





Chapter 13

SURFACE WATER

The City of Maplewood (City) has completed an update to its Surface Water Management Plan (SWMP or Plan) to establish a more functional and up-to-date guide for future surface water management activities throughout the City. The full SWMP, the 2018-2028 Maplewood Surface Water Management Plan, is a separate document that builds on the City's activities under the National Pollutant Discharge Elimination System Permit (NPDES) program, highlights the range of issues the City faces related to overall management of the conveyance and treatment systems and discusses the critical partnerships the City has with the local watershed organizations. This Chapter of the Comprehensive Plan provides a summary of the full SWMP, including a brief description of the purpose and basis for this updated Plan, followed by a presentation of the overriding goals that were used to guide development of the Plan and highlights the key issues the City intends to address as part of the Plan.

WHAT WE HEARD

“ » Appreciate collaboration between City and Watershed Districts on lake improvements

» Explore opportunities to use rain gardens or curbs with drains to control water flow

» Concern for water quality in Wakefield Lake

» Concern for flooding and high water near Minnehaha Avenue

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Purpose of the Plan

The purpose of this Plan is to establish the framework of a comprehensive program that does more than simply protect and improve the quality of existing water resources within the City. The Plan also recognizes that development and redevelopment must and will continue well into the future, and will serve as a guide for City staff to follow as they evaluate the potential impacts of a given project on these quality resources. The Plan contains information for the City that includes the best available water resource data at the time the plan was completed, up-to-date design standards, and a process to adjust goals and implementation actions as new data is evaluated. With this guidance specific to surface water, as well as the broader guidance provided in the City's Comprehensive Plan, this SWMP will serve to:

- » Provide the framework for management, improvement and protection of the City's surface water resources
- » Contribute to the quality of life by preserving and enhancing the high environmental quality of the community
- » Protect public investments and private property related to or affected by surface water
- » Help to understand the larger context of surface water management issues in relation to land use and land use policy
- » Balance environmental protection and enhancement needs with economic needs and capabilities
- » Meet regulatory requirements

Basis for the Plan

The Minnesota Board of Soil and Water Resources (BWSR) provides guidance resources for Metro Area Surface Water Management Plans. These Statutes and Rules require the preparation of watershed plans by watershed management organizations (WMOs) and watershed districts (WDs) and the preparation of local water management plans that are consistent with the respective WMO/WD plans. The most current SWMPs applicable to Maplewood are the:

- » Ramsey-Washington Metro Watershed District (RWMWD) 2017-2026 Watershed Management Plan, adopted in April 2017
- » Capital Region Watershed District (CRWD) 2010 Watershed Management Plan, adopted in September 2010 and amended in 2015
- » Valley Branch Watershed District (VBWD) 2015-2025 Watershed Management Plan, adopted September 2015

The purpose of the SWMP is that through policies and thoughtful program implementation, goals for proper water and wetland resource management can be realized and water quality can be protected. Through proper planning and implementation, informed decisions can be made which allow for the protection and/or enhancement of water quality, prevention of ground water degradation, and reduction of local flooding.

Plan Overview

Using the nine goals summarized in **Table 13-1**, the Plan will serve as a guide for surface water and water resource management activities over at least the next ten years.

Though long term in focus, the Plan has numerous future decision points related to recommended capital improvements and ongoing inspection, maintenance and monitoring activities. The Plan was developed recognizing the need for proper land utilization and growth and, at the same time, emphasizing the need to prioritize management actions and decisions based on the assigned category of a receiving water body (i.e., lake, stream, wetland, pond).

