restoration work in CD-P86 focused on non-cropped areas.

Groundwater

In cooperation with Washington County, the SWWD provides management of groundwater resources as identified in the County Groundwater Plan. The SWWD's focus is on regional groundwater quality and potential impacts from stormwater management practices. The SWWD will continue to evaluate potential impacts from regional stormwater infiltration. Support to the County and Municipalities relating to other groundwater issues is also provided. The SWWD has partnered with municipalities to provide for management of deicing chemicals through application, storage and handling.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$102,500	87,400	87,400	88,440	\$365,740

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(6) Groundwater			\$88,440.00
Groundwater Monitoring - quality			
Project Management	\$10,000.00		
Data Collection	\$10,000.00		
Model Development Calibration	\$10,000.00		
Assessment and Evaluation	\$12,500.00		
Reporting	\$7,500.00		
Implementation Fund		\$35,000.00	
Groundwater Monitoring - quality			
Project Management	\$860.00		
Data Collection	\$430.00		
Model Development Calibration	\$430.00		
Assessment and Evaluation	\$860.00		
Reporting	\$860.00		

Management Area Goals

Pursue a sustainable balance between surface water management, land use activities, and groundwater integrity.

2014 Action Items

- Work with the County and MDH to evaluate the potential impacts of regional stormwater infiltration.
- Coordinate with Washington County through groundwater planning.
- Coordinate with Minnesota DNR to install additional groundwater monitoring wells.

Erosion and Sediment Control

Erosion of soil presents one of the greatest threats to water quality. The SWWD implements an annual program to provide assistance to Municipalities that increases compliance with existing local state and national permits. Soil erosion and resultant deposition of sediment carries with it many pollutants delivered directed to the water resource. The SWWD has a role in controlling erosion and helping to prevent degradation of the water body.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$13,168	3,200	3,200	9,460	\$29,028

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(7) Erosion and Sediment Control			\$9,460.00
NPDES Phase II Construction Site Inspections			
Project Management	\$430.00		
Data Collection	\$430.00		
Assessment and Evaluation	\$860.00		
Meetings/Correspondance	\$1,720.00		
Reporting	\$860.00		
NPDES Phase II MS4			
Project Management	\$430.00		
Plan Review	\$1,720.00		
Site Evaluation	\$860.00		
Site Monitoring	\$430.00		
Site Review	\$430.00		
Correspondance	\$860.00		
Meeting	\$430.00		

Management Area Goals

Facilitate erosion control and reduce impacts to wetlands and water bodies from sedimentation.

2014 Action Items

- Continue coordinated effort with the WCD and Municipalities to increase permit compliance on construction sites.
- Provide assistance to municipalities to correct erosion problems.
- Work with the WCD on stabilization of ravines tributary to the Mississippi and St. Croix Rivers.

Education

The SWWD must provide an education program for Municipal Officials and residents of the watershed through the watershed management plan. The SWWD Board believes that County wide and Regional efforts are more effective educational programs than localized efforts. The SWWD is a member of the East Metro Water Resources Education Program and other regional efforts to provide annual education programming in the watershed. In addition these programs fulfill educational requirements places on the SWWD through its MS4 permit.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$54,745	40,300	43,300	43,600	\$181,945

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(8) Education			\$43,600.00
Education Local			
SWWD specific program	\$1,720.00	\$2,000.00	
Public Input			
CAC	\$1,720.00	\$1,000.00	
Education			
Website Modifications	\$2,500.00		
Shared Education Position			
Washington County Education	\$860.00	\$25,000.00	
Education			
Metro Watershed Partners	\$0.00	\$3,500.00	
Blue Thumb	\$0.00	\$1,800.00	
Project NEMO	\$0.00	\$3,500.00	

Management Area Goals

Heighten the awareness of key constituencies within the District, sufficient to modify behavior to improve the recognition and implementation of District policies, programs and activities.

2014 Action Items

- Maintain membership in the EMWREP, Blue Thumb, Metro Watershed Partner, Friends of the Mississippi, and NEMO.
- Provide local education opportunities in cooperation with Municipalities and other local organizations.
- Continue improvements to SWWD website and utilize as a primary information outlet.
- Establish link to school science programs and teachers at specific grade level.

Long Range Work Planning and Finance

The SWWD Board stressed implementation during development of the current 10 year plan adopted in 2007. As a result the SWWD established this management area to provide overall management of the watershed and focus effort and resources on implementation. This management area provides the short and long range work plan and funding authorities for the SWWD implementation. Through annual evaluation and work planning, the SWWD maintains flexibility to adapt or refocus as a result of changing environments or regulations.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$484,632	560,505	585,505	590,605	\$2,221,247

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(9) Long Range Work Planning and Financing			\$590,605.00
Coordinated CIP			
Project Management	\$6,720.00		
Data Collection	\$5,430.00		
Model Development Calibration	\$10,430.00		
Assessment and Evaluation	\$10,860.00		
Meetings/Correspondence	\$5,860.00		
Feasibility/Preliminary Design	\$7,930.00		
Final Design	\$7,930.00		
Implementation Fund		\$500,000.00	
Reporting	\$5,860.00		
Legal	\$6,465.00		
Plan Amendment			
Project Management	\$860.00		
Data Collection	\$1,720.00		
Assessment and Evaluation	\$2,580.00		
Reporting	\$1,720.00		
Legal	\$3,820.00		
Design Manual			
Project Management	\$860.00		
Data Collection	\$2,580.00		
Assessment and Evaluation	\$2,580.00		
Meetings/Correspondence	\$860.00		
Reporting	\$1,720.00		
Legal	\$3,820.00		

Management Area Goals

Utilize District funds to initiate or support long range work plan projects which reduce flooding or otherwise benefit key District resources.

2014 Action Items

- Continue implementation of Coordinated Capital Improvement Program focused on water quality improvements.
- Provide short and long range planning and implementation for the SWWD.
- Maintain an updated and current watershed plan to reduce future planning costs.
- Update SWWD rules to current standards.

Data Management

A primary role of the 2007 SWWD watershed management plan is to help guide decisions of the Board of Managers. A key element is the use of scientific data to assist the Managers in making decisions based on best available information. The SWWD maintains extensive data through studies, reports, monitoring, information and internal operations.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$251,352	194,686	178,755	183,609	\$808,402

2014 Work Plan

Management Area / Action Item	Professional Services	Capital Outlay	Management Area Total
(10) Data Management			\$183,609.22
Web Site			
Project Management	\$430.00	\$2,500.00	
Data Collection	\$430.00		
Stormwater Utility Administration			
Annual Setup	\$860.00		
Rate Calculations	\$1,720.00		
Assesment and Evaluation	\$860.00	\$2,500.00	
Legal	\$1,910.00		
Washington County Administrative Fee		\$15,000.00	
Washington County Surveyor		\$1,000.00	
GIS			
Project Management	\$430.00		
Data Collection	\$860.00		
Data Analysis and Reporting	\$860.00		
Database Management	\$860.00		
Modeling	\$860.00		
Reporting	\$430.00		
Surface Water Monitoring Program			
MS1-North Tributary to Wilmes Lake	\$6,161.70		
MS2-N Tributary to Bailey Lake	\$6,161.70		
O'Conner's Creek	\$6,161.70		
Trout Brook	\$6,161.70		
Wilmes Lake Outlet	\$8,565.64		
Central Ravine	\$8,565.64		
100th Street	\$6,161.70		
St. Paul Park	\$8,565.64		
Newport	\$8,565.64		
Colby Lake Outlet	\$6,054.54		
Waterbody Assess-Powers	\$6,054.54		
Lake Levels	\$2,489.00		
Flow-2 Locations	\$9,442.08		
In Lake Water Quality	\$4,548.00		
Groundwater	\$7,296.00		
Lab Expense		\$20,164	
Capital Equipment Costs		\$11,200	
Surface Water Monitoring Program			
Project Management	\$1,720.00		
Data Collection	\$3,440.00		
Assesment and Evaluation	\$1,720.00		
Reporting	\$1,720.00		
Development Reviews			
Correspondence	\$1,720.00		
Plan review	\$3,440.00		
Meetings	\$1,720.00		
Project Management	\$1,720.00		
Site Review	\$2,580.00		

Management Area Goals

Collect and manage data in a manner which maximizes the availability to and use by constituents of the District.

2014 Action Items

- Maintain and update SWWD website with current information.
- Maintain and update the stormwater utility information annually.
- Maintain and operate an annual monitoring network that provides water resource information vital to SWWD programs and projects.
- Launch online monitoring database and interactive analysis and reporting application.
- Provide development review services to Municipalities.

General

Not specifically mentioned in the 2007 SWWD Watershed Management Plan as a management area, general is included in the SWWD annual budget as an accounting fund. The general fund provides the necessary revenue for daily operation of the SWWD. General fund revenue is levied district wide under MS 103D.905 and is capped at \$250,000. General fund revenue is also collected through MS103B.241 taxing authority available to metropolitan watershed districts.

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$239,855	\$253,357	\$265,327	\$289,274	\$1,047,813

2014 Work Plan

Management Area / Action Item	2014 Budget	Management Area Total
(11) General		\$289,273.74
Salaries/Benefits	\$162,145.40	
Manager Per Diem/Expenses	\$28,500.00	
Office Rent	\$22,831.00	
Employee Expenses	\$6,000.00	
Employee Training	\$5,000.00	
Office Equipment	\$9,200.00	
Office Supplies	\$1,545.00	
Legal Notices	\$1,591.35	
Dues	\$6,365.40	
Insurance and bond	\$12,730.80	
payroll	\$2,163.00	
monthly accounting	\$3,151.80	
audit	\$14,072.89	
Legal	\$10,145.50	
HR/other consulting	\$3,831.60	

Management Area Goals

Provide for day-to-day operations of the South Washington Watershed District.

2014 Action Items

- Maintain adequate funding for SWWD daily operation.
- Provide for annual staff and manager training opportunities.
- Ensure adequate protection against legal actions towards the SWWD.

Debt Service

Not specifically mentioned in the 2007 SWWD Watershed Management Plan as a management area, debt service is included in the SWWD annual budget as an accounting fund. In 2002 the SWWD issued \$5.8 million in General Obligation Bonds for the purchase of real property as described in the 1997 watershed plan. The SWWD completed acquisition of 150± acres for increased downstream stormwater system capacity, flood control and stormwater management. Bonds were issued with a 15-year pay off, and refinanced in 2007. In 2011, SWWD bonded for three projects in the East Mississippi watershed (Newport Ravine, Clear Channel Pond, and Grey Cloud Slough).

Budget History

Year	2011	2012	2013	2014	4-yr total
Budget	\$537,000	\$777,000	\$784,850	\$794,150	\$2,893,000

2014 Work Plan

Management Area / Action Item	2014 Budget	Management Area Total
(12) Debt Service		\$794,150.00
Debt Service South Washington Management Area	\$539,150.00	
Debt Service East Mississippi Management Area	\$255,000.00	

Management Area Goals

Sound financial planning for future infrastructure needs.

2014 Action Items

- Maintain adequate funding for the overflow project debt service.
- Maintain adequate funding for the East Mississippi subwatershed projects debt service.

Appendix A 2013 Audit Report on Compliance



2013 Annual Report



Above: Angie Hong talks about public outreach and engagement during the St. Croix Workshop on the Water for local elected officials and decision makers.

Members of the East Metro Water Resource Education Program:

Brown's Creek Watershed • Carnelian-Marine-St. Croix Watershed •
Comfort Lake-Forest Lake Watershed • Cottage Grove •
Dellwood • Forest Lake • Lake Elmo • Middle St. Croix Watershed •
Ramsey-Washington Metro Watershed • Rice Creek Watershed • Stillwater •
South Washington Watershed • Valley Branch Watershed • Willernie •
West Lakeland • Woodbury • Washington Conservation District • Washington County

**East Metro Water Resource Education Program
2013 Annual Report**

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About the East Metro Water Resource Education Program

Background: The East Metro Water Resource Education Program (EMWREP) is a partnership that was formed in 2006 to develop and implement a comprehensive water resource education and outreach program for the east metro area of St. Paul, MN. Current EMWREP partners include Brown's Creek, Camelian-Marine-St Croix, Comfort-Lake Forest Lake, Rice Creek, Ramsey-Washington Metro, South Washington, and Valley Branch Watershed Districts, Middle St. Croix Watershed Management Organization, the cities of Cottage Grove, Dellwood, Forest Lake, Lake Elmo, Stillwater, Willernie, and Woodbury, West Lakeland Township, Washington County and the Washington Conservation District.

Purpose: The purpose of the shared education program is to provide education about the impacts of non-point source pollution on local lakes, rivers, streams, wetlands and groundwater resources and to engage people in projects that will help to protect and improve water quality in the region. In addition to educating the public, EMWREP also provides training for city, county and watershed staff and local elected officials.

Partnership Structure: EMWREP is guided by a steering committee comprised of representatives from each of the 18 partner organizations. The committee generally meets twice a year to provide recommendations on the program budget and activities. During 2013, EMWREP staff included Angie Hong, full-time education specialist and coordinator for the program, Jenn Radtke, half-time education assistant, and Wendy Griffin, a Washington Conservation District natural resource specialist who provided 170 hours of support for rural education activities. The EMWREP coordinator sends a quarterly e-newsletter to all partners' staff, council members and board members, and communicates one-on-one with individual partners on projects throughout the year. The EMWREP education plan is revised every two to three years to accommodate changing priorities and new target audiences. In addition, the EMWREP coordinator prepares an annual report on program activities and provides outreach data and statistics for partners' MS4 Permit reports. All EMWREP reports, plans, and education updates are available on-line at www.mnwcd.org/emwrep.

Coordination with Other Regional Education Efforts: One of the major benefits of the EMWREP program is that it has helped to strengthen relationships between Washington Conservation District, Washington County and the eight watershed management organizations and eight cities that constitute the partnership, which has resulted in better coordination and less overlap in the management of local water resources. By promoting partner's BMP programs, EMWREP has helped to increase the total number of water quality improvement projects implemented and to target these projects in priority areas.

