STRATEGIC OVERVIEW

2017-2026 WATERSHED MANAGEMENT PLAN

APPROVED BY
The Minnesota Board of
Water and Soil Resources
March 22, 2017

ADOPTED BY
The Ramsey-Washington
Metro Watershed District
Board of Managers
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RAMSEY-WASHINGTON
METRO WATERSHED DISTRICT

Strategic Overview

Ramsey-Washington Metro Watershed District 2017–2026 Watershed Management Plan

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Introduction

The Ramsey-Washington Metro Watershed District (RWMWD or District) is a special-purpose unit of local government that manages water resources on a watershed basis. The 2017–2026 RWMWD Watershed Management Plan (Plan) is a 10-year plan that includes goals, actions, and measures in six primary areas—surface water quality, ecosystems, flood management, groundwater, citizen education and involvement, and organizational management. The Plan was prepared in accordance with Minnesota Statutes 103D and 103B.231 and Minnesota Rules 8410.

The Plan is composed of two main parts: a strategic overview and a resource and organizational assessment. This document, the strategic overview, is designed to reach a broad audience and provide them with an understanding of the District's past, present, and future approach to effective watershed management. The resource and organizational assessment provides more specific details of the District's resources (district-wide and watershed-based) and organizational management (e.g., District operations such as regulatory programs, local water management plans, and the District standards).

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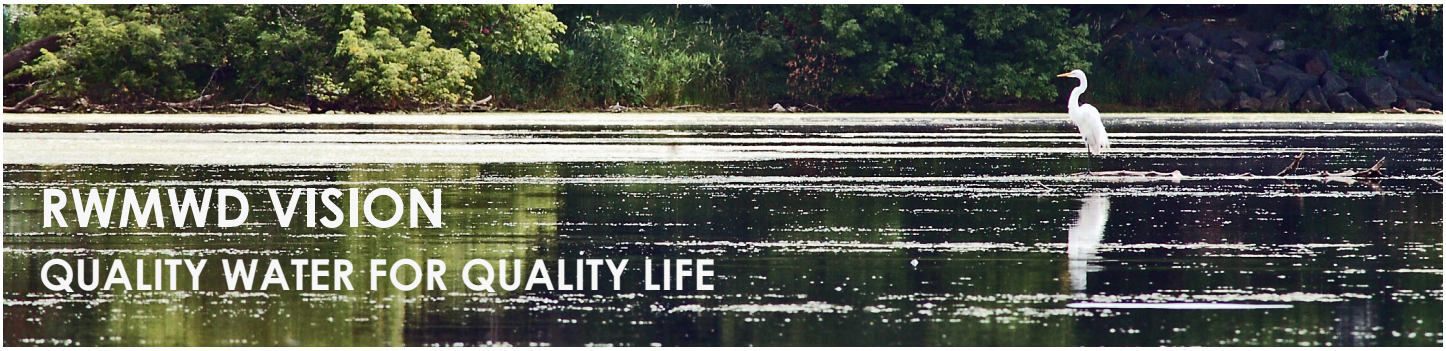


RWMWD VISION

QUALITY WATER FOR QUALITY LIFE

Mission

To preserve and improve water resources and related ecosystems to sustain their long-term health and integrity and contribute to the well-being and engagement of stakeholders within the community.

Core Principles

The Ramsey-Washington Metro Watershed District (RWMWD or District) will adhere to the following core set of principles that will guide their efforts to achieve the mission stated above.

The District will be:

- A leader and innovator in watershed management that integrates natural and built environments.
- An organization focused on high levels of performance and results.
- An organization that uses adaptive management, accurate information, and sound science to guide decision-making.
- A trusted and accountable steward of public resources and moneys.
- An active collaborator with a wide variety of public and private organizations.
- An important and reliable source of information, services, and projects.
- An effective advocate of watershed management principles and values.
- An organization that educates and inspires current and future stewards of the watershed.

Goals

Accomplishing the vision and mission of the District requires a focus on measurable goals. The District will pursue the following goals to ensure progress towards achieving its vision and mission:

1. **Achieve quality surface water—**Maintain or improve surface water quality to support healthy ecosystems and provide the public with a wide range of water-based benefits.

2. **Achieve healthy ecosystems—**Manage water and related natural resources to create and preserve healthy ecosystems.

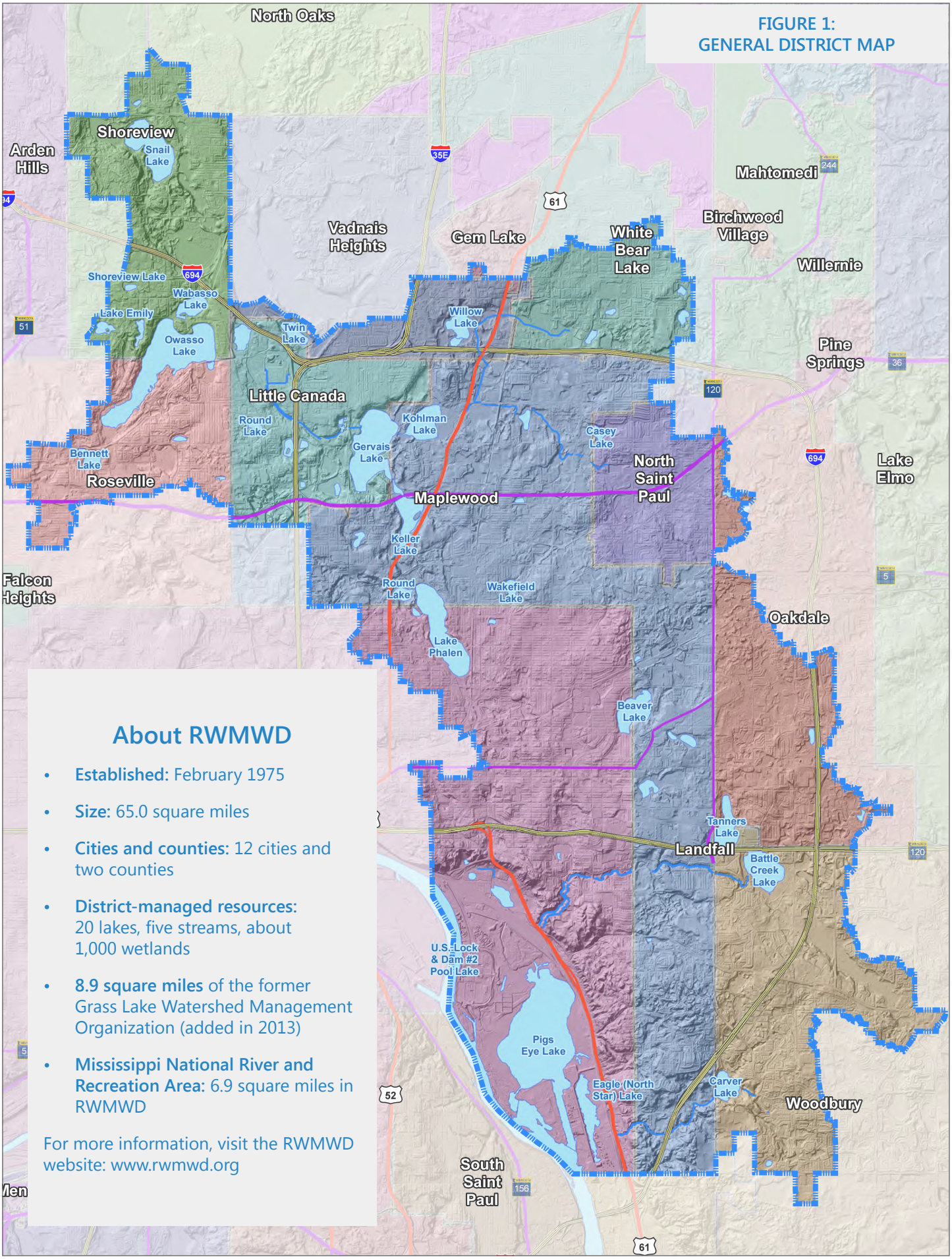
3. **Manage risk of flooding—**Reduce the public's risk to life and property from flooding through programs and projects that protect public safety and economic well-being.

4. **Support sustainable groundwater—**Consider groundwater sustainability management and connections to surface waters in decisions and collaborate with others responsible for groundwater management and protection.

5. **Inform and empower communities—**Inform and empower communities to become partners in improving and protecting the watershed through their own efforts.

6. **Manage organization effectively—**Operate in a manner that achieves the District's mission while adhering to its core principles.