Table 13-1. Maplewood Storm Water Management Plan Goals

Goal Number	Goal	Goal Statement
1	Water Quality	Enhance the water quality of surface waters and strive to achieve water quality improvements to meet City or Watershed water quality goals and state water quality standards.
2	Runoff Management and Food Control	Preserve, maintain and enhance the storm water storage and detention systems to control excessive volumes and rates of runoff, control flooding, protect public health and safety.
3	Wetlands	Achieve no net loss of wetlands, including acreage, functions and values. Where practicable, improve the functions, values, biodiversity and acreage of wetlands and their buffer areas.
4	Erosion and Sediment Control	Prevent erosion and sedimentation from occurring, and correct existing erosion and sedimentation problems.
5	Groundwater	Protect the quality and quantity of groundwater resources, in part, by implementing standards that limit infiltration in vulnerable areas. Protect the public health, safety, and welfare through a comprehensive SSTS ordinance.
6	Education and Public Involvement	Increase public and city official awareness, understanding and involvement in water and natural resource management issues.
7	Financing	Establish and maintain funding sources to finance surface water management activities.
8	Maintenance and Inspection	Preserve function and performance of public infrastructure through continuing the maintenance and inspection program.
9	Regulatory Responsibility	Maintain responsibility for managing water resources at the local level in close coordination and cooperation with other agencies and organizations.

Key Water Resources Issues

This Plan identifies several key issues related to storm water management that the City is likely to encounter in the coming years. These issues include:

- » Meeting the City's goals for improved water quality and the related requirements of the impaired waters program;
- » Implementing standards that protect vulnerable groundwater sources;
- » Addressing known and potential future localized flooding problems;
- » Meeting the challenges of an increased need for maintenance of the public and private stormwater system including testing and removal of accumulated sediments in stormwater ponds and routine maintenance of the many small rain gardens and similar green infrastructure practices;
- » Coordinating efforts with natural resource improvement activities to explore, identify and implement cost-effective approaches.
- » Cooperating with the watershed agency partners that play a lead role in water quality monitoring and management to implement improvements throughout the City;

The issues equate to a need for continued long-term financial commitments and potentially increased funding for the surface water management program into the future.

Water Quality and Impaired Waters

Maplewood has eight waters on the most recent impaired waters List prepared by the MPCA and approved by the US Environmental Protection Agency. **Table 13-2** provides a summary of the affected use and pollutant or stressor for each of these waters. While impaired waters remain, Carver Lake, Beaver Lake and Keller Lake were previously impaired for aquatic recreation (nutrient/eutrophication indicators) but have seen improvement and were removed from the impaired list in 2014.

Of the listed pollutants in **Table 13-2** the City is really only positioned to address the nutrient (i.e., phosphorus) impairments through implementation of stormwater management practices and implementation of its design standards, and chloride impairments through improvement deicing program management. According to the MPCA's Statewide Mercury TMDL Study, most of the mercury in Minnesota's fish comes from atmospheric deposition, with approximately 90 percent originating from outside the state. Because mercury has regional TMDL implications, little effort will be placed on TMDL recommendations related to mercury for these waters as part of this planning effort.

The City will continue to review recommendations for mercury that may be offered by EPA and/or MPCA to see if the regional approach to mercury has any future implications on the City. More detail on the progress of the statewide mercury TMDL process can be found on the MPCA's website.

The City will consider the impaired waters in future management decisions and actively manage the activities in the contributing watersheds to limit the delivery of these pollutants (primarily nutrients, sediment and chlorides) to these waters. The City's Living Streets Policy and updated engineering design standards will help to reduce the levels of phosphorus entering receiving waters.

Table 13-2. Impaired Waters in Maplewood

Receiving Water	Affected Use	Pollutant or Stressor	TMDL Study Approved
Gervais Lake	Aquatic Consumption	Mercury in fish tissue	2008
Kohlman Lake	Aquatic Recreation	Nutrient/eutrophication indicators	2010
	Aquatic Life	Chloride	2016
Lake Phalen	Aquatic Consumption	Mercury in fish tissue	2013
Wakefield Lake	Aquatic Recreation	Nutrient/eutrophication indicators	2017
Battle Creek (Battle Creek Lake to Pigs Eye Lake)	Aquatic Life	Aquatic macroinvertebrate bioassessments	2017
		Fishes Bioassessments	2017
		Chloride	2016
Fish Creek (Carver Lake to North Star Lake)	Aquatic Recreation	E. Coli	2017
Carver Lake	Aquatic Consumption	Mercury in fish tissue	2007
	Aquatic Life	Chloride	2016
Beaver Lake	Aquatic Consumption	Mercury in fish tissue	2008

