WATERSHED MANAGEMENT PLAN

2016

SOUTH WASHINGTON WATERSHED DISTRICT

3RD GENERATION

2016

This third generation watershed management plan establishes the goals and programs which form the foundation for managing water resources within the South Washington Watershed District.

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EXECUTIVE SUMMARY

PLACEHOLDER

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Matt Moore,

SWWD
Administrator

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PART 1 : SWWD INTRODUCTION

This section provides only a summary of District history, land and water resources inventory, and trends. Additional extensive information including all references, past plans, guidance documents is available in the SWWD library at www.swwdmn.org.

The Minnesota Watershed Act, MSA103D, authorizing Watershed Districts was passed in 1955. Established as local, special-purpose units of government, Watershed District boundaries follow those of a natural watershed. Typically established for flood control or drainage improvement, Watershed Districts are now increasingly focused on water quality issues, particularly in the Minneapolis, St. Paul metropolitan area. The South Washington Watershed District (SWWD) is no different. First established in 1993 for the primary purpose of addressing inter-community flows and flooding concerns, SWWD's focus has grown to include protection and restoration of water resources.

The Cottage Grove Ravine Watershed Management Organization (WMO) was formed in 1984 to help address inter-community flooding concerns. The 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 SWWD in 1995. Completion and approval of the first SWWD Watershed Management Plan (WMP) was completed in September, 1997 and later amended in 2002. This first WMP was heavily oriented toward

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inventory and assessment of District resources.

In April 2003, the SWWD petitioned the Minnesota Board of Water and Soil Resources (BWSR) 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 part of recommendations from the Washington County Water Governance Study (1999). The enlargement petition was approved on May 2003 by the BWSR.

In 2007, SWWD's second WMP was completed and approved and later amended in 2009 and 2011. Building on work completed under the first WMP, the second WMP emphasized implementation to address inter-community flow concerns and begin to manage District land and water resources to protect and restore their value to District residents.

In May 2010, the SWWD again enlarged its boundary to include 3 additional catchments from the former Lower St. Croix Watershed Management Organization. The enlargement petition was approved in September 2010 by BWSR, making SWWD one of the few Watershed Districts to manage area within two major watershed basins.

This third generation WMP once again builds on past work in the District and is intended to serve SWWD for decades to come. It is structured in three parts.

- Part I serves as a summary of various District plans and assessments and points the reader to more regularly updated District data, all of which is available on the District's website, www.swwdmn.org. We strongly encourage the reader to visit the website which includes the District's water quality database and web map viewer with extensive spatial data and serves as a repository for District plans and reports described throughout this document.

- Part II includes identified issues and goals and serves as the basis for all actions that the District takes. Progress toward achieving goals will be routinely assessed and implementation actions adjusted as necessary. Should additional issues be identified by SWWD they will be incorporated through amendment.

- Part III serves as the District's implementation plan, establishing District programs, Long Range Workplan, and Administrative procedures. This part will be routinely updated through amendment to continue to serve the District.

SWWD HISTORY AND PLAN CONTEXT

SWWD covers over 70,000 acres or 110 square miles at the confluence of the Mississippi and St. Croix Rivers. The District includes portions of two major watersheds (Mississippi and St. Croix) encompassing 12 lakes, over 120 miles of piped and natural streams, and over 2,400 total acres of wetlands.

Landforms and water resources in SWWD largely reflect past glacial activity. Glacial processes and runoff from melting glaciers filled pre-glacial bedrock valleys, carved new bedrock valleys, and deposited till and outwash in varying forms across the District. Today, we can see several prominent remnants of that activity.

The Mississippi River which today marks the District's western and southern boundary follows its pre-glacial valley carved into Cambrian and Ordivician bedrock.[1,2] The valley bordering SWWD predates glaciation. However, repeated glaciations and melting shaped the valley that we see today. It was repeatedly scoured during times of glacial melting, most prominently by Glacial River Warren, and filled during times of lower flow. The filled valley now forms the Mississippi River Terrace upon which the Mississippi River flows. Today the filling process is accelerated by human activity including excessive sediment originating from the Minnesota River Valley, an extensive lock and dam system, and ongoing channel dredging to facilitate commerce. It is important to recognize, however, that the river does illustrate the success of the Federal Clean Water Act having recovered from a past marked by discharge of untreated sewage and industrial waste.[1] The river now serves as a multi-billion dollar commerce transit-way, critical flyway, and recreation attraction.

SWWD covers over 110 square miles at the confluence of the Mississippi and St. Croix Rivers.

Lake St. Croix, forming the lower portion of the St. Croix River marks the District's Eastern boundary. It is

[1]River of History, a historic resources study of the Mississippi National River and Recreation Area

[2]Geologic History of Minnesota Rivers

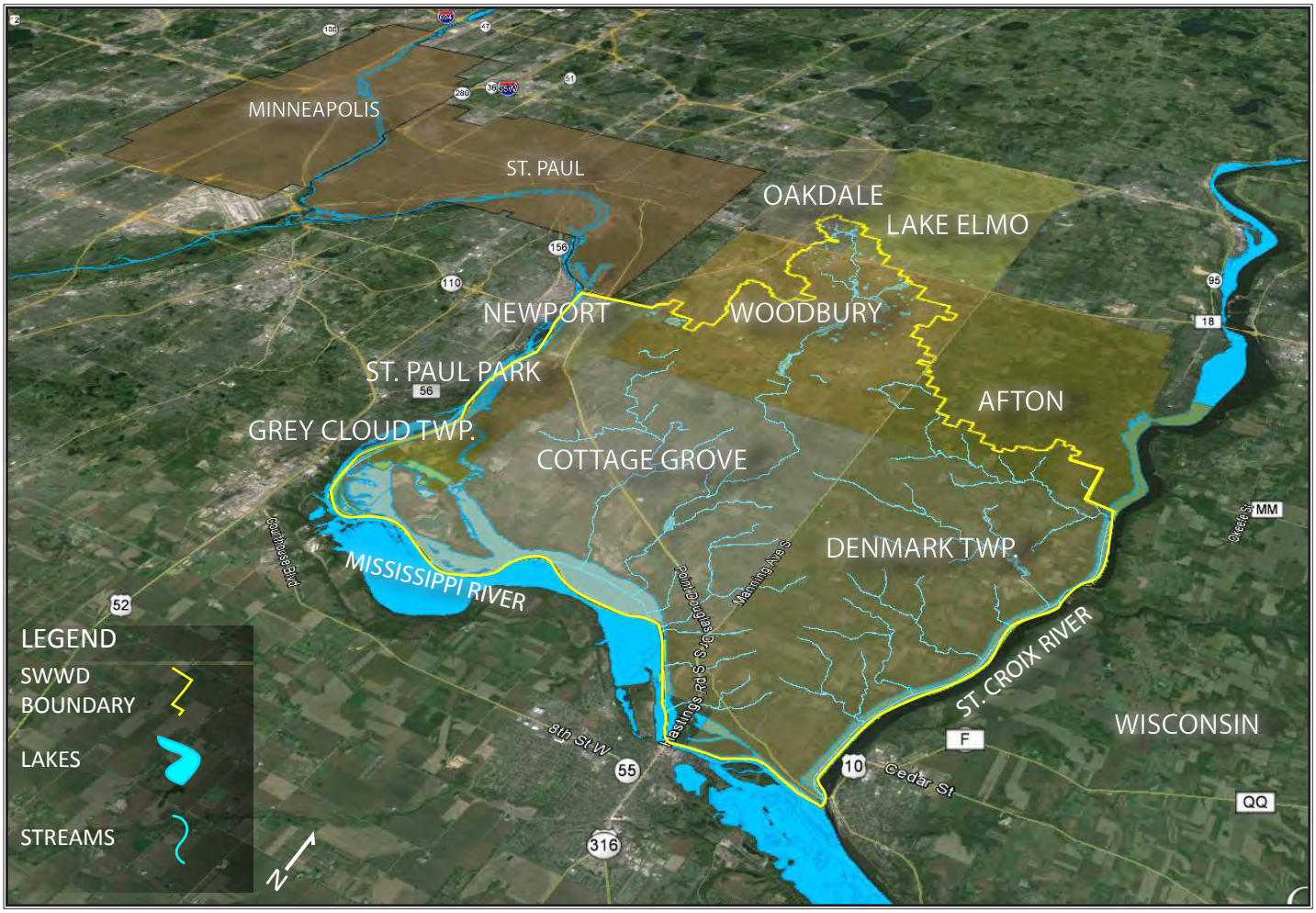


Figure 1: SWWD area with context

The District includes portions of two major watersheds -Mississippi and St. Croix- encompassing 12 lakes, over 120 miles of piped and natural streams, and over 2,400 total acres of wetlands.