EMWREP has also played a central role in the coordination and development of two regional education programs, Blue Thumb and WaterShed Partners. Blue Thumb is a partnership of more than 70 public and private entities in the Upper Midwest, developed to promote the use of native plantings, raingardens and shoreline plantings to conserve water resources and reduce runoff pollution. WaterShed Partners, which manages the Clean Water Minnesota media campaign, is a collaborative of more than 60 non-profit and public entities in the Twin Cities metro area that work together to educate the public about stormwater pollution. Additionally, EMWREP frequently partners with other organizations within the St. Croix River Basin for educational events and activities.

Accolades: In 2012, the Minnesota Association of Watershed Districts recognized EMWREP as the Watershed Program of the Year.

2013 Executive Summary

General Education Campaign: During 2013, EMWREP continued to use a variety of strategies to educate the general public about stormwater pollution and other issues affecting the quality of surface and groundwater resources, and to inform them about partner programs and activities. Major strategies include more than 100 articles per year in local newspapers and community newsletters, ample use of social media, direct mailings to specific audiences, and participation in nearly 30 community events.

Though the impact of these larger public education and awareness raising efforts is often hard to measure directly, we know they greatly improve the success of our targeted outreach activities and are usually the initial gateway through which people learn about EMWREP partner organizations and engage at a higher level by attending a workshop, participating in a watershed planning process, or installing a clean water project on their property.

In 2013, EMWREP also initiated three new special education projects:

- 1) We collaborated with Chisago County to hold an Aquatic Invasive Species workshop in Scandia, attended by 75 people;
- 2) We created new educational materials and sent mailings to homeowners' associations and lawn care companies in Forest Lake and Woodbury; and
- 3) We held a focus group with representatives from area churches, which led to the creation of a new e-newsletter for congregations and plans for additional education activities in 2014.

Blue Thumb Program: The Blue Thumb – Planting for Clean Water program (www.BlueThumb.org) was developed by the Rice Creek Watershed District in 2006 and is now a dynamic coalition of more than 70 partner organizations working together to raise awareness about stormwater pollution and encourage homeowners to plant native gardens, raingardens and shoreline projects to protect surface and groundwater resources.

EMWREP uses Blue Thumb tools and resources, such as the website and print materials, to promote partner BMP programs and strengthen targeted outreach for neighborhood stormwater retrofit projects. In addition to giving presentations about the Blue Thumb program to several community groups and lake / neighborhood associations, EMWREP also conducted five workshops during the year:

- 1) A raingarden workshop in Scandia;
- 2) A prairie workshop in Afton;
- 3) A workshop for large lot owners in West Lakeland Twp.;
- 4) A raingarden maintenance workshop in Lake Elmo; and
- 5) A shoreline maintenance workshop in Forest Lake.

During 2013, EMWREP provided outreach support for stormwater retrofit projects near Casey Lake (Ramsey-Washington Metro Watershed District), Brown's Creek (Brown's Creek Watershed District), and Lily and McKusick Lakes (Middle St. Croix Watershed Management Organization). We also held Ice Cream Social / Raingarden Tours in Stillwater and Woodbury (South Washington Watershed District) to celebrate the completion of recent neighborhood stormwater retrofit projects.

The number of raingardens and other residential projects installed in Washington County continues to climb each year, at least in part, as a result of EMWREP education and outreach efforts. Conservation District staff conducted 240 site visits during 2013. 62 projects were installed with watershed cost-share funding, 45 projects were completed with only technical assistance, and an additional 115 new projects are still in progress. The WCD estimates that residential projects installed in 2013 will reduce phosphorus loading to area waters by 37 pounds per year.

Rural Outreach: During 2013, EMWREP offered several programs specifically designed to engage rural property owners. These included a full-day workshop for horse owners, three water testing clinics for homeowners with private wells, and two buckthorn workshops. In addition, EMWREP also provided outreach support for several targeted implementation projects, including:

- Washington Conservation District - Turf to Prairie;
- Washington Conservation District – Top50P!; and
- South Washington Watershed District's - Trout Brook.

Because previous audience research has shown us that many rural property owners are more interested in creating wildlife habitat or managing invasive species than in protecting surface water quality, we've adapted our messages and workshops for these audiences accordingly. Though we still talk about protecting water resources, we usually use other topics as the hook to engage rural property owners.

Blue Biz: The Blue Biz program consists of a website (www.cleanwaterMN.org/businesses) and outreach materials that partners can use to engage commercial property owners in BMP projects. During 2013, EMWREP initiated conversations with Tamarack Village Shopping Center in Woodbury about a potential stormwater reuse project on their property.

Stormwater U: Early after the EMWREP partnership was created, we worked with staff from Minnesota Extension and the Minnesota Erosion and Stormwater Management Certification Program to develop Stormwater U, a technical training series for municipal staff and contractors, including engineers, planners, inspectors and public works. Past workshops have included Designing for Volume Control, Protecting Water Resources through Comprehensive Planning, Stormwater Pond Management, Turf Management, Illicit Discharge Detection and Elimination and Winter Snow and Ice Management.

In 2013, EMWREP:

- Hosted a Stormwater U workshop in January in Cottage Grove, *What is in your Stormwater BMP Toolbox?*;
- Presented at the Stormwater U *Lessons Learned* workshop in February;
- Collaborated with MECA (Minnesota Erosion Control Association) to hold an outdoor erosion control field seminar in Cottage Grove at the site of a new housing development; and
- Hosted a workshop on Street Sweeping for Nutrient Reduction.

NEMO: The Northland NEMO program (Non-point Education for Municipal Officials) provides local elected officials and decision makers with resources and information to make informed decisions about land use and water quality in their communities. Northland NEMO is hosted by the University of Minnesota Extension and EMWREP is one of ten to twenty partner organizations. Program offerings include several basic presentations, as well as the interactive Watershed Game.

During 2013, EMWREP collaborated with several other partners to hold its fifth *Workshop on the Water* for St. Croix Basin communities in both Minnesota and Wisconsin. Over 120 people attended. In September we held a workshop for Washington County communities to introduce the Minimal Impacts Design Standards Community Assistance Package developed as part of a three-year grant project. Representatives from ten cities and the county attended. After the workshop, we met one-on-one with the communities who attended to discuss how they might incorporate the new package into their ordinances and zoning code in the future. An accelerated implementation grant from the Minnesota Board of Water and Soil Resources will allow the Washington Conservation District to continue working with these communities in 2014.

[MS4 Toolkit](http://www.cleanwatermn.org/MS4toolkit): EMWREP developed the MS4 Toolkit (www.cleanwatermn.org/MS4toolkit) several years ago with a grant from the Minnesota Pollution Control Agency. The toolkit includes educational materials that partners can use to meet the six minimum control measures in the MS4 permit, such as brochures, posters, slide shows, training videos and more. In addition to the on-line materials, training videos for parks and public works staff and pop-up banners for community events are available partners to borrow. The Metro WaterShed Partners MS4 work group is currently discussing strategies for updating the MS4 Toolkit and website.

General Education Campaign

Minimum Control Measure Addressed

<input checked="" type="checkbox"/> Public education & outreach	<input type="checkbox"/> Construction site runoff controls
<input checked="" type="checkbox"/> Public participation & involvement	<input type="checkbox"/> Post-construction storm water management
<input checked="" type="checkbox"/> Illicit discharge detection and elimination	<input type="checkbox"/> Municipal pollution prevention & good housekeeping

Audience: General Public

Program Goals:

1. Provide education on water resource issues and stormwater pollution prevention for people living and working in the east metro area.
2. Collaborate with state and local government as well as non-profit and community groups to carry out educational activities.
3. Utilize master gardeners and other citizen volunteers to help conduct education and outreach.
4. Promote EMWREP partners and their BMP (Best Management Practices) programs.
5. Engage community members and other stakeholders in TMDL (Total Maximum Daily Load) and Non-Degradation Plan processes.

Educational Goals:

Learning

1. Increase the overall understanding and awareness of water resources and storm water runoff among the general public.
2. Increase understanding of the connection between individual actions and water resource quality among the general public.
3. Increase awareness of storm water best management practices among the general public.
4. Increase understanding of the roles that cities, watershed agencies, counties and conservation districts play in managing water resources.

Behavior Change

1. Engage the public in the prevention of storm water pollution at home.
2. Increase the utilization of storm water best management practices and adoption of desirable clean water practices among the general public.
3. Engage the public and other stakeholders in creating and implementing watershed, TMDL and Non-Degradation plans.
4. Unite government, non-profit and community based organizations with a common clean water theme.
5. Develop leaders among citizens and other water related organizations that can carry water resource education to the general public.

Water Quality Improvement

1. Reduce and prevent non-point source pollution of surface and groundwater resources.
2. Maintain adequate groundwater and drinking water resources.

Activities used to reach goals:

Maintaining and developing educational partnerships: EMWREP continues to work collaboratively with governmental, non-profit, private and citizen partners to engage the public, promote and execute events and activities, and develop and distribute educational materials and resources. EMWREP works with partners in both the Twin Cities Metro area and the St. Croix River Basin. Some of these many partners include:

- **Local units of government:** In addition to the 18 partnering entities within EMWREP, we also work closely with other LGUs outside of Washington County
- **Non-profits:** St. Croix River Association, Friends of the Mississippi River, Family Means, local nature centers, sportsman groups
- **Private partners:** EMWREP occasionally teams up with corporations such as 3M and Blue Cross – Blue Shield to provide education for employees and their families
- **Citizens:** Master Gardeners, church members and other community leaders

Community events: EMWREP participated in dozens of local community events, either by helping to plan, sending materials, staffing a table or giving a presentation:

- Forest Lake Home Show – March 16
- St. Croix Basin Conference – April 8 (River Falls)
- Mahtomedi Rite of Spring – April 27
- Go Green Trail Run – May 4 (Battle Creek Park)
- St. Peter UCC Environmental Fair – May 11 (Stillwater)
- Explore Your Parks Day – June 1 (Lake Elmo Regional Park)
- Waterfest – June 1 (Lake Phalen)
- Landscape Revival – June 1 (Roseville)
- Master Gardener Plant Sale – June 2 (Lake Elmo)
- Belwin Bison Release – June 15 (Afton)
- Family Means St. Croix Garden Tour – July 13-14 (Stillwater)
- Tamarack Swamp Nature Preserve Tour – July 16 (Woodbury)
- Our Water, Our Future – July 16 (Century College)
- Washington County Fair – July 31 – Aug. 4
- Heritage Day – Aug. 6 (Lake St. Croix Beach)
- Tri-Lakes Day – Aug. 10 (Lake Elmo)
- Minnesota State Fair – Aug. 22 – Sept. 2
- Taco Daze – Sept. 7 (Scandia)
- Blue Cross Blue Shield Carefest – Sept. 10
- Cottage Grove Public Works Open House – Sept. 19
- Washington County Paper Shredding Event – Sept. 20
- North St. Paul History Cruz – Sept. 20
- Newport Community Buckthorn Pull – Oct. 26



Above: Kids practiced fishing at the Cottage Grove Public Works Open House.



Right: At the Belwin Bison Release, children learned about root depth using our native plant display.

Student Programs: EMWREP participated in the following children's education events:

- Da Vinci Festival, Stillwater ISD - Jan. 5 (2500 K-12 students and parents)
- MN Youth Outdoor Expo, Hugo, May 18-19 (2500 children and parents)
- OH Anderson Field Day, Mahtomedi – May 10 (100 3rd-5th grade students)
- Cottage Grove Safety Camp – July 9 (200 children, ages 8-11)

Special Mailings: EMWREP helped to produce and deliver special mailings for several partners during the year. This included:

- Mailings to Comfort Lake – Forest Lake and Camelian-Marine-St. Croix Watersheds to promote the Aquatic Invasive Species workshop and watershed cost-share programs (February)
- Mailing to the Casey Lake neighborhood (North St. Paul) for a neighborhood raingarden project (April)
- Letter to churches in the Ramsey-Washington Metro Watershed for a Green Churches project (April)
- Washington Conservation District newsletter (April & November)
- Letter to select homes in Brown's Creek Watershed for a neighborhood raingarden project (May)
- Mailing to Homeowner Associations and lawn care companies in Forest Lake and Woodbury (July)
- Comfort Lake – Forest Lake Watershed District newsletter (September)

Newspaper articles: EMWREP coordinator Angie Hong writes regularly for several local papers. Read the articles on-line at www.eastmetrowater.areavoices.com. In 2013, articles appeared in the following papers:



Forest Lake Times (13,029 readers)

Scandia Country Messenger (1075 readers)

- Jan. 8 - MAWD award
- Jan. 25 - Wild Ones Native Plant Conference
- Feb. 5 - *Preventing Groundwater Contamination* (Sealing abandoned wells)
- Feb. 19 - AIS Workshop
- Feb. 23 - Horse workshop
- March 11 - *Pimp Your Downspout* (Rain barrel sale)
- April 9 - Scandia Raingarden Workshop
- April 16 - Well Water Testing Clinic
- Aug. 12 - *Incentive grants for lake and river friendly landscaping*
- Aug. 31 - *Going Up North* (lakeshore landscaping)
- Sept. 5 - *Saving Goose Lake*
- Sept. 11 - *Stopping the phosphorus train* (Broadway Ave. project)
- Oct. 29 - *Reducing agricultural water pollution*

South Washington County Bulletin

(8616 readers in Cottage Grove, St. Paul Park, Newport and Grey Cloud)

- Jan. 8 - MAWD award
- Jan. 15 - *Reducing mercury*
- Jan. 25 - Wild Ones Native Plant Conference

Feb. 5 - *Preventing Groundwater Contamination* (Sealing abandoned wells)
 Feb. 23 - Horse workshop
 Feb. 27 - *Keeping pharmaceuticals out of our water*
 March 11 - *Pimp Your Downspout* (Rain barrel sale)
 April 16 - Well Water Testing Clinic
 April 30 - *Both the forest and the trees*
 May 13 - *Mississippi Water Walk*
 May 21 - *Dandelion Wars*
 June 4 - *Give me a home where the buffalo roam* (prairie workshop)
 June 20 - *More big rainstorms*
 July 15 - *What to ask for from your lawn care provider*
 Aug. 20 - Buckthorn workshop
 Aug. 28 - *Salt water on the menu*
 Oct. 2 - *For the love of fall*
 Oct. 9 - *Mississippi River Sojourn*
 Oct. 24 - *Where have all the bees gone?*
 Oct. 29 - *Reducing agricultural water pollution*
 Nov. 1 - *Whistling Well Farm*
 Nov. 7 - *Calling Tim the Tool Man*

Hugo Citizen (10,000 readers)

Jan. 8 - MAWD award
 Jan. 25 - Wild Ones Native Plant Conference
 Feb. 5 - *Preventing Groundwater Contamination* (Sealing abandoned wells)
 Feb. 23 - Horse workshop
 March 11 - *Pimp Your Downspout* (Rain barrel sale)
 April 16 - Well Water Testing Clinic
 May 21 - *Dandelion Wars*
 July 15 - *What to ask for from your lawn care provider*

Oakdale- Lake Elmo & Maplewood – North St. Paul Reviews

(34,392 readers in Oakdale, Lake Elmo, North St. Paul, Maplewood, White Bear Lake, White Bear Township, Gem Lake, Western Mahtomedi, and Landfall. Articles are occasionally printed in Lillie owned papers outside the EMWREP area as well, reaching an additional 83,608 readers.)