Vulnerable Groundwater Sources

An estimated 90 percent of Maplewood’s water supply is serviced by St. Paul Regional Water Services (SPRWS). Although the vast majority of the SPRWS water supply comes from surface water, the SPRWS uses/will use groundwater as an alternate water supply when there are taste and/or odor problems, during drought conditions, or in other special situations (e.g., security reasons). Approximately 10% of the SPRWS water supply consists of groundwater (annually). Maplewood Also has agreements with neighboring cities to provide water service to residents from other municipalities including Roseville, Little Canada, Vadnais Heights and North St. Paul. Maplewood coordinates these services annually with neighboring cities.

Related to protection of groundwater resources, Maplewood and the local watershed management organizations have placed prohibitions on using infiltration practices for stormwater treatment where high-levels of contamination in groundwater will be mobilized by the infiltration practice. In addition, City standards restrict the use of infiltration practices within Drinking Water Supply Management Areas (DWSMAs) and vulnerable Wellhead Protection Areas. The City’s 2018-2028 Surface Water Management Plan includes information on these protective standards as well as mapping of DWSMAs and Wellhead Protection Areas throughout the City.

The City is also familiar with the North and East Metro Groundwater Management Area Plan completed by the Minnesota DNR in November 2015.

Flooding and Maintenance of the System

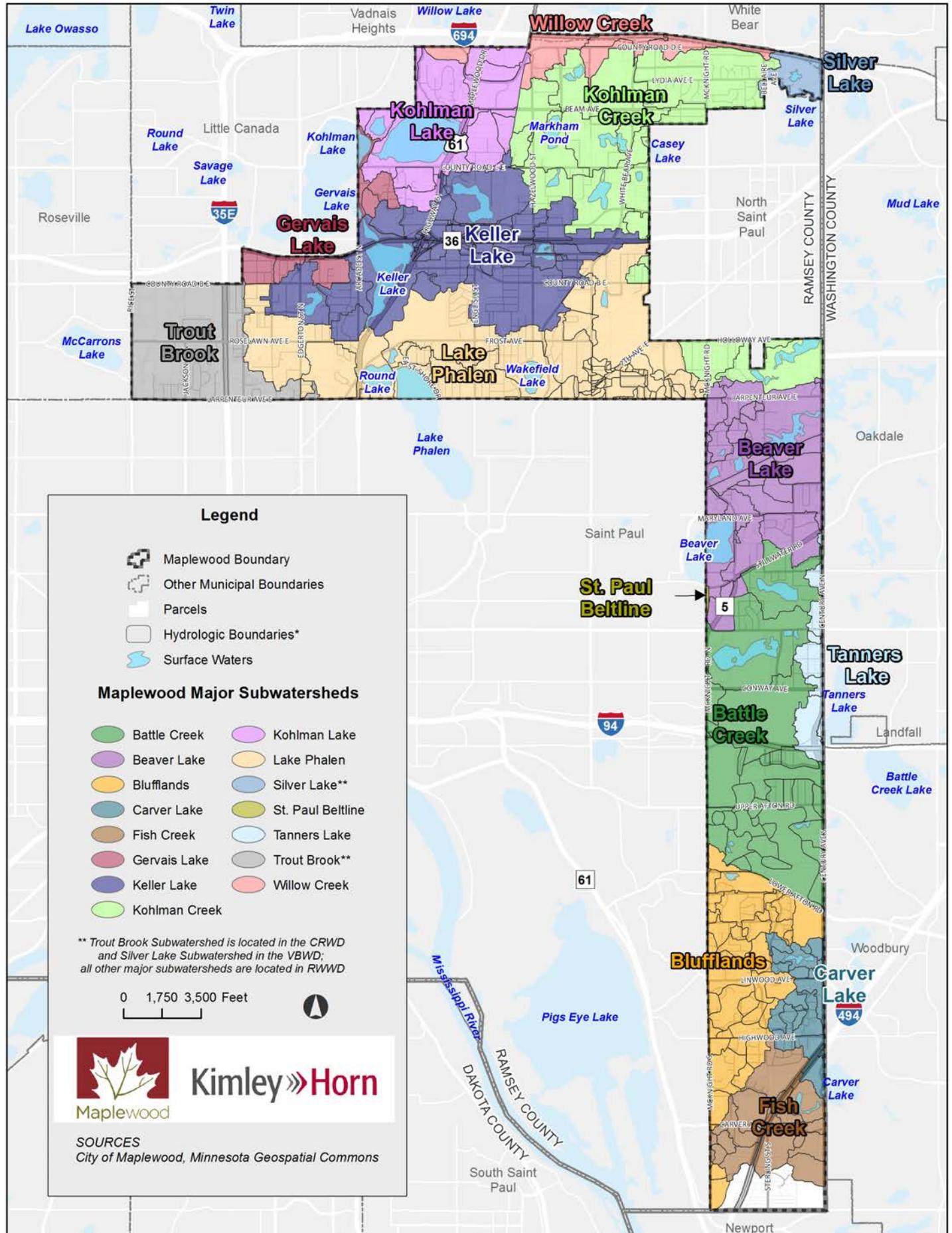
The City will need to continue to address localized flooding areas to protect life and property and reduce the burden of maintaining the system. As weather trends are showing higher intensity storm events, the potential for localized flooding will continue, if not increase. This trend places a greater awareness on the need to maintain the storm water conveyance system so that it functions well during the design storm events as well as the more extreme events that can exceed the design capacity of the system. The City requires all stormwater infrastructure, development and redevelopment projects to use updated Atlas 14 rainfall frequency data in their analysis and design process to account for the latest weather trends. While some debris blockages of pipes and structures will almost certainly continue to occur, the efforts placed on identifying problem areas, conducting maintenance and/or installing physical improvements, will reduce the potential for problems or reduce the extent of damages resulting from extreme events.