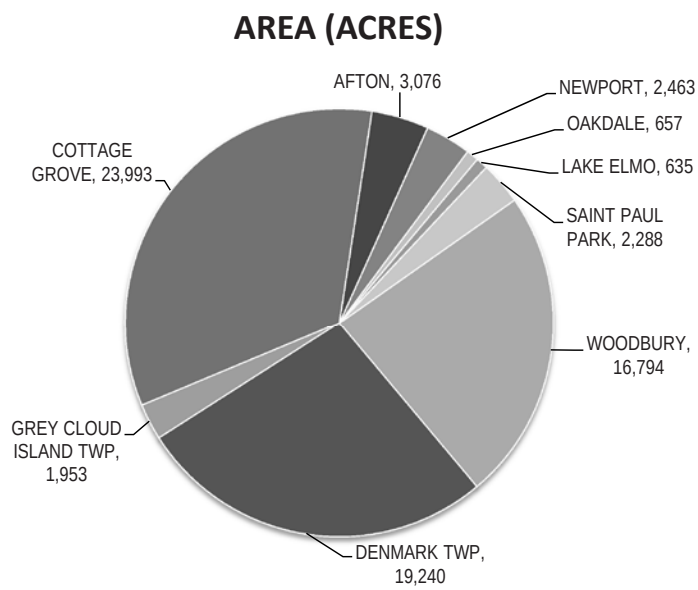


Figure 2: Area of municipalities within SWWD

formed by a natural impoundment at Pt. Douglass and the confluence with the Mississippi River which causes the river to slow, widening and deepening upstream. The river was formed by outflow of Glacial Lake Duluth which carved the valley through the Cambrian bedrock and into the underlying basalt. Today, much of the valley carved by glacial outflow has partially filled, forming the St. Croix River Terrace, upon which the modern day Lake St. Croix lies.

Like the Mississippi River, the St. Croix played a prominent role in the settlement and transformation of the region. Long used as a conduit to transport logs from the Northwoods of Minnesota and Wisconsin to mills in and around Stillwater, there are ongoing efforts to address pollution and sedimentation caused by industry's occupancy of the river and the substantial land use changes in the basin. Despite those challenges though, the river exhibits high water quality and provides extensive habitat for native communities. The river is now a tourism and recreation attraction. That value is reflected with inclusion in the original National Wild and Scenic Rivers Act of 1968 and Lower St. Croix National Scenic Riverway Act of 1972. The St Croix is further protected in Minnesota as a designated Outstanding Resource Value Water. Today, the St. Croix Valley is dotted with state parks both in Minnesota and Wisconsin.

Several of SWWD's lakes are also remnants of past glacial activity and found exclusively in the Lake Elmo-Cottage Grove Outwash Plain. The District's most prominent lakes—the Woodbury chain, Ravine Lake—overlie a bedrock valley through the central portion of the District. As the more recent glaciers retreated, that bedrock valley was filled in with sand and rock. It is likely that the District's lakes were formed by glacial fragments (ice blocks) which were left buried in the filled bedrock valleys and melted to form the existing lake basins. Today, these lakes are an important recreational asset to residents of the District and are extensively used for active and passive recreation. Many of those lakes are currently listed as impaired, a reflection of past development and focus of District management efforts.

Excess nutrients in stormwater overwhelmingly drive water quality degradation in SWWD.

After decades of declining water quality, SWWD lakes are stabilizing and in some cases improving. Excess nutrients in stormwater overwhelmingly drive water quality degradation in SWWD. The source of those nutrients in SWWD is erosion. Concentrations of nutrients peaked in the early 2000s and have since been slowly declining. That decline is a possible reflection of implementation efforts of the District and its local partners, increased enforcement of water quality development rules, and slowing rates of development. SWWD lakes are beginning to reflect the improvement in stormwater quality. Most notably, Armstrong and Ravine Lakes have shown substantial improvement over the past few years. Colby Lake which has been the focus of extensive watershed restoration work should also begin to show rapid improvement. Up to date lake and stormwater data is always available through SWWD's online database which also provides basic graphical functions. See Figure X for SWWD lake, stream and river profiles.

SWWD's streams are concentrated on the bluffs along the Mississippi and St. Croix Rivers which was left largely untouched by the latest glaciation. What now makes up Trout Brook, O'Conner's Creek and several smaller unnamed streams are the result of centuries of stream action carving valleys through the bluff. Those large, broad valleys are now home to unique and important habitat, especially where those valley floors now intersect groundwater which provides cold water. The watersheds draining to the streams are generally rural with a strong agricultural influence. As a result, the biggest issue causing concern for the streams is runoff and field erosion early in the season before crops are established. Exacerbating that dynamic has been the recent trend of more intense early season rainfall which has driven a decline in water quality in Trout Brook over the past 5 years despite ongoing watershed and riparian restoration work.

Soils in SWWD are all derived from glacial alluvium or till deposited along the Mississippi and St. Croix valleys. Soil types that dominate the Mississippi River drainage area of the District are of the Antigo-Chetek-Mahtomedi and Sparta-Dickman-Hubbard map unit, and are formed predominantly in outwash under deciduous hardwood forest or prairie. The Antigo-Chetek-Mahtomedi soils are well drained to excessively drained, medium textured to coarse textured soils, typical on low convex side slopes or knolls, crests and side slopes. The Sparta-Dickman-Hubbard soils are somewhat excessively drained and are coarser textured soils than the Antigo type. These soils occupy broad flats and knolls. Copaston-Sparta map unit is well drained and excessively drained medium textured to coarse textured and dominate the soil types along the Mississippi River primarily on the

[3]Washington County Soil Survey

[4]SWWD Draft Wetland Management Plan

historic river terrace.

In the eastern portion of the watershed that drains to the St. Croix River common soil types include Ostrander-Baytown-Ripon map unit and the Waukegan-Baytown-Ripon map unit. Both map units are formed in a silty mantle over bedrock or over glacial till or outwash. Soils are well drained and medium textured in upland areas of the watershed.3 Soils map layers are available on the SWWD web viewer at www.swwdmn.org.

Wetlands, once common in portions of the District with dense soils have succumbed to development. However, what remains provide an important ecological, aesthetic, recreational, and economic resource. SWWD recognizes that value and actively works to protect what remains of this valuable resource through development standards and its role in administering the State's Wetland Conservation Act (WCA).

Large-scale settlement and thus land use and cover changes began with the treaties of 1837 which purchased the territory between the St. Croix and Mississippi Rivers from the Dakota and Ojibwe. Grey Cloud island with a history of native settlement quickly became a center for trade along the Mississippi River. At the confluence of the Mississippi and St. Croix, Pt. Douglass (today part of Denmark Township) served and supported logging activity in the St. Croix basin and was the start of Military Road which crosses the District in route to Fort Snelling. Throughout the District, trees were cleared and land was utilized for row crops.

The shift from the River Transportation era to Railroad Transportation Era saw a shift from Grey Cloud and Pt. Douglas to rail cities such as Newport and St. Paul Park. Continued population growth and the eventual shift to the Automobile Transportation Era brought development to farming communities like Woodbury, Cottage Grove, and Oakdale and former resort areas like Lake Elmo. Today, SWWD includes industrial river towns along the Mississippi River bluff, picturesque Townships and farmland, and one of the fastest growing communities in the State, all of which face unique resource and management challenges. See figure x for land use changes from 1984 - 2010.

