

Bassett Creek Watershed Management Commission

2015–2025 Watershed Management Plan



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BCMWC 2015 Watershed Management Plan

September 2015

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Adopted by the Bassett Creek Watershed Management Commission (BCWMC)
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Reg. No 19252 Date September 21, 2015

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List of Acronyms

AIS	Aquatic Invasive Species
AMLAC	Association of Medicine Lake Area Citizens
AUAR	Alternative Urban Area-wide Review
BCWMC	Bassett Creek Watershed Management Commission
BMPs	Best Management Practices
BWSR	Minnesota Board of Water and Soil Resources
CAMP	Citizen Assisted Monitoring Program
CLMP	Citizen Lake Monitoring Program
CFS	Cubic Feet per Second
CIP	Capital Improvement Program
CLP	Clean Lakes Partnership
CWA	Clean Water Act
CWF	Clean Water Fund
CWP	Clean Water Partnership
DEED	Department of Employment and Economic Development
DO	Dissolved Oxygen
DS	Downstream
DUP	Duplicate (sample analyzed for water quality parameters)
DWSMA	Drinking Water Supply Management Area
EAW	Environmental Assessment Worksheets
EIS	Environmental Impact Statement
EPT	Ephemeroptera, Plecoptera, and Trichoptera (invertebrate families)
EQB	Environmental Quality Board
EQIP	Environmental Quality Incentives Program
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Studies
FTO	Flexible Treatment Options
GIS	Geographic Information Systems
GPS	Geographic Positioning System
GWMA	Groundwater Management Areas
HBI	Hilsenhoff Biotic Index
ICI	Invertebrate Community Index
JD	Judicial Ditch
JPA	Joint Powers Agreement

LA	Load Allocation
LCA	Local Cooperation Agreement
LCCMR	Legislative-Citizen Commission on Minnesota Resources
LGU	Local Government Unit
LOMA	Letter of Map Amendment
MCES	Metropolitan Council Environmental Services
MCWD	Minnehaha Creek Watershed District
MDH	Minnesota Department of Health
MDL	Minimum Detection Limit
MDNR	Minnesota Department of Natural Resources
MIBI	Macroinvertebrate Index of Biological Integrity
MIDS	Minimal Impact Design Standards
MLCCS	Minnesota Land Cover Classification System
MnRAM	Minnesota Rapid Assessment Method
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MPRB	Minneapolis Parks and Recreation Board
MRL	Minimum Reporting Limit
MS4	Municipal Separate Storm Sewer System
MSP	Minneapolis/St. Paul
MSW	Mean Stream Width
MUSA	Metropolitan Urban Service Area
NAPP	National Aerial Photography Program
NCDC	National Climatic Data Set
NFIP	National Flood Insurance Program
NHIS	National Heritage Information System
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NURP	Nationwide Urban Runoff Program
NWI	National Wetland Inventory
OHWL	Ordinary High Water Level
ORP	Oxidation-Reduction Potential
ORVW	Outstanding Resource Value Water
P8	Program for Predicting Polluting Particle Passage through Pits, Puddles and Ponds
PAH	Polycyclic Aromatic Hydrocarbon
PCA	Project Cooperation Agreement
PWI	Public Waters Inventory
RCP	Reinforced Concrete Pipe
RPD	Relative Percent Difference
RUSS	Remote Underwater Sampling Station

SDS	State Disposal System
SHPO	State Historic Preservation Office
SRV	Soil Reference Value
SSTS	Individual Sewage Treatment Systems
SSURGO	Soil Survey Geographic Dataset maintained by the NRCS
SWCS	Soil and Water Conservation Society
SWPPP	Storm Water Pollution Prevention Plan
TAC	Technical Advisory Committee
TEP	Technical Evaluation Panel
TIF	Tax Increment Financing
TIV	Tolerance Indicator Value
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TP-40	Technical Paper Number 40 (Rainfall frequency atlas for the US pre-dating Atlas 14)
TRPD	Three Rivers Park District
TSI	Trophic State Index
TSS	Total Suspended Solids
US	Upstream
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VIC	Voluntary Investigation and Cleanup
WAVE	Watershed Assessment and Visioning Exercise
WCA	Wetland Conservation Act
WHEP	Wetland Health Evaluation Program
WHPP	Wellhead Protection Plan
WLA	Waste Load Allocation
WMC	Watershed Management Commission
WMO	Watershed Management Organization
WMWA	West Metro Watershed Alliance
WOMP	Watershed Outlet Monitoring Program
WRAPS	Watershed Restoration and Protection Strategy
XPSWMM	Storm Water Management Model (interface by XP Solutions)

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Executive Summary

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Executive Summary

The Bassett Creek Watershed Management Commission (BCWMC) established the following vision to provide strategic direction to its work.

Stewardship of water resources to protect and enhance our communities

This BCWMC *Watershed Management Plan* (Plan) sets the guidelines for managing the water resources within the boundaries of the BCWMC to achieve the organization's vision. This Plan provides data and other background information, outlines the applicable regulations, assesses watershed-wide and resource-specific issues, sets goals and policies for the BCWMC and its members, and lists implementation tasks to achieve the goals. This Plan is organized into five major sections. The general content and highlights of each section follows.

Section 1 – Introduction

Section 1 of this Plan summarizes the BCWMC's location and history, and lists the general authorities of watershed management organizations (WMOs) like the BCWMC. The BCWMC is a local unit of government (LGU) that manages water resources within the Bassett Creek watershed per authorities given in Minnesota Statutes 103B and Minnesota Rules 8410. The Bassett Creek watershed is located in Hennepin County, in the northwestern portion of the Twin Cities. The watershed of Bassett Creek and its three branches cross nine cities: Plymouth, Medicine Lake, Golden Valley, Robbinsdale, Crystal, New Hope, Minnetonka, St. Louis Park, and Minneapolis.

The Metropolitan Surface Water Management Act (Minnesota Statutes 103B.201 – 103B.255) states these purposes of watershed management organization:

1. Protect, preserve, and use natural surface and groundwater storage and retention systems.
2. Minimize public capital expenditures needed to correct flooding and water quality problems.
3. Identify and plan for means to effectively protect and improve surface and groundwater quality.
4. Establish more uniform local policies and official controls for surface and groundwater management.
5. Prevent erosion of soil into surface water systems.
6. Promote groundwater recharge.
7. Protect and enhance fish and wildlife habitat and water recreational facilities.
8. Secure the other benefits associated with the proper management of surface and groundwater.

The BCWMC was originally created in 1968 as the Bassett Creek Flood Control Commission to address flooding concerns within the watershed through a joint powers agreement (JPA) among the nine member cities. In 1984, in accordance with provisions of the 1982 Metropolitan Surface Water Management Act, the Bassett Creek Flood Control Commission revised its JPA and created the Bassett Creek Watershed Management Commission (BCWMC).

The BCWMC is governed by an appointed Board of Commissioners (Board). Each of the nine member cities in the BCWMC appoints one commissioner and one alternate commissioner to the Board. The Board has duties and powers granted through the JPA which, include adopting a watershed management plan that sets policies and standards, accumulating and disbursing funds, setting an annual budget, implementing projects and programs that benefit the watershed, and overseeing staff and contractors. Each member city also appoints a member (typically a city staff person) to the BCWMC Technical Advisory Committee (TAC). This committee works closely with the Board to implement the goals and policies of the BCWMC.

Section 2 – Land and Water Resource Inventory

Section 2 of this Plan contains information on land use and public utilities, climate and precipitation, topography, soils, geology and groundwater resources, surface water resource information, flood control systems, natural communities and rare species, and pollutant sources in the BCWMC. This important information describes the condition of the watershed and affects decisions about infrastructure, development, and ecological preservation. By way of summary, some of the most notable information in Section 2 follows:

Land use: Almost all of the land in the BCWMC is now fully developed with just small parcels vacant for development in some areas. Low density residential is the major land use found in the Bassett Creek watershed (49%) followed by parks, recreational, and natural areas (11%), industrial land uses (8%), and open water (6%). Additional land use found in the watershed includes undeveloped areas, institutional, major highways, retail/commercial, office space, medium density residential, and limited amounts of agriculture.

Climate and precipitation: The climate of the Minneapolis-St. Paul area is a humid continental climate characterized by moderate precipitation, wide daily temperature variations, large seasonal variations in temperature, warm humid summers, and cold winters with moderate snowfall. Average weather imposes little strain on the typical drainage system, however extremes of precipitation and snowmelt are important for design of flood control systems. The National Oceanic and Atmospheric Administration (NOAA) published data on extreme precipitation events that can be used to aid in the design of flood control systems, now called Atlas 14. This data indicates increased precipitation depths for more extreme storm events relative to previously published values.

Topography and soils: The topographic relief of the Bassett Creek watershed is modest. The land slopes generally from higher elevations in the west to lower elevations in the east with only a net loss of 210 feet. Hydrologic soil groups are identified for 53% of the watershed, with the remaining 47% unknown or not rated or unavailable. Of the 53% of the watershed with available soil information, the majority consists of

hydrologic soil group B (30%), group C (26%), and group C/D soils (20%). The majority of the western portion of the watershed has soil with moderate to slow infiltration rates. With only a small portion of the watershed consisting of soils with higher infiltration rates, the Bassett Creek watershed has the potential to produce high volumes of runoff.

Geology and groundwater: The City of Minneapolis and the cities where it supplies water (Golden Valley, Crystal, and New Hope) obtain their water supply from the Mississippi River. The cities of Plymouth, Robbinsdale, Minnetonka, St. Louis Park, and Medicine Lake obtain their water supplies from groundwater aquifers. The Bassett Creek watershed is underlain by four major bedrock aquifers - the St. Peter Sandstone, the Prairie du Chien-Jordan, the Wonewoc (formerly known as the Iron-ton-Galesville) Sandstone, and the Mt. Simon-Hinckley Sandstone. In addition, there are numerous aquifers in the glacial drift. Some groundwater from the glacial drift and the St. Peter aquifer discharges into Bassett Creek. The remaining aquifers discharge into the Minnesota and Mississippi rivers; movement of groundwater within these aquifers is complicated by the intersecting buried bedrock valleys.

Surface water resources and water quality: Surface waters in the Bassett Creek watershed include not only the Main Stem of Bassett Creek but many tributaries, lakes, ponds and wetlands. The BCWMC has classified several lakes as Priority 1 deep lakes (see Section 2.7.2.2) including Medicine, Parkers, Sweeney, Twin, and Wirth Lakes. Northwood Lake and Westwood Lake are classified by the BCWMC as Priority 1 shallow lakes while Crane Lake, Lost Lake and Cavanaugh (Sunset Hill) Pond are classified as Priority 2 shallow lakes. The Main Stem of Bassett Creek, North Branch Bassett Creek, Sweeney Branch Bassett Creek and Plymouth Creek are classified as Priority 1 streams by the BCWMC. Classification as priority waterbodies is relevant to BCWMC monitoring, application of water quality standards, and eligibility for water quality improvement projects. Waterbodies within the BCWMC not classified as priority waterbodies may still be eligible for BMCWC capital projects, and will be managed in accordance with the policies established in this Plan.

For BCWMC priority waterbodies, the BCWMC adopted water quality standards that are the same as those established by the Minnesota Pollution Control Agency (MPCA). Waterbodies that do not meet these standards are considered impaired. There are currently six lakes and three streams in the Bassett Creek watershed that are on the MPCA's draft 2014 Impaired Waters List (Table 2-5). Waterbodies impaired for chlorides include: Parkers, Spring, Sweeney, and Wirth Lakes, Main Stem Bassett Creek, and Plymouth Creek. Waterbodies impaired for excess nutrients include: Medicine, Northwood, and Sweeney Lakes. Plymouth Creek, the Main Stem of Bassett Creek, and the North Branch of Bassett Creek are impaired for bacteria.

The BCWMC monitors its priority waterbodies for chemical, physical, and biological parameters on a rotating schedule according to the BCWMC Monitoring Plan (see Appendix A) and cooperates with many other entities that are also monitoring water resources in the watershed.

Water quantity and flooding: From 1987 to 1996, the U.S. Army Corps of Engineers (USACE) in cooperation with the BCWMC, BCWMC member cities, the Minnesota Department of Transportation (MnDOT) and the Minnesota Department of Natural Resources (MDNR) constructed the Bassett Creek

Flood Control Project. This \$40 million project controls flooding in several BCWMC cities. The principal feature of the Flood Control Project is the new 1.7-mile tunnel through downtown Minneapolis, which replaced the century-old Bassett Creek tunnel. The BCWMC inspects the Flood Control Project features and ensures adequate maintenance of the structures by member cities. The roles, responsibilities and funding mechanisms for rehabilitation and replacement of the Flood Control Project structures will be studied by the BCWMC during the life of this Plan.

The BCWMC monitors water levels on various lakes, along with stream flow on Bassett Creek near the tunnel entrance. The BCWMC also cooperates with member cities to ensure accurate and updated floodplain delineations and flood insurance studies.

Natural communities and rare species: Prior to settlement, the Bassett Creek watershed was covered by oak forests interrupted by tall grass prairie and vast areas of marshland. Although parks and open areas remain, agriculture and then urbanization altered the native vegetation, wetlands, and wildlife communities that once covered these areas. Remaining wetland areas are concentrated in the western part of the watershed. Surveys indicate the presence of a tamarack swamp in Theodore Wirth Park and five occurrences of federally- or state-listed rare animal species in the watershed. Game fish are present in several BCWMC lakes including Medicine, Parkers, and Sweeney Lakes.

Pollutant sources: The sources of pollution impacting water resources in the BCWMC are many and varied. While there are point sources of pollution that are regulated under State permits, the vast majority of pollution reaching the BCWMC waters comes from non-point source – those which cannot be traced back to a single source or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and in atmospheric transport. These pollutants include nutrients, bacteria, sediment, chlorides, pesticides, solvents, and chemicals.

Section 3 – Assessment of Issues and Opportunities

Development of this Plan relied heavily on the assessment of issues and the identification of opportunities. The BCWMC performed a gaps analysis (see Appendix D) along with a rigorous public participation process called the Watershed Assessment and Visioning Exercise (WAVE). The WAVE included an online survey with 174 respondents, small group discussions in each member city, a Watershed Summit event where the public prioritized issues, and a prioritization of issues by the Commission, TAC members, and technical partners (see Appendix E for WAVE results).