FIGURE 1:
GENERAL DISTRICT MAP



About RWMWD

- **Established:** February 1975
- **Size:** 65.0 square miles
- **Cities and counties:** 12 cities and two counties
- **District-managed resources:** 20 lakes, five streams, about 1,000 wetlands
- **8.9 square miles** of the former Grass Lake Watershed Management Organization (added in 2013)
- **Mississippi National River and Recreation Area:** 6.9 square miles in RWMWD

For more information, visit the RWMWD website: www.rwmwd.org

1. Achieve quality surface water

2. Achieve healthy ecosystems

3. Manage risk of flooding

The District will maintain or improve surface water quality to support healthy ecosystems and provide the public with a wide range of water-based benefits.

Accomplishments

Surface water quality has been the primary emphasis of the District, with many relevant studies, projects, and programs implemented over the past decade.

The District tracks water quality in lakes and streams through its Water Quality Monitoring Program. As of 2016, the annual program included the monitoring of 15 major lakes. The District has also been monitoring outlet flows from Battle Creek, Fish Creek, and the Beltline Interceptor since 1995. The District uses this water quality data to assess progress towards its goals and adjust its programs, as needed, to make the best use of available resources.

The District has also completed numerous lake studies to:

1. Characterize the stormwater runoff and pollutant loading to District lakes.
2. Identify the effects of land-use changes on the water resources.
3. Assist in determining realistic water quality targets for individual lakes.
4. Develop strategies to protect and improve water quality.

A more comprehensive list of the lake studies completed by the District is included in Section 1 of the Plan and includes several strategic lake management plans and other lake and watershed studies. Based on recommendations from these studies and other water quality analyses, the District has implemented numerous projects to maintain or improve the quality of its water resources.

Most recently, the District cooperated with the Minnesota Pollution Control Agency on a watershed restoration and protection strategy study. Completed in 2016, this study identifies strategies to restore water quality in impaired waters and protect waterbodies that are not impaired. At the same time, the District worked with the Minnesota Pollution Control Agency to complete total maximum daily load studies for Bennett Lake, Wakefield Lake, Battle Creek, and Fish Creek. The District also worked with the Minnesota Pollution Control Agency to complete a total maximum daily load study for Kohlman Lake in 2010. The actions identified in the watershed restoration and protection strategy and total maximum daily load studies are included among the implementation items in this Plan.

The District also protects water quality through its permitting program. The program regulates activities at construction sites to minimize erosion and sediment loss and requires a stormwater management plan that adheres to District standards and criteria for treating stormwater runoff. Through this program, the District has facilitated implementation of a number of best management practices which minimize the impacts of development on water quality.

The District also implements a cost-share program that provides technical resources and funding to cities, counties, businesses, and residents who install stormwater best management practices (BMPs).

The location of all permit, cost-share, and District capital improvement projects implemented since the District's inception is shown on Figure 2.

Challenges

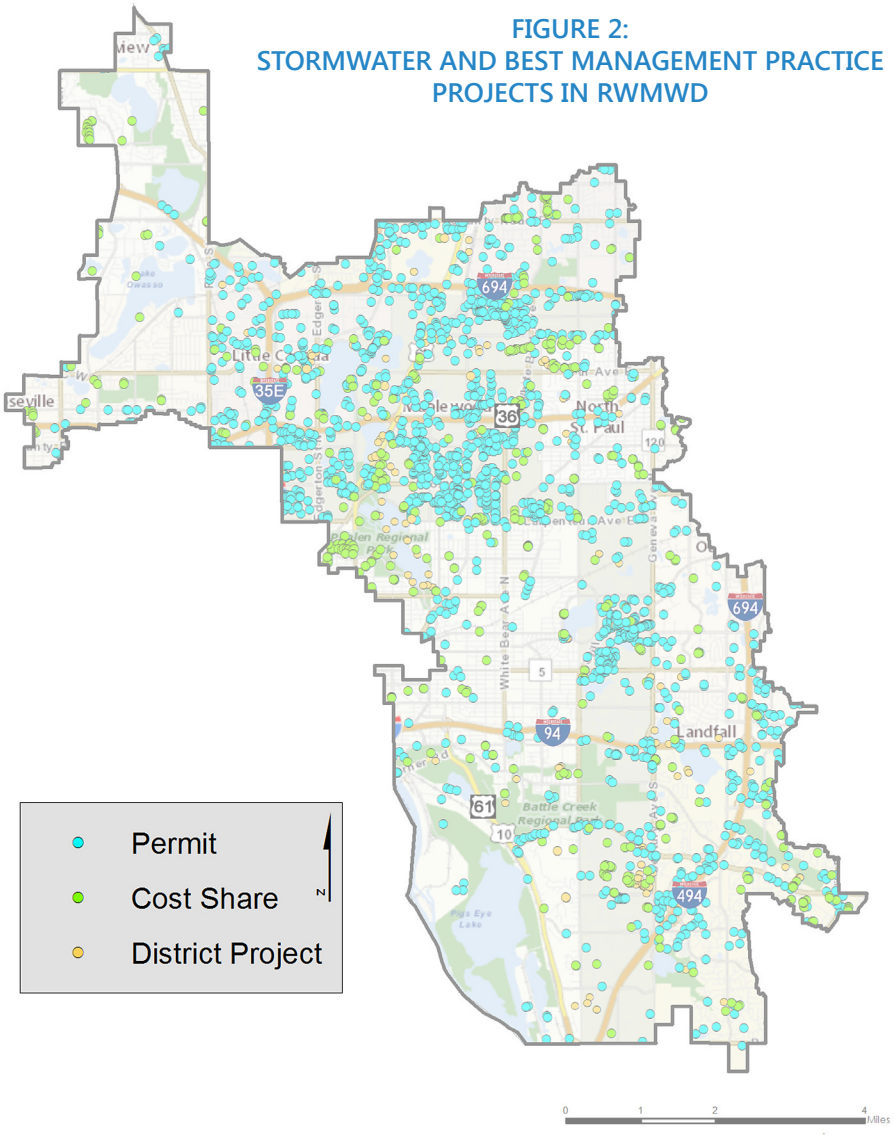
Water quality is commonly defined by its physical, chemical, biological, and aesthetic (appearance and smell) characteristics, but it is more than a collection of metrics. Water quality may be used to describe a water's suitability for specific and diverse purposes (drinking water, recreation, aquatic life). Good water quality results in a waterbody fulfilling its intended uses in a sustainable manner.

The lakes, ponds, streams, and wetlands in the RWMWD are important community assets, supplying recreational and aesthetic benefits, wildlife habitat, and fishery resources. The urban nature of the District makes it challenging to maintain high water quality, due to the extent of impervious surfaces, limited space for treatment, and sometimes long histories of pollutant loading. If water quality becomes degraded, a waterbody's intended uses may be impaired. If water quality is not maintained, the ecological function as well as the commercial and recreational value of our water resources will diminish and public health may be compromised. Several District waterbodies are classified as "impaired" by the Minnesota Pollution Control Agency because their intended uses are limited by excessive nutrients or other pollutants.

To address the water quality challenges facing the District, the board has prioritized the following as key areas to be addressed over the life of this Plan:

Research and implementation of innovative water quality practices— Due to the difficulty of removing phosphorus from stormwater runoff and surface waters, it will be necessary to explore innovative best management practices and treatment techniques. The District is giving special consideration

FIGURE 2:
STORMWATER AND BEST MANAGEMENT PRACTICE PROJECTS IN RWMWD



to stormwater infiltration practices and alternative treatment options as they become known.

Monitoring and maintenance of District water quality improvement projects—To ensure lasting benefit from the many water quality improvement projects implemented by the District, periodic inspection and maintenance is necessary. Ongoing monitoring programs allow the District to assess the benefits of specific projects and programs and measure progress toward overall water quality goals.

Promotion of and support for residential and other private best management practices—Due to the developed nature of the RWMWD and the fact that stormwater runoff is discharged over a wide area, small-scale best management practices throughout the watershed provide an opportunity to have a significant cumulative benefit on water quality. Future water quality improvements will require the involvement and action of property owners. The District can encourage cities, counties, businesses, and residents to implement best management practices by providing education, technical resources, and funding. This emphasizes the need for a comprehensive watershed education program that reaches multiple target audiences with relevant educational messages.

Reversing the impact of development—The quantity of stormwater runoff and mass of pollutants it carries depends on the amount of impervious surface within the watershed. Reducing the amount of impervious surface will reduce the pollutant load to downstream waterbodies while potentially reducing the risk of flooding. Because the District is already fully developed, redevelopment is the primary opportunity to reduce impervious area. The District's permitting program is an opportunity to limit increases and promote reductions of impervious area.

A major deterrent in achieving quality surface water is the cost associated with implementing best management practices and other treatment technologies. In fully developed areas, improvements in water quality often require significant investments to retrofit existing public and private infrastructure and acquire land for best management practice implementation. Focusing on the issues described above, the District plans to accomplish its goals by maximizing the benefit from available resources.