While the District works to address water resource impacts related to past development, it also maintains a strong focus on preventing issues from ongoing development and land use changes. SWWD recognizes municipalities as the land use authority in the District. However, it also views its role of planning and resource protection as integral to municipal planning and development processes. SWWD fills a local planning void by taking a regional and resource based focus. It's systematic and iterative process of assessment, planning, and implementation

PLACEHOLDER - TIMELINE : SHAPING SWWD (GEOLOGIC TO PRESENT)

ARMSTRONG LAKE

GRAPHIC

PLACEHOLDER

ID: 82-0116

Waterbody Area: 39 acres

Watershed Area: 566 acres

Mean Depth: 3 feet

Max Depth: 5 feet

Water Quality:

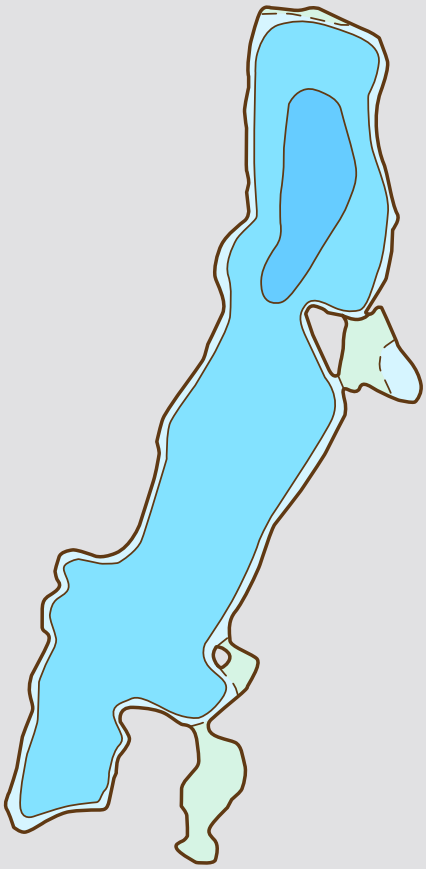
Annual Average TP Concentration: 74 ppb

Goal TP Concentration:

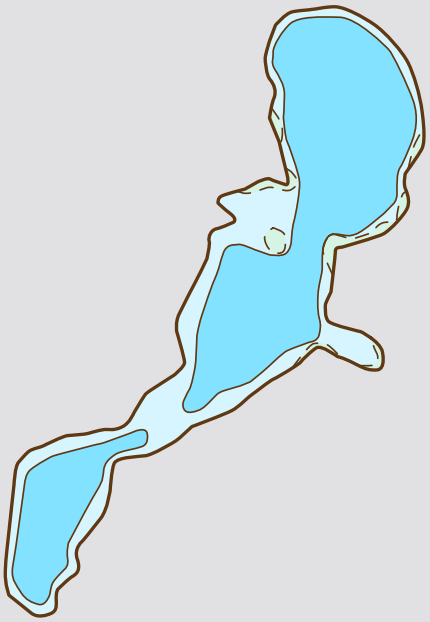
60 ppb (State of MN),
66 ppb (SWWD)

Water Quality Trend:

IMPROVING



MARKGRAFS LAKE



ID: 82-0089

Waterbody Area: 46 acres

Watershed Area: 436 acres

Mean Depth: 5 feet

Max Depth: 8 feet

Water Quality:

Annual Average TP Concentration: 142 ppb

Goal TP Concentration:

60 ppb (State of MN),
85 ppb (SWWD)

Water Quality Trend:

IMPROVING

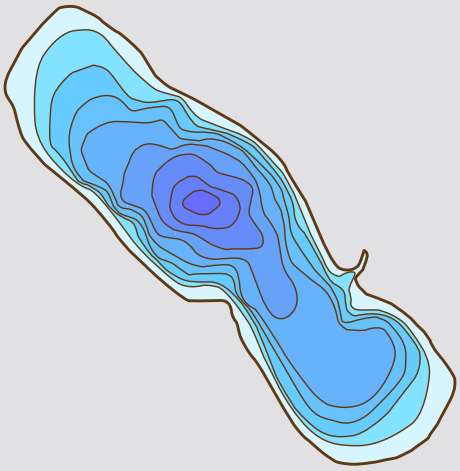


Figure X: SWWD lake, stream and river profiles - 5 ft gradient intervals

COLBY LAKE

ID: 82-0094

Waterbody Area: 68 acres

Watershed Area: 2,839 acres

Mean Depth: 7 feet

Max Depth: 11 feet

Water Quality:

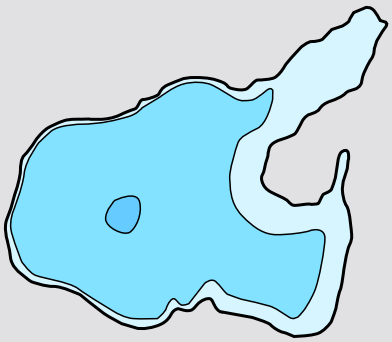
Annual Average TP Concentration: 148 ppb

Goal TP Concentration:

60 ppb (State of MN),
107 ppb (SWWD)

Water Quality Trend:

IMPROVING



LA LAKE

ID: 82-0097

Waterbody Area: 45 acres

Watershed Area: 81 acres

Mean Depth: 6 feet

Max Depth: 10 feet

Water Quality:

Annual Average TP Concentration: 84ppb

Goal TP Concentration:

60 ppb (State of MN),
60 ppb (SWWD)

Water Quality Trend:

DECLINING

POWERS LAKE

ID: 82-0092

Waterbody Area: 56 acres

Watershed Area: 1384 acres

Mean Depth: 16 feet

Max Depth: 41 feet

Water Quality:

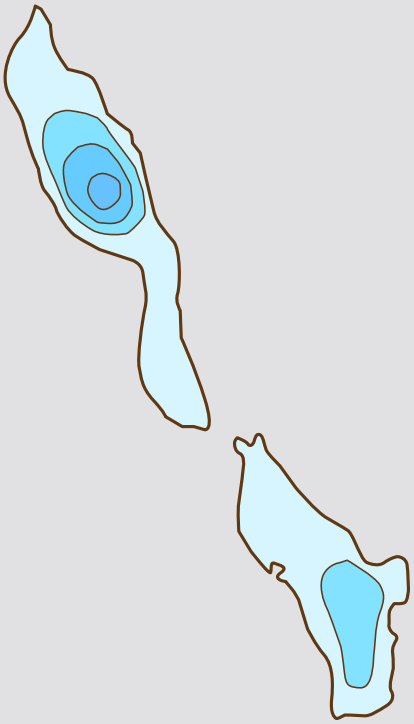
Annual Average TP Concentration: 35 ppb

Goal TP Concentration:

40 ppb (State of MN),
29 ppb (SWWD)

Water Quality Trend:

STEADY



WILMES LAKE

ID: 82-0090

Waterbody Area: 30 acres

Watershed Area: 3,242 acres

Mean Depth: 5 feet

Max Depth: 18 feet

Water Quality:

Annual Average TP Concentration: 83 ppb

Goal TP Concentration:

60 ppb (State of MN),
54 ppb (SWWD)

Water Quality Trend:

IMPROVING

Figure X: SWWD lake, stream and river profiles - 5 ft gradient intervals

GRAPHIC

PLACEHOLDER

RAVINE LAKE

ID: 82-0087

Waterbody Area: 25 acres

Watershed Area: 802 acres

Mean Depth: 7 feet

Max Depth: 16 feet

Water Quality:

Annual Average TP Concentration: 77 ppb

Goal TP Concentration:

60 ppb (State of MN),
66 ppb (SWWD)

Water Quality Trend:

IMPROVING

GRAPHIC

PLACEHOLDER

GRAPHIC

PLACEHOLDER

LAKE ST. CROIX

ID: 07030005

Waterbody Area: xx acres

Watershed Area: xx acres

Mean Depth: xx feet

Max Depth: xx feet

Water Quality:

Annual Average TP Concentration: 41 ppb

Goal TP Concentration:

29 ppb (State of MN)

Water Quality Trend:

IMPROVING

O'CONNORS LAKE/STREAM

ID: 82-0020 (LAKE);
07030005-608 (STREAM)

Waterbody Area: 23 acres

Waterbody Length: xxx ft

Watershed Area: 2,435 acres

Mean Depth: N/A

Max Depth: 11 feet

Water Quality:

Annual Average TP Concentration: 52 ppb

Goal TP Concentration:

60 ppb (State of MN), maintain existing concentration (SWWD)

Water Quality Trend:

STEADY

GRAPHIC

PLACEHOLDER

TROUT BROOK

ID: 07030005-568

Waterbody Length: xx feet

Watershed Area: 2,240 acres

Mean Depth: 5 feet

Max Depth: 8 feet

Water Quality:

Annual Average TP Concentration: 142 ppb

Goal TP Concentration:

60 ppb (State of MN),
85 ppb (SWWD)

Water Quality Trend:

DECLINING

GRAPHIC

PLACEHOLDER

MISSISSIPPI

ID: 07010206

Waterbody Area: xx acres

Watershed Area: xxx acres

Mean Depth: xx feet

Max Depth: xx feet

Water Quality:

Annual Average TP Concentration: xxx ppb

Goal TP Concentration:

xx ppb (State of MN),
xx ppb (SWWD)

Water Quality Trend:

IMPROVING

Figure X (continued): SWWD lake, stream and river profiles - 5 ft gradient intervals

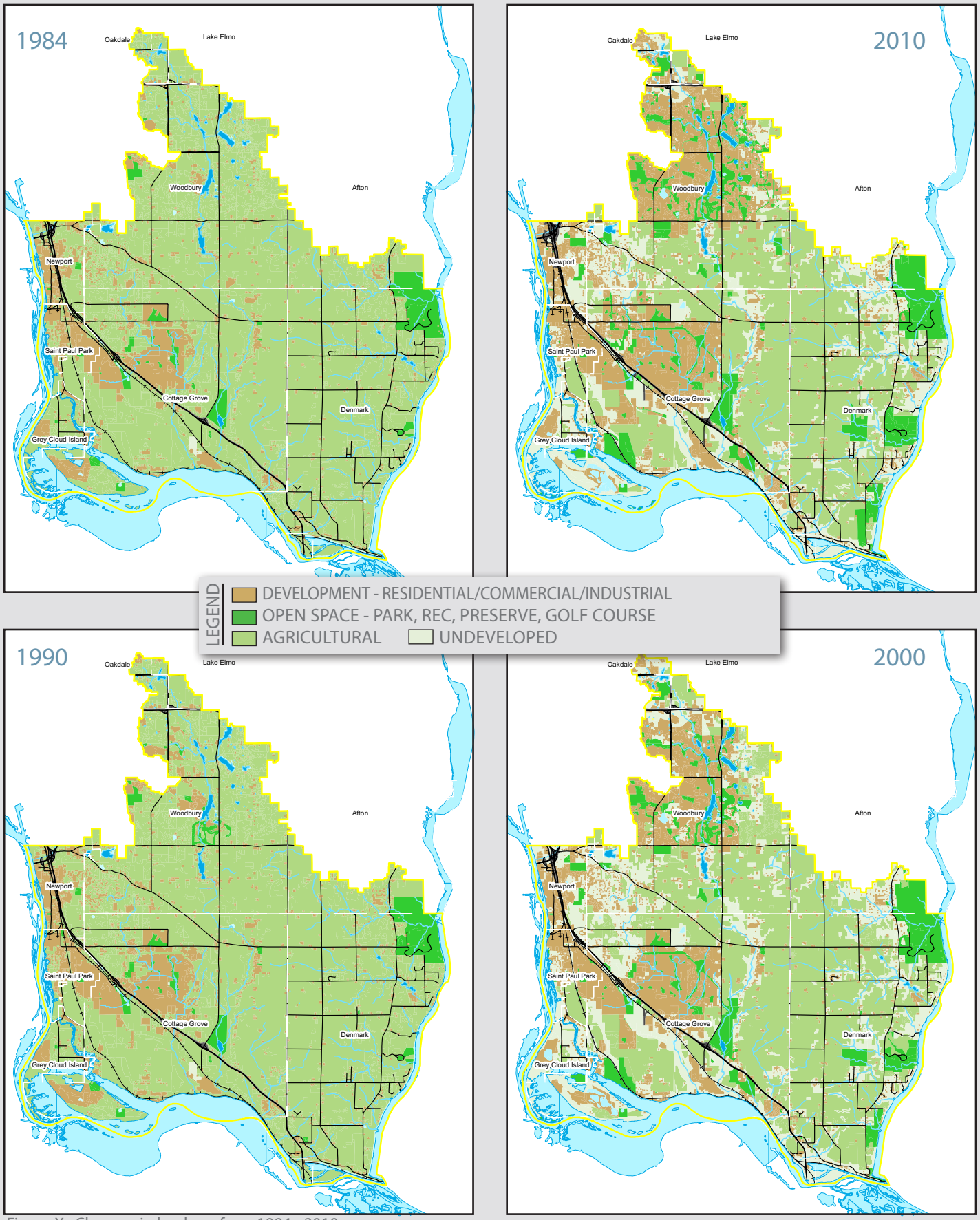


Figure X: Changes in land use from 1984 - 2010

ensures that planned growth is accommodated and that resources are protected and restored. All residents in the District, and Washington County, rely on groundwater for drinking water. The quantity and quality of that groundwater, like that of District surface waters, is shaped by the regions geologic characteristics6¬. Advancing and retreating marine seas left behind a sequence of limestone, sandstone, and shale bedrock layers dating back to the Paleozoic Era (570 to 245 million years ago). Following these events, the bedrock was subjected to a long period of erosion. Following that period of erosion, a series of glaciers advanced and retreated across the county shaping the bedrock and leaving in their wake formations of clay, silt, sand, and gravel on top of bedrock formations. Resulting layers of bedrock, sands and gravels, and silt form the various aquifers lying beneath the District and are responsible for its characteristically high infiltration rates and recharge potential.4 The bedrock configurations that make groundwater abundant also make it highly sensitive to pollution through high infiltration rates and presence of karst features, and industrial pollution. Further, quantities of groundwater are a growing concern. Increasing populations are increasing pumping from aquifers while simultaneously reducing chances for recharge. Still somewhat unknown, is how Threats to groundwater translate to surface water resources which to date have been the focus of District management efforts.

In addition to challenges posed by development, the District also faces several confounding impacts from a changing climate. Data clearly shows that Minnesota's climate is changing; annual temperature and precipitation is increasing, precipitation is getting more intense, snow and ice is melting sooner, and the growing season is increasing.

-SWWD mission statement -

"To manage water and related resources of the District in cooperation with our citizens and communities"

All of these changes have serious consequences for the District. First and foremost, plans and infrastructure in the District were developed and designed based on several assumptions. While the District and its communities have always been conservative in their assumptions (i.e. planning for large events), many of those assumptions are no longer valid. Translated, that means stormwater infrastructure is undersized, buildings are too close to lakes and streams, and algae have longer to proliferate in lakes, making them unusable.

To address challenges it faces, SWWD focuses on cooperative implementation in partnership with other local, regional, and State agencies. That approach is reflected in the District's mission statement.

Figure 3: Average annual temperature and precipitation for the Minneapolis and Saint Paul Metropolitan Area

PART II: ASSESSMENT OF ISSUES AND MEASUREABLE GOALS

ISSUE IDENTIFICATION

Development of past plans included extensive public participation processes to identify District issues. That work has served as the basis for District programs and projects since 2007 when the District's second generation WMP was adopted. Beginning in 2013, several efforts were made to evaluate status and success of existing District efforts and identify current and emerging issues all of which have led to the development of this 3rd generation plan.

In 2013, the SWWD Board of Managers held a workshop to discuss the status of the 2007 Plan and discuss changing and emerging issues. As a result of that workshop several changes to the Plan were identified and the District proceeded to develop a Plan amendment. Ultimately, however, the District decided to delay the amendment in deference to two pending actions at the State level—a state led assessment of District performance and update to MN Rule 8410 which governs Twin Cities metropolitan Watershed Districts.

The Board of Water and Soil Resources (BWSR) supports Minnesota's counties, watershed districts and soil and water conservation districts that deliver water and related land resource management projects and programs. In 2007 the BWSR set up a Performance Review and Assessment Program (PRAP) to systematically review the performance of these local units of government to ensure their effective operation. Each year BWSR staff conducts routine reviews of several of these local conservation delivery entities. In 2014, building on SWWD's own assessment in 2013, BWSR completed a PRAP assessment of SWWD. The conclusion of that assessment was:

> "The South Washington Watershed District (SWWD) is an effective agent for positive water resource management in a complex metropolitan environment. The district's systematic, deliberate approach to project development, as set out in their management plan and management processes, is impressive. The confidence that the cities within the district have in the organization's capabilities is evidenced by the gradual expansion of the district's jurisdiction as neighboring watershed management organizations have dissolved. The SWWD has been aggressive at applying the various tools and authorities available to a metro area watershed district in its pursuit of

effective local water and resource management. In general, the partner organizations find the SWWD good to work with and recognize the quality of its efforts. If there are any areas for improvement in the district's working relationship with its partners they would be in the area of improved communication about changing timelines or follow-through on projects or programs. The district meets an impressive 93 percent of BWSR's benchmark performance standards. This rate of compliance shows organizational sophistication, attention to detail in overall district management, and a commitment to service for the people who live in the district and to the resources they depend upon."