Key issues identified through the gaps analysis and the WAVE process span several topics, including water quality, water quantity and flooding, erosion and sedimentation, streams, wetlands, (along with habitat and shoreland management), groundwater, education and outreach, and implementation responsibilities. For each of these topics, the gaps analysis identified issues and opportunities the BCWMC should consider in the development of this Plan. Additionally, the public weighed in on the importance of these and other topics through survey responses, small group discussions, and prioritization at the Watershed Summit. Many residents identified low water levels in Medicine Lake as a key issue (see Section 3.2). The results of the public input process were consulted during the development of this Plan.

Section 4 – Goals and Policies

Goals

The BCWMC established the following goals for this Plan (see Section 4.1):

- Manage the surface water resources of the watershed to meet or exceed state standards and BCWMC water quality goals for wetlands, lakes, and streams.
- Improve the quality of stormwater runoff reaching the Mississippi River by reducing nonpoint source pollution.
- Protect and enhance fish and wildlife habitat in the BCWMC.
- Consider aesthetics and recreational opportunities within the watershed when completing BCWMC projects.
- Reduce stormwater runoff volume for the purposes of improving water quality.
- Protect against flood risks along the Bassett Creek trunk system.
- Protect human life, property, and surface water systems that could be damaged by flood events.
- Reduce stormwater runoff rates and volumes to minimize flood problems, flood damages, and the future costs of stormwater management systems.
- Provide leadership and assist member cities with coordination of intercommunity stormwater runoff issues.
- Notwithstanding that which occurs from natural processes, minimize erosion and sedimentation to protect the BCWMC's water resources and health, safety and welfare.
- Maintain or improve shoreland integrity and implement stream restoration measures to maintain or enhance ecological functions as well as human health, safety, and welfare.
- Increase the quality and quantity of wetlands in the BCWMC.
- Protect the quantity and quality of groundwater resources.
- Manage public ditches in a manner that recognizes their current use as urban drainage systems and as altered natural waterways.
- Raise awareness of the BCWMC's existence and its role in protecting and improving water quality, minimizing flooding, and preserving the watershed's ecological functions and aesthetics.
- Strengthen public confidence in the BCWMC's expertise and enable meaningful public participation in the planning process and ongoing projects conducted by the BCWMC.

- Raise awareness of the impact that individuals, businesses, and organizations have upon water resources and motivate these audiences to change personal/corporate behavior that has a negative impact on the watershed.
- Minimize the spread and manage the adverse impacts of harmful aquatic invasive species.
- Develop a greater understanding of climate change and its impact on water resources, including stormwater infrastructure capacity and flooding, and develop strategies to appropriately manage future impacts.

Policies

The BCWMC developed a total of 122 policies to reach these goals. The policies are specific and measurable and include actions the BCWMC will take, along with required actions by member cities and requirements for development and redevelopment projects. Policies are included in Section 4.2 of this Plan. The most notable changes to the BCWMC policies from the 2004 Watershed Management Plan (2004 Plan) include the following:

Policy 12: The BCWMC requires all stormwater to be treated in accordance with the MPCA's Minimal Impact Design Standards (MIDS) performance goal for new development, redevelopment, and linear projects. If the MIDS performance goal is not feasible and/or is not allowed for a proposed project, then the project proposer must implement the MIDS flexible treatment options, as shown in the MIDS Design Sequence Flow Chart, or BCWMC-approved alternative.

Policy 32: The BCWMC requires the retention of on-site runoff from development and redevelopment projects consistent with the MPCA's Minimal Impact Design Standards (MIDS) performance goals. These include the retention of:

- 1.1 inches of runoff from impervious areas for new development creating more than 1 acre of new impervious area
- 1.1 inches of runoff from new or fully reconstructed impervious areas for redevelopment creating one or more acres of new or fully redeveloped impervious area
- 0.55 inches of runoff from new or fully reconstructed impervious areas for linear projects creating one or more acres of new or fully redeveloped impervious area (or 1.1 inches from the net increase in impervious area, whichever is greater)
- If an applicant is unable to achieve the performance goals due to site restrictions, the MIDS flexible treatment options approach shall be used, following the MIDS design sequence flow chart.

For all other projects, the BCWMC encourages the use of infiltration, filtration, or other abstraction of runoff from impervious areas for all development and redevelopment projects as a best practice to reduce stormwater runoff.

Policy 47: The BCWMC will collaborate with local and state agencies if/when these agencies develop a groundwater action plan in an effort to gain a better understanding of groundwater-surface water interaction and develop management strategies that consider the protection of both resources.

Policy 64: Member cities shall maintain and enforce buffer requirements adjacent to priority streams for projects that will result in more than 200 yards of cut or fill, or more than 10,000 square feet of land disturbance. Buffer widths adjacent to priority streams must be 10 feet or 25 percent of the distance between the ordinary high water level (i.e., the top of the bank of the channel) and the nearest existing structure, whichever is less. Member cities may allow exemptions for public recreational facilities parallel to the shoreline (e.g., trails) up to 20 feet in width, with that width being added to the required buffer width.

Policy 66: The BCWMC requires member cities to develop and implement wetland protection ordinances that consider the results of wetland functions and values assessments, and are based on comprehensive wetland management plans, if available. For wetlands classified as Preserve or Manage 1, member cities shall implement standards for bounce, inundation, and runout control that are similar to BWSR guidance; member cities are encouraged to apply standards for other wetland classifications.

Policy 68: Member cities shall maintain and enforce buffer requirements for projects containing more than one acre of new or redeveloped impervious area. Average minimum buffer widths are required according to the MnRAM classification (or similar classification system):

- An average of 75 feet and minimum of 50 feet from the edge of wetlands classified as Preserve
- An average of 50 feet and minimum of 30 feet from the edge of wetlands classified as Manage 1
- An average of 25 feet and minimum of 15 feet from the edge of wetlands classified as Manage 2 or 3

Allowable land uses and vegetative criteria for buffers are specified in the BCWMC's *Requirements for Development and Redevelopment* (as amended). Member cities may allow exemptions for public recreational facilities parallel to the shoreline (e.g., trails) up to 20 feet in width, with that width being added to the required buffer width.

Policy 110: The BCWMC will consider including projects in the CIP that meet one or more of the following "gatekeeper" criteria:

- Project is part of the BCWMC trunk system (see Section 2.8.1, Figure 2-14 and Figure 2-15).
- Project improves or protects water quality in a priority waterbody.
- Project addresses an approved TMDL or watershed restoration and protection strategy (WRAPS).
- Project addresses flooding concern.

The BCWMC will use the following criteria, in addition to those listed above, to aid in the prioritization of projects:

- Project protects or restores previous Commission investments in infrastructure.
- Project addresses intercommunity drainage issues.
- Project addresses erosion and sedimentation issues.
- Project will address multiple Commission goals (e.g., water quality, runoff volume, aesthetics, wildlife habitat, recreation, etc.).
- Subwatershed draining to project includes more than one community.
- Addresses significant infrastructure or property damage concerns.

The BCWMC will place a higher priority on projects that incorporate multiple benefits, and will seek opportunities to incorporate multiple benefits into BCWMC projects, as opportunities allow.

Section 5 – Implementation Program

Section 5 of this Plan describes the responsibilities of the BCWMC and the responsibilities the BCWMC has delegated to its member cities. Many agencies have jurisdiction within the BCWMC; Section 5 also discusses the roles and responsibilities of those agencies relevant to the management of water resources. The section presents the BCWMC implementation program, including its capital improvement program and other implementation responsibilities.

Responsibilities

The BCWMC has many specific responsibilities including: reviewing improvements and developments, managing the BCWMC trunk system and BCWMC Flood Control Project, implementing the BCWMC capital improvement program (CIP), reviewing and assisting with intercommunity planning and design, dispute resolution, reporting and evaluation, monitoring, and total maximum daily load (TMDL) implementation.

The BCWMC does not have a permit program. The BCWMC Plan and the BCWMC *Requirements for Improvements and Development Proposals* (as amended, see Appendix H of this Plan) establish goals, standards, and requirements that the member cities must incorporate into their official controls (e.g., ordinances). The BCWMC relies on its member cities to review improvement (e.g., street reconstruction projects), redevelopment, and development proposals for compliance with BCWMC requirements, when applicable, and to issue permits only after compliance has been determined.

Additional responsibilities of BCWMC member cities include:

- Appointing commissioners and alternate commissioners to the Commission.
- Appointing technical advisory committee members.

- Incorporating the BCWMC's requirements into its official controls and implementing BCWMC policies at the time of development and redevelopment.
- Preparing a local water management plan that conforms to this Plan.
- Updating its ordinances (or official controls) to conform to and implement the requirements of this Plan.
- Implementing the capital improvement projects list in Table 5-3 of this Plan.
- Acquiring the necessary easements or right-of-way or interest in land upon order of the BCWMC.
- Contributing annually to the BCWMC general fund.

Section 5 in this Plan provides a brief description of the responsibilities of other units of government, including the Minnesota Department of Natural Resources (MDNR), the Minnesota Board of Water and Soil Resources (BWSR), the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Health (MDH), the Minnesota Environmental Quality Board (EQB), the Minnesota Department of Transportation (MnDOT), the U.S. Army Corps of Engineers (USACE), and the Metropolitan Council Environmental Services (MCES).

Implementation Program

This Plan includes comprehensive lists of the projects, programs, and official controls that comprise the BCWMC implementation program. Table 5-3 is the BCWMC's 10-year capital improvement program (10-year CIP) that will be financed through an ad valorem tax levied by Hennepin County (per Minnesota Statutes 103B.251) along with grant funding and city contributions, when available. Table 5-4 lists the BCWMC's annual water quality and flood control programs, administrative actions, and education actions (i.e., non-capital projects) that will be financed through the BCWMC general fund. Table 5-5 lists the past accomplishments of the BCWMC.

Plan Amendments

This Plan remains in effect for ten (10) years from the date it was adopted by the Board of Water and Soil Resources, unless it is superseded by approval and adoption of a succeeding Plan. All amendments to this Plan must follow the procedures set forth in this Plan, or as required by revised laws and rules. The BCWMC will follow the plan amendment process (for either minor or general amendments) as described in Minnesota Statutes 103B.231, Subd. 11 and in Minnesota Rules 8410.

BCMWC 2015 Watershed Management Plan

Section 1 – Introduction

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1.0 Introduction

The Bassett Creek Watershed Management Commission (BCWMC) *Watershed Management Plan* (Plan) sets the vision and guidelines for managing the water resources within the boundaries of the BCWMC. This section summarizes the location and history of the BCWMC, as well as its purposes, goals, powers, and management structure.

1.1 The Role of Watershed Management Organizations

Like all watershed management organizations (WMOs), the BCWMC is a special purpose unit of local government that manages water resources on a watershed basis. Watershed management organization boundaries generally follow natural watershed divides, rather than political boundaries. Thus, they may include several municipalities and counties.

Recognizing that water does not follow political boundaries, the State of Minnesota established the Watershed Act (Minnesota Statutes 103D) in 1955, which provided for the creation of watershed districts anywhere in the state. In 1982, the Minnesota Legislature enacted the Metropolitan Surface Water Management Act (Minnesota Statutes 103B.201 – 103B.255). This act required the formation of a WMO, and the development and implementation of a watershed management plan, for each of the watersheds in the seven county Twin Cities metropolitan area. WMOs can be organized as joint powers agreement organizations among municipalities (e.g., BCWMC), as watershed districts (e.g., Minnehaha Creek Watershed District – MCWD), or under county government (e.g., Scott County WMO).

The Metropolitan Surface Water Management Act states that the purposes of WMO water management programs are as follows (quoted from Minnesota Statutes 103B.201):

1. Protect, preserve, and use natural surface and groundwater storage and retention systems.
2. Minimize public capital expenditures needed to correct flooding and water quality problems.
3. Identify and plan for means to effectively protect and improve surface and groundwater quality.
4. Establish more uniform local policies and official controls for surface and groundwater management.
5. Prevent erosion of soil into surface water systems.
6. Promote groundwater recharge.
7. Protect and enhance fish and wildlife habitat and water recreational facilities.
8. Secure the other benefits associated with the proper management of surface and groundwater.

1.2 BCWMC Location and History

1.2.1 Location and Boundaries

The Bassett Creek watershed is located entirely within Hennepin County, in the northwestern portion of the Twin Cities. Figure 1-1 shows the location of the BCWMC in relation to the other WMOs in the seven-county metropolitan area. The BCWMC is adjacent to the following WMOs:

- Mississippi WMO (formerly Middle Mississippi River WMO) – along eastern boundary of BCWMC
- Minnehaha Creek Watershed District – along southern and western boundary of BCWMC
- Shingle Creek WMC – along northern boundary of BCWMC
- Elm Creek WMC – along extreme northwestern boundary of BCWMC

The watershed of Bassett Creek and its three branches covers all or part of the following nine cities:

- Crystal
- Minneapolis
- Plymouth
- Golden Valley
- Minnetonka
- Robbinsdale
- Medicine Lake
- New Hope
- St. Louis Park

The downstream end of the BCWMC is a tunnel which conveys Bassett Creek under downtown Minneapolis and flows into the Mississippi River below St. Anthony Falls. The legal boundary of the BCWMC ends at the new tunnel. The total drainage area of the BCWMC upstream of the tunnel is 39.6 square miles (25,337 acres). Overall, the watershed is heavily developed (see Figure 2-1). Except for a very small amount of land along the western edge of the BCWMC, in western Plymouth, all of the land in the BCWMC is within the 2030 Metropolitan Urban Service Area (MUSA). Five major lakes (Medicine, Sweeney, Twin, Wirth, and Parkers) lie within the watershed, as well as numerous smaller lakes, ponds, and wetlands.

A 1979 BCWMC document provides a legal description of the BCWMC boundary within the city of Plymouth. The boundaries between BCWMC, Shingle Creek WMC, and Elm Creek WMC closely follow the natural watershed divides. A 1985 order by the Minnesota Water Resources Board (now the Minnesota Board of Water and Soil Resources – BWSR) revised the legal boundary between the BCWMC and the Minnehaha Creek Watershed District to reflect the changed drainage conditions resulting from the construction of I-394.

In 2000, the BCWMC and the Mississippi WMO entered into a joint and cooperative agreement for a boundary change. A legal description of the revised boundary is included as part of the agreement and is also included in Appendix I. This boundary change transferred 1,002 acres from the BCWMC to the Mississippi WMO to reflect the changed drainage conditions upon completion of the Bassett Creek Flood Control Project. With the project in place, the watershed area tributary to the old tunnel no longer flows to Bassett Creek. The City of Minneapolis has assumed responsibility for maintenance of the old tunnel.

A legal description for the entire Bassett Creek watershed was prepared on June 27, 2003, and is included in Appendix J.