The challenges of achieving water quality in an urban environment

Water quality is closely linked to current and past land use and conditions in the surrounding watershed. The water quality of a lake, pond, wetland, or stream depends on:

- How much runoff reaches the waterbody and the path the runoff takes (hydrology).
- How much groundwater reaches a waterbody (hydrogeology) and the pollutants carried by runoff and groundwater.
- Processes occurring within the waterbody and the soil-water interface.

Stormwater runoff can carry significant amounts of sediment, phosphorus, and other pollutants. As urbanization continues, the resulting land disturbance and additional impervious surfaces (e.g., parking lots, roofs, roads, and driveways) increase the amount of pollutants carried in stormwater runoff.

Water quality ponds and other best management practices that slow/detain the discharge of stormwater are effective in removing particulate phosphorus in runoff. Ponds and other detention practices, however, require significant land resources which may not be readily available. These best management practices are also relatively ineffective in removing soluble phosphorus, which continues to be problematic for several District lakes.

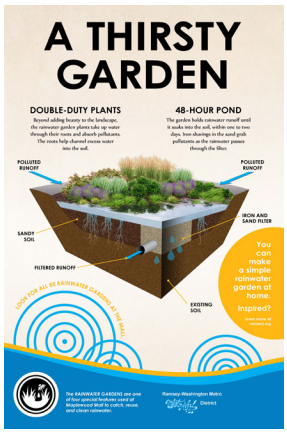
For examples of the innovative approaches the District uses to meet these challenges, read about the Maplewood Mall stormwater retrofit project.

Maplewood Mall stormwater retrofit

The Maplewood Mall stormwater retrofit project incorporates an array of best management practices to significantly reduce the amount of polluted stormwater runoff leaving the parking lot and entering downstream lakes.

In addition to rainwater gardens, porous paver crosswalks, a sand filter, and a cistern that captures mall roof runoff for irrigation, the system features more than a mile of rock trenches planted with 200 trees. These trees will remove up to 50 pounds of phosphorus annually. In addition, public art and educational components were incorporated to educate mall visitors about the benefits of treating stormwater.

The large-scale system captures and treats an average of 67 percent of the stormwater runoff from the 35-acre lot. By intercepting, filtering, and/or infiltrating the first inch of runoff, it removes an estimated 60 percent or more of the phosphorus that would otherwise flow into impaired Kohlman Lake.



A multi-faceted approach to stormwater management

Top: The cistern outside the Maplewood Mall entrance (top photo) captures runoff from the mall's roof, used for irrigation. The public art, seen behind the cistern, was incorporated to increase the project's aesthetics and facilitate community involvement.

Bottom: Left—Special tree trenches reduce the pollutants that enter Kohlman Lake from rainwater runoff. Right—Public education efforts included signage that explains the best management practices and how they work.

Action items

WQ1	Cooperate with the Minnesota Pollution Control Agency to complete future total maximum daily load studies, as necessary.
WQ2	Implement, or assist in implementing projects and/or programs recommended in total maximum daily load studies, watershed restoration and protection strategy studies, or other District studies.
WQ3	Assist local communities in implementing projects or other management actions resulting from the Minnesota Pollution Control Agency's Twin Cities Metro Chloride Project or future chloride total maximum daily load studies.
WQ4	Monitor lakes, streams, and watershed outlets to assess and evaluate long-term water quality trends.
WQ5	Assist local communities in meeting the water quality components of their National Pollutant Discharge Elimination System municipal separate storm sewer system (MS4) permit requirements.
WQ6	Assist the Minnesota Pollution Control Agency, as appropriate, with issues related to industrial stormwater management permits issued within the District.
WQ7	Implement and maintain water quality monitoring and research to assess performance of District projects and identify ways to further improve water quality.
WQ8	Support and promote research, monitoring, or other efforts to achieve a better understanding of factors influencing the quality of the water resources in the District and seek opportunities to incorporate this information into the implementation of water quality projects.
WQ9	Maintain District water quality improvement projects and consider opportunities to support the maintenance activities of others.
WQ10	Expand District collaboration efforts with cities and counties to assist in the implementation of appropriate technologies and maintenance practices for improving water quality.
WQ11	Expand the use of innovative water quality improvement designs, products, equipment, and methods as necessary to address sites with limited land area for conventional treatment techniques.
WQ12	Implement the District's permitting program.
WQ13	Encourage and provide technical assistance to individuals to implement water quality improvement practices at their homes and businesses and in public places.
WQ14	Continue the District's cost-share program to assist citizens, institutions, and businesses in implementing water quality improvement projects on their properties.
WQ15	Collaborate with local entities to reduce barriers to green infrastructure and alternative stormwater infrastructure design (minimum street widths, allowable pavement materials, etc.).
WQ16	Emphasize and promote pollution prevention throughout the District through education of stakeholders.
WQ17	Reduce stormwater runoff from impervious surfaces where opportunities arise (e.g., infiltration, impervious surface reduction, stormwater capture and use).
WQ18	Implement retrofit water quality improvement projects.
WQ19	Consider long-term changes to precipitation and hydrology when planning water quality projects or infrastructure modifications.

Signs of success

- Current and historical water quality data informs water resource management decisions.
- Projects and programs maintain or improve water resources, as confirmed by water quality trends.
- Water quality improvement projects are functional, properly maintained, and monitored for cost-effectiveness and long-term performance.
- Projects and programs work to remove impaired water bodies from the Minnesota Pollution Control Agency's list of impaired waters.
- Water resources are managed according to their unique characteristics and the goals established for them.
- Permitted projects are implemented following rules and standards, as demonstrated by improved contractor performance and decreased need for inspections and enforcement actions.
- Projects and programs incorporate new methods and innovative technology resulting from watershed management research.
- Landowners implement BMPs to improve water quality.

The District will manage water and related natural resources to create and preserve healthy ecosystems.

Accomplishments

The District has developed and implemented a natural resources program that creates and sustains healthy urban ecosystems. The overall program approach integrates the creation, preservation, and restoration of aquatic, wetland, and associated upland habitats with flood control, water quality protection, and other projects. The District has also completed several large-scale ecological restoration projects and actively manages a variety of urban habitats for fish and wildlife. It is committed to maintaining these areas over the long-term and providing opportunities for residents to learn about and enjoy them, and build personal connections. The locations of many of these ecological restoration projects are shown in Figure 2.

The District protects natural resources through its permitting program. With the exception of the City of Saint Paul, the District is responsible for administering the Wetland Conservation Act within the District boundaries. The Wetland Conservation Act and the District's permitting programs limit alterations to wetlands and require measures to protect these areas and associated ecosystems (e.g., vegetated buffers).

The District has implemented several projects and monitoring programs to characterize the current condition of ecosystems, addressing:

- Wetland inventory, assessment, and classification.
- Shore buffers, natural areas, and lake aquatic plant communities.
- Aquatic invasive species.

Data collected through these projects and programs are used to assess ecosystem health, track changes in environmental conditions, and help identify ongoing management tasks. Wetland data has been used in conjunction with District wetland buffer protection policies and city permitting to protect wetland habitat. Aquatic plant data has been used to develop and implement management plans addressing invasive species such as curlyleaf pondweed and Eurasian watermilfoil.

The District has developed successful partnerships with multiple stakeholders to facilitate healthy ecosystems. Collaborative efforts include:

- Encouraging land stewardship by administering the Landscape Ecology Awards Program (LEAP), which recognizes landowners in the watershed for implementing good land and water management practices (see page 16).
- Involving local school groups in its natural resources projects—from classroom exercises to hands-on, real-life field work (see page 17).
- Collaborating with university researchers on projects related to ecological restoration, biological monitoring, and invasive species management.
- Partnering with the University of Minnesota (since 2009) to study the presence and movement of invasive carp within the watershed and develop and implement practices to mitigate their impact (see page 9).

The District supports natural resource projects through cost-sharing and grant opportunities. Since its inception in 1998, the natural resources program has secured close to one million dollars in grant funds to conduct ecological restoration and research projects.

Challenges

Clean water and healthy wetland, shorelands, and associated upland ecosystems are critical components of the natural environment. These areas support an immense variety of microbe, plant, insect, amphibian, reptile, bird, fish, and mammal species and provide multiple benefits, including recreational and aesthetic benefits, flood risk reduction, increased biodiversity and wildlife habitat, sources for groundwater recharge, and more.

Healthy water, wetland, and associated upland ecosystems are defined by more than water quality; they are also defined by the characteristics of the plants and animals in and near bodies of water. Managing wetland, shoreland, and associated upland areas with consideration for their ecological functions is necessary to prevent degradation of these resources.

High quality natural habitats associated with the District's surface waters are relatively uncommon. There are numerous challenges when it comes to managing and restoring these natural systems in an urban watershed, some of which include:

- Limited land available for restoration and the complicated land ownership issues.
- Partner involvement and a commitment to long-term maintenance.
- The threat of invasive plant and animal species.
- Public perception—communicating the value of natural areas.
- Physical disturbance from human use (loving restoration areas "to death").