Jan. 8 - MAWD award
 Jan. 25 - Wild Ones Native Plant Conference
 Feb. 5 - *Preventing Groundwater Contamination* (Sealing abandoned wells)
 Feb. 27 - *Keeping pharmaceuticals out of our water*
 March 11 - *Pimp Your Downspout* (Rain barrel sale)
 April 9 - *Let's chat about scat*
 May 13 - *Mississippi Water Walk*
 May 21 - *Dandelion Wars*
 May 21 - VBWD meetings
 June 4 - *Give me a home where the buffalo roam* (prairie workshop)
 June 20 - *More big rainstorms*
 July 15 - *What to ask for from your lawn care provider*
 Aug. 20 - Buckthorn workshop
 Oct. 9 - *Mississippi River sojourn*
 Oct. 16 - *Reducing agricultural water pollution*
 Oct. 24 - *Where have all the bees gone?*
 Dec. 2 - *Regaining a Sense of Wonder*

Woodbury Bulletin (7811 readers)

- Jan. 8 - MAWD award
- July 8 - Tamarack Tour
- Sept. 10 - Woodbury raingarden tour and ice cream social

Stillwater Gazette (6,966 readers)

- Jan. 8 - MAWD award
- Feb. 19 - AIS Workshop
- Aug. 20 - Buckthorn workshop
- March 11 - *Pimp Your Downspout* (Rain barrel sale)
- May 21 - VBWD meetings

Valley Life (48,000 readers in Stillwater, Bayport, Oak Park Heights, Stillwater Township, Afton, Lakeland, Marine, Hugo, Lake Elmo, Houlton, Somerset and New Richmond)

Oakdale Patch (974 Facebook / 816 Twitter)

Stillwater Patch (2893 Facebook / 1325 Twitter)

Woodbury Patch (2898 Facebook / 1773 Twitter)

- Jan. 2 - *Having kids can be hazardous to your health*
- Jan. 7 - *Don't be a drip* (water conservation)
- Jan. 15 - *Reducing mercury*
- Jan. 22 - *Reading the landscape* (Wild Ones Native Plant Conference)
- Jan. 28 - *Things they don't tell you when you buy a horse* (Horse Workshop)
- Feb. 5 - *Preventing Groundwater Contamination* (Sealing abandoned wells)
- Feb. 13 - *California dreaming on a winter day*
- Feb. 19 - *Aliens invade the St. Croix Valley*
- Feb. 27 - *Keeping pharmaceuticals out of our water*
- Feb. 28 - *Community Thread mixes raingardens and volunteerism*
- March 8 - *The garbage boat sails away*
- March 10 - *Crazy carp tournament*
- April 1 - *How to carry a baby across a river*
- April 9 - *Let's chat about scat*
- April 15 - *Well water testing clinics*
- April 19 - *Gardening in the snow*
- April 29 - *Journey on two wheels*
- April 30 - *Both the forest and the trees*
- May 13 - *Mississippi Water Walk*
- May 21 - *Dandelion Wars*
- May 29 - *VBWD Local lakes study*
- June 4 - *Give me a home where the buffalo roam*
- June 10 - *Big Backyards*
- June 20 - *More big rainstorms*
- June 28 - *Behind the scenes gardens*
- July 8 - *Tamarack Tour*
- July 15 - *What to ask for from your lawn care provider*
- July 22 - *Protecting the St. Croix*
- July 31 - *Going up north*
- Aug. 5 - *Ice cream and raingardens*
- Aug. 14 - *Rush River rambles*
- Aug. 21 - *Digging for treasure*
- Aug. 28 - *Salt water on the menu*

Sept. 3 - *The great (never-ending) Minnesota get-together*
 Sept. 5 - *Saving Goose Lake*
 Sept. 11 - *One year later at Oak Glen*
 Oct. 2 - *For the love of fall*
 Oct. 9 - *Mississippi River sojourn*
 Oct. 16 - *Reducing agricultural water pollution*
 Oct. 24 - *Where have all the bees gone?*
 Nov. 1 - *Whistling Well Farm*
 Nov. 7 - *Calling Tim the Tool Man*
 Nov. 20 - *Holey Pavement*
 Nov. 21 - *Stopping the Zebra*
 Dec. 2 - *Regaining a Sense of Wonder*
 Dec. 10 - *Winter Fish Tale*
 Dec. 17 - *Swamp Stories*
 Dec. 24 - *As the water drop rolls*

*Press releases were also sent to the Pioneer Press and Star Tribune throughout the year.

City newsletter articles: Information about water resources and EMWREP partner activities reached more than 175,000 people through community newsletters in 2013. Below are some of the topics covered in these newsletters:

- Afton (pop. 2800) - [newsletter](#)
 - Jan - WCD tree and rain barrel sale
 - June - VBWD meetings for lakes and Kelle's Creek; impacts of triclosan
 - September - Turf to Prairie grant
 - October - fall leaves impact water quality
 - December - impacts of road salt
- Bayport (pop. 3200) - [newsletter](#)
 - April - raingarden clean-up event
 - September - fall leaves impact water quality; raingarden at City Hall
- Baytown Twp. (pop. 1723) - no newsletter
- Birchwood (pop. 875) - [newsletter](#)
 - Winter - road salt
 - Spring - road salt, Blue Thumb
- Cottage Grove (pop. 34,000) - [newsletter](#)
 - June - lawn care tips
- Dellwood (pop. 1063) - annual Mayor's Letter, not posted on-line
- Denmark Twp. (pop. 1737) - no newsletter
- Forest Lake (pop. 18,957) - [newsletter](#)
 - Summer - prairie and "Big Backyard" workshops
 - Fall - leaves and water quality, RCWD cost-share program
 - Winter - road salt; WCD tree sale
- Grant (pop. 4026) - twice yearly, not posted on-line
- Hugo (pop. 14,000) - [newsletter](#)
 - Fall - water conservation
- Lake Elmo (pop. 7647) - [newsletter](#)
 - Spring - septic system care; spring cleaning to keep waterways clean

- Fall – leaves impact water quality
- Lake St. Croix Beach (pop. 1051) - [newsletter](#)
 - Jan – septic systems, road salt
 - March – groundwater, road salt
 - April – “Good bug, bad bug”, raingarden myths, lawn care
 - July - Algae blooms, “Good bug, bad bug”
 - October – septic systems
 - November – septic systems
- Lakeland (pop. 1830) - [newsletter](#)
 - Jan – WCD tree and rain barrel sale
 - Feb. - WCD tree and rain barrel sale
 - June – prairie workshop at Belwin
 - Aug. – lawn clippings
- Lakeland Shores (pop. 355) – [newsletter](#)
 - Spring – MSCWMO
 - Winter – Low impact development – MIDS community assistance project
- Mahtomedi (pop. 8000) - [newsletter](#)
 - April – June: water conservation
- Maplewood (pop. 39,337) – only current month’s newsletter posted on-line
- Marine on St. Croix (pop. 700) – no 2013 newsletters posted on-line
- May Twp. (pop. 761) – twice annually, not posted on-line
- Newport (pop. 3435) - [newsletter](#)
 - Fall – community buckthorn pull
 - Winter – community buckthorn pull
- North St. Paul (pop. 11,694) – [utility newsletter](#)
 - October – leaves and water quality
- Oakdale (pop. 27,726) – only current newsletter posted on-line
- Oak Parks Heights (pop. 4724) - [newsletter](#)
 - Fourth quarter – leaves and water quality
- Pine Springs (pop. 408) – no newsletter or website
- Scandia (pop. 3934) - [newsletter](#)
 - Fall – leaves impact water quality
- Stillwater (pop. 18,000) - [newsletter](#)
 - 2013 – Raingarden tour and ice cream social
- Stillwater Twp. (pop. 3000) - [newsletter](#)
 - February – WCD tree and rain barrel sale
- St. Mary’s Point (pop. 370) – no newsletter
- West Lakeland (pop. 3547) - [newsletter](#)
 - May – “Big Backyard” workshop
 - June – special mailer for “Big Backyard” workshop
 - Fall - buckthorn
- Willernie (pop. 511) – Mayor’s letter sent occasionally, none in 2013

- Woodbury (pop. 57,345) - [newsletter](#)
 - June – lawn watering and rain sensors
 - July – grass clippings
 - Sept. – Colby Lake raingarden tour and ice cream social
 - November – special clean water insert

Cable Access Programming: In February of 2013, EMWREP worked with White Bear Lake Suburban Cable Commission to film a 30-min segment about Blue Thumb – Planting for Clean Water. Watch it on-line at: <https://www.youtube.com/watch?v=6Mc1r16Yoxg>.



Websites and Social Media: EMWREP uses several websites to provide information and resources for the public and also uses social media, such as Facebook, Twitter and the East Metro Water blog to reach people in the community:

- **Washington Conservation District:** In 2013, the WCD website (www.mnwcd.org) received 9,627 visits from 6,007 visitors. The WCD has 150 Facebook friends and EMWREP has 75 Twitter followers.
- **Blue Thumb – Planting for Clean Water:** The website (www.BlueThumb.org) received 23,548 visits from 18,710 visitors. Blue Thumb has 835 Facebook friends and 212 Twitter followers.
- **WaterShed Partners:** The Clean Water Minnesota website (www.cleanwatermn.org) received 2,799 visits from 2,380 visitors. StormDrain Goalie, a new social media initiative of WaterShed Partners has 522 Facebook friends.
- **East Metro Water Blog:** The blog (www.eastmetrowater.areavoices.com) had 7,358 visits in 2013.

In 2013, we found that social media often helped us to amplify our media outreach and gain additional exposure. For example, the Star Tribune wrote a feature article about the neighborhood raingarden retrofit project in Colby Lake, Woodbury, after learning about the project via Twitter.

WaterShed Partners: EMWREP is one of 65 partners in the WaterShed Partners, an innovative, dynamic coalition of public, private and non-profit organizations in the Twin Cities metro area that work collaboratively to teach residents how to care for area waters. WaterShed Partners coordinates the Clean Water Minnesota Media Campaign, maintains the www.cleanwatermn.org website, the MS4 Toolkit, and the StormDrain Goalie program, and has prominent exhibit space in the Eco Experience and DNR Buildings at the Minnesota State Fair.



In April, WaterShed Partners hosted a social media training for Minnesota water educators with Jamie Millard, a social media consultant that specializes in working with non-profit and government organizations. In June, WaterShed Partners coordinated their 7th Annual Boat Trip on the Mississippi River. Presenters talked about the State of the Mississippi River Report, progress on Asian Carp prevention, and the new Atlas 14 guidelines developed to reflecting changing rainfall patterns in Minnesota. In November, WaterShed Partners held a roundtable discussion to address the question of how water educators can best evaluate the impact of their work.

The 2013 WaterShed Partners and Media Campaign annual report can be found at www.cleanwatermn.org.

Special Projects



Above: Over 70 people attended a workshop on aquatic invasives in March.

Aquatic Invasive Species Workshop: EMWREP partners CLFLWD and CMSPWD collaborated with Chisago County to host a workshop about aquatic invasive species on March 9 at the Scandia Community Center. More than 70 people attended to learn about identifying, managing, and preventing the spread of invasive species such as curly leaf pondweed, zebra mussels and carp.

Outreach to Homeowners Associations and Lawn Care Companies: In 2013, EMWREP began developing education and outreach materials specifically for homeowners associations (HOAs) and people who hire lawn care companies to maintain their yards. New materials included a

one page fact sheet *What to ask for from your lawn care provider*, as well as a new webpage on the Washington Conservation District website. A special mailing was also sent to HOAs and lawn care providers in Forest Lake and Woodbury during the summer.

The Washington Conservation District recently received a Clean Water grant from the Board of Water and Soil Resources, which will allow EMWREP to spend additional time conducting interviews and focus groups to learn how to better connect with these “hard-to-reach” audiences. During 2013, EMWREP also developed door hangers, which will be distributed to the Colby Lake neighborhood in Woodbury in 2014.

Pond Dipping at Cottage Grove Ravine Park: On September 26, EMWREP collaborated with Friends of the Mississippi River to hold an outdoor event at Cottage Grove Ravine Park. Approximately 30 people turned out to dip for aquatic invertebrates in the lake, hike around the shoreline wetlands with FMR ecologist Karen Schik and learn about water quality and habitat health in the park.