1.2.2 History

Prior to the adoption of a formal joint powers agreement, the cities in the Bassett Creek watershed acted together as a committee, which was formed to study flood control issues in the watershed. The committee members were the city engineers and/or city council members. In 1968, the Bassett Creek Flood Control Commission was formed by adoption of a joint powers agreement (JPA) between the nine communities in the watershed. As required by the joint powers agreement, the BCWMC adopted the *Watershed Management Plan for Bassett Creek* in February 1972.

In accordance with provisions of the 1982 Metropolitan Surface Water Management Act, the Bassett Creek Flood Control Commission revised its JPA in 1984 and created the Bassett Creek Watershed Management Commission (BCWMC). The BCWMC prepared the *Bassett Creek Water Management Plan* in 1986 and adopted the Plan on December 18, 1986. The Minnesota Water Resources Board (now the Board of Water and Soil Resources – BWSR) approved the plan on July 26, 1989, and the BCWMC printed the plan in 1990 (1990 Plan).

In accordance with provisions of the Metropolitan Surface Water Management Act set forth in Minnesota Statutes 1992 and Minnesota Rules relating to Metropolitan Area Local Water Management, the BCWMC revised its JPA in 1993. The 1993 JPA remained in effect until 2014, when the nine member cities agreed to extend the joint powers agreement to 2025. The current JPA is included in this Plan as Appendix G. The powers and duties of the BCWMC are outlined in the joint powers agreement.

1.3 BCWMC Vision and Purpose

1.3.1 BCWMC Overall Purposes

Minnesota Statutes 103B defines the statutory purposes and authorities of watershed management organizations including the BCWMC (see Section 1.1). Within the context of the statutory authority granted to WMOs and contained in its JPA, the BCWMC has established the following vision to provide strategic direction to its work. The following vision helps to focus the organization's efforts and is a reminder of what the BCWMC is working to achieve:

Stewardship of water resources to protect and enhance our communities

The BCWMC has established goals and policies to promote the above vision. The goals and policies of the BCWMC are presented in Section 4 of this Plan. The BCWMC's goals are also listed in Section 1.3.2.

1.3.2 BCWMC Goals

The BCWMC has established goals that are closely aligned with the general purposes of watershed management organizations as described in Section 1.1. The BCWMC goals are to:

-
- Manage the surface water resources of the watershed to meet or exceed state standards and BCWMC water quality goals for wetlands, lakes, and streams.
 - Improve the quality of stormwater runoff reaching the Mississippi River by reducing nonpoint source pollution.
 - Protect and enhance fish and wildlife habitat in the BCWMC.
 - Consider aesthetics and recreational opportunities within the watershed when completing BCWMC projects.
 - Reduce stormwater runoff volume for the purposes of improving water quality.
 - Protect against flood risks along the Bassett Creek trunk system.
 - Protect human life, property, and surface water systems that could be damaged by flood events.
 - Reduce stormwater runoff rates and volumes to minimize flood problems, flood damages, and the future costs of stormwater management systems.
 - Provide leadership and assist member cities with coordination of intercommunity stormwater runoff issues.
 - Notwithstanding that which occurs from natural processes, minimize erosion and sedimentation to protect the BCWMC's water resources and health, safety and welfare.
 - Maintain or improve shoreland integrity and implement stream restoration measures to maintain or enhance ecological functions as well as human health, safety, and welfare.
 - Increase the quality and quantity of wetlands in the BCWMC.
 - Protect the quantity and quality of groundwater resources.
 - Manage public ditches in a manner that recognizes their current use as urban drainage systems and as altered natural waterways.
 - Raise awareness of the BCWMC's existence and its role in protecting and improving water quality, minimizing flooding, and preserving the watershed's ecological functions and aesthetics.
 - Strengthen public confidence in the BCWMC's expertise and enable meaningful public participation in the planning process and ongoing projects conducted by the BCWMC.
 - Raise awareness of the impact that individuals, businesses, and organizations have upon water resources and motivate these audiences to change personal/corporate behavior that has a negative impact on the watershed.

- Minimize the spread and manage the adverse impacts of harmful aquatic invasive species.
- Develop a greater understanding of climate change and its impact on water resources, including stormwater infrastructure capacity and flooding, and develop strategies to appropriately manage future impacts.

1.4 Management Structure, Power, and Duties

The Board of the BCWMC consists of nine commissioners and nine alternates appointed by the member cities. Each of the nine member cities appoints one commissioner and one alternate. Alternate commissioners are voting Board members when the primary commissioner is absent. The JPA gives each member city the responsibility to determine the eligibility or qualifications of its representative (commissioner) on the Board.

The term of each commissioner and alternate is three years and until their successors are selected, staggered as shown in Table 1-1. Commissioner vacancies must be filled in accordance with the JPA. Commissioners cannot be removed from the Commission prior to their term expiration except under the conditions given in the JPA. The commissioners serve without compensation from the BCWMC. Table 1-1 lists the Commissioner terms and Table 1-2 is the historical listing of BCWMC commissioners and their terms.

Table 1-1 BCWMC Commissioner Terms

Member City	Termination of Commissioner's Term
Crystal	February 1, 2015, 2018, 2021, 2024, etc.
Golden Valley	
Medicine Lake	
Minneapolis	February 1, 2016, 2019, 2022, 2025, etc.
Minnetonka	
New Hope	
Plymouth	February 1, 2017, 2020, 2023, 2026, etc.
Robbinsdale	
St. Louis Park	

Table 1-2 Historical Listing of BCWMC Commissioner and Terms (not including Alternate Commissioners)

Member City	Commissioner	Term	Member City	Commissioner	Term
Crystal	Robert Dunn	1970-1971	Minnetonka	Al Ilies	1970
	James McLaughlin	1971-1976		Fred Hanus	1971-1976
	Adrian Rygg	1976-1981		Don Asmus	1977-1988
	William Sherburne	1981-1986		David Sonnenberg	1989-1995
	Bill Monk	1986-1994		Lee Gustafson	1995-2002
	Steve Peaslee	1994-1997		Bill Yaeger	2002-2006
	Tom Mathisen	1997-2003		Kris Sundberg	2007-2009
	Pauline Langsdorf	2003-2011		Bonnie Harper-Lore	2010-2011
	Dan Johnson	2012 - 2013		Jacob Millner	2011-
	Guy Mueller	2013 -			
Golden Valley	Gordon O. Garis	1970-1972	Minneapolis	Vern Anderson	1970-1973
	John Bies	1972		Lee Munnich, Jr.	1974-1977
	Ralph Crews	1973-1974		Parker Trostel	1978-1982
	Ed Silberman	1974-2000		Perry Smith	1982-1989
	David Hanson	2000-2004		Marv Hoshaw	1990-1992
	Linda Loomis	2006- 2011		R. Kannankutty	1993-1999
	Stacy Hoschka	2012 -		Michael Welch	1999-
Medicine Lake	Roy Winkler	1970-1982	Plymouth	Richard O'Fallon	1970-1979
	James Padden	1983-1989		Sherman Goldberg	1979-1982
	John O'Toole	1989-2005		Fred Moore	1983-1997
	Cheri Templeman	2006-2009		Ron Quanbeck	1997-2002
	Ted Hoshal	2010-2013		Elizabeth Thornton	2002-2005
	Clint Carlson	2013-		Virginia Black	2005 -
Robbinsdale	Z. Joseph Bauer	1970-1971	St. Louis Park	Murray Galinson	1970
	Harvey L. Lange	1971-1972, 1975		Jim Jones	1970-1972
	Raymond A. Mattson	1973		David Rudberg	1973-1977
	Reynold Eckstrom	1973-1974, 1978-1984		Seymour Druskin	1977
	Richard Halverson	1976		R. L. Koppy	1978-1980; 1984-1985

Table 1-2 Historical Listing of BCWMC Commissioner and Terms (not including Alternate Commissioners)

Member City	Commissioner	Term	Member City	Commissioner	Term
Robbinsdale	Merry Olson	1977	St. Louis Park	Chester Harrison	1981-1984
	Lee Gustafson	1984-1991		Donald Rye	1985-1993
	Wallace Johnson	1991		James Grube	1993-1995
	Jerome Ruffenach	1992-1996		Michael Rardin	1995-2002
	Maria Hagen	1996-1999		Paul Andersen	2002-2004
	William Deblon	1999-2002		Richard Johnson	2005-2007
	Karla Peterson	2002-2008		Manuel Jordan	2008-2009
	Wayne Sicora	2009-		Jim de Lambert	2009-
New Hope	Milton C. Honsey	1970-1971			
	Richard Plufka	1971-1976			
	Peter Enck	1976-1999			
	Guy Johnson	1999-2001			
	Vincent Vander Top	2001-2004			
	Mary Gwin-Lenth	2004 - 2006			
	Daniel Stauner	2007-2009			
	John Elder	2010 -			

At the time of this writing, regular meetings for the BCWMC are held at 8:30 AM at the Golden Valley City Hall on the third Thursday of each month. The fiscal year extends from February 1 through January 31.

The powers and duties of the BCWMC, taken from the joint powers agreement, include, but are not limited to:

1. Prepare and adopt an "overall plan" (watershed management plan).
2. Acquire necessary personal property to accomplish its purposes.
3. Contract for space, material, and supplies.
4. Make necessary surveys or use other information and develop projects to accomplish the purposes for which the BCWMC is organized.
5. Enter into contracts or cooperate with governmental agencies, private/public organizations, or individuals to accomplish the purposes for which the BCWMC is organized.

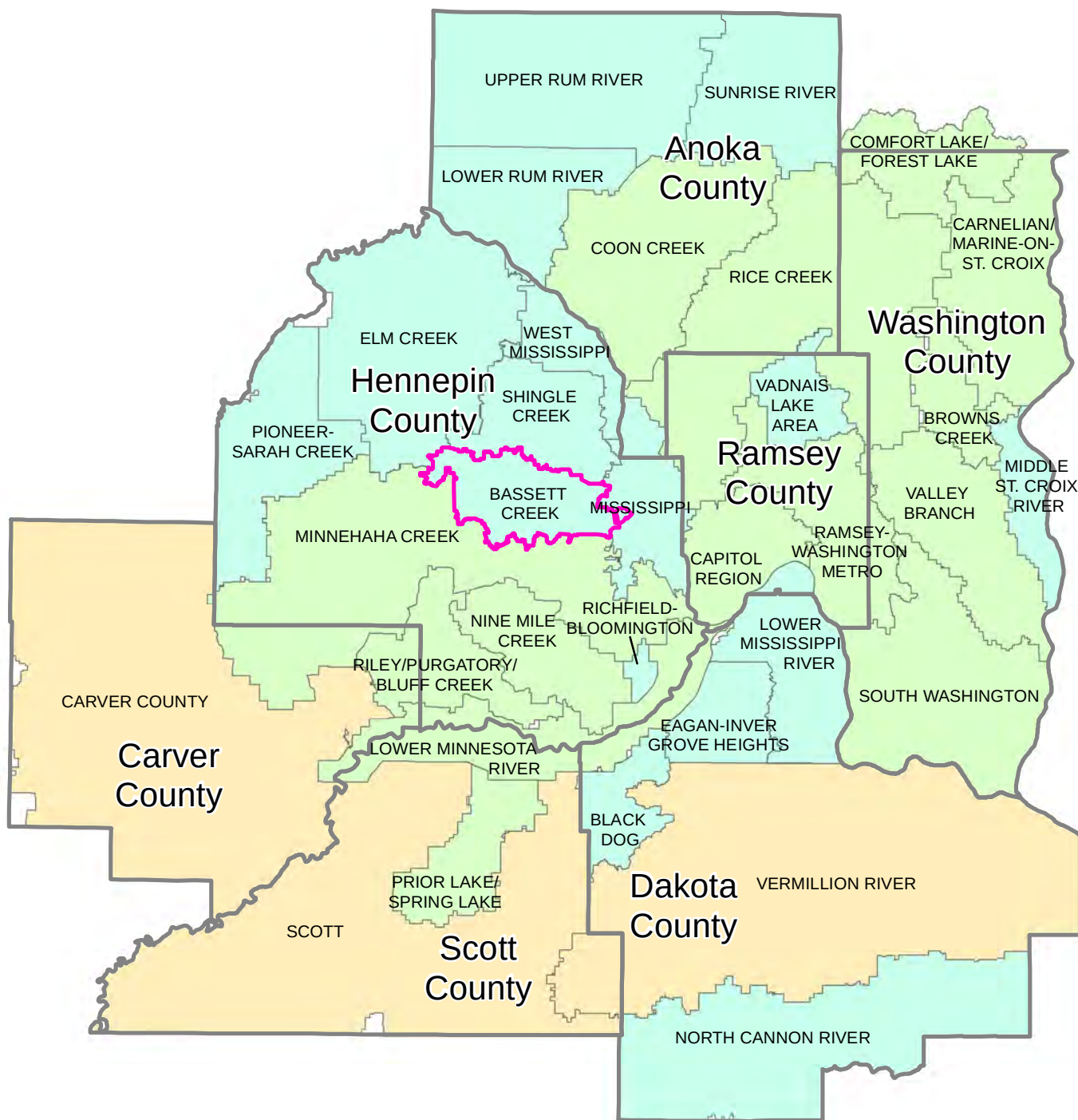
6. Order any member city to construct, clean, repair, alter, abandon, consolidate, reclaim or change the course or terminus of any ditch, drain, storm sewer or water course, natural or artificial, within BCWMC.
7. Order any member city to carry out improvements necessary to implement the BCWMC watershed management plan.
8. Regulate, conserve and control the use of stormwater, surface water and groundwater within BCWMC.
9. Contract for or purchase insurance, as needed.
10. Establish and maintain devices for acquiring and recording hydrological and water quality data within BCWMC.
11. Enter upon lands to make surveys and investigations to accomplish the BCWMC's purposes.
12. Provide any member city with technical data or other information to assist the city in preparing its local watershed management plan.
13. Provide legal and technical assistance in connection with litigation or other proceedings between one or more of its members and any other unit of government relating to drainage or water quality within BCWMC.
14. Accumulate reserve funds and invest funds not currently needed for BCWMC operations.
15. Collect money from the BCWMC members, Hennepin County, and from any other BCWMC-approved source.
16. Make contracts, employ staff or consultants, incur expenses and make expenditures.
17. Obtain an annual audit of the BCWMC books and accounts.
18. Make its books, reports, and records available for and open to inspection by its member cities.
19. Recommend changes to the joint powers agreement to its member cities.
20. Exercise all other powers necessary and incidental to the implementation of the purposes and powers set forth in the joint powers agreement and state law.
21. Cooperate with the Minnesota Department of Natural Resource (MDNR) in obtaining protected waters permits and complying with Minnesota law regarding protected waters.
22. Member cities may conduct separate or concurrent studies on any matter under study by the BCWMC.
23. Establish a procedure for establishing citizen or technical advisory committees and to provide other means for public participation.