In July of 2011, the City experienced one of those extreme events that caused varying levels of flooding at more than 20 locations throughout the City. The City quickly responded by addressing the highest risk areas in the first year following the storm event and has continued to address the remaining sites in subsequent years. As of 2017, there are two main flooding areas from the 2011 event that remain to be addressed. These are will be studied on a more regional basis and improvements are anticipated to be incorporated into the City's annual street reconstruction projects for these areas. Construction of any recommended improvements will be completed as part of 2019 and 2020 street reconstruction projects. The City understands that as future extreme storm events hit portions of the City, new areas of concern may arise. In addition, evaluating the existing drainage and conveyance system as part of the annual street maintenance program will be a critical element of the City's efforts to manage and reduce localized flooding. The City's overall drainage system network is illustrated in **Figure 13-1**.

Connection of Surface Water and Natural Resources

The Natural Resources Chapter of this Plan covers all aspects of natural resources management, including the lakes, ponds, wetlands and stream that are directly addressed in this Surface Water Chapter. The City's surface water management program is directly connected to its management of Natural Resources through programs and improvements such as the City's existing Living Streets Policy, restored prairie landscapes at three preserves and ongoing efforts related to education. These all have direct impacts on the quality of surface waters within the City. As it has for decades, the City's approach to coordinating surface water management needs with natural resources management will continue to help maximize the overall environmental benefits and the return on City investments.