Valley Branch Watershed District Public Meetings: During 2013, EMWREP provided support for partner Valley Branch Watershed District as they organized a series of public meetings around WRAPS (watershed restoration and protection strategy) underway in the watershed and to update the District’s 10-yr plan. Public meetings were held for Kelle’s Creek and lakes WRAPS on June 4 and 6. The Plan Update meeting was held on Oct. 30.



Above: Valley Branch watershed residents talked in small groups during a plan update meeting.

Lake Association Meetings: EMWREP attended lake association meetings for Bone Lake (Scandia) and Silver Lake (North St. Paul) to talk about watershed district programs and discuss opportunities for involvement.

Church Focus Groups: In October, EMWREP held a focus group session with representatives from congregations in Washington County and RWMWD that have completed or are going to complete clean water projects at their churches. Participants included pastors, facilities managers and congregation members. Attendees expressed an interest in a monthly clean water e-newsletter, online resources, a maintenance workshop for grounds-keeping staff, and a Church Raingarden Tour.

Evaluation: Though the impact of public education and awareness raising efforts is often hard to measure directly, we know they greatly improve the success of our targeted outreach activities and are usually the initial gateway through which people learn about EMWREP partner organizations and engage at a higher level by attending a workshop, participating in a watershed planning process, or installing a clean water project on their property.

During 2013, EMWREP did not conduct surveys or other behavioral research to measure learning or behavior change. However, conversations with attendees at public events seem to indicate that people are more aware of surface and groundwater issues in their communities and practices such as raingardens than they were eight years ago. Metro WaterShed Partners are currently discussing tools for evaluation and EMWREP looks forward to using these tools once they are developed.

Knowledge gained during our church focus group will help us to develop appropriate educational tools and resources for this audience and to maximize the public education value of clean water projects installed by area congregations.

Blue Thumb
Planting for Clean Water

Minimum Control Measure Addressed

<input checked="" type="checkbox"/> Public education & outreach	<input type="checkbox"/> Construction site runoff controls
<input checked="" type="checkbox"/> Public participation & involvement	<input type="checkbox"/> Post-construction storm water management
<input type="checkbox"/> Illicit discharge detection and elimination	<input type="checkbox"/> Municipal pollution prevention & good housekeeping

Audience: Homeowners

Program Goals:

1. Promote native gardens, raingardens and shoreline plantings in targeted areas within EMWREP partner communities.
2. Coordinate Blue Thumb outreach with partner BMP programs and TMDL implementation.
3. Coordinate with landscapers, nurseries, Master Gardeners, and others to conduct outreach and implement projects.
4. Publicize and utilize demonstration gardens created by the program to increase educational benefit. Create signage, conduct tours and highlight demonstration projects.

Educational Goals:

Learning

1. Provide a visible “hook” to discuss and encourage people to think about stormwater and water resources.
2. Increase understanding of native plants, raingardens and shoreline stabilization as best management practices for clean water.

Behavior Change

1. Engage the public in preventing non-point source water pollution.
2. Increase the utilization of native plantings, raingardens and shoreline stabilization by local residents.

Water-quality Improvement

1. Reduce and prevent non-point source pollution of surface and groundwater resources.
2. Maintain adequate groundwater and drinking water resources.

Activities used to reach goals:



Regional collaboration: The Blue Thumb partnership includes more than 70 public and private entities - nurseries, landscaping companies, watershed agencies, cities, non-profits and citizen groups. The collaborative nature of the program ensures a consistent message for the public and maximizes the outreach efforts of all program partners. EMWREP continues to play a lead role in the partnership by serving on the regional steering committee.

EMWREP uses Blue Thumb tools and resources, such as the website and print materials, to promote partner BMP programs. These tools also help us to strengthen outreach for targeted stormwater retrofit projects. In 2013, EMWREP also helped to coordinate and teach a full-day professional training for Blue Thumb partners on how to plan, promote and conduct educational workshops.

Workshops: EMWREP holds community workshops to promote native gardens, raingardens and shoreline plantings. These workshops are open to interested community members and are promoted through flyers, press releases and community newsletters. In 2013, EMWREP conducted five workshops:

- Raingarden workshop in Scandia, hosted in partnership with Prairie Restorations, Inc.
 - 28 homes (individuals or couples) attended;
 - Participants came from BCWD, CLFLWD, CMSCWD, MSCWMO, RCWD, RWMWD, SWWD and VBWD.
- Prairie workshop in Afton, hosted in partnership with Belwin Conservancy
 - 10 homes attended;
 - Participants came from BCWD, CMSCWD, MSCWMO and VBWD.
- A workshop for large lot owners in West Lakeland Twp., organized in partnership with Master Gardeners
 - 40-50 people attended
- Raingarden maintenance workshop in Lake Elmo
 - The workshop was for homeowners who had raingardens installed on their properties during city road projects in 2009-12;
 - 5 homes attended.
- Shoreline maintenance workshop in Forest Lake
 - The workshop was for shoreline landowners in CLFLWD and CMSCWD who completed restoration projects on their properties;
 - 11 homes attended.



Above: Local landowners learn about the prairie at Belwin Conservancy.



Above: Recent BMP project participants learn how to maintain their shoreline plantings.

Neighborhood Parties: Three of the workshops listed above were hosted by homeowners.

Presentations: In addition to workshops, EMWREP gave presentations to the following groups in 2013:

- Trillium Garden Club – Stillwater (Feb. 13)
- Tii Gavo Homeowners Association – Scandia (March 6)
- Goose Lake residents – Scandia (April 17)
- Bone Lake association – Scandia (May 30)

Targeted homeowner outreach: During 2013, EMWREP provided outreach support for the following partner projects:

- Casey Lake neighborhood stormwater retrofits (Ramsey-Washington Metro Watershed District)
- Neal Ave. neighborhood stormwater retrofits (Brown's Creek Watershed District)
- Lily and McKusick Lake neighborhood stormwater retrofits (Middle St. Croix Watershed Management Organization)

We also organized tours of recently completed neighborhood stormwater retrofits near Colby Lake (South Washington Watershed District) and Lily and McKusick Lakes (Middle St. Croix WMO) to celebrate and showcase these projects. Approximately 200 people attended each of these events.



Above: A collage of photos from gardens featured on the Stillwater raingarden tour.

Integration with partner BMP programs: EMWREP continues to integrate Blue Thumb education and outreach with partner BMP programs.

Promotional materials: EMWREP has created a suite of print materials and brochures to promote Blue Thumb practices. We also have interactive displays, digital photo frames, posters and banners that we use ourselves and loan out to other for use at community education events.

Evaluation: The number of raingardens and other residential projects installed in Washington County continues to climb each year, at least in part, as a result of EMWREP education and outreach efforts. Conservation District staff conducted 240 site visits during 2013. 62 projects were installed with watershed cost-share funding, 45 projects were completed with only technical assistance, and an additional 115 new projects are still in progress. The WCD estimates that residential projects installed in 2013 will reduce phosphorus loading to area waters by 37 pounds per year.

Rural Outreach

Minimum Control Measure Addressed

<input checked="" type="checkbox"/> Public education & outreach	<input type="checkbox"/> Construction site runoff controls
<input checked="" type="checkbox"/> Public participation & involvement	<input type="checkbox"/> Post-construction storm water management
<input type="checkbox"/> Illicit discharge detection and elimination	<input type="checkbox"/> Municipal pollution prevention & good housekeeping

Audience: Rural landowners

Program Goals:

1. Find creative ways to engage rural landowners in projects that improve habitat and also reduce erosion and non-point source water pollution.
2. Promote projects on sensitive and highly erodable lands, such as steep slopes, ravines and bluff tops; encourage buffer plantings on streams, lakes and wetlands; and help people to restore wetlands and natural stream corridors.
3. Coordinate outreach with partner BMP programs and TMDL implementation.

Educational Goals:

Learning

1. Increase awareness about watersheds and water resource issues in the East Metro, as well as the causes of non-point source water pollution.
2. Increase awareness of and knowledge about wildlife habitat requirements.
3. Increase public knowledge about forest, prairie and wetlands systems, including:
 - a. The roles that plants, animals and non-living components such as soil and water play in ecosystems; and
 - b. The threats posed by invasive species, habitat fragmentation and degradation and loss of natural processes.
4. Educate local residents about how to improve existing and create habitat on their property to attract wildlife and reduce runoff pollution.

Behavior Change

1. Engage private property owners in projects that will improve habitat and reduce non-point source water pollution. Specific actions may include:
 - a) Removing buckthorn and other invasive plant species, especially on steep slopes, ravines and bluff tops, and in floodplains and drainage paths.
 - b) Planting native trees, shrubs and plants, especially on steep slopes, ravines and bluff tops, and in floodplains and drainage paths.
 - c) Repairing ravines, gullies and other erosion areas with native plants that also provide habitat.
 - d) Establishing buffer plantings on streams, lakes and wetlands.
 - e) Restoring wetlands and natural stream corridors.

Water-quality Improvement

1. Reduce and prevent non-point source pollution of surface and groundwater resources.
2. Maintain adequate groundwater and drinking water resources.

Activities used to reach goals:

Collaboration with local non-profits and sportsmen groups: EMWREP continues to seek out opportunities for collaboration with local non-profits and sportsmen groups in order to better reach rural landowners. In 2013, we hosted an activity station at the Minnesota Outdoor Youth Expo, held at Wild Wings hunt Club in Hugo, and also attended the Hugo Feed Mill open house.

Horse owner's workshop: EMWREP collaborated with Minnesota Extension and Hagberg's Country Feed, LLC to put on a full-day workshop for people who own and board horses in Washington County. Washington County has the most horses of any county in Minnesota and, though we know that there are many opportunities for conservation projects, horse owners and boarders generally do not qualify for agricultural assistance programs because they are not considered producers. Workshop topics included:

- Pasture management;
- Reducing runoff and BMP programs;
- Composting manure;
- Pharmaceuticals in groundwater ;
- Phosphorus in horse feed; and
- Hoof care.

Roughly 25 people attended, including folks from Baytown, Grant, Marine, May Twp., Stillwater Twp., West Lakeland and Woodbury.



Above: Horse owners learned about pasture management from Minnesota Extension expert Kirshona Martinson.

Nitrates Water Testing Clinics: During the spring, EMWREP worked with Washington County and the Minnesota Department of Health to hold three water testing clinics for rural landowners with private wells:

- Denmark Twp. – May 6
- Scandia – May 8
- Cottage Grove – June 24

In addition to conducting on-site analysis of well water samples to determine nitrate levels, EMWREP also used the clinics as an opportunity to distribute information about conservation programs and practices.

Buckthorn Workshops: On Sept. 11 and 12, EMWREP held buckthorn workshops in Denmark Twp. and Lake Elmo. During the workshops, landowners learned about best practices for removing and managing buckthorn and also took home information about other conservation programs and practices. Several attendees signed up for site visits after the workshop. In addition, EMWREP participated in Newport's annual community buckthorn event at Bailey School Forest on Oct. 26.

Support for targeted implementation projects: During 2013, EMWREP provided outreach assistance for several targeted implementation projects, including:

- **Washington Conservation District – Turf to Native project:** EMWREP created a mailing that was sent to 250 priority landowners with an acre or more of turf in areas draining to the St. Croix River. We also promoted the project through a variety of other means, including contacting previous workshop participants, creating flyers and writing articles for local papers and city newsletters.

- Washington Conservation District – Top50P!: EMWREP created case study fact sheets to highlight five clean water projects completed with rural landowners near the St. Croix River.
- South Washington Watershed District – Trout Brook: EMWREP helped to recruit landowners within the Trout Brook subwatershed to install run-off and phosphorus reduction projects on their land.

Integration with partner BMP programs: We strive to integrate our outreach and education efforts with partner BMP programs by encouraging landowners to schedule free site visits with Conservation District staff and apply for cost-share funding through their local watershed organization for habitat and clean water projects on their land.

Promotional materials: EMWREP distributes educational materials dealing with a variety of topics, including yard care, shoreline plantings, native plantings, well water and invasive species management.

Evaluation: During 2013, EMWREP did not conduct any audience research with rural landowners. Previous focus groups and surveys have indicated that rural landowners in our area are interested in creating and improving wildlife habitat on their land and managing invasive species, so we have modified our outreach to highlight the connections between habitat and clean water.

Blue Biz
Helping local businesses go blue

Minimum Control Measure Addressed

<input checked="" type="checkbox"/> Public education & outreach	<input type="checkbox"/> Construction site runoff controls
<input type="checkbox"/> Public participation & involvement	<input checked="" type="checkbox"/> Post-construction storm water management
<input type="checkbox"/> Illicit discharge detection and elimination	<input type="checkbox"/> Municipal pollution prevention & good housekeeping

Audience: Commercial property owners, business owners, property managers and commercial developers

Program Goals:

1. Promote stormwater BMP's for businesses in targeted areas within EMWREP partner communities.
2. Encourage use of LID techniques for new commercial development.
3. Coordinate commercial outreach with partner BMP programs and TMDL implementation.
4. Publicize and utilize demonstration projects created by the program to increase educational benefit. Create signage, conduct tours and highlight demonstration projects.

Educational Goals:

Learning

1. Help business owners, property managers and commercial developers to understand that impervious surfaces on commercial properties contribute significantly to stormwater pollution in local water bodies.
2. Increase understanding of best management practices and low impact development techniques.

Behavior Change

1. Engage commercial entities in preventing non-point source water pollution.
2. Involve local businesses as active partners in watershed and TMDL plan implementation.
3. Increase the utilization of BMP's and LID by local businesses.

Water-quality Improvement

1. Reduce and prevent non-point source pollution of surface and groundwater resources.
2. Maintain adequate groundwater and drinking water resources.