In 2015, BWSR adopted and update to MN Rule 8410. That update resulted in several changes to what is and is not required in Watershed Management Plans. Ultimately, the revised rules allow for a condensed format that provides a more intuitive and user friendly document. With those changes, SWWD decided to undertake a Plan update process which resulted in creation of this current Plan. Consistent with the revised (2015) MN Rule 8410, SWWD requested input from State and local review agencies regarding agency resource priorities and perceived issues in SWWD.

-SWWD mission statement - "To manage water and related resources of the District in cooperation with our citizens and communities"

Building on input received from review agencies, SWWD engaged both a Citizen and Technical Advisory Committee. Those committees are formed, respectively, by District residents and representatives from municipalities and State and local agencies. Both committees were heavily leaned on to identify and evaluate issues presented in this section and develop implementation priorities and actions presented in Part III.

The following Issues and Goals are the result of the aforementioned process and reflect the priority resource issues of the District. This section is organized following a Results Based Accountability approach. Each issue statement is followed by the desired outcome (goals/results), implementation progress indicators, and associated implementation programs. Additionally, each issue includes a section with live links to additional information from SWWD and its partners.

ISSUES AND GOALS: FLOODING

FLOOD DAMAGE REDUCTION AND MITIGATION

Issue: There are several areas within the District which are at risk for flooding during and following large precipitation and/or extended wet periods; including Wilmes Lake, City of Newport riverfront, Cottage Grove Central Draw (at CDSF overflow), West Draw, Clear Channel/ TH61, Hamlet Pond, O'Conners Lake, and Ravine Park. Several of these identified areas involve intercommunity flows. Others are the result of undersized or inadequate infrastructure. SWWD has historically led or participated in these regional or inter-community flooding issues while assisting municipalities with their efforts to address more localized issues. The District's general approach begins with source reduction and continues with identification and protection of critical storage locations and floodplains as a means to reconstruct or mimic a more natural hydrograph. It is the District's policy to opportunistically manage floodplains for multiple, non-development uses (e.g. greenspace, recreation, and habitat). If source reduction approaches are not adequate or feasible, the District pursues mitigation measures ranging from flood-proofing property and infrastructure to support for property buyouts.

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

Implementation Indicators:

- Prevent increases in runoff from development activity through development and enforcement of District Rules;
- Prevent increases in flooding risk due to development (e.g. Wilmes, Ravine, and O'Conner's Lakes);
- Update key flood storage inventory within 3 years;
- Achieve no net loss in inventoried key flood storage areas;
- Complete SWWD Flooding Emergency Response Plan within 6 years;
- Review and update inter-community flow limits within 3 years;
- Achieve progress toward inter-community flow limits as development occurs;
- Maintain implementation flexibility to respond to identified flood damage reduction/mitigation needs that may arise.

Implementation Tools: Planning, Regulatory, Implementation and Maintenance

Additional Information:

http://www.swwdmn.org/wp-content/uploads/2015/03/3-Assessment-of-Issues_Amended2011.pdf

ISSUES AND GOALS: FLOODING

CENTRAL DRAW OVERFLOW

Issue: One of the primary reasons SWWD was formed was to identify, design and construct an outlet for the District's Northern Watershed which one of the fastest growing communities in the State. At the time, runoff from the Northern Watershed collected at Bailey Lake which had no controlled outlet. Communities in the District recognized that Bailey Lake would not be adequate to contain all of the runoff from the watershed when it was fully developed. Since that time, SWWD and its partners have been working to construct the Central Draw Storage Facility (CDSF), which includes 1800 acre feet of storage on 250 acres near the outlet of Bailey Lake. A City of Woodbury lift station pumps water from Bailey Lake to the CDSF. With the size of the CDSF and rate/volume restrictions on development draining to Bailey Lake, the system should be adequate to retain the runoff for a 6.3", 24 hour rainfall event. However, because of uncertainty in design, recent trend of extreme precipitation events and degree of safety necessary for flooding situations, SWWD is in the process of constructing a controlled overflow out of the CDSF to the Mississippi River. The project is being implemented in 5 phases. Phases I (pipe connection under CSAH 19) and II (stream stabilization between Ravine Lake and Mississippi River) are complete. For more information see CDSF Overflow Project story map at www.swwdmn.org

Goals/Results: Complete establishment of a controlled overflow from SWWD's Northern Watershed to the Mississippi River

Implementation Indicators:

- Phase III, modification of the Ravine Lake outlet by 2017;
- Phase IV, stabilization of Ravine Park by 2018
- Phase V, construction of remaining pipe sections by 2019;
- Completion of function overflow system by January 1, 2020 as specified in SWWD/Lower St. Croix WMO consolidation agreement, unless otherwise agreed to by Cottage Grove, Woodbury, and SWWD.

Implementation Tools: Implementation and Maintenance

Additional Information:

http://www.swwdmn.org/wp-content/uploads/2015/03/2013_BoDR_100913.pdf, http://www.swwdmn.org/wp-content/uploads/2015/03/SWWD-Greenway-Corridor-Plan.pdf, http://www.swwdmn.org/projects/central-draw-storage-facility-overflow-project-environmental-assessment-worksheet-eaw/

ISSUES AND GOALS: WATERSHED ALTERATIONS

SURFACE WATER DEGRADATION AND IMPAIRMENT

Issue: Typical of urban systems, District water resources are significantly affected by land use and changes in land cover. What was once wetland, prairie, savanna, and forest is now suburban development and agriculture, both of which pose several challenges. Both increase rate and volume of runoff to district resources, carrying with it sediment, debris, and nutrients which degrade or impair natural aquatic systems. Both require very different approaches to address however. Suburban development is highly regulated and results in highly impervious areas with fragmented open space and high infrastructure costs. Agricultural lands have comparatively low regulation and result in significant land cover changes over large land areas with comparatively low infrastructure costs. These differences create a dynamic where it is easier to implement more costly improvements in suburban areas through regulation than in agriculture lands through voluntary implementation. Cost effective implementation requires overcoming that dynamic.

SWWD believes in proactively coordinating with its constituents for long-term surface water planning and implementation of projects toward the protection and restoration of District resources. Key to that function is management planning. SWWD systematically assesses its resources through its monitoring and modeling programs. Building on those efforts, the District then develops management plans focused on protection or restoration for impaired waters. Completed plans are adopted by the District as guidance documents. Following an adaptive management approach, SWWD routinely revisits completed plans to evaluate progress and re-assess strategies in light of new or changing information.

Additionally, SWWD recognizes the inherent difficulty for local agencies in addressing emerging, widespread contaminants and impairments of regional resources extending beyond local jurisdictions. Clear, existing examples include the Mississippi River turbidity impairment, Lower St. Croix excess nutrients impairment, and widespread Metro area chloride contamination. For these larger and more widespread resources and impairments the District recognizes the importance of planning at a level broader than the District but continues to place high value and importance on local implementation. SWWD will assist in implementation of TMDLs for State or regional resources or impairments which extend beyond District boundaries. Likewise, SWWD will evaluate potential impact of emerging contaminants and seek guidance from State and Regional agencies in addressing those impacts.

Goals/Results: Protection and restoration of District resources to meet local resource goals and State standards.

Implementation Indicators:

- Complete resource management plans for all lakes and perennial open channel streams within the District within 6 years;
- Re-assess completed management plans at a minimum of once every 3 years to evaluate progress and review and adjust strategies;
- Consider adoption of completed TMDLs for Statewide and Regional resources for which implementation actions are identified for SWWD;
- Continue existing Incentive programs to encourage voluntary implementation of BMPs;
- Develop Incentive program focused on BMP implementation on agricultural lands within 3 years;
- Identify willing landowners and begin operation of pilot agriculture BMP research program within 6 years;
- Achieve load reductions and restoration actions identified in adopted management plans and/or TMDLs;
- Prevent new impairment listings;
- No net loss in wetland acreage or function;
- Protect/promote soil health as part of District projects and through District rules as a means to limit hydrological impacts of land alteration.
- Coordinate CIP plan with Municipalities through engagement of a standing Technical Advisory Committee;
- Implement actions identified in the Metro Chloride TMDL to reduce roadsalt usage by XX%;
- Support joint educational efforts to train and educate District residents and contractors on methods to reduce salt use on private property;

ISSUES AND GOALS: WATERSHED ALTERATIONS

- Evaluate impact of emerging contaminants and identify District programs or actions to control or mitigate that risk.