1.4.1 Regulatory Environment and Agency Responsibilities

Various units of government are involved in regulating water resource related activities and have jurisdiction overlapping that of the BCWMC, including municipalities, counties, and state and federal agencies. Several state and federal agencies have established regulatory standards that are applicable within the BCWMC. Agencies with regulatory or oversight roles related to the management of water resources within the BCWMC include:

- Minnesota Department of Natural Resources (MDNR)
- Minnesota Board of Water and Soil Resources (BWSR)
- Minnesota Pollution Control Agency (MPCA)
- Minnesota Department of Health (MDH)
- Minnesota Environmental Quality Board (EQB)
- Minnesota Department of Transportation (MnDOT)
- United States Army Corps of Engineers (USACE)
- Metropolitan Council

The specific roles of these entities are described in greater detail in Section 5.1.3 of this Plan.



-  County Boundary
- Metro Watershed Management Organizations (WMO)**
-  Watershed District
-  Joint Powers (JP) WMO
-  County WMO



Figure 1-1

LOCATION MAP
Bassett Creek Watershed
Management Organization
2015 Management Plan



**Bassett Creek Watershed
Management Commission**

BCMWC 2015 Watershed Management Plan

Section 2 – Land and Water Resources Inventory

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2.0 Land and Water Resource Inventory

This section summarizes the land and water resources located within the BCWMC. The inventory section contains information on land use and public utilities, climate and precipitation, topography, soils, geology and groundwater resources, surface water resource information, water quality monitoring, water quantity and flooding, natural communities and rare species, fish and wildlife habitat, and pollutant. This information is important because it describes the condition of the watershed and it affects decisions about infrastructure, development, and ecological preservation.

2.1 Land Use

Almost all of the land in the BCWMC is now fully developed. Figure 2-1 shows the current land use in the BCWMC (source: Metropolitan Council, 2010). The current vacant areas that are planned for development include areas in western Plymouth and other scattered infill locations within the BCWMC (note that the “vacant” land use designation includes undevelopable land such as wetlands). Proposed redevelopment areas are scattered throughout the watershed. The comprehensive plans for the BCWMC member cities contain more information about these future redevelopment areas. Low density residential is the major land use found in the Bassett Creek watershed (49%), followed by parks, recreational, and natural areas (11%), industrial land uses (8%), and open water (6%). Additional land uses found in the watershed include: undeveloped areas, institutional, major highways, retail/commercial, office space, medium density residential and limited amounts of agriculture.

Figure 2-2 shows the anticipated future land use based on Metropolitan Council 2030 data. The future land use anticipated in 1990 (and its associated impervious coverage) was the basis for the design of the Bassett Creek Flood Control Project and associated allowable flow rates. Prior to the adoption of the 2004 BCWMC Plan, the BCWMC tracked discrepancies between the projected future land use and actual land use in the watershed. Discrepancies between the planned future land use (and associated impervious coverage) and actual land were mitigated, when necessary. In areas that developed to a higher intensity than was projected, for example, mitigation in the form of additional flood storage was provided. BCWMC’s policies included in this Plan require no increase in peak discharge from current conditions (see Section 4.0) and are independent of the proposed future land use. Knowledge of future land use remains useful, however, to identify areas where redevelopment might offer opportunities for additional stormwater treatment or retrofits of existing stormwater infrastructure.

2.1.1 Water and Wastewater Service Areas

Wastewater collection facilities are now available throughout the watershed, the entirety of which is now included within the Metropolitan Urban Services Area (MUSA). The MUSA is the area delineated by the Metropolitan Council where urbanization is expected to occur and where metropolitan service systems (particularly sanitary sewer service and major highways/interchanges) will be provided to accommodate growth.

Stormwater and sanitary sewer waste for much of the City of Minneapolis was formerly discharged to a combined storm sewer and sanitary sewer system. Efforts began in the 1930s to build separate systems

and separate the existing flows. While almost all of the discharges have now been separated into two systems, there is still some stormwater and clear water conveyed by the sanitary sewer system. The Bassett Creek Flood Control Project design assumed that the entire tributary area from the City of Minneapolis was separated and that the stormwater drains to the creek rather than to wastewater treatment facilities. Therefore, whenever additional projects are completed to separate the remaining combined systems, they are already accounted for in the Project's design capacity.

The City of Minneapolis obtains its water supply from the Mississippi River for municipal purposes. In addition, Minneapolis supplies the cities of Golden Valley, Crystal and New Hope with their municipal water supplies. The cities of Plymouth, Robbinsdale, Minnetonka, St. Louis Park, and Medicine Lake obtain their water supplies from groundwater aquifers (see Section 2.5, Geology and Groundwater Resources). In the extreme western portions of the Bassett Creek watershed, some residents still obtain their domestic water supplies from private supply wells. Some residents in Medicine Lake also obtain water from private supply wells.

2.2 Climate and Precipitation

The climate of the Minneapolis-St. Paul area is a humid continental climate, characterized by moderate precipitation (normally sufficient for crops), wide daily temperature variations, large seasonal variations in temperature, warm humid summers, and cold winters with moderate snowfall.

The mean annual temperature for the Bassett Creek watershed is 46.2°F, as measured at the Minneapolis/St. Paul (MSP) airport station (1981-2010). Mean monthly temperatures vary from 15.6°F in January to 73.8°F in July (1981-2010). According to NOAA National Climatic Data Center (NCDC) extreme temperatures recorded at MSP (or downtown Minneapolis prior to April 1938, when the location of official measurement was changed to MSP) were a high of 108°F on July 14, 1936 and a low of -34°F on January 1, 1936 and January 19, 1970. For the 1981-2010 climate normal period, the average date for latest occurrence of freezing temperatures was April 26, while the average date for the first autumn frost was October 7. The average frost-free period (growing season) is approximately 160 days.

Table 2-1 summarizes precipitation data for the MSP airport station. Average total annual precipitation at the MSP airport station is 30.6 inches (1981-2010). Annual precipitation recorded at downtown Minneapolis and MSP has ranged from a low of 11.5 inches in 1910 to a high of 40.2 inches in 1911. The mean monthly precipitation varies from 4.3 inches in August to 0.9 inches in January (1981-2010). From May to September, the growing season months, the average rainfall (1981-2010) is 19.03 inches, or about 62 percent of the average annual precipitation. Precipitation amounts vary across the Minneapolis-St. Paul metropolitan area. For example, the average annual precipitation measured at a local volunteer weather observation site in New Hope (within the Bassett Creek watershed) is 34.2 inches (1981-2010). At this site, the average monthly precipitation varies from 4.7 inches in June to 0.9 inches in January, and the average May-September rainfall is 21.0 inches, or 61 percent of the average annual precipitation at the site.

Figure 2-3 shows the average high and low temperatures for the Minneapolis-St. Paul International Airport. The figure also displays average precipitation events for the area.

Snowfall averages 54.4 inches annually at the MSP airport station (1981-2010). Extreme snowfall records range from 98.6 inches during the 1983-1984 season to 14.2 inches during the 1930-1931 season.

Table 2-1 Historical Precipitation Summary for Minneapolis-St. Paul Area

Month	Rainfall							Snowfall		
	Mean (in)	Max (in)	Year of Max	Min (in)	Year of Min	1-day Max (in)	Year of 1-day Max	Mean (in)	Max (in)	Year of Max
January	0.90	3.63	1967	0.05	1892	1.21	1967	12.2	46.4	1982
February	0.77	3.25	1922	0.03	1894	1.90	1930	7.7	26.5	1962
March	1.89	4.75	1965	0.09	1910	1.66	1965	10.3	40.0	1951
April	2.66	7.00	2001	0.16	1987	2.58	2006	2.0	21.8	1983
May	3.36	10.33	1906	0.21	1934	3.39	2012	0.0	3.0	1946
June	4.25	9.82	1990	0.22	1988	3.28	2003	0.0	T	1995
July	4.04	17.90	1987	0.11	1936	10.00	1987	0.0	T	1994
August	4.30	9.32	2007	0.20	1925	7.36	1977	0.0	T	1992
September	3.08	7.77	1903	0.30	2012	4.96	1903	0.0	1.7	1942
October	2.43	6.42	1911	0.01	1952	4.83	2005	0.6	8.2	1991
November	1.77	5.29	1991	0.02	1939	2.91	1940	9.3	46.9	1991
December	1.16	4.27	1982	T	1943	2.47	1982	11.9	33.2	1982
Annual	30.61	40.15	1911	11.54	1910	--	--	54.4	101.5	1983

Mean values based on 1981-2010 period; minimum and maximum values based on downtown Minneapolis (1981-1938) and MSP (1938-2014) records

T = trace amount

Source: Minnesota Climatology Working Group (www.climate.umn.edu)

Average weather imposes little strain on the typical drainage system. Extremes of precipitation and snowmelt are important for design of flood control systems. The National Oceanic and Atmospheric Administration (NOAA) has data on extreme precipitation events that can be used to aid in the design of flood control systems. Extremes of snowmelt most often affect major rivers, the design of large stormwater storage areas, and landlocked basins, while extremes of precipitation most often affect the design of conveyance facilities.

NOAA published Atlas 14, Volume 8, in 2013. Atlas 14 is the primary source of information regarding rainfall in the region. Atlas 14 supersedes publications TP-40 and TP-49 issued by the National Weather Bureau (now the National Weather Service) in 1961 and 1964. Improvements in Atlas 14 precipitation estimates include denser data networks, longer (and more recent) periods of record, application of regional frequency analysis, and new techniques in spatial interpolation and mapping. Atlas 14 provides

estimates of precipitation depth (i.e., total rainfall, in inches) and intensity (i.e., depth of rainfall over a specified period) for durations from 5 minutes up to 60 days.

Runoff from spring snowmelt is also important in this region, but is not provided in Atlas 14. The Soil Conservation Service's (now the Natural Resources Conservation Service) National Engineering Handbook, Hydrology, Section 4, presents maps of regional runoff volume. Table 2-2 lists selected precipitation and runoff events used for design purposes.

Table 2-2 Selected Rainfall and Snowmelt Runoff Events

Type	Event Frequency	Duration	Depth (inches)
Rainfall	2-year	24 hour	2.87
	5-year	24 hour	3.60
	10-year	24 hour	4.29
	25-year	24 hour	5.39
	50-year	24 hour	6.36
	100-year	24 hour	7.42
	10-year	10 day	6.83
	100-year	10 day	10.2
Snowmelt ¹	10-year	10 day	4.7
	25-year	10 day	5.7
	50-year	10 day	6.4
	100-year	10 day	7.1

Source: NOAA Atlas 14 – Volume 8. Station: Golden Valley (21-3202).

Hydrology Guide for Minnesota (USDA Soil Conservation Service – NRCS)

¹ Snowmelt depth reported as liquid water.

Even with wide variations in climate conditions, climatologists have found four significant recent climate trends in the Upper Midwest (Minnesota Weather Almanac, Seeley, 2006):

- Warmer winters
- Higher minimum temperatures
- Higher dew points
- Changes in precipitation trends – more rainfall is coming from heavy thunderstorm events and increased snowfall

According to the Soil and Water Conservation Society's (SWCS) 2003 report on climate change, total precipitation amounts in the United States (and in the Great Lakes region) are trending upward, as are storm intensities. Higher intensity precipitation events typically produce more runoff than lower intensity

events with similar total precipitation amounts; higher rainfall intensities are more likely to overwhelm the capacity of the land surface to infiltrate and attenuate runoff. Precipitation records in the Twin Cities area show the annual average precipitation has increased, as shown in the following examples:

- Minneapolis-St. Paul Airport station – the average annual precipitation increased from 28.32 inches (1961–1990 average) to 30.61 inches (1981–2010 average), an 8.1% increase (data from the Climatology Working Group website: <http://climate.umn.edu/>).
- St. Paul station – the average annual precipitation increased from 30.30 inches (1961–1990 average, from the Minnesota Department of Natural Resources [MDNR] State Climatology Office) to 33.45 inches (1981–2010 average), a 10.4% increase (data from the Climatology Working Group website: <http://climate.umn.edu/>).

Comparison of precipitation depths between TP-40 and Atlas 14 indicates increased precipitation depths for more extreme events. As noted by the SWCS, increased storm intensities result in increased soil erosion and increased runoff. The Minnesota Pollution Control Agency's (MPCA) global warming website states that increased flooding could also result from more intense precipitation events:

<http://www.pca.state.mn.us/index.php/topics/climate-change/index.html>

2.3 Topography

The topographic relief of the Bassett Creek watershed is not extreme with land sloping generally from higher elevations in the west to lower elevations in the east with only a net loss of 210 feet. The watershed high points include areas west of Parkers Lake and west of Schmidt Lake with elevations ranging from approximately 980 to 1,010 feet, respectively. From this point east, the northern and southern watershed boundaries drop to an elevation of approximately 800 at the point where the creek enters the Mississippi River as can be seen in Figure 2-4. The extensive urbanization of the watershed has greatly altered the natural topography of the watershed. With these alterations, drainage patterns have become more defined. Many of the wetland areas that existed prior to urbanization have been eliminated or altered, especially in the older developed areas, concentrated downstream of Medicine Lake. The location of steep slopes within the watershed is of interest as these areas limit options for land development and have a higher potential for erosion. Areas of known erosion and sedimentation are identified in Figure 2-4.

2.4 Soils

2.4.1 Hydrologic Soil Groups and Infiltration

Soil composition, slope and land management practices determine the impact of soils on water resource issues. Soil composition and slope are important factors affecting the rate and volume of stormwater runoff. The shape and stability of aggregates of soil particles—expressed as soil structure—influence the permeability, infiltration rate, and erodibility (i.e., potential for erosion) of soils. Slope is important in determining stormwater runoff rates and susceptibility to erosion.

Infiltration capacities of soils affect the amount of direct runoff resulting from rainfall. Higher infiltration rates result in lower potential for runoff from the land, as more precipitation is able to enter the soil.

Conversely, soils with low infiltration rates produce high runoff volumes and high peak discharge rates, as most or all of the rainfall moves as overland flow.

The Natural Resources Conservation Service (NRCS – formerly the Soil Conservation Service) has established four general hydrologic soil groups. These groups are:

- Group A Low runoff potential—high infiltration rate
- Group B Moderate infiltration rate
- Group C Slow infiltration rate
- Group D High runoff potential—very slow infiltration rate

Combined with land use, the hydrologic soil grouping symbols (A-D) may be used to estimate the amount of runoff that will occur over a given area for a particular rainfall amount. The most current soils data for the Bassett Creek watershed are based on the Soil Survey Geographic dataset (SSURGO) from the NRCS and are presented in Figure 2-5.