Activities used to reach goals:

Website: EMWREP has a website (www.cleanwatermm.org/businesses) where commercial entities can go to find information about Low Impact Development and BMP's, as well as case studies and links to resources for cost-share and technical assistance.

Print materials: EMWREP has a one-page fact sheet that summarizes information available on the website and several one-pg fact sheets about local commercial BMP projects. We provide these print materials to business owners when meeting one-on-one to discuss conservation projects.

Targeted outreach: In 2013, EMWREP and Conservation District staff met with representative from Tamarack Village Shopping Center in Woodbury. The Wilmes Lake subwatershed analysis identified the shopping center as a key location for reducing phosphorus loading, and we discussed a potential project that would use recycled water from stormwater ponds on the property to irrigate the grounds. Though the property managers were very interested in pursuing the project, the initial concept proved to be too expensive to implement, so they are currently exploring alternative designs.

Coordination: EMWREP will continue to coordinate outreach efforts with partner BMP programs.

Evaluation: EMWREP did not conduct any audience research or evaluation with business owners in 2013.

Stormwater U

Minimum Control Measure Addressed	
<input type="checkbox"/> Public education & outreach	<input checked="" type="checkbox"/> Construction site runoff controls
<input type="checkbox"/> Public participation & involvement	<input checked="" type="checkbox"/> Post-construction storm water management
<input checked="" type="checkbox"/> Illicit discharge detection and elimination	<input checked="" type="checkbox"/> Municipal pollution prevention & good housekeeping

Audience: Municipal staff, consultants, and contractors

Program Goals:

1. Provide technical training for municipal staff, consultants and contractors to help them meet MS4 Permit requirements and reduce stormwater pollution.
2. Work with local communities and EMWREP partners to identify training needs and topics.
3. Develop high-quality trainings that can be carried to communities outside the EMWREP region by the University of Minnesota Extension and other partners.
4. Encourage EMWREP partners and local MS4 communities to send at least one staff person or contractor to each Stormwater U workshop.

Educational Goals:

Learning

1. Increase understanding of non-point source water pollution and water resource connections among municipal staff, consultants and contractors.
2. Increase this audience's understanding of their role in achieving and maintaining clean surface and groundwater resources.

Behavior Change

1. Through training, enable EMWREP partners and local communities to reduce stormwater pollution through illicit discharge detection and elimination, construction site runoff controls, post-construction stormwater management and municipal pollution prevention.

Water-quality Improvement

1. Reduce and prevent non-point source pollution of surface and groundwater resources.
2. Maintain adequate groundwater and drinking water resources.

Activities used to reach goals:

Coordination with University of Minnesota Extension Programs: During the fall of 2012, EMWREP coordinated with Minnesota Extension's Stormwater U program to plan a four-part workshop series on Stormwater BMPs (best management practices). The first two workshops in the series were held in December 2012 and January 2013. However, due to scheduling delays, we had to cancel the third and fourth workshops. EMWREP also participated in the Stormwater U "Lessons Learned" workshop, in which Angie Hong gave a presentation about outreach for neighborhood stormwater retrofits in BCWD, MSCWMO and SWWD, and hosted a street sweeping workshop in the fall.

Hosting workshops: EMWREP hosted three workshops in 2013:

- Stormwater U – *What is in your BMP Toolbox?*, organized in partnership with Minnesota Extension
 - Held at Cottage Grove City Hall;
 - 22 staff and consultants from metro area communities attended.
- Erosion control field seminar, organized in partnership with Minnesota Erosion Control Association (MECA)
 - Located on-site at a residential development in Cottage Grove;
 - 52 people attended, including staff from Forest Lake, Newport, St. Paul Park, Woodbury, CLFLWD, and Washington County.
- Street Sweeping for Nutrient Reduction, organized in partnership with Minnesota Extension
 - Held at the Washington Conservation Center in Oakdale;
 - 40 people attended.



Above: More than 50 city staff and contractors attended an erosion control field seminar at a new development in Cottage Grove.

Developing new workshops: EMWREP continues to work with local communities and EMWREP partners to inventory and evaluate current professional trainings available and to develop new trainings as needed.

Presentations: In addition to the workshops listed above, Angie Hong gave two presentations at the International Low Impact Development Symposium, held in St. Paul in August. At the symposium she talked about Blue Thumb – Planting for Clean Water and the EMWREP partnership.

Evaluation: Workshop evaluations indicated that the majority of participants at all three of our workshops were satisfied or very satisfied with the content and information that they learned. Many also indicated that they will change their practices as a result of what they learned in the workshops. Participants expressed a desire to learn more about the following topics:

- Maintenance
- BMPs, including: Pervious pavement, Tree trenches, Underground infiltration, Iron-enhanced sand filters
- Stormwater reuse for irrigation
- Advanced street sweeping topics: tree canopy assessments, management of sweeping waste, zone prioritization, water quality impacts from street runoff, and types of sweepers.

Northland NEMO

Minimum Control Measure Addressed	
<input type="checkbox"/> Public education & outreach	<input type="checkbox"/> Construction site runoff controls
<input type="checkbox"/> Public participation & involvement	<input checked="" type="checkbox"/> Post-construction storm water management
<input type="checkbox"/> Illicit discharge detection and elimination	<input type="checkbox"/> Municipal pollution prevention & good housekeeping

Audience: Local elected officials and decision makers

Program Goals:

1. Work with NEMO partners to develop outreach programs for local communities that cover a range of topics related to water resources management.
2. Use NEMO programs to provide local decision makers such as city councils, planning commissions, watershed boards and county commissioners with the information they need to make land use decisions and protect water resources.

Educational Goals:

Learning

1. Increase understanding of water resources and storm water management among elected officials and decision makers.
2. Increase understanding among elected officials and decision makers of the connection between land use and water quality.

Behavior Change

1. Increase the implementation of city ordinances, zoning and planning practices that enable low impact development and stormwater best management practices.

Water-quality Improvement

1. Prevent non-point source water pollution from new development and redevelopment.
2. Maintain adequate groundwater and drinking water resources.

Activities used to reach goals:

Regional workshops: On July 17, EMWREP worked with several other partners, including the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, University of Minnesota Extension, the St. Croix River Association and others to hold a workshop on the St. Croix River for local decision makers from Minnesota and Wisconsin. The workshop was the fourth “on-the-water” workshop we have held and was attended by more than 120 people, including representatives from:

- Afton, Bayport, Baytown Twp., Denmark Twp., Lakeland, Lake St. Croix Beach, Marine on St. Croix, Scandia, Stillwater, and Stillwater Twp.;
- BCWD, CLFLWD, CMSCWD, MSCWMO, SWWD, and VBWD; and



Above: Participants on the St. Croix River “on-the-water” workshop discussed clean water projects in small groups.

- Washington County Board of Commissioners and Washington County Board of Adjustment and Appeals.

During the workshop, we showcased stories of success from agricultural, urban and riparian areas, talked about methods for connecting the river, land and people, and spent time in small groups creating action plans for local water resource projects.



Above: Local decision makers from Washington County and local communities learned about the MIDS community assistance package.

Community Workshops: During 2013, EMWREP also gave presentations to the Afton Planning Commission and the Stillwater Township Board. The Afton presentation focused on the Lake St. Croix TMDL and the Stillwater Twp. presentation was about the MIDS Community Assistance project.

St. Croix Basin Minimal Impact Design Standards (MIDS) grant project: EMWREP continued to provide support for the MIDS St. Croix Community Assistance project in 2013. On Sept. 18, we held a workshop for local communities to learn more about MIDS and the community assistance package. Twenty-three community representatives attended, including people from:

- Afton
- Bayport
- Baytown Twp.
- Lake St. Croix Beach
- Lakeland
- Lakeland Shores
- Scandia
- St. Mary's Point
- Stillwater Twp.
- West Lakeland; and
- Washington County

After the workshop, EMWREP helped to conduct follow-up one-on-one discussions with interested communities.

Evaluation: Consistently high levels of participation from local communities indicate that our educational offerings are filling a need for local decision makers. Evaluations from the workshop on the water showed that participants highly valued the program and being on the river itself greatly enhanced their learning experience. Seventy-five percent of the participants indicated that they gained new knowledge in the following areas:

- Ordinances;
- Aquatic invasive species;
- Raingardens;
- Wisconsin Farmer Led Council;
- Wastewater solutions;
- Phosphorus clean water goals; and
- Resources available for assistance to local communities.

Participants most often said they would like to pursue reviewing and revising ordinances, will share the information with others, and will increase overall education. We are hopeful that with additional funding from a new Clean Water Accelerated Implementation Grant, several communities in Washington County will adopt components of the MIDS Community Assistance package which will ultimately lead to improved protections for water resources.

MS4 Toolkit

Minimum Control Measure Addressed

<input checked="" type="checkbox"/> Public education & outreach	<input checked="" type="checkbox"/> Construction site runoff controls
<input checked="" type="checkbox"/> Public participation & involvement	<input checked="" type="checkbox"/> Post-construction storm water management
<input checked="" type="checkbox"/> Illicit discharge detection and elimination	<input checked="" type="checkbox"/> Municipal pollution prevention & good housekeeping

Audience: General public, municipal staff and contractors, local elected officials, and other target audiences

Program Goals:

1. Provide simple and effective materials to MS4 staff to use when educating target audiences.
2. Help EMWREP partners to meet MS4 permit requirements.

Educational Goals:

Learning

1. Increase understanding of non-point source water pollution and stormwater best management practices among the target audiences.

Behavior Change

1. Engage municipalities and MS4 staff as active partners toward reducing non-point source water pollution from stormwater runoff and illicit discharges.
2. Increase the utilization of stormwater best management practices among the target audiences.
3. Increase the detection and elimination of illicit discharges to storm water systems.
4. Increase the utilization of best management practices in street sweeping, salt application, landscaping and other municipal operations.

Water-quality Improvement

1. Reduce and prevent non-point source pollution of surface and groundwater resources.
2. Maintain adequate groundwater and drinking water resources.

Activities used to reach goals: The Metro WaterShed Partners MS4 work group is currently discussing strategies for updating the MS4 Toolkit and website. EMWREP has participated in these conversations and will provide assistance as needed to move this process forward.

Evaluation: Though EMWREP used surveys with city staff during the creation of the MS4 Toolkit, we do not currently have measures in place to evaluate the use or impact of education materials available through the toolkit. Website analytics tell us that more than 200 people have created profiles to access materials in the toolkit.

APPENDIX A: EDUCATION PROGRAM BUDGET FOR 2013-2015

Shared Water Resource Education Program - Washington Conservation District Annual Budget

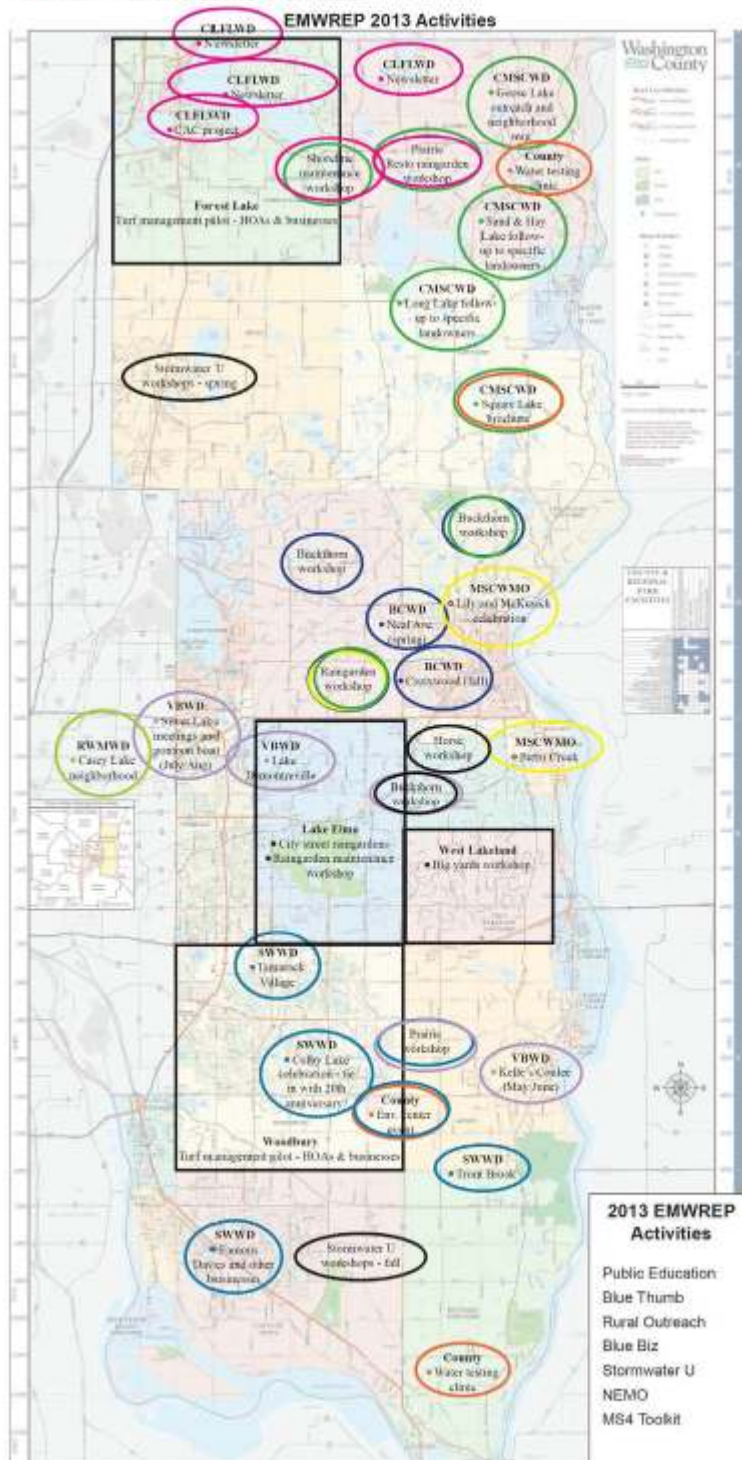
Staff Support (2650 hours/year)	Materials	Total
\$119,780	\$6,000	\$125,780

MEMBERSHIP STRUCTURE AND FUNDING CONTRIBUTIONS*

* PARTNER contributions will be reviewed and adjusted on an annual basis, as needed and in accordance with the terms of the Agreement.