- Urban watershed stressors—extreme hydrological fluctuations, disturbed soils, erosion, elevated nutrient inputs, and legacy nutrients in aquatic systems.

To address the challenges facing water, wetland, and associated upland ecosystems in the District, the board has prioritized the following key areas to be addressed over the life of this Plan:

Partnering with agencies, cities, organizations, and residents on ecological restoration—The District does not own large tracts of land for preservation and management. Thus, forming partnerships with cities, counties, state agencies, and residents is critical to the ecological restoration program. A high priority is given to projects that are ecologically connected, visible, and provide recreational and educational value. We have a commitment to share technical knowledge with our local partners. We have a long history of securing state grant funds, and we will continue to pursue outside funding for large restoration efforts. A substantial portion of lake shoreland is in private ownership. We will support restoration of this critical habitat by offering cost-share opportunities and technical services to shoreland owners. We have a commitment to long-term maintenance of restored natural areas, and will communicate the importance of this approach to our partners.

Residents are essential District partners. The District will continue to incorporate public involvement in its restoration and natural resource management efforts. This includes providing opportunities to work in the field—preparing areas, installing native plants, or maintaining and monitoring ecological restoration sites. Through these efforts, the District will build community involvement and communicate the critical importance of natural areas in the watershed on many levels.

Keller Golf Course: An urban nature preserve

Keller Golf Course is a beautiful public course located just to the east of Lake Keller. It has played host to two national PGA championships, nine LPGA tournaments, and 38 Saint Paul Open competitions. The course has been a favorite of thousands of local golfers for nearly a century.

In 1996, Superintendent Paul Diegnau had a vision to minimize the golf course's impact on the environment. He has had an ongoing commitment to preserve the top-flight golf experience while establishing an "urban nature preserve" on the property. The no-play areas on this course are part of the natural corridor of the Phalen Chain of Lakes. This land provides critical habitat and improves water infiltration, which means less stormwater runoff to the lakes. In partnership with the District, Diegnau has received grant funding over the years to restore pond and wetland buffer areas, prairie, and woodlands. Today, the course boasts 26 acres of high quality no-play area, the greatest quantity of any course in the Twin Cities. A multitude of educational signs throughout the course share conservation messages. The golf experience remains exceptional, while innovative management has provided substantial benefits to the region's water and natural resources

Monitor and manage aquatic invasive plant and animal species—The District will actively manage invasive plant and animal species in waters where there is a benefit to water quality, ecosystems, and recreation. We will conduct and support monitoring programs that will detect new infestations, gauge management activities, and be used to develop new control programs. We will look for opportunities to support university research. We will partner with counties and the Department of Natural Resources in supporting a regional aquatic invasive species program which includes lake and boat

ramp monitoring, prevention plans, management, and education.

Control of shoreline erosion— Limiting shoreline erosion in wetlands, lakes, and streams is critical to preserving the ecological functions and environmental benefits of downstream waterbodies. The presence of vegetated buffers or other best management practices reduces the potential for shoreline erosion by obstructing the flow of runoff, reducing runoff velocities, and allowing infiltration. Leaf litter from vegetation has the added benefit of increasing the organic content of the soil and increasing adsorption and infiltration. Vegetation also scatters sunlight and provides shade—reducing water temperature in the summer, limiting nuisance algae growth, and reducing the release of nutrients from the sediment. Finding space for buffers in developed areas is often difficult; however, redevelopment provides a good opportunity to plan for them.

Recognize natural resource elements in all District projects— To achieve healthy ecosystems, the District must consider all opportunities to have a positive impact on natural resources. This includes evaluating the potential impact of all District projects and programs on the natural resources with which they coexist. The District will continue to looks for ways to optimize its actions to achieve natural resource benefits while accomplishing its other goals.

Monitoring and managing invasive species

Invasive aquatic animals, such as carp, zebra mussels, and spiny water fleas, can negatively impact water quality and ecological health. The common carp is an invasive benthivorous (bottom-feeding) fish found in the District and most metro-area lakes. Feeding on the lake's bottom, these fish stir up sediment and uproot beneficial aquatic plants, causing the water to become turbid or cloudy. This behavior also releases phosphorus from the sediment, leading to increased algal blooms and a decline in native aquatic plant communities.

In 2009, the District partnered with the University of Minnesota's Sorensen Lab on an applied research project to investigate carp in the Phalen Chain of Lakes. Through research and management the District has:

- Reduced the adult carp biomass by over 60 percent—from 130 pounds per acre to 48 pounds per acre (average biomass for Kohlman, Gervais, and Keller Lakes). Ninety pounds per acre is the threshold where carp negatively impact water quality.
- Eliminated carp in connected shallow lakes that were key spawning areas.
- Installed a carp barrier in Kohlman Creek to block carp from moving into spawning areas.

The District will continue to monitor and actively manage carp in the Phalen Chain and investigate opportunities for carp reduction in other lake systems.

Through summer box-netting, RWMWD has been able to remove 500 carp from the Phalen Chain of Lakes.

Creating critical pollinator habitat

In addition to cleaning and infiltrating water, high quality natural areas with a variety of native plants provide important pollinator habitat, especially in urban watersheds. Significant declines in the populations of pollinating insects have been widely reported over the last decade. Suspected stressors are disease, use of pesticides, habitat loss, and poor nutrition due to limited quantity and quality of appropriate flowering plants.

Ecological restoration areas in the District provide habitat that supports local animal pollinators throughout the seasons. A diversity of native plants provides food and shelter for bees, butterflies, moths, and hummingbirds. These species, which provide nectar, pollen, and other nutrition though the growing season, need to be considered when planning and managing restored native plant communities. The District must also consider pollinator ecology when developing long-term management plans that include prescribed burns and mowing.

During the summer, flowering plants and busy animal pollinators add enjoyment for visitors to restored areas. During the winter months, dormant standing vegetation offers important opportunities for nesting and hibernation.

Over the last 15 years, the District and numerous public and private partners have succeeded in restoring over 40 acres of critical park land in the Phalen Chain of Lakes corridor—once home to eroding lakeshore, weedy reed canary grass thickets, and noxious buckthorn and smooth brome slopes.

Action items

EC1	Implement the District's wetland permitting program.
EC2	Implement the District's lake aquatic plant monitoring program and assess data for trends.
EC3	Lead ecological restoration projects to improve water resources and associated upland habitat.
EC4	Monitor and maintain District restoration sites and natural areas.
EC5	Collaboratively manage invasive species that threaten water resources and associated upland habitats.
EC6	Coordinate with public and private organizations that are responsible for restoration and management of natural areas.
EC7	Provide technical services to organizations (e.g., cities, counties) that restore and manage natural areas.
EC8	Provide opportunities for schools, civic groups, and the Citizen Advisory Committee to become involved in restoration projects.
EC9	Inform watershed residents and stakeholders about ecological preservation and best management practices.
EC10	Publish and share information on water resources management and ecological restoration.

Signs of success

- The quantity of ecologically diverse aquatic, wetland, and associated upland habitats is increased.
- Priority natural areas are preserved, improved, and maintained.
- Wetlands are preserved and protected, as measured by their net area (no net loss) and the continued viability of their functions and value.
- Invasive species populations are reduced to lessen or eliminate their adverse impacts on water quality and associated habitats.
- Monitoring and research data are used to inform District projects and programs, and District data are shared to contribute to the science of ecological restoration.
- The District collaborates with public and private organizations to promote, implement, and maintain ecological restoration projects.
- Public awareness of accessible natural areas in the watershed is increased through partnerships.

The District will reduce the public's risk to life and property from flooding through programs and projects that protect public safety and economic well-being.

Accomplishments

The District has performed many studies and projects to address identified flooding problems within its boundaries. In addition, the District has collaborated with developers and local municipalities to address flooding issues. Many of these projects have been multipurpose in nature—providing not only flood protection, but water quality treatment, habitat improvement, and erosion control. They have reduced runoff volume (via infiltration), provided storage, and/or controlled stormwater discharge rates. These projects have also resulted in the removal of numerous homes and businesses from the floodplain. Notable flood protection projects and their locations include:

- Battle Creek Project 1—Saint Paul and Maplewood
- Battle Creek Lake Area Flood Protection—Woodbury
- Phalen/Keller Outlet Project—Saint Paul
- Target Pond—North Saint Paul
- Owasso Basin—Little Canada
- Beltline Interceptor Rehabilitation—Saint Paul
- Hoyt/Montana Project—Saint Paul
- Tanners Lake Emergency Response Plan—Oakdale
- Gervais Lake Emergency Response Plan (Little Canada)
- Battle Creek Lake Emergency Response Plan (Woodbury)
- McKnight Basin Emergency Response Plan (Maplewood)

In 1978, Battle Creek Park was closed to the public due to severe erosion and dangerous flash flooding. This ongoing problem became a significant focus for the District for nearly a decade. Successful flood management of Battle Creek required work on nearly 3 miles of creek and included installation of sheet pile drop structures, construction of a major flood detention basin, and installation of pipe to route flood flows underground.