Figure 13-1. Watershed and Drainage Areas



SURFACE WATER

Partnerships and Funding

The City currently has a storm water utility in place named the Environmental Utility Fund (EUF). The EUF was established in 2003 and funds storm water management related costs including educational efforts through the Nature Center programs, construction of treatment systems throughout the City and maintenance of the overall storm water treatment and conveyance systems including storm sewer maintenance and street sweeping. The City will rely primarily on the EUF, along with leveraging the grant opportunities available to implement the goals and activities of this Plan.

The final critical area of focus will be the continued close coordination with the local watershed organizations, Ramsey County, and other project-specific partners to take full advantage of opportunities to incorporate water quality improvements and enhance other natural resources to help reduce the cost of doing the stormwater improvements as standalone projects.. These efforts will be needed and are a priority for the City on public capital improvement projects, storm water system and utility maintenance activities, public outreach and education activities and on private development and redevelopment projects. This cooperative approach will allow the City to leverage the limited funding that is currently available.

Actions / Implementation Plan

The overall implementation program includes a mixture of capital improvement projects, studies, ongoing maintenance, inspection, monitoring and other recommended management activities over the next 10 years. Estimated costs are not provided, recognizing that they can set unrealistic expectations of the actual costs of projects and/or activities. The costs for each action will be developed through more detailed assessments as projects are advanced from the planning to implementation stage. Specific projects will be included in the City's Capital Improvements Plan on an annual basis.

The City's water bodies and wetlands are truly exceptional resources for City residents and thus water quality is one of the priority areas for future program efforts. City lakes and water resources offer a range of recreational opportunities and some are truly exceptional resources from a water quality perspective. Others are impaired for various pollutants and have a reduced value due to those impairments. Flooding issues are another key area for the City to focus efforts on in the coming years. There are several areas throughout the City where localized flooding has occurred in the past, including the July 2011 storm event that caused flooding in more than 20 areas throughout the City. While many of these areas have since been addressed, a few remain and are anticipated to be studied and addressed in 2018-2020.

The Implementation Plan is a suggested course of action that will accomplish the major goals of this plan; to accommodate new development, in-fill development and redevelopment in the community while protecting and improving Maplewood's surface water resources. Infrastructure replacements and/or additions will be reviewed, approved and administered in accordance with Maplewood's Capital Improvement Plan.

Table 13-3. Implementation Program Priority Projects and Activities

ID	Project Name	Description	Year(s)
1	Implement water quality improvement projects and install BMPs in partnership with the local watershed districts	Identify where water quality improvements can be made beyond the minimum required of public and private projects.	Annual
2	Review chloride use and management	Review deicing methods and material for improvements.	Annual
3	Complete regional study of flood issues areas in the Beaver Lake subwatershed.	Identify options and implement flood reduction and water quality improvements identified. Study in year one, feasibility report and (if applicable) grant applications in year two. Implement in year 3.	2018 2019 2020
4	Complete regional study of flood issues areas in the Battle Creek subwatershed	Identify options and implement improvements identified. Study in year one, feasibility report and (if applicable) grant applications in year two. Implement in year 3.	2019 2020 2021
5	Complete infiltration/volume control feasibility study for future street reconstruction areas	Intent to get ahead of volume control with a more cost-effective implementation effort and possibility of banking credits.	Annual
6	Explore opportunities for discharge rate reductions in the Fish and Snake Creek Systems	Evaluate flows coming from the east.	2019-2020
7	Review drainage easements on City owned ponds/facilities relative to new Atlas 14 based high water levels	Review selected pond areas to available model results from watersheds or site specific studies.	Annual
8	Water Resources Education	Continue to implement the education and public outreach efforts related to the City's NPDES MS4 Permit Program	Annual
9	Green Infrastructure Improvement on City Facilities	Review City Facilities, including buildings and parks for water quality BMP opportunities.	Annual
10	Update NPDES MS4 Program in response to new permit issuance	Permit is generally updated every 5 years	2018 2023 2028
11	Update SWMP	Update Surface Water Plan in conjunction with 10-year Comprehensive Plan Update schedule	2028