PARTNER	Annual Contribution
SWWD	\$22,000
VBWD	\$16,750
BCWD	\$16,750
CLFLWD	\$16,750
CMSCWD	\$11,000
RWMWD	\$11,000
RCWD	\$2,225
Washington County	\$11,000
MSCWMO	\$5,500
Cottage Grove	\$2,225
Forest Lake	\$2,225
Lake Elmo	\$2,225
Stillwater	\$2,225
Woodbury	\$2,225
Dellwood	\$560
Willermie	\$560
West Lakeland Twp	\$560
	\$125,780.00

APPENDIX B: MAP OF EDUCATION ACTIVITIES



StarTribune

Bridge in play for Grey Cloud fix

Article by: KEVIN GILES
Star Tribune
February 16, 2013 - 4:47 PM

A little strip of land leading to Grey Cloud Island Township will get a lot of attention this year as Washington County throws its muscle behind an effort to build a bridge.

The bridge would replace an earthen dam that has served as the main road to the north end of the township since the 1960s, but the project has wider environmental implications. The dam blocks a 2.8-mile Mississippi River channel that, for lack of free-flowing water, is filling with invasive weeds and someday could wind up a swamp.

"Everyone recognizes that it's inevitable if we don't do something," said Township Supervisor Dick Adams, who said the problem has been under study for at least 10 years.

County engineers now will prepare a proposal to commit an estimated \$500,000 in county funding to the \$1.6 million project, which would include new pavement for County Road 75 and a bridge to restore the channel, known locally as a slough. Under the agreement, the county would turn over the road to the township in 2018.

Grey Cloud Island is actually two islands surrounded by lakes and river channels. The township has a mere 300 residents, but it has the largest limestone quarry in the county on the north island. The south island has a sand-and-gravel operation.

The bridge was the most favored alternative to replacing the dam, County Engineer Wayne Sandberg told the county's five commissioners last week. Several public agencies that examined possible solutions settled on the bridge for reasons such as safety and fish passage, he said, and the higher road would be less prone to flooding.

"Getting all those agencies to agree on anything is a miracle. We have a miracle here because they all agree that a bridge is the best way to go," Sandberg told the commissioners. The presentation came in a workshop, which means no vote was taken.

Whenever the proposal comes up for formal consideration, commissioners will decide whether to pay for the work from the county gravel and wheelage taxes, from the county levy, or from other sources such as federal and state grants.

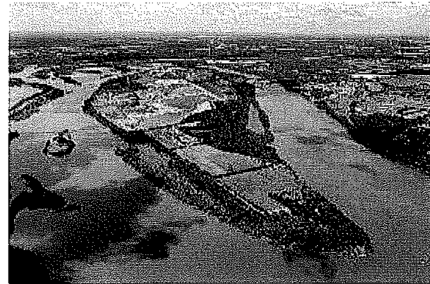
Also under consideration as a source of money is the county's Land and Water Legacy fund, a voter-approved initiative to save open spaces and improve water quality.

Adams said the Grey Cloud project fits the vision of Land and Water, because fresh water once again would flow through the channel and a bridge would improve the link to parkland on the island.

"That money is not just for land acquisition," he said. "It's for water projects also, and this is exactly what this is."

About half of the funding for construction would come from the South Washington Watershed District, which is leading the project. The balance of the money, about \$350,000, would come from sources that haven't yet been determined.

Watershed supervisors weren't fond of installing a less-expensive culvert instead of a bridge, because it would create a fast current especially dangerous to children.



Grey Cloud Island from the south. A bridge would replace an earthen dam.

Mike Zerby, Submitted photo

READ THE REPORT

The 2012 Grey Cloud Slough Restoration Feasibility Study, including aerial photographs and technical information, is available at www.startribune.com/a2070.

Replacing the earthen dam makes sense from both water quality and transportation points of view, said Commissioner Autumn Lehrke, whose district includes Grey Cloud Island.

In a separate action, the County Board is considering whether to buy property owned by Betty Kartarik to contribute toward an envisioned Grey Cloud Island Regional Park. It would be purchased with Land and Water Legacy money and would be added to other properties the county has acquired for the park.

Kevin Giles • 651-925-5037 Twitter: @stribgiles

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South Washington County
Bulletin

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Published February 22, 2013, 09:14 AM

Solution closer for Grey Cloud Island bridge over stagnant water

Construction project expected to clean up channel

By: Judy Spooner, South Washington County Bulletin

There will be at least one more summer of stagnant water in Grey Cloud Channel before bridge construction begins, but a funding gap is close to being bridged.

Washington County officials told the township last week that it would contribute \$500,000 as its share of the \$1.6 million project slated to get started this fall or in the spring of 2014.

The channel is south of First Fill on County Road 75 that links the township to the mainland. To the north is Mississippi River backwater and the road is a solid barrier between the two.

The channel is stagnant and choked with milfoil during the summer months. Zebra mussels have also been found. Poor water quality has affected the fish population and, at the height of the summer, only boaters who know how to navigate it can get through.

The solution, which has been discussed in the township for at least eight years, is to connect the two bodies of water. Moving water causes scouring and would not be conducive to milfoil or mussels. Some harvesting of weeds would also be needed.

A solution used to be just a pipe dream for township residents and those on the Cottage Grove side because of the cost.

When the township joined the Mississippi subwatershed district of the South Washington County Watershed District four years ago, help would eventually be on the way.

A tax levy for the subwatershed only — which contains Grey Cloud, St. Paul Park, Newport and a small portion of Woodbury — over three years means the watershed district will contribute about \$700,000, leaving about \$350,000 left to raise. The township will have to contribute and some of the money will come from grants, according to Matt Moore, watershed administrator.

About 1920, local residents built a wooden bridge at First Fill and it looks like a similar solution is coming back.

After an engineering study, watershed managers decided that a bridge, also called a bottomless culvert, would be the best solution. The U.S. Army Corps of Engineers, one of the agencies that has jurisdiction in the Critical River Corridor administrated by the Minnesota Department of Natural Resources, also favors a bridge.

A small culvert would improve water quality only and, at times of flooding, the water flow rate could be dangerous.

Town Board Chair Dick Adams said that culverts would rule out speedy access for an emergency Washington County sheriff water patrol boat currently docked at the Northern Tier Energy refinery.

Officials said a larger culvert would have to be maintained and the road would have to be raised, adding to the expense.

Tags: washington county, updates, environment

More from around the web

StarTribune

Woodbury finds new use for stormwater: Irrigate golf courses

Article by: Kevin Giles
Star Tribune
April 15, 2013 - 8:39 AM

More than 40 million gallons of water a year will be saved from aquifers beneath Woodbury in a highway project that will pipe stormwater runoff to two golf courses.

The \$9.9 million makeover of County Road 19, known locally as Woodbury Drive, includes installation of piping and irrigation ditches that planners say will improve water quality in nearby Colby and Bailey lakes.

"It seems we have to start looking at ways to conserve and this might be one of them," said Steve Kernik, environmental planner for Woodbury. "We've got to be smart with the way we use our water. Even though we're in the land of 10,000 lakes, it's not an inexhaustible resource."

The project involves rebuilding a 1.75-mile stretch of County Road 19 into modern times. The crumbling two-lane highway, built when Woodbury was a much smaller city, now sees substantial traffic.

Stormwater runoff from the highway has been draining into nearby lakes, causing algae growth because of the high phosphorous content. As a result, the Minnesota Pollution Control Agency (MPCA) has added Colby Lake to its impaired waters list.

Reconstruction of the highway will include the new water plan — diverting stormwater to holding ponds at nearby Eagle Valley and Prestwick courses where it will irrigate grass.

Traditional stormwater ponds were scratched off the construction list when it became apparent they wouldn't fit into the busy neighborhood, said Cory Stagle, transportation construction engineer for Washington County.

"There are houses built up and down the corridor and there is not a lot of other space," he said. "We needed a place to put our water and also to treat our water."

Because of the stormwater diversion plan, golf courses will reduce their pumping from wells by about 40 million gallons a year, Eckles said, which has benefits for a city of about 65,000 residents that's been frugal with its water supply.

"The water that was going to grow algae in the lakes now will grow grass," said Klayton Eckles, Woodbury's city engineer. "I think long-term the implication is we don't want to run out of groundwater. This is another one of our efforts to reduce the overall water footprint, or draw, on the aquifer."

Woodbury and other east-metro cities are painfully aware of recent theories that municipal wells surrounding White Bear Lake are tapping aquifers to the point that they're slurping water from the lake. Water demands in suburbia, coupled with years of successive drought, have led to new conservation measures.

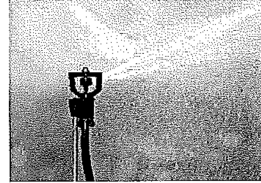
Eckles said he wants to make sure that some agencies charged with monitoring stormwater don't pull the plug on creative uses like the County Road 19 plan because of concern over possible health problems. Golf courses have sprinkled surface water for 100 years, he said, and owners of lake homes do it, too.

"It's happening all around us," he said. "My interest is making sure that we don't regulate it to the point of making it infeasible."

The County Road 19 project is managed by Washington County, Woodbury and the South Washington Watershed District. Eckles and Kernik hope the water plan will become a model for other projects.

"It's an elegant little system," Kernik said. "We'll keep our fingers crossed and hope it works."

Kevin Giles • 651-925-5037



◀ The water that was going to grow algae in the lakes now will grow grass. ▶Klayton Eckles, Woodbury city engineer

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Published May 08, 2013, 08:42 AM

Colby Lake angling to be fishing destination?

An already popular Woodbury lake is about to get even more attention.

By: Riham Feshir, Woodbury Bulletin

An already popular Woodbury lake is about to get even more attention.

Colby Lake, a place where many residents walk, bike and run, will soon have a place to sit, throw a fishing lure and catch some fish.

With shoreline fishing already taking place at the lake, and a new aeration system the city put in this year, the Minnesota Department of Natural Resources decided to add Colby Lake to its Fishing in the Neighborhood program.

"We see all sorts of fishing on all the small lakes in the city," Woodbury Parks and Recreation Director Bob Klatt said, adding that Colby Lake has seen an increase in visitors recently so it only made sense to install a fishing pier there.

Identical to the Powers Lake fishing dock, Klatt said the new Colby Lake fishing pier will be located at the south end of the lake off of Lake Road and west of the parking lot.

There is currently no trail that connects to the location of the pier, so the city will add the hard surface asphalt this summer before the DNR installs the pier later in August or early September.

"It's completely handicap accessible," Klatt said.

The DNR began managing the lake and stocking it in 2002. The lake has a good panfish population and shore access around its 2-mile perimeter, according to the DNR.

Bullheads and white suckers were the most abundant fish when the DNR did an assessment of Colby Lake in March 2012.

Klatt said the lake is rather shallow and many of the fish don't survive long, snowy Minnesota winters when the oxygen levels deplete so much.

"We've had periodic winters where we've had pretty substantial fish kills," he said. "Once the ice is out, you see that on top of the lake."

The DNR stocked the lake with channel catfish fingerlings for the first time in 2012. Meanwhile, the city of Woodbury and South Washington Watershed District installed an aeration system to prevent additional winter kill of catfish.

The DNR says the catfish are expected to reduce the number of bullheads in the lake, which would then help improve water quality.

Similar fishing experiences in Woodbury can be found at Battle Creek Lake, where an aeration system was also installed to keep fish alive over the winter months.

Other lakes like Carver and Powers don't need aeration systems, but are becoming popular for fishing as well.

Klatt said fishing opportunities in Woodbury continue to increase and provide convenient access to amenities within the city.

"For families and kids to walk to the lake, bike to the lake, and drive to the lake and park and just have a few hours of lake fishing," he said. "The DNR, through their Fishing in the Neighborhood program, has done a lot of things to improve fishing opportunities to make it more accessible."

Tags: news, outdoors, woodbury

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Woodbury, DNR cleaning up Colby Lake

By Bob Shaw bshaw@pioneerpress.com TwinCities.com-Pioneer Press

Posted:

TwinCities.com

Colby Lake -- like a lot of single men -- knows what it's like to be dirty, shallow and unpopular.

But now the Woodbury lake is getting a makeover. Colby will undergo a coordinated blitz this summer, designed to make it a more attractive destination for fishing and boating.

"It's a collaboration," said Jim Levitt, a fisheries specialist with the Fishing in the Neighborhood program of the Minnesota Department of Natural Resources.

The DNR will be working with Woodbury and the South Washington Watershed District.

To make Colby more appealing to anglers, a pier will be built. To give them something to catch, fish will be stocked and an aeration system has been installed.

To clean up the water, runoff pollution will be reduced by building rain gardens and diverting runoff from a golf course.

Levitt said well-populated areas that have the potential for greater use are chosen for the Fishing in the Neighborhood program. Playgrounds and shelters on the shore, which Colby has, are a plus.

The program's annual budget for the metro area is \$50,000. That does not include salaries, said Levitt, and it assumes plenty of help from cities, counties and watershed districts.

The program has rehabbed 60 lakes in the metro area, including the Washington County lakes Carver, Alice, Hidden Valley, Lost, Lily, Powers and Ravine.

Some need only a few extra fish, while others -- like Colby -- require much more.

Colby is a shallow lake, which makes it tougher for fish to survive. An aerator installed by the city and the watershed district is meant to give the fish oxygen during the winter.

Another problem is the phosphorous that runs off neighbors' yards and driveways.