Large portions of the eastern half of the watershed fall within the Not Rated/Not Available category (47%). This classification is typically assigned to areas where development has altered the existing soil, or data were unavailable prior to development; hydrologic soil groups or infiltration rates are typically not determined after development. Of the remaining 53% of the watershed that has available soil information, the majority of this portion consists of hydrologic soil group B (30%), group C (26%), and group C/D soils (20%). The majority of the western portion of the watershed has soil with moderate to slow infiltration rates. Hydrologic soil group A soil, which indicates high infiltration rates, are present in approximately 13% of the rated portion of the Bassett Creek watershed. With only a small portion of the watershed consisting of soils with higher infiltration rates, the Bassett Creek watershed has the potential to produce high volumes of runoff.

Development is another factor that may increase the potential for high volumes of runoff. As land is developed for urban use, much of the soil is covered with impervious surfaces, and soils in the remaining areas are significantly disturbed and altered. Development often results in consolidation of the soil and tends to reduce infiltration capacity of otherwise permeable soils, resulting in significantly greater amounts of runoff. Grading, plantings, and tended lawns tend to dominate the pervious landscape in urbanized areas and may become more important factors in runoff generation than the original soil type.

The hydrologic soil groups map (Figure 2-5) provides general guidance about the infiltration capacity of the soils throughout the watershed. Soils should be inspected on a site-by-site basis as projects are considered.

2.4.2 Surficial Soils

Surface soils throughout much of the Bassett Creek watershed are principally of the Hayden series and are predominantly found in two major associations – the Hayden-Cordova-Peaty Muck Association and the Hayden-Peaty Muck Association. Hayden soils comprise 40 to 50 percent of these associations. Hayden

soils are found on low knolls and hills, are generally well-drained, and have a surface layer of grayish loam or clay loam and a subsoil of light clay loam. These associations are moderately permeable and have high available moisture capacity.

Of the Hayden-Cordova-Peaty Muck Association, the Hayden soils make up about 40 percent, Cordova soils about 10 percent, Peaty Muck soils about 5 percent, and minor soils about 45 percent of the association. Poorly-drained Cordova soils in swales and on flats have a surface layer of black silty clay loam and a subsoil of clay loam. They have a high available moisture capacity and a moderately low permeability. The very poorly-drained Peaty Muck soils in depressions consist of deep organic materials. Important minor soils in this association include the very poorly-drained Glencoe soils in depressions, the poorly-drained Hamel, Dundas, Minnetonka and Shields soils in drainageways and on the flats, and the moderately well-drained Dalbo soils on the low knolls and hills.

Of the Hayden-Peaty Muck Association, the Hayden soils comprise about 50 percent, the Peaty Muck soils about 10 percent, and minor soils about 40 percent of the association. The very poorly-drained Peaty Muck soils consist of deep organic materials. They have a very high available moisture capacity and a low fertility. The minor soils in this association include the Glencoe, Cordova, Dundas, Hamel, Nessel, and Dalbo soils. The very poorly-drained Glencoe soils are found in shallow depressions and the poorly-drained Hamel, Cordova, and Dundas soils are found in drainageways. The moderately well-drained Nessel and Dalbo soils occur in low knolls and on the crowns of the larger hills.

In the vicinity of Parkers Lake in the western portion of the Bassett Creek watershed, the surface soils tend to be of the Estherville series. Estherville soils have a surface layer of very dark brown sandy loam and a subsoil of dark yellowish-brown sandy loam. The underlying material is calcareous sand and gravel.

Surface soils downstream of Cedar Lake Road in Minneapolis are of the Hubbard series, which are common in the Mississippi River valley train. Hubbard soils formed under prairie vegetation have a dark surface horizon that grades into bright brown-colored subsoil. Larger medium sands are typical of the Hubbard profile.

These soil units are named for the major soil types present but contain many unique soil types in varying amounts and patterns.

2.5 Geology and Groundwater Resources

2.5.1 Geology

The Bassett Creek watershed is located in the northwestern portion of a bowl-like bedrock structure underlying the Minneapolis-St. Paul metropolitan area (called the Twin Cities basin), which has a gentle slope to the southeast. A generalized geologic section is presented in Figure 2-6. The bedrock is overlain by a layer of glacial drift, which varies from over 250 feet thick in the western portion and along the eastern border of the watershed, to less than 50 feet thick in the southeastern portion of the watershed in Minneapolis. Generally, there is no uniform relationship between the existing surface topography and the bedrock structure. The watershed is underlain by up to 40 feet of Platteville and Glenwood Formation

limestone and shale in the southern and eastern portions of the watershed. The northern portion of the watershed is underlain by up to 160 feet of St. Peter Sandstone, except in the northwest portions and in the extreme eastern portions, where pre-glacial Mississippi River valleys cut through the sandstone and into the Prairie du Chien Dolomite. Three buried erosional valleys cut deep into the bedrock and bisect the glacial drift. One valley extends north and southeast from Medicine Lake. The north branch cuts into the Prairie du Chien Dolomite and the southeast branch cuts into the St. Peter Sandstone. These valleys are filled with up to 250 feet of glacial drift. Another valley extends northerly from Wirth Lake to the watershed border, cutting into the St. Peter Sandstone and filled with up to 200 feet of drift. The third valley extends through the very southeastern portion of the watershed between Highway 55 and Interstate 394. It cuts through the Prairie du Chien Dolomite and is filled with up to 400 feet of glacial drift.

2.5.2 Groundwater Resources

While the City of Minneapolis and the cities where it supplies water (Golden Valley, Crystal, and New Hope) obtain their water supply from the Mississippi River, the cities of Plymouth, Robbinsdale, Minnetonka, St. Louis Park, and Medicine Lake obtain their water supplies from groundwater aquifers. In the extreme western portions of the Bassett Creek watershed, some residents still obtain their domestic water supplies from private supply wells. Some residents in Medicine Lake also obtain water from private supply wells.

Two types of aquifers are present in the watershed: surficial aquifers and bedrock aquifers. The following paragraphs provide detailed information about the aquifers located in the BCWMC.

2.5.2.1 Bedrock Aquifers

The watershed is underlain by four major bedrock aquifers: (1) St. Peter Sandstone, (2) Prairie du Chien-Jordan, (3) Wonevok Sandstone (formerly Iron-ton-Galesville Sandstone), and (4) Mt. Simon-Hinckley Sandstone. In addition, there are numerous aquifers in the glacial drift. Some groundwater from the glacial drift and the St. Peter aquifer discharge into Bassett Creek. The remaining aquifers discharge into the Minnesota and Mississippi rivers; movement of groundwater within these aquifers is complicated by the intersecting buried bedrock valleys.

The following cities within the BCWMC obtain their water supplies from the associated groundwater sources:

- Plymouth – 16 wells in the Prairie du Chien-Jordan aquifer (4 new wells proposed)
- Minnetonka – 14 wells in the Prairie du Chien-Jordan aquifer, 3 wells in the Jordan aquifer, and 1 well in the Prairie du Chien-St. Lawrence aquifer
- Robbinsdale – 4 wells in the Prairie du Chien-Jordan aquifer and 1 well in the St. Peter-Prairie du Chien aquifer

- St. Louis Park –6 wells in the Prairie du Chien-Jordan aquifer, 4 wells in the Mt. Simon-Hinckley aquifer, and 1 well in the Platteville-St. Peter aquifer.
- Medicine Lake – private wells

In addition to the above cities, the Joint Water Commission (Crystal, Golden Valley, and New Hope) plans to construct at least one emergency supply well in the Prairie du Chien-Jordan aquifer within the next few years.

The Prairie du Chien-Jordan aquifer is high-yielding, more easily tapped than deeper aquifers, has very good water quality, and is continuous throughout most of the area. This is the most heavily used aquifer in Hennepin County, with yields above 2,000 gallons per minute throughout much of the Bassett Creek watershed. The MDNR closely reviews permits for groundwater withdrawals from the Prairie du Chien-Jordan aquifer to ensure that the withdrawals will not cause drawdown effects on nearby water resources of regional significance.

The groundwater level in the Prairie du Chien-Jordan aquifer varies from about 800 feet to 900 feet above mean sea level within the Bassett Creek watershed, as shown in the Hennepin County Geologic Atlas (1989). The aquifer is recharged in areas where thin permeable drift overlies the limestone layers. Some recharge of this aquifer occurs locally from percolation through the overlying glacial deposits or St. Peter sandstone. However, hydrogeologic characteristics suggest this recharge would be a minimal contribution to the aquifer flow. Regional recharge of the Prairie du Chien-Jordan aquifer occurs to the south of the Minneapolis-St. Paul metropolitan area. Groundwater movement in the aquifer is generally from west to east, toward the Mississippi River.

The regional aquifer with the highest water quality is the Mt. Simon-Hinckley aquifer, but it is more expensive to use than the Prairie du Chien-Jordan because of its greater depth. Yields from the Mt. Simon-Hinckley aquifer range from 1,000 to 1,500 gallons per minute in the western portion of the Bassett Creek watershed to over 1,500 gallons per minute in the eastern portion of the watershed. Minnesota statutes limit appropriations from the Mt. Simon-Hinckley aquifer to potable water uses, where there are no feasible or practical alternatives, and where a water conservation plan is incorporated with the appropriations permit. The groundwater level of the Mt. Simon-Hinckley ranges from about 600 to 700 feet above mean sea level within the Bassett Creek watershed. Recharge of the Mt. Simon-Hinckley takes place far northwest of the county, where the bedrock is closer to the surface, and occurs by percolation through the overlying drift and bedrock. The pattern of flow in the Mt. Simon-Hinckley aquifer differs greatly from the pattern in the overlying Prairie du Chien-Jordan aquifer. Groundwater movement in the aquifer below the Bassett Creek watershed is generally to the southeast towards a cone of depression located just outside the Bassett Creek watershed and formed by major pumping centers (groundwater levels below 600 feet above mean sea level). In general, the Mt. Simon-Hinckley aquifer has little or no hydraulic connection with the surficial groundwater system or major streams.

2.5.2.2 Surficial (Quaternary) Aquifers

Surficial aquifers are water-bearing layers of sediment, usually sand and gravel, which lie close to the ground surface. Many private domestic wells in the watershed draw water from these aquifers. Since the surficial aquifers are more susceptible to pollution, they are generally not used for municipal or public supply wells. In some locations in the BCWMC, the aquifer could provide sufficient water yield for some non-potable industrial uses. The depth of the water table varies across the watershed, but is on the order of tens of feet.

Recharge to the surficial aquifers is primarily through the downward percolation of local precipitation. The ponds, lakes, and wetlands scattered throughout the watershed recharge the groundwater. Some of these waterbodies are landlocked and their only outlet is to the groundwater; some landlocked lakes may be perched above the regional level of the shallow groundwater in the watershed. Some surficial aquifers may also be recharged during periods of high stream stage. Surficial aquifers may discharge to local lakes, streams or to the underlying bedrock.

2.5.3 Wellhead Protection Areas

The increasing population in the Twin Cities metropolitan area has put increased pressure not only on groundwater quantity but also on its quality. The Minnesota Department of Health (MDH) is responsible for the protection of groundwater quality and aims to prevent contaminants from entering the recharge zones of public water supply wells through its wellhead protection program. This includes the development of wellhead protection plans (WHPPs) and guidance to limit potential for groundwater contamination (see Section 3.6). Wellhead protection efforts may restrict or prevent the use of certain stormwater BMPs within these areas to prevent possibly contaminated stormwater from reaching groundwater supplies.

Figure 2-7 shows the location of the municipal water supply wells and the delineated wellhead protection areas within the Bassett Creek watershed. Each of the communities within the BCWMC that obtains its municipal water supply from groundwater has an MDH-approved wellhead protection plan.

2.6 Surface Water Resources

The Bassett Creek watershed has numerous streams, creeks, lakes, ponds, and wetlands. The watershed is subdivided into 18 subwatersheds based on the drainage areas tributary to its major surface water resources (see Figure 2-8). Table 2-3 summarizes the physical characteristics of major BCWMC lakes and ponds. Other governmental units have identified or inventoried surface water resources within the BCWMC specifically related to their management jurisdictions; these include:

- Public waters basins, watercourses, and wetlands – Minnesota Department of Natural Resources (MDNR)
- Public ditches – Hennepin County
- National Wetland Inventory (NWI) – US Army Corps of Engineers (USACE)

The following sections further describe the surface water resources within the BCWMC, including those identified in the above inventories. Note that for water quality management purposes, the BCWMC has further classified specific water resources as priority waterbodies (see Section 2.7.2).

2.6.1 MDNR Public Waters

The MDNR designates certain water resources as public waters to indicate those lakes, wetlands, and watercourses over which the MDNR has regulatory jurisdiction. By statute, the definition of public waters includes both “public waters” and “public waters wetlands.” The collection of public waters and public waters wetlands designated by the MDNR is generally referred to as the public waters inventory, or PWI.

Public waters are all basins and watercourses that meet the criteria set forth in Minnesota Statutes, Section 103G.005, Subd. 15 that are identified on public water inventory maps and lists authorized by Minnesota Statutes, Section 103G.201. Public waters wetlands include all type 3, type 4, and type 5 wetlands, as defined in U.S. Fish and Wildlife Service Circular No. 39, 1971 edition, that are 10 acres or more in size in unincorporated areas or 2.5 acres or more in size in incorporated areas (see Minnesota Statutes Section 103G.005, Subd. 15a and 17b.) A MDNR permit is required for work within designated public waters.

The MDNR uses county-scale maps to show the general location of the public waters and public waters wetlands under its regulatory jurisdiction. These maps are commonly known as public waters inventory (PWI) maps. PWI maps also show public waters watercourses and ditches (see Section 2.6.2). The regulatory boundary of these waters and wetlands is called the ordinary high water level (OHWL). PWI maps are available on a county-by-county basis. Additionally, county-by-county lists of these waters are available in tabular form. The MDNR also maintains a web-based mapping tool for viewing PWI maps. The PWI maps and lists are available on the MDNR’s website:

http://www.MDNR.state.mn.us/waters/watermgmt_section/pwi/maps.html.

Public waters (e.g., lakes) are identified with a number and the letter “P”. Public waters wetlands are identified with a number and the letter “W”. Public waters wetlands include, and are limited to, types 3, 4, and 5 wetlands that have not been designated public waters.

Figure 2-9 shows the MDNR public waters located in the Bassett Creek watershed and shows their associated drainage patterns.