The District continues to manage the risk of flooding through permitting and education programs. Projects that meet specific criteria, including those involving alteration to wetlands or floodplain areas, must be permitted. District rules include requirements for controlling the rate and volume of runoff from development sites; this reduces the strain on existing stormwater infrastructure. The rules also establish minimum building elevation requirements for development and redevelopment sites to protect homes and businesses from flooding. Floodplain areas are protected by ensuring 100-year flood storage volumes are maintained (i.e., no net loss of floodplain).

The District further manages the risk of flooding by promoting stormwater best management practices that limit runoff volume, including infiltration and water reuse. Encouraging these practices through its education program and best management practice cost-share program has the added benefit of reducing the potential pollutant load to downstream waterbodies.

In 2015, the District performed District-wide hydrologic and hydraulic modeling to assess the impact of recently updated precipitation data on 100-year flood elevations (see Section 1 of the Plan). The modeling results suggest increased 100-year flood levels and peak flow rates in many locations. The District will use this information in the design of future projects and programs.

Challenges

Both natural and developed environments are at risk of flooding. However, development can significantly increase flood risk by reducing the infiltration capacity of soils and increasing the amount of impervious area. These changes in the landscape increase the volume and rate of runoff, resulting in higher flows and higher water levels in downstream conveyances and basins. The risk of flooding may be further increased by future climate trends. According to the National Oceanic and Atmospheric Administration (NOAA) 2013 report on regional climate trends, storm amounts and intensities in the

Midwest are trending upwards (see Section 1 of the Plan). Higher intensity precipitation events are more likely to overwhelm the capacity of the land to infiltrate and attenuate runoff.

As development and redevelopment continues throughout the RWMWD, routing stormwater runoff to manage the risk of flooding remains a challenge. To address these challenges, the board has prioritized the following key areas to be addressed over the life of this Plan:

Reduction and management of stormwater runoff volume— Developed watersheds produce significantly more runoff than natural, undeveloped areas. This can result in flooding along stormwater conveyances or in downstream waterbodies. Even when feasible, increasing the capacity or storage of existing infrastructure is expensive and may simply shift flooding issues farther downstream. Reducing stormwater runoff volume where it is generated via infiltration, water reuse, or other best management practices is a more practical solution.

Identification, assessment, and mitigation of potential flooding problems—Though it may be a challenge to balance flood control efforts with other priorities, it will be necessary for the District to continue committing resources to the identification and management of flooding issues.

Infrastructure improvements to increase stormwater management capacity—Recent updates in regional precipitation data (see Section 1 of the Plan) project significant increases in the 100-year and other "design storm" events (events used to size infrastructure). The new data suggests that some existing infrastructure may be undersized for current or future estimated conditions. Increasing the capacity of existing stormwater management devices and planning for new infrastructure to accommodate future climate conditions poses a challenge for the District and its cities.

Action items

FL1	Maintain District flood storage facilities and storm sewer systems.
FL2	Implement and enforce the District permitting program, including volume control and flood-risk-management criteria.
FL3	Cooperate with appropriate stakeholders to identify, assess, and address potential flooding problems in the District.
FL4	Monitor lake levels within the RWMWD.
FL5	Implement flood emergency response plans for homes and businesses where a complete structural solution is not feasible or cost-effective.
FL6	Collaborate with cities to enforce minimum building elevations.
FL7	Update the District's 100-year flood levels and other critical hydraulic characteristics to reflect the best available information.
FL8	Reduce stormwater runoff volumes during development, redevelopment, or retrofit opportunities.
FL9	Incorporate anticipated precipitation and hydrology changes when planning flood control projects or infrastructure modifications.
FL10	Manage public ditches in a manner consistent with their current use as primary conveyors.

Signs of success

- Public and private infrastructure susceptible to flooding is identified.
- Collaboration with public and private organizations mitigates flood risk.
- Flood emergency response plans are implemented.
- The number of private and public structures within the established floodplain are reduced (where necessary) to minimize flood damage.
- Flood-control-prevention facilities and related storm sewer systems function as intended.
- Sound science and historical data are used to define flood elevation (100-year) and floodplain extent and to inform flood risk mitigation decisions.

The District will consider groundwater sustainability management and connections to surface waters in decisions and collaborate with others responsible for groundwater management and protection.

Accomplishments

Throughout its existence, the District has collaborated with other entities responsible for the management and protection of groundwater resources. From 1990 through 2002, the District implemented a cost-share program that provided applicants with 50 percent of the funds required to seal unused and abandoned wells. The District also assisted Ramsey County and several cities in sealing large, abandoned deep-aquifer wells.

The District participated in the most recent Ramsey County (2010) and Washington County (2015) groundwater planning and provided technical assistance to its cities during the development of their municipal wellhead protection plans. From 2013 to 2015, the District also cooperated with the Minnesota Department of Natural Resources in developing the North and East Metro Groundwater Management Area Plan. This plan will guide efforts to sustainably manage groundwater appropriations. The District is open to future collaborative efforts to assure the safety of area groundwater resources.

The District has also conducted, funded, and/or participated in numerous groundwater studies. In 2005 the District helped fund the Washington County and Washington Conservation District joint study, *Integrating Groundwater and Surface Water Management: Southern Washington County.* More recently, the District performed a *Groundwater/ Surface Water Interaction Study* (Barr 2015), which considered local geology and soils, depth to groundwater, proximity to surface waters, and volume. The study also identified areas for focused groundwater recharge via stormwater infiltration.

Challenges

Many District residents obtain their drinking water from groundwater. This makes it especially important to ensure that these aquifers are protected from contamination and provide adequate supplies. Overuse and contamination of groundwater can impact human health and have negative effects on highly valued resources such as streams, wetlands, groundwater-connected lakes, and fish, wildlife, and plant communities. Well data collected by the Minnesota Department of Natural Resources, the United States Geological Survey, and others have raised concern about the long-term sustainable use of groundwater across the state, including the RWMWD.

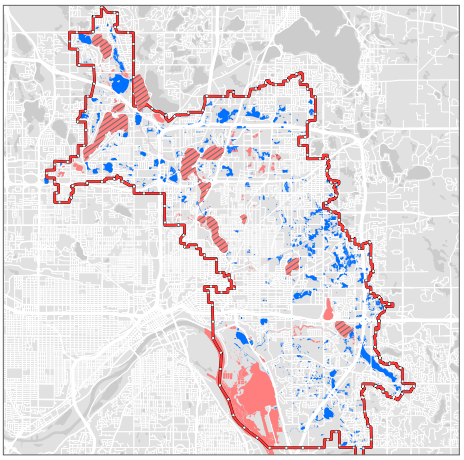
To address the District's groundwater management challenges, the board has prioritized the following key areas to be addressed over the life of this Plan:

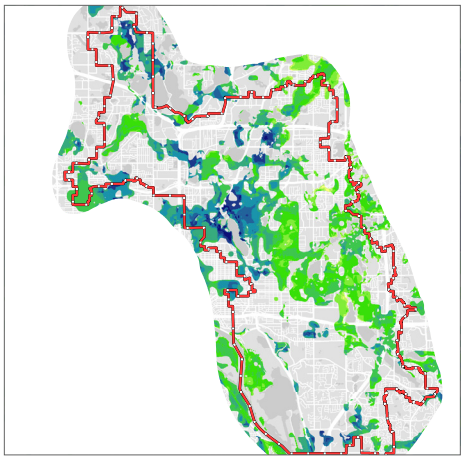
Support of research to better define relationships between surface water and groundwater quality—Groundwater quality and quantity is linked to the above-ground environment. Quality is dependent on the infiltration of surface water/ rainfall through the soil. Soil type, land cover, and other factors influence groundwater recharge and, ultimately, groundwater supply. Conversely, the quality of groundwater may impact the quality of water in the waterbodies it feeds. Understanding the types and extents of surface water-groundwater interactions is critical to evaluating the impacts of proposed projects and actions in the RWMWD.

Identification of sensitive areas where infiltration should be limited—As the District increasingly promotes the use of infiltration basins as a best management practice to reduce the volume of stormwater runoff and pollutant load, it is important to evaluate the potential impacts of infiltration on the quality of groundwater. Determining whether proposed infiltration basins could contribute pollutants to the groundwater is a challenge since available information on the migration of pollutants into shallow groundwater and subsequent implications is limited. Several cities in the watershed have identified vulnerable groundwater recharge areas in their wellhead protection plans. The District needs to be aware of these designated areas and consult with cities when making stormwater management decisions that may affect groundwater supplies.