Ordinarily, phosphorous settles and sits harmlessly on the bottom of a lake.

But Colby has a problem. "That lake is infested with bullheads," said Bob Klatt, Woodbury's parks and recreation director.

Bullheads are bottom feeders that whip up sediment as they search for food. When the phosphorous is lifted, the water looks muddy and algae get fertilized. And when the overgrown algae die, the rotting material consumes oxygen that fish need.

This year, the DNR is adding 2,100 catfish, most of them less than 10 inches long, to eat the bullheads.

Woodbury's Klatt said the watershed district is paying for runoff-diversion programs that include rain

gardens on the west side of the lake. The gardens trap rainwater so it can soak into the ground instead of running into the lake.

Pollution also washes in from the nearby Eagle Valley Golf Course. Woodbury has initiated a program to retain that runoff and reuse it to irrigate the golf course.

The most noticeable addition to the lake will be the \$30,000 fishing pier. It will be similar to one added at Powers Lake in Woodbury.

The new pier will be built on the south end of Colby in the park at Lake Street and Edgewater Drive.

The pier will be paid for by the DNR, but the city will help install it and will add a walkway from a bike trail.

And anglers on the pier will have plenty of fish to choose from. For them, the DNR has stocked, and will continue to stock, bluegills, panfish, crappies, yellow perch and largemouth bass.

Bob Shaw can be reached at 651-228-5433. Follow him at twitter.com/BshawPP.

StarTribune

Efforts on land, water cleaning Colby Lake

Article by: Jim Anderson
Star Tribune
June 15, 2013 - 2:00 PM

On the surface, so to speak, Colby Lake is one of several pretty bodies of water clustered in the western part of Woodbury, the focal point of nearby housing developments, encircled by a well-kept trail popular with joggers, bicyclists and dog walkers.

But serious problems have been lurking with the lake's water quality for years, and a broad-based effort is aiming to get the lake back into proper environmental shape by the end of next year.

The state Department of Natural Resources (DNR), South Washington Watershed District, the Washington Conservation District, the city and even homeowners near the lake are working in concert to achieve that goal.

"Everyone is working on different aspects of this — it's all about working together," said Jim Levitt, a fisheries specialist with the DNR who supervises the agency's Fishing in the Neighborhood (FiN) program. "It's about leveraging those local connections to do more with the limited resources that we have."

FiN has been managing the fish population in Colby Lake since 2002, Levitt said. It has been a slow and steady effort that will reach a key benchmark of progress when an 84-foot fishing pier — a T-shaped structure similar to those on Powers and Battle Creek lakes in the city — is installed on the south end of Colby Lake, probably by September.

The pier installation, which is planned at no cost to the city, comes a year after the watershed district installed an aeration system to keep oxygen in the lake and prevent the frequent winterkill of fish, Levitt said. With that and other steps, a lake once dominated by bullheads and white suckers will soon be giving way to bluegill, crappie and even northern pike.

The pier has been a priority for the FiN program. The program aims to increase angling opportunities, public awareness and environmental stewardship in the seven-county metro region. Ultimately, it works to keep the fishing tradition in Minnesota vibrant, particularly among young people, he said. A key aspect of that is to providing angling opportunities close to where people live.

Improving habitat is part of that mission, and Colby Lake clearly needed help.

The lake was listed as "impaired" by the Minnesota Pollution Control Agency in 2006, mostly because of the high content of phosphorus washed into it by stormwater runoff from the surrounding area. The phosphorus, in turn, causes a major algae bloom that chokes off oxygen for fish. The DNR's water quality summary lists it as "very green," and in the agency's grading system, it has consistently gotten D's and F's.

Shallow lake hurts quality

The lake's physical characteristics also work against it, Levitt said. It has a surface area of about 70 acres, yet its deepest point is only about 11 feet. Because of that shallowness, the entire lake is in what scientists call the "littoral zone," the top 15 feet of lake surface that is dominated by vegetation.

Also, the lake's watershed is nearly 8,100 acres, a watershed-to-lake ratio of 114:1 — a high number that increases the lake's potential for stress.

With installation of an aerator, stocking by the DNR and the addition of rain gardens in surrounding residential areas, Colby



This fishing pier at Battle Creek Lake is identical to the one that will be installed at Colby Lake this summer, part of an ongoing effort to restore the lake and its fish population.

Jim Anderson • jim.anderson@startribune.com,

Lake should soon become more habitable for fish — and more attractive to anglers, who will have a pleasant place to wet their lines.

The DNR has typically stocked the lake with bluegills, crappie and perch. But last year and this spring, Levitt said, channel catfish were added to the mix, with the specific aim of cutting down on the population of bullheads on which the catfish prey.

"That will also help with water clarity," he said.

25 rain gardens

Some of the most effective efforts to clean the lake are happening offshore, in the neighborhood around it, said Angie Hong, educator with the East Metro Water Resource Education Program run jointly by Washington County, the conservation district, the county's eight watershed districts and eight cities.

Using grant money from the state's Clean Water Land & Legacy Fund, 25 rain gardens are being built to filter phosphorus and other pollutants in the runoff before they can reach the lake, she said. About half were installed last year, and the remainder will be completed by mid-July.

The rain gardens, using deep-rooted plants and grasses that absorb a lot of water, were installed at no cost to homeowners, she said, though they will take over responsibility for their maintenance.

Designers also worked with homeowners — whose properties were picked based on a study of surface water flow to the lake — so the rain gardens were a good fit with their property.

The city also had a role in the neighborhood effort, Hong added. In planning a recent street improvement project, roads were designed with boulevard strips so the roads could be narrower, thus cutting down on the amount of impervious surface that adds to runoff.

Jim Anderson • 651-925-5039

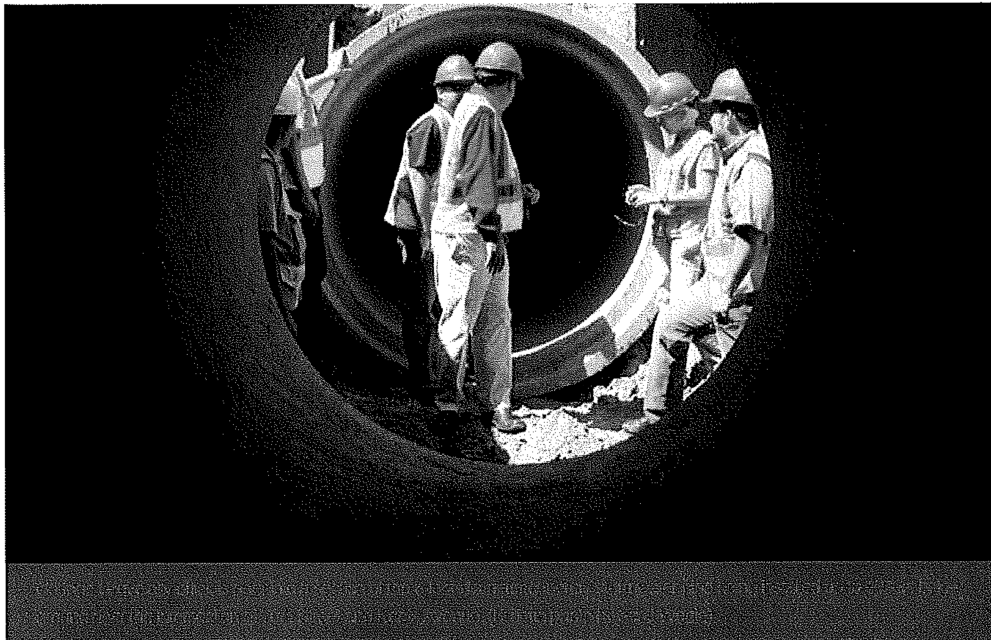
Twitter: @StribJAnderson

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One piece at a time, large stormwater pipe buried in Cottage Grove

FRIDAY, AUGUST 30, 2013 - 2:23PM

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Imagine trying to bury short cylinders end to end underground across a backyard.

<http://www.swcbulletin.com/content/one-piece-time-large-stormwater-pipe-buried-cottage-...> 9/11/2013

Sound tricky?

Now try doing something similar — albeit on a much larger scale — with sections of concrete pipe at depths of roughly 40 feet across a full mile of sometimes rocky soil.

That is part of the work that's creating the mess of dusty roads and traffic closures around Keats Avenue and 70th Street in Cottage Grove.

In conjunction with improvements this summer and fall to 70th and Keats and the addition of a roundabout to that intersection, crews are installing a 6-foot diameter pipe to move overflowing stormwater from the northern portion of the South Washington Watershed District — including parts of Lake Elmo, Woodbury and Oakdale — south through Cottage Grove's East Ravine area along Keats to a drainage field near the Mississippi River.

From a basin northwest of 70th and Keats to a point southeast of that intersection, roughly 5,000 feet of pipe is being laid eight feet at a time. Another 550 feet of the pipe is being hydraulically pushed horizontally beneath the roadway and in areas where digging and placing the pipe from above would be too disruptive, such as along the northern edge of the Shoppes at Almar Village commercial development.

The watershed district-led project requires the heft of large construction equipment to move tons of sandy soil and buried rock but also the finesse of hand tools to move small amounts of dirt as pipe sections are jacked into place and sealed with just a large rubber seal.

Precision and patience are critical.

Once the pipe is buried, crews must carefully refill the hole that was dug to lay the pipe. That can only be done 8 inches at a time. One layer of fill is packed before another 8 inches of loose soil is dumped into the hole and packed.

"It's a slow-moving project," David Thompson, resident project representative of HDR Construction, told local officials during a recent tour of the project. "It takes days and days to put the dirt back in the hole."

<http://www.swcbulletin.com/content/one-piece-time-large-stormwater-pipe-buried-cottage-...> 9/11/2013

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The project actually is being completed in multiple phases. Crews will finish the \$3.1 million Phase 1 this construction season. The subsequent four phases will be done in the coming years and completed by 2019, watershed district Administrator Matt Moore said, extending the stormwater system south toward the Mississippi River. It will pass through Cottage Grove Ravine Regional Park as overland flow, beneath Highway 61 in a pipe and across 3M-Cottage Grove property as overland flow, Moore said.

The system is designed to serve a roughly 24-square-mile drainage area. Only 20 percent of that area is developed but both cities predict future housing growth in the area.

"As things are developed, this overflow will allow a way out for water," said HDR Construction's Matt Redington, who is the stormwater project's engineer of record.

Drainage basins serving the area will hold stormwater that accumulates if 6.3 inches of rain falls in a 24-hour period. A more severe rainfall would trigger the need for the new overflow stormwater pipe.

"What we're really building it for and planning it for is that rare event," Moore said.

The section of pipe being installed this year will be temporarily capped while work continues on the next phases of the project.

The mile of pipe is expected to be completed by October, but Keats Avenue and 70th Street will not be fully reopened until November, said Cory Slagle, Washington County's engineering and construction manager.

The road and stormwater projects were coordinated so that as the pipe and other underground utilities are buried, road crews can follow behind and pave the realigned 70th Street.

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Wilmes Lake Ravine Restoration Project



Top: Water flowing over a series of riffles in the new channel. **Inset:** Preexisting channel with a poor vegetative cover, eroded slopes, and debris within the channel.

We often imagine pristine streams and rivers conveying stormwater from our backyards and local streets to some far-off, unspoiled lake. However, in urban settings, this is not always reality - most of the water conveyance

systems within an urban environment are not quite so pristine or idyllic. To the untrained eye of local residents and casual pedestrians, vertical streambanks, lack of vegetation, fallen and broken trees, and years of accumulated debris may seem natural,

but these are not at all part of a natural setting. In reality, these conveyance systems are valued places in our communities and can hold great meaning. Unfortunately,



Rising waters in Wilmes Lake during spring snow melt.

they are often forgotten in the bigger picture of urban development and can actually cause significant pollution to our local resources. However, with a little creativity, these places can be redesigned to handle the volume of runoff and pedestrian traffic generated from urban areas while maintaining their natural aesthetic character.

About Wilmes Lake

Wilmes Lake is approximately 30 acres and is nested in the north-central portion of Woodbury, Minnesota (a suburb of St. Paul). The lake is surrounded by a 7,000-acre watershed area that consists primarily of the single- and multi-family residential neighborhoods and commercial shopping areas typical of most of the suburban neighborhoods on the eastern side of the Twin Cities metropolitan area. With all this area draining into Wilmes Lake, there is a 700-acre portion that drains to the lake and ultimately drains into a small ravine on the lake's western edge. This ravine was unique to the area because it featured a paved trail, considerably differing flow conditions, nearly vertical channel slopes, a

densely wooded area with a heavy canopy, and significant amounts of wildlife. These characteristics made the ravine a particularly interesting and heavily used recreational area.

Due to the differing flow conditions, it was typical for the City of Woodbury to perform minor repairs within the ravine after larger rain events. Then in early October 2005, Woodbury experienced a 100-year rainfall event that had devastating effects on the ravine. The culverts within the ravine couldn't begin to handle the volume of runoff generated by this event, which ultimately washed out culverts, trail crossings, and trees, and washed tons of sediment into Wilmes Lake. At that point, the City recognized the need for improvements within the ravine to handle the volume of runoff generated by the surrounding area. However, the City also had a long-term vision for the ravine. They wanted something different - an improvement that would stabilize the ravine, virtually eliminate the erosion that flows directly into Wilmes Lake (which is listed as an impaired water body by the Minnesota Pollution Control

Agency), and improve the existing overall aesthetics of this heavily used recreational area.

Pre-Construction Condition

Upon completing an inspection of the Wilmes Lake Ravine, WSB & Associates, Inc. found that the ravine had many unique characteristics, such as a tremendous amount of elevation change (approximately 40 feet) from the top of the ravine down to the lake, over a length of about 1,600 feet. This gave the ravine an average gradient of about 2.5%, which is uncommon in Minnesota. There was also a tight corridor of steep, unstable slopes; large trees; several wildlife species living within the ravine; and Wilmes Lake at the bottom of the ravine, which is prone to flooding during spring and larger rain events. The heavily used recreational trail corridor that wound through the ravine included four trail crossings and several additional storm sewer outfalls that entered the ravine in multiple locations. Sanitary sewer and watermain also ran through the ravine.