Implementation Tools: Assessment and Planning, Regulatory, Implementation and Maintenance

Additional Information:

http://www.swwdmn.org/wp-content/uploads/2015/03/Colby-Lake-Modeling-Report.pdf

http://www.swwdmn.org/wp-content/uploads/2015/03/Final-Armstrong-Markgrafs-Wilmes-Report.pdf

http://www.swwdmn.org/wp-content/uploads/2015/03/Grey-Cloud-Slough-Feasibility-Report-Final.pdf

http://www.swwdmn.org/wp-content/uploads/2015/03/OConnersStreamandLakeManagementPlan.pdf

http://www.swwdmn.org/wp-content/uploads/2015/03/PowersLakeMgmtPlanMay2010_JHL.pdf

http://www.swwdmn.org/wp-content/uploads/2015/03/Ravine-Lake-Mngmnt-Report-Final.pdf

http://www.swwdmn.org/wp-content/uploads/2015/03/Trout-Brook-Mgmt-Plan.pdf

http://www.swwdmn.org/wp-content/uploads/2015/03/Trout-Brook-Watershed-Improvements-Concept-Design-Report.pdf

http://www.swwdmn.org/wp-content/uploads/2015/03/DRAFT_Wetland_Mgmt_Plan_2002_SWWDVERSION.pdf

http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/tmdl-projects/special-projects/metro-area-chloride-project/metro-area-chloride-project-history.html

ISSUES AND GOALS: WATERSHED ALTERATIONS

BLUFF, STREAMBANK, AND SHORELAND EROSION

Issue: Bluffs, streambanks, and shorelands are highly susceptible to erosion. Further, once erosion begins, it typically becomes severe due to highly erosive soils and high velocities and concentration of flows commonly seen at these features. One of the simplest ways to prevent erosion of bluffs, streambanks, and shorelands, is to maintain a buffer which prevents erosion in two ways; (1) by intercepting and slowing velocity of runoff and minimizing concentration of flow, and (2) by increasing stability of native soils. SWWD is committed to establishing buffers along bluffs, streambanks, and shorelands through voluntary and regulatory mechanisms as now required by the State though it will focus on voluntary measures when possible.

Goals/Results: Prevent resource degradation of District resources from bluff, streambank, and shoreland erosion.

Implementation Indicators:

- Develop and implement buffer regulatory measures to comply with State requirements;
- Establish and maintain a 50 foot, permanently vegetated buffer along all bluffs, ravines, lakes, and streams;
- ID excessively eroding bluff ravines within 3 years; Stabilize identified ravines within 10 years.

Implementation Tool: Planning, Implementation and Maintenance, Regulatory

Additional Information:

ISSUES AND GOALS: GROUNDWATER SUSTAINABILITY

SUPPLY

Issue: Groundwater supply is a known issue for South Washington County with documented aquifer depletion. SWWD views supply as a Municipal issue, however it does value its role in preserving groundwater quality and quantity. And, although many questions remain about how much water can be sustainably withdrawn from aquifers there is consensus on the need for conservation. SWWD is committed to implementing and improving conservation efforts to ensure long term viability of groundwater resources in South Washington County. The MnDNR North & East Metro Groundwater Management Area Plan provides a breakdown of groundwater use by category (Figure xx). The breakdown includes water use across the entire North & East area (roughly, Washington, Ramsey, and SE Anoka Counties) which share groundwater resources. Of particular concern in Southern Washington County is the amount of water used for irrigation (golf course, landscape, and agricultural) and pollution containment.

Goals/Results: Implement conservation efforts to ensure long term viability of groundwater resources in South Washington County.

Implementation Indicators:

- Implement conservation actions identified in regional planning efforts;
- Incentivize practices that reduce demand on groundwater supply;
- Promote and incentivize feasible re-use of water;
- Promote use of infiltration as a tool for recharge where appropriate;
- Evaluate feasibility of active recharge.

Implementation Tool: Planning, Implementation and Maintenance

Additional Information:

http://files.dnr.state.mn.us/waters/gwmp/area-ne/draft-plan.pdf

http://www.co.washington.mn.us/DocumentCenter/View/794

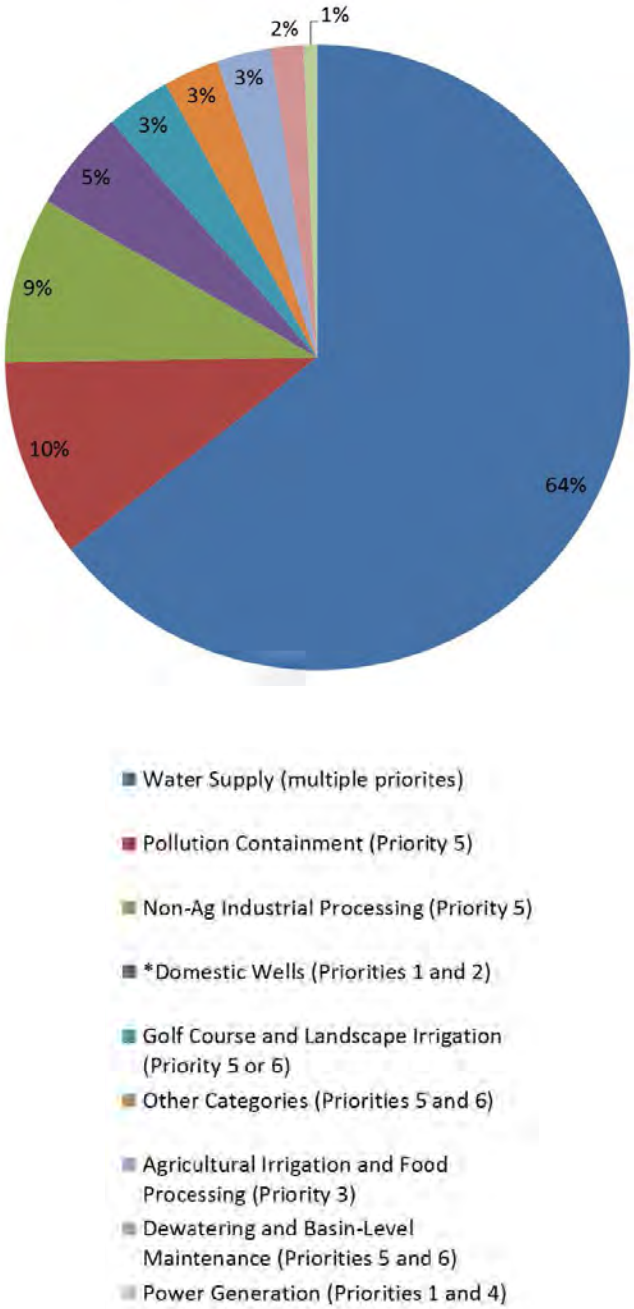


Figure 4: Groundwater use by category [North and East Metro Groundwater Study (2014)]

ISSUES AND GOALS: GROUNDWATER SUSTAINABILITY

PROTECTION (POLLUTION PREVENTION)

Issue: District residents rely on groundwater for 100% of their water supply. Because of that, SWWD and its local partners place great emphasis on protecting groundwater resources from potential pollution. Those efforts include wellhead protection (Municipalities), special well construction areas (Lake Elmo/Oakdale), and pollution remediation (3M). SWWD is committed to preventing pollution from stormwater BMPs and local operations (i.e. large scale infiltration, de-icing operations, karst, etc.). Additionally, there are several known connections between surface water and groundwater resources in the District. SWWD is committed to continued assessment of those connections and the risks associated with them

Goals/Results: Protect groundwater resources through pollution prevention and management of surface water, groundwater interactions.

Implementation Indicators:

- Continue enforcement of existing karst rules;
- Consider pollution potential in siting and design of District funded stormwater BMPs;
- Utilize alternative compliance sequencing for meeting District development rules in areas where infiltration is not appropriate;
- Participate in State and regional efforts to quantify risks to groundwater resources from de-icing operations;
- Incentivize road authority upgrades to de-icing operations to prevent overuse of roadsalt;
- Continue groundwater quality monitoring at District regional infiltration facilities sufficient to identify potential impacts to groundwater from large scale infiltration practices.
- Consider additional protection of surface water features with potential to impact groundwater quality.