Table 2-3 Characteristics of Major BCWMC Waterbodies

2.6.2 Public Ditches

Judicial ditches and county ditches are public drainage systems. They are established under Chapter 103E of Minnesota Statutes and are under the jurisdiction of the county. Per Minnesota Statute 363B.61, cities or watershed management organizations (WMOs) within Hennepin County may petition the county to transfer authority over public ditches to the city or WMO (see Section 3.8.2).

Figure 2-9 identifies the public ditches within the BCWMC, which includes a large portion of the Main Stem of Bassett Creek between Medicine Lake and Brookview Golf Course, and downstream of Highway 100. The original function of public ditches was to provide drainage for agricultural lands. Some of the systems shown as public ditches are no longer in existence, but the public ditch designation has not been removed. One such system is located along Highway 100 in Golden Valley and Crystal. The public ditch system shown following Highway 100 is currently all in a storm sewer pipe and is no longer ditched.

2.6.3 Wetlands

Prior to development, much of the land within the BCWMC was wetland. Many wetland areas were drained or filled as the BCWMC member cities developed (prior to the establishment of regulations protecting wetlands). Presently, wetlands are protected by the Wetland Conservation Act (WCA, see Section 3.5). The BCWMC currently acts as the local governmental unit (LGU) responsible for administering WCA in the Cities of St. Louis Park, Robbinsdale, and Medicine Lake. The remaining BCMWC member cities serve as the LGUs for their own communities.

The extent of wetlands inventoried within the BCWMC varies by member city. Nationally, the U.S. Fish and Wildlife Service (USFWS) is responsible for mapping wetlands across the country, including those in Minnesota. Using the National Aerial Photography Program (NAPP) in conjunction with limited field verification, the USFWS identifies and delineates wetlands, produces detailed maps on the characteristics and extent of wetlands, and maintains a national wetlands database as part of the National Wetland Inventory (NWI). The NWI is periodically updated based on available imagery.

Figure 2-10 shows the location of all NWI wetlands within the Bassett Creek watershed. There may be additional wetlands (especially those smaller than 0.5 acre) in the BCWMC that are not included in the NWI. Based on land use information, wetlands represent approximately 6% of the watershed.

2.6.4 Lakes and Ponds

Figure 2-8 identifies the major subwatersheds and drainage patterns for the Bassett Creek Watershed. Many of the subwatersheds are delineated and named according to the lake or pond located within that subwatershed. The physical characteristics of the following lakes and ponds are summarized in Table 2-3. Additional information on the BCWMC and MPCA classifications of these lakes and ponds is included in Section 2.7.2. [Normal water elevations and 100-year flood elevations for waterbodies in Sections 2.6.4.1 – 2.6.4.14 and Table 2.10 were updated in May 2017 using new XPSWMM model and with NAVD88 datum.]

2.6.4.1 Bassett Creek Park Pond

Bassett Creek Park Pond is a 9.7-acre waterbody located in the City of Crystal in the northeast portion of the BCWMC. The pond was created by the City of Crystal out of an existing inundation area. Bassett Creek Park Pond has a maximum depth of 7.4 feet and an average depth of 2.6 feet. The normal water elevation is estimated at 840.6 feet (NAVD88 datum) and the 100-year elevation is approximately 851.2 feet (NAVD88 datum). The Bassett Creek Park Pond has a contributing watershed area of approximately 2,564 acres, which includes both the Bassett Creek Park Pond direct watershed and the Northwood Lake and the North Branch Bassett Creek watersheds. The North Branch of Bassett Creek discharges to the pond at its northwest corner. Portions of the cities of Crystal and Golden Valley drain directly into Bassett Creek Park Pond; additionally, portions of New Hope and Plymouth are tributary to Bassett Creek Park Pond via the North Branch of Bassett Creek. The pond receives outflows from Northwood Lake and drains southeast through two 36 x 58.5 inch arch culverts into the Bassett Creek Main Stem.

The Bassett Creek Park Pond watershed (including the Northwood Lake and North Branch Bassett Creek watersheds) is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (66%), followed by parks and recreational use (10%) and institutional (7%). Other land uses include: medium density residential, natural space, commercial, and industrial.

Bassett Creek Park Pond is not listed on the BCWMC's priority list. The pond is also not listed as impaired by the MPCA. Bassett Creek Park Pond is part of the BCWMC Flood Control Project (see Section 2.8.1).

2.6.4.2 Crane Lake

Crane Lake is a 30-acre lake located in the City of Minnetonka in the southern portion of the Bassett Creek watershed. Crane Lake does not have any parkland, boat access, or public beach areas.

Crane Lake has a maximum depth of approximately 5 feet and a mean depth of 3.3 feet. The ordinary high water level of the lake is estimated at 920.4 feet (NGVD29 datum). The 100-year elevation is 920.2 feet (NAVD88 datum). Due to the lake's shallow nature, submerged macrophytes can be found on the entire lake bottom. Emergent vegetation can be found around its circumference. Crane Lake has a contributing drainage area of approximately 591 acres, draining portions of Minnetonka. Crane Lake drains northerly into Medicine Lake at the north side through a 21-inch reinforced concrete pipe (RCP) at an elevation of 917.3 feet (NAVD88 datum).

The Crane Lake watershed is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (40%), followed by retail and commercial (21%) and parks and recreational use (10%). Other land uses include: open water, institutional, office space, major highway, and industrial.

Crane Lake is a BCWMC Priority 2 Shallow Lake waterbody. Classification as "shallow" is based on the MPCA's shallow/deep classification (shallow lakes have a maximum depth of less than 15 feet or a littoral area greater than 80% of the total lake surface area). The lake is not listed as impaired by the MPCA.

2.6.4.3 Grimes Pond

Grimes Pond is a 6.1-acre waterbody located in the City of Robbinsdale just east of North Rice Pond in the northeast portion of the BCWMC. A parkland area to the north of the pond provides opportunities for aesthetic viewing and fishing.

Grimes Pond has an average depth of 2.6 feet, a normal water elevation of 832.5 feet (NAVD88 datum), and a 100-year elevation of approximately 836.4 feet (NAVD88 datum). Grimes Pond has a contributing drainage area of approximately 114 acres that drains a portion of the City of Robbinsdale. Runoff enters Grimes Pond through two open channels and one storm sewer outlet. The Grimes Pond outlet to North Rice Pond consists of two submerged 24-inch corrugated metal culverts through the railroad embankment located on the west side of the pond.

The Grimes Pond watershed is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (81%), followed by parks and recreational use (6.3%) and open water (4.3%). Other land uses include: industrial, institutional, open water, and retail/commercial.

Grimes Pond is not listed on the BCWMC's priority waterbody list. The pond is also not listed as impaired by the MPCA.

2.6.4.4 Lost Lake

Lost Lake is a 22-acre lake located in the City of Plymouth in the northern portion of the BCWMC. Lost Lake has no public access, as it is surrounded completely by residential homes.

Lost Lake has a maximum depth of 6.5 feet, a mean depth of 3.5 feet, and its littoral area consists of the entire area of the lake (22 acres). Being such a shallow lake, Lost Lake has submerged vegetation throughout most of its lake bottom. The normal water elevation is approximately 940.2 feet (NAVD88 datum) and the 100-year elevation is 941.2 feet (NAVD88 datum). Lost Lake has a contributing drainage area of approximately 61 acres. A small portion of the City of Plymouth drains to Lost Lake. Lost Lake is landlocked and therefore does not discharge to any major resource in the Bassett Creek watershed.

The Lost Lake watershed is fully-developed, with no parcels available for new development. Low density residential and open water are the only two land use categories for the Lost Lake watershed.

Lost Lake is a BCWMC Priority 2 Shallow Lake waterbody. Classification as "shallow" is based on the MPCA's shallow/deep classification (shallow lakes have a maximum depth of less than 15 feet or a littoral area greater than 80% of the total lake surface area). The lake is not listed as impaired by the MPCA.

2.6.4.5 Medicine Lake

Medicine Lake is a 902-acre lake located in the cities of and Plymouth and Medicine Lake in approximately the center of the BCWMC. The lake is a major recreational resource for the area. French Regional Park, public beaches and a public boat landing provide opportunities for swimming, fishing, boating, birding, and biking or walking adjacent trails. Medicine Lake is also an important resource for wildlife.

Medicine Lake has a shoreline of approximately 8.9 miles, a littoral area of 397.0 acres, an estimated mean depth of 17.5 feet, and a maximum depth of 49 feet. The lake's ordinary high water level is 889.1 feet (NGVD29 datum) and its 100-year elevation is 890.4 feet (NAVD88 datum). Shallow areas near the shoreline of the lake allow for both emergent and submerged vegetation growth. The Medicine Lake tributary watershed is approximately 11,015 acres (including the drainage area of upstream lakes ultimately tributary to Medicine Lake, see Figure 2-8). Portions of the cities of Plymouth, Medicine Lake, New Hope, Golden Valley, and Minnetonka all drain to Medicine Lake.

Medicine Lake receives outflows from Plymouth Creek, Crane Lake, Turtle Lake, and Hidden Lake. Plymouth Creek discharges directly into Medicine Lake near its southwest corner and an unnamed creek from the Crane Lake watershed discharges to Medicine Lake at the south end of the southwest bay. Additionally, over 30 storm sewers have been identified that discharge into the lake. The Medicine Lake outlet is located at the south end of the main basin. A composite overflow weir structure, fourteen feet wide at the normal water level of 887.9 feet (NAVD88 datum), discharges water directly into the main stem of Bassett Creek; the weir is owned by Hennepin County and regulated by the MDNR. The overflow structure is approximately three feet above the level of the creek channel to deter fish migration into the lake.

The Medicine Lake watershed (including the watersheds of upstream waterbodies ultimately tributary to Medicine Lake) is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (46%), followed by open water (11%) and parks and recreation (10%). Other land uses include: medium density residential, natural space, industrial, commercial, golf courses, institutional, agricultural, and office.

Medicine Lake is a BCWMC Priority 1 Deep Lake waterbody. Classification as "deep" is based on MPCA's shallow/deep classification. The lake is currently listed on the 303(d) impaired waters list for mercury and excess nutrients. The lake's mercury impairment is addressed by the statewide mercury Total Maximum Daily Load (TMDL) approved by the US Environmental Protection Agency (USEPA) in 2007 (MPCA, 2007). A TMDL study (see Section 5.1.1.8) was prepared for Medicine Lake to address the nutrient impairment (LimnoTech, 2010). The presence of excess nutrients in the lake periodically makes the water unsuitable for swimming and wading due to low clarity and excessive algae growth. As part of the MPCA's 2014 Metro Chloride Assessment, Medicine Lake was classified as a "high risk water" for chloride impairment, but was not listed as impaired for chloride.

Curlyleaf pondweed, an aquatic invasive plant (see Section 3.5.2), is present in Medicine Lake. The Medicine Lake TMDL identified growth and die-off of curlyleaf pondweed as a source of internal nutrient loading in Medicine Lake, and recommended management of the plant (Limnotech, 2010). The City of Plymouth, Three Rivers Park District, BCWMC, MDNR and others established a Medicine Lake Aquatic Vegetation Management Group and developed an aquatic vegetation management plan for the lake. In the spring of 2004, 2005, and 2006, approximately 300 acres of the lake were treated with herbicide. Monitoring performed from 2004 through 2007 identified decreased curlyleaf pondweed frequency in the spring of each year, but recommended ongoing treatment (Three Rivers Park District, 2008). From 2008

through 2014, the City of Plymouth has treated areas ranging from 15 to 80 acres (Blue Water Science, 2014).

Additionally, the Minnesota Department of Health website contains advice on consuming fish caught in Medicine Lake, as the concentrations of mercury in fish tissue exceed the water quality standard.

2.6.4.6 North Rice Pond

North Rice Pond is a 3.7-acre waterbody located in the City of Robbinsdale in the northeast portion of the Bassett Creek Watershed. Parkland adjacent to the lake provides opportunities for aesthetic viewing.

North Rice pond has a maximum depth of 5 feet and a mean depth of 2.6 feet. The normal water elevation of North Rice Pond is approximately 832.5 (NAVD88 datum) and the 100-year elevation is approximately 836.4 feet (NAVD88 datum). North Rice Pond has a contributing watershed area of approximately 233 acres which includes the North Rice Pond direct watershed and the Grimes Pond watershed. Portions of the cities of Crystal, Golden Valley, Minneapolis, and Robbinsdale drain to North Rice Pond. North Rice Pond receives outflows from Grimes Pond through overflows from three wetland basins. A 30-inch corrugated metal culvert with a submerged manhole skimming structure connects North Rice to South Rice Pond, which discharges into Bassett Creek.

The North Rice Pond watershed (including the Grimes watershed) is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (73%), park and recreational use (15%) and undeveloped (6.3%). Other land uses include: retail and commercial, institutional, open water, and industrial.

North Rice Pond is not listed by the BCWMC as a priority waterbody. The pond is also not listed as impaired by the MPCA.

2.6.4.7 Northwood Lake

Northwood Lake is a 15-acre lake located in the City of New Hope in the northern portion of the Bassett Creek Watershed. Parkland is located around the lake providing opportunities for fishing, picnicking, and aesthetic viewing making Northwood Lake an important recreation resource. The lake is also used for non-motorized boating.

Northwood Lake has a maximum depth of 5 feet, an average depth of 2.7 feet, an ordinary high water level of 885.5 feet (NGVD1929 datum), and a 100-year elevation of 891.4 feet (NAVD88 datum). Its 1,294 acre tributary watershed includes both the Northwood Lake direct watershed and a portion of the North Branch Bassett Creek watersheds. The North Branch of Bassett Creek discharges into Northwood Lake through a 66-inch culvert. Portions of the cities of Plymouth and New Hope drain to Northwood Lake through four storm sewers. Northwood Lake has an outlet structure located at the east side of the lake at Boone Ave. A 10-foot wide weir set at an elevation of 884.8 feet (NAVD88 datum) discharges to a culvert that crosses Boone Ave. This culvert then discharges into the North Branch of Bassett Creek, which flows towards Bassett Creek Park Pond, ultimately discharging into the Bassett Creek Main Stem.

The Northwood Lake watershed (including a portion of the North Branch Bassett Creek watershed) is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (67%), followed by institutional (9%) and parks and recreational use (6.7%). Other land uses include: natural space, commercial, retail, major highways, open water, and industrial.

Northwood Lake is a BCWMC Priority 1 Shallow Lake waterbody. Classification as “shallow” is based on the MPCA’s shallow/deep classification (shallow lakes have a maximum depth of less than 15 feet or a littoral area greater than 80% of the total lake surface area). The lake is currently listed on the MPCA’s 303(d) impaired waters list for excessive nutrients (phosphorus) and chloride. A TMDL study has not yet been conducted for Northwood Lake.