Based on watershed modeling, the



Beginning excavation for the new channel and insulating adjacent utilities after the bypass pipe was installed.

ravine showed a considerable amount of flow variability. It was determined that the culverts and trail crossings would indeed be washed out due to the potential flows of a 100-year rainfall event, which was estimated to be up to 250 cubic feet per second and just over 100 cubic feet per second for the 10-year event. Watershed modeling determined that there was considerable pollutant loading from the ravine estimated at 190 tons of sediment and 190 pounds of phosphorus annually. There were periods of little to no flow identified within the ravine during periods of drought, making this a truly complicated location.

Project Objectives

The project objectives were to provide a solution that would:

- Reduce the sediment entering Wilmes Lake
- Provide an improved conveyance system for the runoff generated from the 700-acre watershed
- Stabilize the ravine channel and significantly reduce or eliminate erosion
- Improve on the natural aesthetics and wildlife habitat that already existed within the ravine

Project Strategy

As part of the strategy to restore the ravine, a design and implementation plan was needed that would allow for an innovative design and provide for a considerable

amount of flexibility during construction. Based on similar ravine and stream restoration projects that WSB had completed in the past, designers anticipated some unavoidable complexities, including everything from utility conflicts to resident issues, permit compliance, site and weather conditions, and the overall constructability of the project within such a narrow corridor.

In anticipation of potential issues, WSB's approach simplified construction management by using a "pay as you go" process. This approach streamlined project accounting to simple units of ton, foot, square yard, etc. to reduce risk for the contractor and decrease the potential for change orders.

WSB developed a design and build approach that provided plans and specifications that included extensive detail on how to build the project and achieve the overall project goals while allowing for maximum flexibility during construction. This strat-

egy began with a thorough background investigation of the area. This included site visits, data collection, and gathering of as-built drawings and hydraulic models. In addition, WSB met with City and Watershed District staff, as well as local residents – the people who live along the ravine know the area best. Plans and specifications that clearly achieved project goals were sent out for agency review and comment. Once the design and permitting process had been completed, the design engineer then transitioned into the field engineer role. This transition is one of the most critical keys to the success of these types of projects. It provides continuity for the project and allows the intimate knowledge the engineer developed as part of the project's design to be carried into the field during construction. This continuity extends to familiarity with residents, awareness of critical permitting requirements, and understanding of how to best achieve the overall goal of the project.

This process also allowed the field engineer to be closely involved in the layout of the improvements so that any necessary adjustments could be made. Management of construction projects such as this can also be difficult and can expose the contractor to a considerable amount of risk. In anticipation of potential issues, WSB's approach simplified construction management by using a "pay as you go" process. This approach streamlined project accounting to simple units of ton, foot, square yard, etc. to reduce risk for the contractor and decrease the potential for change orders.

Design Considerations

WSB's staff worked through the complex design issues with the understanding that the Wilmes Lake Ravine project was more of a restoration project than an infrastructure project. The design needed to stand up to a 100-year rainfall event and 250 cubic feet per second flow, while providing an area where people could find a sense of place within their community. Once the data was thoroughly reviewed - potential utility conflicts; consideration for tree removal; and determining the peak, average, and base flows that can occur - several design options were developed to improve the ravine:

1. Redesign the existing culverts and stabilize the ravine to allow for improved flow within the channel

2. Install larger culverts and then realign and stabilize the existing ravine to allow for the volume of flow within the channel.
3. Install a 48-inch reinforced concrete pipe within the ravine and remove the water feature from within the ravine to eliminate any potential for erosion within the channel.
4. Install a 42-inch high-density polyethylene bypass pipe to realign and restore the existing channel to handle the higher flows and maintain a base flow within the channel.

WSB's engineers reviewed each option with the City of Woodbury. Option 1 could have provided an aesthetic improvement within the ravine but would not have solved the issue of the trail crossings washing out during larger rain events. It was therefore ruled out as a reasonable option. Option 2 would be similar to Option 1; however, modeling showed that the larger culverts would actually wash out earlier than the smaller culverts due to the increased velocities allowed by the larger culverts within the channel. This option was also ruled out. Option 3 was ruled out due to the complete elimination of the water feature within the ravine that local residents value, although it would completely elimi-



Backfilling of the bypass pipe and an inline catchment.

nate the erosion issue within the ravine. In the end, it was determined that Option 4, the combination of installing a 42-inch bypass pipe to handle the higher flows and the complete restoration the channel, was the best approach to handle runoff volume generated from the watershed and preserve

the ravine's natural beauty.

The base flow of the new ravine would be created by the installation of a custom-fabricated Tee section manhole, which would allow the base flow to be directed, or dropped, out of the 42-inch pipe and redirected into the reconstructed ravine



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Top: Softening of the upper slopes of the new channel. Below: Placing of the base layers, geotextile fabric and filter rock, for the new channel.



that had a typical width and side slope, designed to handle a flow of up to 10 cubic feet per second.

Option 4 was chosen because it would significantly reduce any erosion that was occurring within the ravine, could handle the volume of runoff from the watershed, and would enhance the overall aesthetics of the ravine due to the restoration of the channel with a typical section that could be realigned along the existing trail that runs through the ravine.

The new channel would consist of a five-foot-wide typical section with two-to-one side slopes lined with fabric, filter

aggregate, and class-three fieldstone rip-rap. The design compensated for the steep profile of the new channel by installing 22 riffles to allow for the base flow within the channel to run from pool to pool. In other words, the base flow would rise up over the riffles and then cascade down the rock into the next downstream pool. This gives the channel the unique characteristic of several small waterfalls that keep the water churning within the channel but reduce its overall velocity, something that was a concern due to 40 feet of relief from the top of the ravine to the lake.

Construction and Installation of Improvements

Installation of the 42-inch pipe began in early January 2011. Completing the larger portion of the project during the winter months exposed the contractor to fewer risks during construction because of the reduced chance for rainfall that could potentially wipe out the entire project. The frozen ground made for easier access for equipment and materials into the sensitive areas, specifically around the lake. As expected in a Minnesota winter, snow and cold were apparent, with up to 30 inches of snow on the ground and temperatures dipping to a brisk 16 degrees below zero Fahrenheit.

Work began by staking the storm sewer to determine the best alignment for it and the new channel, and to start selecting specific trees for removal. Most of the trees removed were invasive and undesirable species, hazards that had broken limbs or were leaning, and those that were dead or dying. A significant effort was made to keep the larger, more desirable trees in place to maintain the character of the ravine. Removal of the selected trees would also eventually reduce the overall tree canopy, allowing more direct sunlight to penetrate, enabling further stabilization of the ravine by the growth of new vegetation.

The contractor paid careful attention to the trees that were flagged to remain while selectively clearing the area, so as not to disrupt anything more than the sewer and channel area. Once clearing work was completed, installation of a 42-inch diameter "high-flow" bypass pipe began. The flared end section was aligned to fit the pond at the bottom of the ravine and placed at the normal water level of the pond. The pipe followed up the ravine in typical reaches of 40 to 80 feet. Once a typical reach of pipe was placed, the highly erodible slopes within the ravine were softened and regraded, closely followed by establishment of the new channel and installation of the cross vanes. This process continued up to the top of the 1,600-foot-long channel. The Tee section drop structure was then installed and the pipe was connected to the existing culvert that ran under the street.

During installation of the storm sewer and shaping of the channel, the contractor worked closely with the field engineer to fine-tune the alignment of the pipe and

channel to provide the best fit through the ravine, ensure proper bury depth of the pipe, avoid the remaining trees, and reduce construction materials wherever possible to decrease overall project costs.

Many challenges were encountered during the course of the storm sewer installation and construction of the new channel within the ravine. Limited access and slippery access roads made it difficult to stage and move materials around the site. Fluctuating temperatures produced snowmelt and varying amounts of runoff directed to the site, which caused minor flooding at the bottom of the ravine. Frozen ground ultimately became difficult to properly shape, and maintaining compliance with NPDES regulations was also challenging.

The engineer and contractor had to continually anticipate these challenges during construction and work to prevent any loss or damage to the project site. The varying amount of runoff was addressed by leaving the upstream channel undisturbed, which helped maintain NPDES compliance. Upstream culverts were blocked with sandbags, which allowed the runoff to back up in the channel. Runoff was then bypass pumped around the work site and dis-

To prepare and protect the lower portion of the site for potential spring flooding, these areas were shaped as the first part of the project. They were stabilized immediately with a heavy erosion blanket that was stapled into the side slopes to hold the soils in place. Multiple rows of floating silt curtain, hay bales, and silt fence were installed to provide protection for the varying water levels.

charged directly into the new storm sewer. This technique worked well because it allowed for a small amount of settling time for the mostly pretreated runoff before it was discharged into the sewer. The contractor was able to piggyback the entire opera-

tion up the ravine along the existing trail, while continually maintaining a dry and safe work site.

To prepare and protect the lower portion of the site for potential spring flooding, these areas were shaped as the first part of the project. They were stabilized immediately with a heavy erosion blanket that was stapled into the side slopes to hold the soils in place. Multiple rows of floating silt curtain, hay bales, and silt fence were installed to provide protection for the varying water levels. In addition, temporary surface water treatment systems were made available in the case of significant flooding.

Once spring arrived and the spring road restrictions were lifted, the contractor returned to the site to begin the restoration activities. One benefit to constructing the project during the winter is that the channel received the typical spring runoff flows while the project was not fully completed, which helped the engineer and contractor identify any deficiencies. The project did hold up well over the spring with only a few areas along the channel requiring maintenance.

After the site was touched up following the spring thaw, the final restoration ac-

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activities began. The project area was seeded with native seed mixes specially developed for this project. These seed mixes respond to the sporadic sun within the ravine and are designed to survive inundation for several days. The City of Woodbury also developed a tree and shrub plant replacement plan after the project was completed.

The recreational trail that was present within the ravine and was used as the primary access route to the site and to haul materials into the project survived the winter due to the engineer's and contractor's extra efforts to protect it.

Just like the channel itself, the trail was steep and had many sharp curves. The City of Woodbury often received negative comments from local residents about the trail alignment. As restoration activities drew to a close, it was determined that there was budget remaining to allow for the complete removal, realignment, and reconstruction of the trail. This was the result of cost savings identified during installation of the storm sewer and channel. Before restoration activities were fully completed, the steep slopes along the trail were softened and the sharp corners relaxed to better ac-

commodate pedestrian and bicycle traffic. In the end, the new trail alignment fit right alongside the new channel. Now trail users can walk or bike along the channel and enjoy watching and listening to the water flowing within the channel.

Project Budget and Timeline

The final project cost was \$558,915. This is 4% below the estimated project budget of \$582,189, which included other additional upstream improvements and a complete replacement of the trail. The project was accepted in October 2011.

In Closing

This project has provided significant improvements to Wilmes Lake. It has greatly reduced the sediment and erosion that directly flow into the lake and will make great strides to get the lake de-listed as an Impaired Water. It has also been commended by the local residents of the area as an overall improvement to the community.

"The system seems to be operating as designed. There were no signs of any erosion in the channel as the pipe took the majority of flow. Notice the calm water behind each riffle (small waterfall type features shown in the first photo), designed to dissipate the energy over small controllable areas versus a steep erodible grade along the entire ravine."

—Paul B. Kauppi, PE, Principal Engineer, City of Woodbury, MN, E&W

by Erick Francis

For more information, contact Erick Francis, PE – Project Manager, WSB & Associates, Inc., 701 Xenia Avenue South, Minneapolis, MN 55416, Phone: 763-512-5251, email: efrancis@wsbeng.com.

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Tour Colby Lake rain gardens Sept. 19

In an effort to improve the water quality of Colby Lake, the South Washington Watershed District (SWWD) recently recruited volunteers in the Colby Lake neighborhood to plant rain gardens in their yards.

A rain garden is a shallow depression that collects stormwater runoff from a house or street and soaks it into the ground before it can wash dirt and pollutants into storm sewers that connect to lakes and rivers.

"Neighborhood rain gardens are a critical component in the effort to clean up Colby Lake," said Angie Hong, water resource education specialist with SWWD. "Between 2012 and 2013, 26 beautiful and functional rain gardens have been installed in the Colby Lake neighborhood."

The public is encouraged to celebrate the neighborhood's clean water efforts by taking a self-guided tour of the rain gardens between 5:30 and 7 p.m. Thursday, Sept. 19. Participants should meet at Pioneer Park, 2670 Wimbledon Drive, and enjoy a free scoop of Nelson's Ice Cream before walking or biking along the tour route. Maps will be provided.

The Colby Lake neighborhood rain garden project is an initiative led by SWWD in partnership with the Washington Conservation District (WCD) and the City of Woodbury. The purpose is to provide education, design assistance, and project oversight to help homeowners around Colby Lake install rain gardens in priority locations.

Funding for the rain gardens was provided through state Clean Water Funds (from the Clean Water, Land and Legacy Amendment) and SWWD. Homeowners planted the vegetation. Minnesota Conservation Corps workers will weed the gardens for the first couple of years before the homeowners take over maintenance responsibilities.

The ice cream social and tour is co-sponsored by the City of Woodbury, SWWD and the WCD. Pre-registration is not required. Questions about the project or the tour should be directed to Hong at angie.hong@mnwcd.org (651) 275-1136, ext. 35.



The Cunningham family (back, from left: Kyle, Ryan and Kevin; front: Sally) receives many compliments on their beautiful new rain garden in the Colby Lake neighborhood. The family volunteered to plant the garden as part of an effort to protect the water quality of Colby Lake. The program was sponsored by the South Washington Watershed District, Washington Conservation District and the City of Woodbury.