Implementation Tool: Planning, Regulatory, Implementation & Maintenance

Additional Information:

http://www.co.washington.mn.us/DocumentCenter/View/794

ISSUES AND GOALS: NATURAL RESOURCES

Issue: Several of the issues facing District resources are caused by changes to the landscape. Loss of unique or rare habitats, threats to pollinators, habitat fragmentation, and changes in land use and land cover all decrease habitat diversity and ecological resilience. That change often translates as decreased groundcover density and quality causing increases in runoff volumes and rates as well as sediment and nutrient concentrations and degraded aquatic habitat. Therefore, one of the simplest solutions for the District's resource issues is protection and restoration of native terrestrial habitat.

Aquatic habitat is essential to healthy lakes and streams. Aside from watershed influences which can increase productivity in lakes and streams and bury habitat features in sediment, aquatic habitat is also strongly affected by invasive aquatic plant species and unbalanced fish communities which favor fish like black bullhead and sunfish which can drastically disturb lake sediments.

SWWD is committed to preserving and where feasible restoring native terrestrial and aquatic habitat. Every effort will be made in District projects and programs to achieve that result.

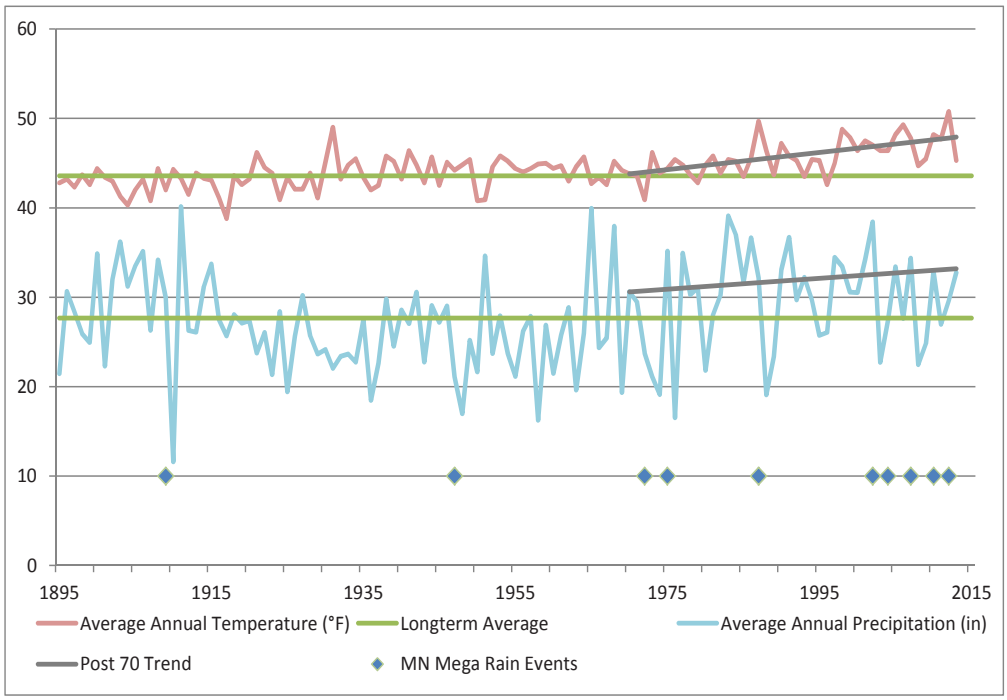
Goals/Results: Protect, restore, and reconstruct native terrestrial and aquatic habitat for the benefit of resource management.

Implementation Indicators:

- Survey aquatic vegetation of District Lakes a minimum of every 3 years;
- Participate in development of regional programs to address spread and management of invasive terrestrial and aquatic invasive species;
- Implement local actions identified in regional planning efforts;
- Avoid impacts to rare, unique, and high quality habitats as part of all District projects;
- Identify areas with high priority for protection or potential for restoration within 6 years and incorporate into District Greenway development where feasible;
- Promote use of site appropriate native plants as part of District funded projects;
- Promote compliance with guidance for pollinator friendly design practices as part of District funded projects;
- Consider preservation or restoration of native habitat and benefits to pollinators and other wildlife in allocation of incentive funding.
- Develop credit mechanism to incentivize developers to maintain mature trees during development within 6 years;
- Implement habitat improvement practices identified in completed Resource Management Plans.
- Implementation Tool: Implementation and Maintenance, Regulatory, Planning

Additional Information:

ISSUES AND GOALS: CLIMATE CHANGE



Issue: Minnesota's climate is changing—precipitation patters are increasingly variable with extremes (i.e. drought and flooding) more common, growing seasons are expanding, winters are warmer and thereby increasing stress on infrastructure due to increasing freeze/thaw patterns. These changes are also reflected in risks to District resources. More frequent precipitation extremes will increase fluctuations in lake levels and increase rates of runoff and flow in streams. Those changes are reflected in increasing field and streambank erosion and increased demand on regional water supply provided by already stressed aquifers. Depressed water levels in lakes, streams, and wetlands during prolonged droughts will result in changing surface water/groundwater interactions. And, increasing growing seasons will result in additional nuisance algal conditions in already impaired waters.

While efforts at the national and international level have traditionally focused on mitigation of climate change, SWWD and other State and Local agencies are increasingly focused on climate adaptation. Through adaptation, SWWD and its partners and residents can prepare for anticipated challenges to ensure healthy resources and sustained water supply.

Goals/Results: Facilitate increasing resilience of District resources and public infrastructure through development of information and strategies and implementation of accepted climate adaptation practices.

Implementation Indicators:

- Consider adaptive capacity—ability of a system to adjust to climate change to mitigate potential damages, take advantage of opportunities, or cope with consequences—of District systems and resources in developing projects;
- Require use of up to date hydrologic data for meeting District development and redevelopment standards;
- Utilize District models and predicted, extreme hydrologic scenarios to identify infrastructure vulnerabilities—degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change—within 5 years;
- Utilize District surface water modeling and County Groundwater model to explore changes in surface water/groundwater interactions as a result of predicted changes in hydrologic conditions and water demand;
- Utilize District CCIP program to assist Cities in adapting their infrastructure systems to increase resiliency—capability to anticipate, prepare for, respond to, and recover from significant threats with minimum damage to social well-being, the economy, and the environment;
- Promote use of alternative landscapes which require less water;
- Promote water re-use where feasible to reduce demand on aquifers;
- Work with local partners to improve delivery of soil conservation programs to prevent increased field erosion.

Implementation Tool: Planning, Education, Implementation and Maintenance

Additional Information:

http://climatechangemn.org/

ISSUES AND GOALS: INFORMATION AND EDUCATION

RESOURCE ASSESSMENT

Issue: The District utilizes an adaptive management approach to watershed and resource management. Key to that approach is reliable and relevant feedback data that accurately characterize District resources and changes in water quality and quantity.

Goals/Results:

- In partnership with Local, State, and Regional partners, operate a monitoring program adequate to establish baseline water quality and quantity measures and identify long-term trends.
- Operate a monitoring program adequate to detect changes in loading rates as a result of District implementation actions.

Implementation Indicators:

- Annually implement District's monitoring plan;
- Monitor levels and water quality of all publically accessible lakes annually;
- Monitor established Regional Assessment Locations a minimum of 3 out of every 6 years;
- Maintain equipment inventory to quickly establish additional monitoring locations in response to identified resource concerns;
- Biennially, complete trend analyses for all lakes and Regional Assessment Locations and complete a review of the District's Monitoring Plan;
- Expand groundwater monitoring program in partnership with Washington County, MnDNR, MDH, and MPCA to adequately characterize groundwater resources in the District;
- In cooperation with MnDNR, identify gaps in aquifer level monitoring network within the District within 2 years.
- Identify existing wells or install new wells necessary to fill identified monitoring gaps.

Implementation Tool: Implementation and Maintenance Program

Additional Information:

http://www.swwdmn.org/programs/monitoring-program/

http://wq.swwdmn.org/

ISSUES AND GOALS: INFORMATION AND EDUCATION

DISTRICT-WIDE HYDROLOGIC MODELING

Issue: Nearly all resource management decisions now require some degree of modelling on the front end to ensure that efforts are targeted and cost-effective. Additionally, SWWD and its partners rely on modeling for predictive analysis of changing conditions (i.e. planned development, climate change). SWWD believes that modelling is best initiated and maintained at the watershed level.