Implementation of programs to control/limit potential groundwater contaminants—Groundwater can be contaminated by commercial and industrial waste disposal, landfills, leaking underground storage tanks, salt and other road chemical applications, non-functioning subsurface sewage treatment systems, and other sources. With adequate knowledge of potential contaminant sources and impacts, the District may develop and prioritize programs or projects to address these contaminants.

Collaboration with other entities to ensure the sustainability of groundwater resources—Cities, counties, and state agencies are assigned various groundwater protection and management roles, including preparation of wellhead protection and groundwater management plans and data collection. The role of watershed management organizations in protecting and managing groundwater resources is not clearly defined by statute. This has made it challenging to manage stakeholder expectations regarding the District's level of involvement in groundwater-related activities. Further definition of the District's role and responsibilities will contribute to more effective management efforts.





In 2015, the RWMWD completed a groundwater-surface water interaction study to identify areas that are well-suited for targeted infiltration projects. These projects would help recharge groundwater aquifers—benefitting surface waters and drinking water supplies. The figure above (left) shows waterbodies that are likely vulnerable to changes in groundwater level (pink areas are particularly vulnerable, blue less so). The figure above (right) shows District areas that are well-suited for targeted infiltration (the "bluer" areas).

Signs of success

- The relationship between priority surface waters and groundwater resources is increasingly understood.
- Collaboration with cities, counties, and other agencies contributes to the effective management and protection of groundwater.
- Programs and projects support sustainable groundwater quantity and quality.

Action items

GW1	Review implementation of the Ramsey County and Washington County groundwater plans and participate in collaborative efforts to promote the quality and quantity of groundwater resources within the RWMWD.
GW2	Study the connection between surface water and groundwater throughout the District.
GW3	Collaborate with local and state agencies to: • Gain a better understanding of groundwater-surface water interaction and develop management strategies that address the protection of both resources. • Identify data gaps and work to fill those gaps through collection of groundwater-level data, surface water data, research, or other methods. • Identify areas of potential vulnerability. • Develop and utilize tools to assess the impacts of groundwater use on surface water and groundwater (e.g., refinement of the Metro groundwater model, better synchronization of surface water and groundwater models, etc.). • Identify sensitive groundwater areas where infiltration should be limited.
GW4	Use available information and guidance to evaluate potential impacts of stormwater infiltration best management practices on groundwater and make changes to the District's infiltration standards and programming, as appropriate.
GW5	Maintain an inventory of infiltration projects that can be shared with agencies that govern groundwater resources.
GW6	Cooperate with Ramsey and Washington Counties to promote sealing of abandoned wells.
GW7	Review updated city wellhead protection plans.
GW8	Participate in local and state agency groundwater permitting and planning programs, as necessary to protect District water resources.
GW9	Research and identify the impact of District infiltration projects on regional aquifer recharge to guide future actions.
GW10	Inform residents, city staff, and other stakeholders about topics key to supporting sustainable groundwater (e.g., groundwater-surface water interaction, impacts of withdrawal, conservation practices).

The District will inform and empower communities to become partners in improving and protecting the watershed through their own efforts.

Accomplishments

Engaged, cooperative stakeholders support a water management organization's ability to achieve its mission. Recognizing this, the RWMWD established a public involvement and education (PIE) program. The mission of the PIE program is to create sustainable networks of watershed stewards to help the District inform and empower communities to engage in their own efforts to improve and protect the watershed. The RWMWD has established PIE program activities, methods, and tracking mechanisms to ensure that appropriate, relevant education messages reach multiple target audiences. The District periodically updates its messages and methods to maximize its effect.

The District advances its PIE mission and goal by:

- Frequently interacting with cities—providing support for permit review and compliance and hosting a monthly meeting with city and county public works staff and engineers and planners regarding best management practices and stormwater infrastructure maintenance.
- Educating and informing various stakeholder communities by publishing information via the District website, blog, newsletter, social media, and hosting workshops.
- Interacting with District communities including residents, schools, faith-based organizations, homeowner associations, and businesses to provide watershed education on rain gardens and other best management practices, sustainable landscaping, winter maintenance, aquatic invasive species, habitat restoration, water conservation and groundwater protection, and a variety of other topics. District staff engage up to 20 schools annually, develop lesson plans, lead tours, organize the annual WaterFest celebration, and support classes with service learning projects.
- Coordinating a robust collaboration among Master Gardener, Master Naturalist, and Master Water Steward volunteers to assist in a variety of watershed initiatives, including BMP education and project implementation and natural resources habitat and shoreline restoration projects.
- Encouraging landowner participation in protecting local water resources by administering the Landscape Ecology Awards Program (see sidebar at right).
- Implementing a best management practice cost-share program. Since 2006 this cost-share program has provided technical resources and funding to watershed residents, faith-based organizations, and businesses to implement over 300 projects using best management practices.

The Landscape Ecology Awards Program (LEAP) team, which includes nine volunteers, identifies landowners who model sound management practices that preserve and improve the District's water quality and natural resources (see sidebar at right).

Through this combination of efforts, the District has leveraged its resources to create an increasingly self-sustaining program. The intent is for individuals, schools, faith–based organizations, and businesses to take what they have learned through District programs and educate others within their own communities. As K–12 schools, community colleges, and neighborhood groups adopt watershed-friendly practices and, subsequently, educate more people, the District gains a sustainable

community of watershed stewards. In this spirit, all staff members are educators and ambassadors for the District. The District office itself is an educational tool—designed to function as a best management practice demonstration site and education center.

The District extends its education reach beyond its boundaries by participating in several collaborations including Metro WaterShed Partners and Blue Thumb. These groups develop collaborative watershed education outreach initiatives, exhibits, brochures, communication/media campaigns, advertisement, and websites. The District has also collaborated with other metro watersheds on strategic communication efforts and with the University of Minnesota on a community capacity study to understand and remove obstacles that prevent the realization of District goals.

Challenges

Partners and other stakeholders (e.g., residents) play an important role in the District's pursuit of its vision. For example, informed and involved citizens may choose to take action in their neighborhoods and on their properties to improve the quality of stormwater runoff. Conversely, public opposition to projects or programs can prevent their implementation or limit their effectiveness.

To address the challenges to fostering informed and empowered communities, the board has prioritized the following key areas to be addressed over the life of this Plan:

Support for residents, institutions, and businesses to create shared watershed stewardship efforts— Community support and participation can greatly increase the return on investment from District programs and projects. Implementation of modest stormwater best management practices throughout a community can have a cumulative positive effect on water resources. However, to affect positive change in the watershed, communities must be provided with the knowledge, resources, and inspiration to do so. The District's education program must continue to provide this support (e.g., through the best management practice cost-share program).

Education for city staff, advisory commissions, and public works departments—Cities are responsible for maintaining their storm sewer systems (MS4 permits) and serve various other water resource management roles (e.g., maintaining trails or other recreational facilities). The District is in a position to assist cities in fulfilling these roles. Such collaboration between the cities and the District may reduce redundancies and maximize limited municipal resources.

Expanded awareness of District programs—Increasing the visibility of the District and its accomplishments will help expand its influence on public behavior, increase the number of volunteers and other partners, and foster a community of watershed stewards.

Education efforts targeted and tailored to specific audiences—To develop a shared vision of watershed stewardship, the District must connect with a broad range of audiences. However, stakeholders span a wide range of ages, have different educational and cultural backgrounds, and may have contrasting water resource priorities. It will be a challenge to reach the most relevant audiences in ways that encourage them to learn about and adopt behaviors that positively impact water resources.

LEAP program

The Landscape Ecology Awards Program (LEAP) recognizes owners of private, public, and commercial properties within the RWMWD that use best management practices to preserve and improve water quality and natural resources. These practices include the use of native plants in landscaping, rain gardens, rain barrels, limited use of fertilizers and pesticides, and vegetated buffers around lakes, ponds, and wetlands.

Since the inception of the LEAP program in 2002, 83 sites have been recognized, including 64 private residences, four schools, four businesses, two churches, and nine government entities.

RWMWD in the schools

Each year over 800 students and teachers in the RWMWD get involved in watershed-based programs and projects. Through their participation, students engage in the natural world, gain awareness and understanding of issues in the watershed, and make meaningful contributions toward the improvement of water quality and habitats in their neighborhoods.

Photo (top): Fifth-grade classes at L'Etoile Du Nord French Immersion School participated in a service learning project, using spray paint to stencil the message "Keep 'em Clean/ Drains to River" next to 100 storm drains.

Photos (bottom): Eighth-grade students from Battle Creek Middle School held their science class at the creek, monitoring water quality parameters and collecting macroinvertebrate samples.