2.6.4.8 Parkers Lake

Parkers Lake is a 97-acre lake located in the City of Plymouth at the western edge of the Bassett Creek watershed. The lake is a major recreational resource for the area. A public beach and public boat landing provide opportunities for swimming, fishing, boating and aesthetic viewing.

Parkers Lake has a maximum depth of 37 feet, an average depth of 12 feet, and a littoral area of approximately 68 acres. Shallow areas near the shoreline of the lake allow for both emergent and submerged vegetation growth. The lake has an ordinary high water level of 935.9 feet (NGVD29 datum), a normal water elevation of approximately 934.4 feet (NAVD88 datum), and a 100-year elevation of 938.6 feet (NAVD88 datum). Parkers Lake has a contributing watershed of approximately 1,065 acres. A portion of the City of Plymouth drains to the lake and discharges into it through five storm sewers. Parkers Lake discharges through a 24-inch concrete outlet at the southeast corner of the lake and is ultimately tributary to Medicine Lake.

The Parkers Lake watershed is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (37%), followed by industry (31%) and open water (9%). Other land uses include: medium density residential, natural, parks and open space, commercial, developed parks, golf course, institutional, highways, and industrial/office.

Parker Lake is a BCWMC Priority 1 Deep Lake waterbody. Classification as “deep” is based on MPCA’s shallow/deep classification. The lake is currently listed on the 303(d) impaired waters list for mercury. Parkers Lake is not covered by the statewide mercury TMDL due to measured concentrations of mercury in fish tissue exceeding a threshold value specified in the TMDL (see Table 2-5). Parkers Lake is also listed in on the 303(d) impaired waters list for chloride.

The Minnesota Department of Health website contains advice on consuming fish caught in Parkers Lake, as the concentrations of mercury in fish tissue exceed the water quality standard. The lake is, however, suitable for swimming and wading with good clarity and low algae levels throughout the open water season.

2.6.4.9 South Rice Pond

South Rice Pond is a 3.2-acre waterbody located in the cities of Robbinsdale and Golden Valley in the northeast portion of the Bassett Creek watershed, just south of North Rice Pond. Parkland adjacent to the lake provides opportunities for aesthetic viewing.

South Rice Pond has a maximum depth of 3 feet and an average depth of 1.7 feet. The lake has a 100-year water elevation of 834.3 feet (NAVD88 datum). Its 514-acre tributary watershed includes both the South Rice Pond direct watershed and the North Rice Pond and Grimes Pond watersheds. Portions of the cities of Crystal, Golden Valley, Minneapolis, and Robbinsdale drain to South Rice Pond. South Rice Pond receives outflows from North Rice Pond as well as Grimes Pond. South Rice Pond discharges to Bassett Creek via a small channel located at the south end of the pond.

The South Rice Pond watershed (including the North Rice Pond and Grimes Pond watersheds) is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (76%), followed by park and recreational use (15%). Other land uses include: institutional, industrial, open water, and retail/commercial.

South Rice Pond is not listed by the BCWMC as a priority waterbody. The pond is also not listed as impaired by the MPCA.

2.6.4.10 Sweeney Lake

Sweeney Lake is a 67-acre lake located in the City of Golden Valley in the eastern portion of the BCWMC. Sweeney Lake is a recreation waterbody frequently used by residents for swimming, fishing, boating and aesthetic viewing. A public access at the southern end of the lake offers carry-in boat access.

Sweeney Lake has an estimated mean depth of 12 feet, a maximum depth of 25 feet, and a littoral area of approximately 34 acres. Shallow areas near the shoreline of the lake allow for both emergent and submerged vegetation growth. A precast concrete dam serves as the outlet structure for Sweeney Lake. The normal water elevation is at approximately 827.2 feet (NAVD88 datum) and the 100-year elevation is approximately 831.9 feet (NAVD88 datum). Sweeney Lake has a contributing drainage area of approximately 2,396 acres including both the Sweeney Lake direct watershed and the Ring Ponds, Cortlawn Pond, and Schaper Pond watersheds. Portions of St. Louis Park and Golden Valley drain into Sweeney Lake. Sweeney Lake receives outflows from the Ring Ponds, Cortlawn Pond, Schaper Pond and Twin Lake and drains northeast into the Sweeney Lake Branch of Bassett Creek, which connects to the Bassett Creek Main Stem shortly downstream.

The Sweeney Lake watershed (including the contributing ponds' watersheds) is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (44.5%), followed by highway (12%) and industry (7%). Other land uses include: medium density residential, natural space, park, and open space, commercial, developed parks, golf course, institutional, open water, and office.

Following severe summer algal blooms in the early 1970s, lakeshore residents for the Sweeney Lakeshore Owners Association organized efforts to protect and improve Sweeney Lake water quality. Residents have operated an aeration system since the 1970s. Initially, residents installed aeration at a few locations; the system has expanded to up to 18 aerators currently distributed throughout the lake. The intent of the aerators is to keep oxygen levels high near the lake bottom, preventing the anoxic release of phosphorus bound in lake sediments. The system is permitted by MDNR and operates fully during the summer months; winter aeration occurs on a limited basis (SEH and Barr, 2011). Sweeney Lake is a BCWMC Priority 1 Deep Lake waterbody. Classification as “deep” is based on the MPCA’s shallow/deep classification. The lake is currently listed on the 303(d) impaired waters list for excess nutrients (phosphorus). A TMDL study has been conducted for Sweeney Lake. Due to excessive phosphorus, the lake is not always suitable for swimming or wading because of low clarity and excessive algae growth. Sweeney Lake is also listed in on the 303(d) impaired waters list for chloride.

2.6.4.11 Turtle Lake

Turtle Lake is a 28-acre waterbody located in the City of Plymouth in the northwest portion of the Bassett Creek watershed. Turtle Lake is classified as a wetland by the MPCA, owing to its shallow depth, and as a public waters wetland by the MDNR (see Section 2.6.1). Parkland is available for use by residents for aesthetic viewing and fishing. No boat launch is available.

Turtle Lake has a maximum depth of 0.5 feet and an average depth of 0.3 feet. The normal water level of Turtle Lake is at approximately 962.9 feet (NAVD88 datum) and the 100-year elevation is at 967.0 feet (NAVD88 datum). Turtle Lake has a tributary watershed area of 420 acres. A portion of the City of Plymouth drains into Turtle Lake. A small open channel between the north wetland and Turtle Lake acts as an inlet to the lake. Two wetland basins also overflow into the southeast portion of the lake and one storm sewer discharges at the east side. The Turtle Lake outlet is located at the southwest corner of the lake. A small channel conveys water to an 18-inch corrugated metal pipe at County Road 9, which discharges to Plymouth Creek.

The Turtle Lake watershed is almost fully-developed, with only a few small parcels available for new development. Low density residential is the major land use (70%), followed by open water (9.4%) and undeveloped areas (8.6%). Other land uses include: parks and recreational uses, institutional, retail, commercial, and agricultural.

Turtle Lake is not listed as a BCWMC priority waterbody owing to its classification as a wetland by the MDNR and MPCA. Turtle Lake is not listed as impaired by the MPCA.

2.6.4.12 Twin Lake

Twin Lake is a 21-acre lake located in the City of Golden Valley in the eastern portion of the Bassett Creek Watershed and is connected to Sweeney Lake through a navigable channel. The southern half of the lake is located within Theodore Wirth Regional Park. The lake is used for swimming, non-motorized boating, fishing, and aesthetic viewing.

Twin Lake has a maximum depth of 56 feet, an average depth of 25.7 feet, and a littoral area of approximately 8 acres. Shallow areas near the shoreline of the lake allow for both emergent and submerged vegetation growth. Floating leaf vegetation is primarily seen in the northern portion of the lake. The lake's normal water elevation is estimated at 827.2 feet (NAVD88 datum) with a 100-year elevation at 831.9 feet (NAVD88 datum). Twin Lake's watershed area is 131 acres. A portion of the City of Golden Valley drains to Twin Lake through one open channel at the south side of the lake. An outlet channel discharges beneath a bridge at the north side of the lake into a wetland that is hydraulically connected to Sweeney Lake.

The Twin Lake watershed is fully developed. The watershed area surrounding Twin Lake has three major land uses: park, recreational, or preserve (60%), institutional (20%) and low density residential (20%).

Twin Lake is a BCWMC Priority 1 Deep Lake waterbody. Classification as "deep" is based on MPCA's shallow/deep classification. The lake is not listed as impaired by the MPCA. The relatively high ratio of lake surface to drainage area and lack of high-imperviousness land use around the lake have prevented Twin Lake from experiencing many of negative effects of urbanization (i.e., increased stormwater runoff and pollutant loading).

In 2008 and 2009, summer average concentrations of phosphorus in Twin Lake increased significantly (see Appendix F – Water Quality Summary). The BCWMC performed a study (*Twin Lake Phosphorus Internal Loading Investigation*, March 2011) to determine the causes of these increased phosphorus levels, which were identified as increased release of phosphorus from lake sediments (internal phosphorus loading) and enhanced transport of phosphorus from bottom waters to the surface. The BCWMC performed a feasibility study to evaluate management options (BCWMC, February 2013); the study identified alum treatment as the most feasible option based upon cost, probability for success, and maintenance. As part of the feasibility study, the BCWMC ordered fish surveys of Twin Lake (Blue Water Science, 2013). An alum treatment of Twin Lake was performed in 2015.

2.6.4.13 Westwood Lake

Westwood Lake is a 38-acre lake located in the City of St. Louis Park in the southern portion of the Bassett Creek watershed. Although the lake does not have a public beach, the adjacent parkland and Westwood Hills Nature Center trails surrounding the lake provides residents opportunities for canoeing or kayaking, aesthetic viewing, birding, and hiking.

Westwood Lake has a maximum depth of 5 feet, a normal water elevation of 887.6 feet (NAVD88 datum), and a 100-year elevation of 890.0 feet (NAVD88 datum). The majority of the lake bottom is covered with submerged vegetation due to the shallow nature of the lake and emergent vegetation can be found around the lake's entire circumference. Westwood Lake has a watershed area of approximately 463 acres. Portions of the cities of St. Louis Park, Golden Valley, and Minnetonka drain towards Westwood Lake. Runoff draining to Westwood Lake enters through five storm sewers located around its edge. A 400-foot-long open channel at the north side of the lake discharges to a 27-inch RCP storm sewer at an elevation of 886.2 feet (NAVD88 datum).

The Westwood Lake watershed is almost fully-developed, with only a few small parcels available for new development. Single family residential is the major land use (34%), followed by park and recreational land use (27%) and golf course (25%). Other land uses include: major highway, office space, and open water.

Westwood Lake is a BCWMC Priority 1 Shallow Lake waterbody. Classification as “shallow” is based on the MPCA’s shallow/deep classification. The lake is not listed as impaired by the MPCA.

2.6.4.14 Wirth Lake

Wirth Lake is a 38-acre lake located in the City of Golden Valley in the southeast portion of the Bassett Creek watershed. The lake is located in Theodore Wirth Regional Park, which is owned and maintained by the Minneapolis Park and Recreation Board. The lake is an important recreational resource to the residents of north Minneapolis and surrounding inner-ring suburbs. A public beach and parkland surrounding the lake provide opportunities for swimming, fishing, picnicking, and aesthetic viewing, and non-motorized boating.

Wirth Lake has an estimated mean depth of 14 feet, a maximum depth of 26 feet and a littoral area of approximately 23.3 acres. Shallow areas near the shoreline of the lake allow for both emergent and submerged vegetation growth. Floating leaf vegetation is primarily seen in the northern portion of the lake. Wirth Lake has an ordinary high water level of 818.9 feet (NGVD1929 datum) and a 100-year elevation of 822.0 feet (NAVD88 datum). Wirth Lake has a 405-acre tributary watershed including portions of the cities of Golden Valley and Minneapolis. The lake has four main inlets, three storm sewers and one open channel in the northern portion of the lake. The Wirth Lake outlet was modified in 2012 to prevent backflow from Bassett Creek to Wirth Lake. The new outlet includes a fabricated steel lift gate which closes during period of high water in Bassett Creek.

The Wirth Lake watershed is almost fully-developed, with only a few small parcels available for new development. Parks and recreation is the major land use (46%), followed by low density residential (37%) and open water (10%). Other land uses include: medium density residential, commercial, golf course, institutional, highways and industrial/office.

Wirth Lake is a BCWMC Priority 1 Deep Lake waterbody. Classification as “deep” is based on the MPCA’s shallow/deep classification. The lake is currently listed on the 303(d) impaired waters list for mercury and chloride. The lake’s mercury impairment is addressed through the statewide mercury TMDL. The lake was previously listed as impaired for excessive nutrients and a TMDL study was performed (Barr Engineering Company, 2010). Wirth Lake was removed from the impaired waters 303(d) list because of water quality improvement projects by the BCWMC, its member cities and the MPRB (see Table 5-5). The Minnesota Department of Health website has advice on consuming fish caught in Wirth Lake, as the concentrations of mercury in fish tissue exceed the water quality standard.

2.6.5 Streams and Open Channels

Several streams and open channels in the Bassett Creek watershed have also been classified on BCWMC’s priority waterbody list. Figure 2-8 presents the BCWMC priority streams and open channels in the BCWMC as well as the BCWMC major subwatersheds and their drainage patterns. In addition to BCWMC priority

streams, there are several smaller tributaries that drain to BCWMC priority waterbodies, including several draining to Medicine Lake and others (see Figure 2-8).

2.6.5.1 Plymouth Creek

Bassett Creek originates upstream of Medicine Lake in western Plymouth as a branch called Plymouth Creek. This branch flows generally east and south, relatively parallel to Highway 55, until it reaches the southwest bay of Medicine Lake. This branch drains large portions of south and central Plymouth. The area tributary to the creek prior to its discharge into Medicine Lake is approximately eight square miles. Plymouth Creek flows through a large public water wetland complex near Medicine Lake Park prior to entering Medicine Lake.

Plymouth Creek is a BCWMC Priority 1 stream. Plymouth Creek is included on the MPCA's Impaired Waters 303(d) list in 2014 as impaired for aquatic life (due to chloride) and aquatic recreation (due to *Escherichia coli*) (see Table 2-5). Plymouth Creek was included in the Upper Mississippi River Bacteria TMDL and Protection Plan (MPCA, 2014), which was approved by the US EPA in 2014 and addresses the Plymouth Creek impairment due to *Escherichia coli*.