Goals/Results: Maintain updated, District-wide hydrological modeling to inform District and Municipal management of resources and infrastructure.

Implementation Indicators:

- Establish standard modelling specifications within 3 years;
- Complete development of subwatershed models to complete District-wide coverage within 6 years;
- Calibrate completed models to collected monitoring data once every 3 years.
- Annually update completed models to reflect changing conditions;

Implementation Tool: Assessment and Planning

Additional Information:

SWWD Modeling Spec/Library…

ISSUES AND GOALS: INFORMATION AND EDUCATION

RESEARCH

Issue: Information and dissemination of information is essential to effective implementation of District's adaptive management approach in addressing resource issues. SWWD continuously strives to develop and improve information and refine delivery methods. Several knowledge gaps have been identified and are grouped into the following categories:

- Effective incorporation of emerging Best Management Practices into existing Public Works systems and management paradigms
- Methods for source reduction in agriculture land use
- Alternative crops and buffers
- Evaluation of emerging Best Management Practices
- Refinement of existing Best Management Practices
- Integration of water quality and habitat Best Management Practices
- Effective incentives for implementation of various Best Management Practices
- Control of invasive and unwanted species
- Impacts of regional infiltration on groundwater

SWWD will pursue collaborative research opportunities to address known gaps in knowledge. SWWD's primary tool disseminating information is its website. The District's website includes interactive mapping and water quality database applications. Additionally, the website serves as an online library for all documents identified in this plan. Is the District's intention to serve as a primary source for information related to condition and management of resources within the District. To facilitate that role, SWWD will continue to develop web applications and evaluate new technologies for incorporation into the District's website.

Goals/Results: Work with local and regional partners to advance knowledge of watershed management issues.

Implementation Indicators:

- Further identify and refine research and information needs as ongoing role of Technical Advisory Committee;
- Pursue research opportunities to provide for identified information needs;
- Annually publish summary of completed and ongoing research efforts.

Implementation Tool: cost share for innovative or demonstration tech…

Additional Information:

ISSUES AND GOALS: INFORMATION AND EDUCATION

EDUCATION

Issue: Informed residents and cities are essential for establishment of reasonable resource expectations and successful implementation of District programs. Since it formed, the District has been working to educate its constituents about the direct and indirect impacts they and their actions have on District resources. Those efforts continue and now involve more partners. SWWD and other water management organizations in the County have long pooled resources toward a shared education program. Increasingly, Municipalities are joining that effort as a means to achieve their own resource goals and comply with State permit requirements. It is the District's intention to continue to work jointly with its partners to develop and deliver a coordinated, comprehensive education program. Toward that end, SWWD maintains partnership and involvement in the East Metro Water Resources Education Program (EMWREP).

Goals/Results: 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.

Implementation Indicators:

- Actively participate in regional education efforts as an active partner in the East Metro Water Resources Education Partnership (EMWREP);
- Develop programming for Municipal and District facilities focused on identified District issues;
- Engage local public, private, and NGO partners to develop experiential programming for children;
- Maintain a website to disseminate consistent information and coordinate program implementation;
- Utilize existing Municipal committee structure to educate residents and disseminate information as part of the District's Citizen Advisory Committee;
- Develop a mechanism to gauge effectiveness of educational programming efforts.

Implementation Tool: Education and Information; EMWREP

Additional Information:

http://www.mnwcd.org/emwrep/

http://www.swwdmn.org/

ISSUES AND GOALS: EFFICIENCY AND ACCOUNTABILITY

PROGRESS EVALUATION

Issue: SWWD utilizes an adaptive management approach to managing its resources. Likewise, it utilizes a results based accountability approach to evaluating District programs. Key to both is routine evaluation of progress. SWWD is committed to routine, objective evaluation of District programs and projects.

Goals/Results: Utilize a Results Based Accountability approach in evaluating and refining implementation strategies for achieving resource goals and to evaluate program performance.

Implementation Indicators:

- Biennially, evaluate District progress in achieving identified issue goals;
- Ongoing development and use of documented strategies and actions to achieve established resource goals;
- Incorporate strategy documentation, progress evaluation, and annual workplan into annual report;
- Amend Watershed Plan as necessary to provide the District with and programs and tools necessary to implement identified strategies.

Implementation Tool: Planning

Additional Information:

ISSUES AND GOALS: EFFICIENCY AND ACCOUNTABILITY

UNIFORM STANDARDS

Issue: SWWD believes that primary control and determination of appropriate land use is the responsibility of municipalities. Likewise, the District believes the permitting process is best performed at the municipal level. However, one of the primary purposes of Watershed Districts is to manage resource issues that cross municipal boundaries or otherwise become too big for individual jurisdictions to address. Additionally, the District views its water resources as regional resources and values its role in preventing impacts to those resources from development. SWWD's primary tool for addressing these issues is uniform design standards—Rules—which the District is authorized to develop under State Statute. Municipalities within the District are required to adopt and enforce those standards.

Ultimately, the District believes that standards based on local resource goals and that consider variability in soil and land cover conditions are best. However, the District does recognize the difficulty for municipalities, residents, and businesses to navigate standards across Watershed District boundaries. To the extent possible, SWWD will seek to achieve uniformity in Standards across District boundaries, although varying resource issues may make that infeasible.

Finally, the District recognizes its responsibility in implementing State programs (e.g. TMDLs) and permits (e.g. MS4) and seeks to simplify the inherent overlap of regulatory jurisdictions and eliminate duplication of efforts where possible.

Goals/Results: Establish and maintain District controls necessary to achieve established District resource goals, comply with mandated permits and programs, and maximize regulatory consistency with neighboring jurisdictions.

Implementation Indicators:

- Regularly review and update District Rules as necessary to keep pace with changing resource issues and mandated regulatory programs;
- Ensure uniform MS4 program coverage across District using a documented cooperative approach that limits duplication of efforts;
- Work with neighboring Watershed Districts to develop uniform standards where possible;
- Require municipal adoption of District Rules within 2 years of any completed update; Prevent continued degradation of resources.

Implementation Tool: Assessment and Planning, Regulatory

Additional Information:

http://www.swwdmn.org/wp-content/uploads/2015/03/6-Standards_Amended2011.pdf, http://www.swwdmn.org/pdf/2015SWWDRules.pdf,

http://www.swwdmn.org/wp-content/uploads/2015/03/Washington-County-Water-Governance-Study.pdf,

http://www.swwdmn.org/wp-content/uploads/2015/03/SWPPP_2014.pdf

ISSUES AND GOALS: EFFICIENCY AND ACCOUNTABILITY

COLLABORATION AND COORDINATION OF EFFORTS

Issue: Minnesota is advanced in management of water resources. However, the framework of local, regional, and state jurisdictions which empower Minnesota to respond to water resource issues also results in a high degree of overlap in regulatory jurisdictions and responsibilities. SWWD believes implementation is generally best achieved at local levels of government and approaches this issue from two distinct angles; (1) addressing challenges of multiple, overlapping regulatory jurisdictions through collaboration and coordination of efforts and (2) pursuing opportunities to leverage existing local planning efforts and combining implementation programs and projects to gain economy of scale.

Goals/Results:

- Limit duplication of planning and implementation efforts by the District and its State and Local partners by improving collaboration and coordination of efforts.
- Create efficiencies in implementation through partnerships

Implementation Indicators:

- Collaborate and coordinate agency efforts through engagement of a standing Technical Advisory Committee;
- Incorporate local input into District planning efforts through engagement of a standing Citizens Advisory Committee
- Inform State and Regional agencies and organizations of local efforts through participation in their advisory committees;
- Combine local implementation to gain economy of scale;
- Incorporate implementation actions identified in regional planning efforts into District programs.

Implementation Tool: Assessment and Planning, Education

Additional Information:

http://www.swwdmn.org/pdf/LocallyDriven.pdf

PART III: IMPLEMENTATION

PROGRAMS

Several Watershed District programs are specifically required under MN Rule 8410 and the District's Municipal Separate Storm Sewer System (MS4) permit. While the District takes seriously its general roles and responsibilities it tailors those programs to first address priority issues identified through the aforementioned public process. The following programs reflect that commitment and are intended to establish the programmatic framework to facilitate a community response to issues currently identified in this plan and others that emerge during the course of implementation. That focus is reflected in the District's mission statement

-SWWD mission statement -

To manage water and related resources of the District in cooperation with our citizens and communities.