WaterFest

The District held its first WaterFest in 2000 to promote connections between residents and the natural community. The free event, which attracts more than 4,500 participants, offers outdoor entertainment and hands-on educational opportunities. It creates awareness of the District, its programs, and the resources it protects.

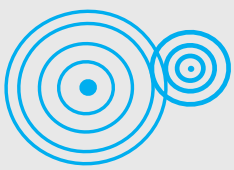
WaterFest is a collaborative effort, supported by area cities, counties, conservation districts, non-profits, and local businesses.

Action items

IE1	Use the District's best management practice programs and participants to increase public awareness, visibility, and interest in the District and its efforts and positively influence the actions of others.
IE2	Recruit and engage volunteers in District projects and programs (including restoration activities, best management practice implementation, aquatic invasive species management, and others).
IE3	Develop and support educational programs and resources that will inform residents and other stakeholders about how individuals can be responsible stewards of the watershed through their own actions.
IE4	Implement tours, workshops, and other events to increase awareness of watershed issues.
IE5	Collaborate with cities, watershed management organizations, and other stakeholders to develop and implement shared communication and messaging strategies.
IE6	Cooperate with city staff and other MS4 permittees to provide ongoing education regarding stormwater best management practices and other topics relevant to MS4 permit compliance.
IE7	Integrate the District's education efforts into all projects and programs.
IE8	Evaluate the District's education program annually and update the program, as necessary, to address emerging issues and use current science, available resources, and communication methods.
IE9	Tailor information content and delivery methods to appropriate audiences and intended outcomes.
IE10	Implement the District's communication plan, using various media (e.g., press releases, social media, blog) and keeping the District's key messaging items current (e.g., logo, website).
IE11	Implement a K–12 school program that empowers youth and educators to take action to address watershed issues in cooperation with the District and community partners.
IE12	Build partnerships with community involvement groups, college classrooms, and other stakeholder groups to recruit volunteers and increase community participation in watershed activities.
IE13	Hold events (e.g., WaterFest) to celebrate community connections and participation, showcase partner accomplishments, and educate youth, families, and residents about clean water.
IE14	Work with cities, neighborhoods, and other stakeholders to promote understanding and acceptance of green infrastructure and alternative stormwater management practices.
IE15	Support a Citizens Advisory Commission and engage the group in a meaningful watershed management role.
IE16	Develop a program to incorporate public art into District programs and projects.
IE17	Coordinate with cities and other entities to accommodate additional benefits (e.g., recreation access, aesthetic improvements) to District projects as opportunities arise.

Signs of success

- Cities are active partners in water resource management through project collaboration, program support, application of best management practices, and promotion of public education about watershed protection and improvement measures.
- Residents, neighborhoods, and other community stakeholders increasingly participate in District projects and programs.
- The District's school and community education programs contribute to educating young citizens about watershed issues.
- District events continue to expand their audience, public participation, and partner involvement.
- The Citizen Advisory Commission is an active and effective volunteer advisory group.
- Community awareness of the District and its role in water resource management is increased among watershed residents and stakeholders through the expanded use of communication channels.



The District will operate in a manner that achieves its mission while adhering to its core principles.

Accomplishments

The District is governed by a five-member board of managers. Four managers are appointed by the Ramsey County Board and one by the Washington County Board. The long average tenure of its board members (12 years) is an indicator of the overall health of the District as an organization. The current board members have served on the board from one to 30 years. The board continues to provide clear leadership for the District by focusing on the strategic direction of the organization and its responsibility to manage water and related resources.

Since its creation in 1975, the organization has seen significant growth in its staff. After relying solely on consulting staff from 1975 to 1988, the District hired its first administrator in 1989. As of 2016, the District has 12 full-time staff and employs several seasonal interns. The District strives to provide a work environment and professional experience that attracts and retains high-quality natural resource and administrative personnel. The District offers a competitive salary schedule and benefits program. The low turnover rate among the District staff is one indicator of effective organizational management, which increases operational efficiency.

Though it has developed an ambitious implementation program, the District continues to maintain a balanced budget, with approximately $6,500,000 in expenditures in 2015. Most of the District's funds come from taxpayers (either directly through the District's ad valorem levy, or indirectly through government agency grants). The District will continue to demonstrate that it is cost-conscious and responsible with public dollars. This includes annual reporting of expenditures and budgeting and periodic review of program costs and available funding methods.

To be both effective and efficient, the District coordinates and collaborates with other organizations and agencies on a number of efforts to accomplish its goals. One example of this is the District's Public Works Forum, comprised of city and county public works staff. The forum allows the District to share ideas and information and develop collaborative implementation programs with other local governmental units.

Challenges

While the District is recognized as an effective watershed district, it faces a number of organizational challenges to maintain and its high level of performance. Board members and staff must understand their respective organizational roles. The organization operates most efficiently when the board focuses its attention on larger issues (such as setting organizational goals and defining organizational policies) and staff focuses on the implementation of programs, projects, and other planned actions. Effective communication between the board and staff is necessary to ensure that the District's actions are aligned with goals that support the ultimate vision.

The District includes all or part of 12 cities and two counties. Several state agencies also have jurisdiction

Photos (left and above): The Ramsey-Washington Metro Watershed District office building incorporates environmental stewardship and serves as an example of low-impact site development. The design includes an infiltration-based stormwater management system using native plants, rainwater gardens, a green roof, and a pervious asphalt parking lot.

over resources within the watershed. Each of these entities has unique interests, political challenges, and land-use and operational issues. A significant challenge for the District is working and collaborating with other entities that are required to balance water resource management interests with other responsibilities (e.g., transportation, police and fire protection, economic development, human services).

To address the challenges of managing the District organization effectively, the board has prioritized the following key areas to be addressed over the life of this Plan:

Leadership in innovation through research, projects, and collaboration—The challenges facing the District in achieving its goals are complex. Solutions are subject to multiple constraints, including cost, technical feasibility, and community support or opposition. Effective solutions to current and emerging water resource management problems will require innovation. The District is committed to leading innovation through its own research efforts and demonstration projects, as well as collaborative efforts with its partners (see example on page 22).

Adaptive management—Water resource management issues continue to evolve due to a number of factors: underlying science becomes better understood, regulatory environments change, and community priorities shift. To accomplish its vision under such conditions requires the District to monitor its actions, track progress towards its goals, learn from experience, and adjust accordingly. To do this, the District must use accurate and relevant assessment tools, allowing the board to evaluate progress toward goals and whether alternative projects, programs, or actions should be implemented.

Implementation of cost-effective projects—The District recognizes its duty to its taxpayers to spend its funds in a manner that considers the relative benefits of its actions. The District evaluates relative costs/benefits using past experiences, best professional judgment, and drawing on resources such as consultants, advisory committees, and other cooperating entities. The District annually reassesses its implementation programs to remain fiscally responsible.

Green roof at the RWMWD office building

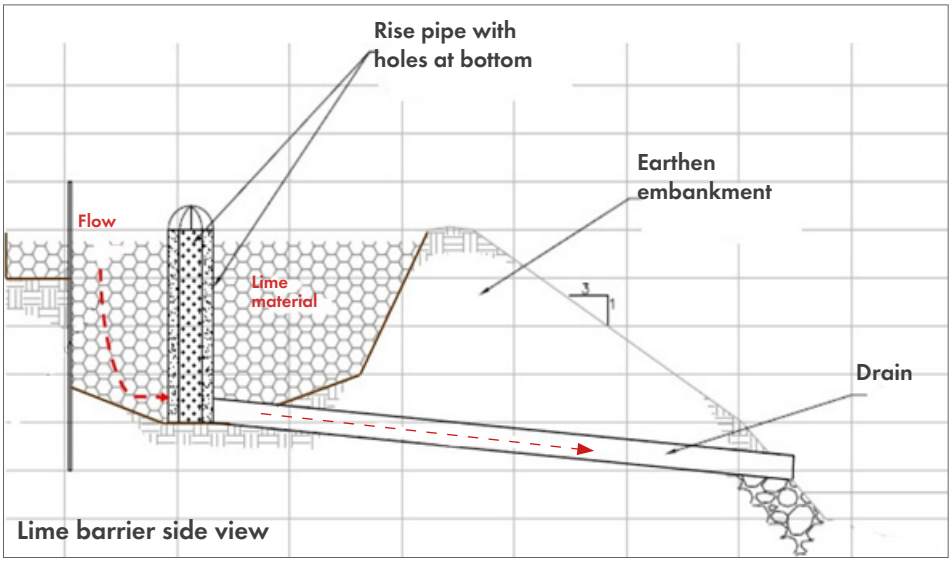
Action items

MO1	Implement effective board leadership through continued board education, succession of positions, and maintenance of the District's charter, bylaws, and mission statement.
MO2	Periodically assess the District's vision and mission to ensure they reflect the intentions of the District and its board.
MO3	Assess projects and programs relative to the District's vision, mission, and ongoing strategic planning.
MO4	Develop an annual plan and budget, including periodic reassessment of District project and program priorities and District capacity.
MO5	Maintain financial solvency and accountability through annual review of the District's accomplishments and spending; the District will document its performance in its annual report.
MO6	Implement cost-effective projects and perform a cost-benefit analysis on projects.
MO7	Follow all legal requirements applicable to watershed districts.
MO8	Pursue opportunities for grant funding for District projects and programs.
MO9	Continually develop staff through education and collaboration, focusing on emerging technology and the latest information.
MO10	Create a positive work environment for staff by offering competitive salaries and benefits as well as opportunities for professional growth.
MO11	Develop and implement methods/programs for measuring, tracking, and reporting progress towards achieving District goals.
MO12	Practice adaptive management: implement, monitor, track progress, learn from experience, adjust (and repeat).
MO13	Promote innovation by sponsoring research projects and collaborating with organizations and agencies to address water resource management challenges.
MO14	Base decisions on sound science; use methods and procedures that are affirmed through existing research, monitoring, and/or accepted practices.
MO15	Implement, track, and update the District's permitting program, including periodic updates to the District's rules, as necessary.
MO16	Coordinate management efforts and collaborate with local and state agencies and governments to promote the efficient use of resources.
MO17	Coordinate with private sector and nonprofit organizations.
MO18	Consistently provide and maintain current technology and equipment to effectively manage information and processes.
MO19	Maintain a service-oriented, fair-minded, and courteous approach in all District business.
MO20	Conduct reviews of permit applications and project proposals in a fair and equitable manner.
MO21	Consider the social, economic, and environmental impact of projects and programs.

District innovation highlighted by spent-lime project

The District is committed to innovation in stormwater management—that's why it was the first to use spent lime to treat stormwater. The spent-lime system (shown below) was designed to reduce phosphorus loading to Wakefield Lake. Spent lime is a by-product of lime-softened drinking water; its primary components are calcium carbonate and magnesium carbonate. The properties of this material enable it to bind or remove dissolved phosphorus (orthophosphate), particulate phosphorus, suspended solids, and metals. Performance monitoring indicates that 74.4 percent of orthophosphate is removed from the stormwater, as well as 66 percent of particulate phosphate.

Spent lime is "green" waste material that can be cheaply obtained from water treatment facilities. In addition to its cost and effectiveness, advantages include a long life span, the ability to treat large volumes of stormwater within a relatively small footprint, and easy maintenance. In addition, treated stormwater is not toxic to aquatic life.



When stormwater enters the cell it begins to infiltrate through the spent-lime material; the average contact time is 5 minutes. The outlet consists of a riser with 1-inch-diameter holes. Peak outflow rates are often seen after the peak of the storm event, as the water level draws down around the riser and a head differential develops between the outlet and inlet of the cell. Below: A treatment cell before (left) and after (right) introduction of spent lime.

Signs of success

- The District is a positive, productive, and efficient place to work.
- Sound fiscal management is demonstrated.
- The board establishes goals, policies, and procedures, and regularly evaluates progress toward goals.
- Input from stakeholders informs the District's projects and programs.
- Progress towards District goals is measured.
- Qualified and highly effective staff are employed and retained.
- District facilities and equipment are maintained to perform as designed or manufactured.
- Other organizations recognize the District as a leader in innovation.

Ten-year implementation program/funding

The Plan includes a comprehensive list of the projects and programs that comprise the District's implementation program. The implementation program includes operational costs, District-wide activities, and anticipated actions targeting specific subwatersheds over the next 10 years. The District's expenses are summarized in the pie chart on page 24. The District will fund its implementation program using three primary sources:

1. Property tax levy
2. Grant funds
3. Local cost-share funding

Approximately 95 percent of the District's funds for implementing capital projects, programs, and other operations are raised through a property tax levy. This tax is an ad valorem tax (a tax on all taxable parcels in the District, based on property value).

Per Minnesota Statutes 103B, watershed districts in the Twin Cities metropolitan area have the authority to levy an ad valorem tax to pay for the costs of implementing their watershed management plan. This includes costs related to the District's operations (facilities and staff), programs, capital improvement projects, and maintenance. The District also has the authority to finance large capital projects by selling bonds or securing loans.

The District's preferred financing approach is to pay for District capital improvements in the year they are constructed. Larger projects (in excess of approximately $1 million) may be financed in multiple years. For example, the Maplewood Mall retrofit project, constructed from 2009–2012, was broken into multiple phases and partially financed by the capital improvement budget over each year of construction. Large projects may also be funded through bonds or loans. The District has issued its own bonds and will continue to do so, if needed. Current and past bond issues and loans and their original amounts are listed in Section 3 of the Plan.

Grants and loans make up a small percentage of the District's funding sources. The District will continue to apply for grants and loans to offset project and program costs whenever possible and cost-effective. However, grant and loan programs are highly competitive and change frequently as available funds and priorities change, new grants/loans become available, and existing programs are terminated. The District will also seek opportunities for partnerships or cost-sharing to reduce its portion of project and program costs.

Since its inception in 1975, the District has determined and justified the amount of its annual levy through its work program and budgeting process. As a guiding principle, the District intends to restrict its annual levy to a property tax rate of approximately 0.025 percent, or about $25 per $100,000 of property value. From 2006 through 2015, the District's annual levy ranged from approximately $3 to $6 million. This tax rate will allow the District's levy to grow at approximately the same rate as the increase in property values. This self-imposed tax limit requires that the District establish spending priorities to assist the board in decision-making when there is a high demand for the District's programs.

The general schedule of the District annual work program, budgeting, and levy process is as follows:

1. **March 1–July 1:** Prepare biennial work program and budget report. Present to board for review
2. **July 1–August 1:** Develop preliminary work program and budget for the next calendar year using the biennial report and current year spending estimates
3. **August 1:** Board review of preliminary work program and budget; board approves distribution of work program and budget for review and comment by District cities, counties, and community groups
4. **September 1:** Public hearing on proposed work program, budget, and preliminary levy
5. **September 15:** File preliminary levy certification with counties
6. **October 1–December 1:** Refine work program, budget, and levy as needed to address community input and public comments
7. **December 1:** Board approval of final work program, budget, and tax levy
8. **December 28:** File final levy certification with counties

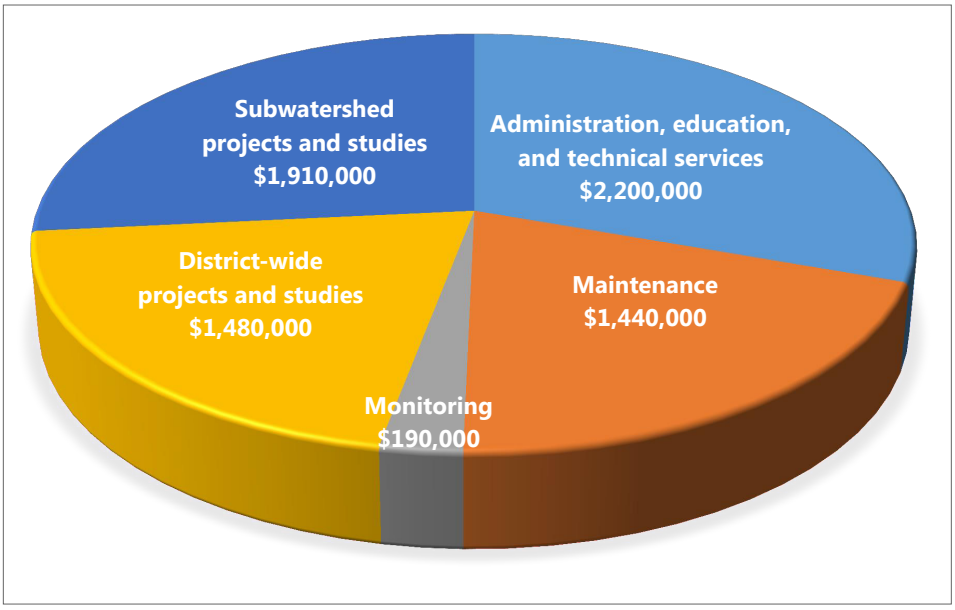
The District will follow all applicable Minnesota Statutes and Rules for notification and hearings on budgets and capital improvement projects. The District will cooperate and work with Washington and Ramsey Counties to provide District budget and levy information prior to preliminary and final levy notice deadlines.

The implementation program costs shown in the pie chart at right are expressed in 2016 dollars and will be adjusted according to inflation.

The Ramsey-Washington Metro District's board is responsible for overseeing the implementation of the District's programs and managing its budget. Pictured from left to right are: Cliff Aichinger, Pam Skinner, Jen Oknich, Marj Ebensteiner, and Robert Johnson.

Estimated annual program costs by category

Total average annual costs = $7,220,000



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