2.6.5.2 Main Stem of Bassett Creek

The Main Stem of Bassett Creek begins downstream of the Medicine Lake outlet, at the south end of the southeast bay of the lake. The Main Stem flows southeast through Plymouth, then easterly through Golden Valley, Crystal, and Minneapolis to the Mississippi River, the last portion of which is through a 1.7-mile long tunnel. The drainage area upstream of the Main Stem of Bassett Creek (i.e., the area tributary to Medicine Lake) is about 18 square miles. Two branches of Bassett Creek, the North Branch and the Sweeney Lake Branch, join the Main Stem between Medicine Lake and the tunnel, and prior to its confluence with the Mississippi River. The additional drainage area to the Main Stem of Bassett Creek between Medicine Lake and the confluence with the North Branch of Bassett Creek is approximately six square miles and includes areas of Plymouth, Golden Valley, St. Louis Park, Minnetonka, New Hope, and Crystal. An additional 2.5 square miles of drainage area from Golden Valley, Crystal, Robbinsdale and Minneapolis is tributary to the Main Stem of Bassett Creek between the confluence with the North Branch of Bassett Creek and the confluence with the Sweeney Lake Branch. Ultimately, the entire 39 square mile drainage area of the BCWMC is tributary to the Main Stem of Bassett Creek upstream of the tunnel. The creek enters the Mississippi River downstream of the Upper St. Anthony Falls Lock and Dam.

The Main Stem of Bassett Creek is a BCWMC Priority 1 stream. The Main Stem of Bassett Creek is included on the MPCA's Impaired Waters 303(d) list as impaired for aquatic life (due to chloride and fish bioassessments) and aquatic recreation (due to fecal coliform) (see Table 2-5). The Main Stem of Bassett Creek was included in the Upper Mississippi River Bacteria TMDL and Protection Plan (MPCA, 2014), which was approved by the US EPA in 2014 and addresses the Plymouth Creek impairment due to fecal coliform.

2.6.5.3 North Branch of Bassett Creek

The North Branch drains portions of eastern Plymouth and southern portions of New Hope and Crystal (and a very small portion of Golden Valley). It begins near Rockford Road (County Road 9) west of

Highway 169, and flows east through New Hope and Crystal. The North Branch of Bassett Creek flows through Northwood Lake and Bassett Creek Park Pond, before joining the Main Stem of Bassett Creek immediately upstream of Highway 100. The drainage area tributary to the North Branch upstream of its confluence with the Main Stem is approximately four square miles.

The North Branch of Bassett Creek is a BCWMC Priority 1 stream. The North Branch of Bassett Creek is included on the MPCA's Impaired Waters 303(d) list in 2014 as impaired for aquatic recreation (due to *Escherichia coli*) (see Table 2-5). The North Branch of Bassett Creek was included in the Upper Mississippi River Bacteria TMDL and Protection Plan (MPCA, 2014), which was approved by the US EPA in 2014 and addresses the Plymouth Creek impairment due to *Escherichia coli*.

2.6.5.4 Sweeney Lake Branch of Bassett Creek

The Sweeney Lake Branch drains northern St. Louis Park and southern portions of Golden Valley. The Sweeney Lake Branch flows northeast through Schaper Pond and Sweeney Lake and joins the Main Stem in Theodore Wirth Regional Park near Golden Valley Road just downstream of Sweeney Lake. The drainage area of the Sweeney Lake Branch prior to its confluence with the Main Stem of Bassett Creek is approximately four square miles.

The Sweeney Lake Branch of Bassett Creek is a BCWMC Priority 1 stream.

2.7 Water Quality

The lakes, ponds, streams, and wetlands of the Bassett Creek watershed are important community assets. These resources supply aesthetic and recreational benefits, in addition to providing wildlife and fisheries habitat and refuge. The BCWMC recognizes the need for good water quality in the waterbodies in its jurisdiction, including groundwater, and has taken steps to protect and improve these resources. These steps include adopting water quality management policies, classifying specific waterbodies as priority waterbodies, collecting water quality data (including biological data) for priority waterbodies, participating in developing TMDLs (both as the sponsoring entity and as a cooperator), developing an implementation program to meet BCWMC and MPCA water quality goals, establishing water quality performance standards based on the MPCA's Minimal Impact Design Standards (MIDS), and reviewing proposed projects for conformance with BCWMC policies.

Stormwater runoff carries with it a number of contaminants affecting water quality. The principal pollutants found in runoff include nutrients, sediments, organic materials, pathogens, hydrocarbons, metals, pesticides, chlorides, trash and debris. Table 2-4 summarizes the source of these pollutants and their impacts. Of these pollutants, the BCWMC recognizes that phosphorus and suspended sediment are particularly detrimental to the ecological health and recreational use of lakes and streams. As a result, the BCWMC has established water quality treatment performance standards based on MPCA's MIDS. The BCWMC's water quality goals and policies are detailed in Section 3 of this Plan and the BCWMC's Requirements for Improvements and Development Proposals (as amended).

Table 2-4 Pollutants Commonly Found in Stormwater Runoff

Stormwater Pollutant	Examples of Sources	Related Impacts
Nutrients: Nitrogen, Phosphorus	Decomposing grass clippings, leaves and other organics, animal waste, fertilizers, failing septic systems, atmospheric deposition	Algal growth, reduced clarity, other problems associated with eutrophication (oxygen deficit, release of nutrients and metals from sediments)
Sediments: Suspended and Deposited	Construction sites, other disturbed and/or non-vegetated lands, eroding streambanks and shorelines, road sanding	Increased turbidity, reduced clarity, lower dissolved oxygen, deposition of sediments, smothering of aquatic habitat including spawning sites, sediment and benthic toxicity
Organic Materials	Leaves, grass clippings	Oxygen deficit in receiving waterbody, fish kill, release of nutrients.
Pathogens: Bacteria, Viruses	Domestic and wild animal waste, failing septic systems	Human health risks via drinking water supplies, contaminated swimming beaches
Hydrocarbons: Oil and Grease, PAHs (Naphthalenes, Pyrenes)	Tar-based pavement sealant, industrial processes; automobile wear, emissions & fluid leaks; waste oil.	Toxicity of water column and sediment, bioaccumulation in aquatic species and through food chain
Metals: Lead, Copper, Cadmium, Zinc, Mercury, Chromium, Aluminum, others	Industrial processes, normal wear of auto brake linings and tires, automobile emissions & fluid leaks, metal roofs	Toxicity of water column and sediment, bioaccumulation in aquatic species and through the food chain, fish kill
Pesticides: PCBs, Synthetic Chemicals	Pesticides (herbicides, insecticides, fungicides, rodenticides, etc.), industrial processes	Toxicity of water column and sediment, bioaccumulation in aquatic species and through the food chain, fish kill
Chlorides	Road salting and uncovered salt storage	Toxicity of water column and sediment
Polycyclic Aromatic Hydrocarbons (PAH's)	Tar based pavement sealant	Carcinogenic to humans
Trash and Debris	Litter washed through storm drain networks	Degradation of the beauty of surface waters, threat to wildlife

Based on *Minnesota Urban Small Sites BMP Manual* (Barr Engineering Company, 2001).

2.7.1 Water Quality Monitoring Programs

Water quality data have been collected for many of the lakes and larger ponds within the BCWMC. These data have been collected by several entities, including the BCWMC, the Metropolitan Council, Three Rivers Park District (TRPD) (formerly Hennepin Parks and Suburban Hennepin Regional Park District), the Minnesota Pollution Control Agency, the Minnesota Department of Natural Resources, Minneapolis Park and Recreation Board (MPRB), municipalities, and others.

The monitored waterbodies and extent of monitoring vary from year to year. The BCWMC performs detailed monitoring on a limited number of waterbodies each year on a rotating basis. The following sections describe the various monitoring programs performed within the BCWMC, including those performed by other entities. The BCWMC will continue to monitor the water quality for all priority waterbodies within the watershed (priority waterbodies are described in Section 0).

Appendix F summarizes the historical water quality data collected for major waterbodies within BCWMC. Figure 2-11 shows the locations of water quality and water quantity monitoring locations within the BCWMC.

2.7.1.1 BCWMC Lake Monitoring

The BCWMC has monitored major waterbodies within the watershed, including:

- Cavanaugh Lake (Sunset Hill Pond)
- Crane Lake
- Lost Lake
- North Rice Pond
- Medicine Lake
- South Rice Pond
- Sweeney Lake
- Twin Lake
- Westwood Lake

BCWMC lake monitoring has included assessment of chemical water quality (e.g., total phosphorus, nitrogen chlorophyll a, transparency, pH, dissolved oxygen, conductivity), water clarity (secchi disc transparency), phytoplankton, zooplankton, and aquatic macrophytes. Chemical water quality, phytoplankton, and zooplankton sampling is typically performed at monthly intervals during the growing season (and twice monthly in early summer). Macrophyte surveys are typically performed twice per growing season, in June and August. Water quality data collected by the BCWMC is presented in Appendix F.

Prior to the adoption of its 2004 watershed management plan, the BCWMC developed lake and watershed management plans (lake plans) for specific waterbodies based on the results of historical water quality monitoring and water quality modeling of those lakes. The BCWMC also developed a watershed management plan for the Main Stem of Bassett Creek in 2000; similar to the lake plans, this management plan included management recommendations to achieve water quality goals based on observed data and P8 water quality modeling of the creek. Several of the actions proposed in those watershed management plans have been implemented (see Table 5-5). The BCWMC continues to analyze water quality monitoring data to identify improving or degrading trends within BCWMC priority waterbodies, and to assess whether BCWMC priority waterbodies are meeting the applicable water quality standards (see Section 0). Future water quality monitoring of priority waterbodies by the BCWMC is described in the BCWMC monitoring plan (see Appendix A).

2.7.1.2 BCWMC Stream Monitoring

The BCWMC conducts biotic (invertebrate) monitoring of streams in the watershed on a regular basis and analyzes the data to determine if the water quality is improving or degrading. The biological data are indicators (bioindicators) of water quality. The BCWMC Monitoring Plan (see Appendix A) describes the biotic monitoring and planned chemical water quality monitoring of BCWMC streams.

Temperature and flow data provide an incomplete measure of a stream's suitability for fish and other aquatic species. A second approach to assessing the ecological health of a stream is to sample the organisms that are living in the stream. Monitoring for the presence of biological indicator organisms provides evidence of the water quality of Bassett Creek, including transitory changes in stream water quality related to stormwater runoff. Evaluating benthic macroinvertebrates (bottom-dwelling aquatic organisms, mainly insects) in a stream provides a long-term assessment of its water quality. The benthic invertebrates are exposed to all of the temporal variations in stream water quality and 'integrate' the quality of passing water. Therefore the presence or absence of pollutant tolerant organisms demonstrates the water quality impacts of urban runoff better than grab samples of water flowing in the creek. The inventory of benthic organisms also indicates whether there is a suitable food supply for fish.

The types of organisms living on the stream bottom depend on the available habitat, and the habitat quality is affected by the water quality. Water quality is degraded when pollutants enter a stream. Organic pollutants and nutrients cause a loss of oxygen in the stream. Organisms sensitive to low oxygen concentrations in the water are only able to survive in the highest water quality. There are tolerant invertebrate species that can survive in low oxygen conditions, and their presence indicates low water quality (i.e., organic pollution). Other stressors, such as high suspended solids concentration or high metals concentrations, can also affect the macroinvertebrate community.

Benthic organisms have been collected and inventoried from several Bassett Creek locations since 1980. Since 2000, biotic monitoring has been performed by the BCWMC or MPCA at three year intervals (2000, 2003, 2006, 2008/2009, and in 2012). Biotic monitoring includes the collection of invertebrate species at specific stream locations. From the collected samples, numeric scores representing overall stream health (generally referred to as indices of biological integrity) are calculated using prescribed methods (see Section 2.7.1.2.1 and Appendix A – BCWMC Monitoring Plan). BCWMC biotic monitoring locations include:

- Main Stem of Bassett Creek at Rhode Island Avenue in Golden Valley.
- Main Stem of Bassett Creek south of Zane Avenue North in Crystal.
- Main Stem of Bassett Creek at Irving Avenue, upstream of the double box culvert, in Minneapolis.
- North Branch of Bassett Creek at 32nd Street and Adair in Crystal (note: monitoring was performed just north of Zane Avenue prior to 1995, at which point the location silted in).
- Sweeney Lake Branch of Bassett Creek at Turner's Crossroad (Xenia Avenue) in Golden Valley.
- Plymouth Creek at Industrial Park Boulevard in Plymouth.

Figure 2-11 shows the location of the biotic index sampling stations. At each monitoring location, samples are collected from riffle areas where the flow is fairly rapid and the substrate was composed of gravel and small stones. Samples are collected by disturbing the creek bottom and allowing dislodged invertebrates to drift into a net downstream. Rocks and other substrate materials are also examined for invertebrates. Future biotic monitoring efforts are described in the BCWMC monitoring plan (see Appendix A).

2.7.1.2.1 Biotic Index Monitoring Results

To assess relative water quality from biotic monitoring results, a biotic index is often used. The index is calculated based on the tolerance of each collected species to various pollutants (referred to as tolerance indicator values, or TIVs). The BCWMC has used two biotic indices to evaluate the water quality of BCWMC streams: the Hilsenhoff Biotic Index (HBI) and the Invertebrate Community Index (ICI). The HBI is an indicator of organic pollution, while ICI is an indicator of a broader range of pollutants.

The BCWMC has used the HBI in all of the surveys to assess water quality at the sample stations, based on the macroinvertebrate communities (Hilsenhoff, 1982 and 1987). The HBI uses TIVs assigned to certain species. TIVs indicate the species' ability to survive in low-oxygen conditions and range from 0 to 10. The lower the value, the less tolerant the species to low dissolved oxygen. A tolerance value of 0 is assigned to species collected only in unaltered streams of very high water quality, and a 10 is assigned to species known to occur in severely polluted or significantly disturbed streams; the lower the calculated HBI, the higher the stream quality.

Beginning in 1995, the BCWMC supplemented the HBI with the ICI, developed by the Ohio Environmental Protection Agency (DeShon, 1995). The ICI-based index uses the same data collected for the HBI, but includes a wider range of invertebrates. The scale for the ICI varies from 0 to 60, with 60 being the highest quality. Like the HBI, the numeric scores are grouped according to water quality categories, ranging from poor to exceptional.

Results of BCWMC biotic monitoring were summarized in the report *A Biotic Index Evaluation of Bassett Creek and Plymouth Creek: 2012* (BCWMC, 2013). The 2012 evaluation of the HBI and ICI values indicated the following:

- The 2012 HBI evaluation identified very good water quality in the Main Stem of Bassett Creek (Rhode Island Avenue) and in Plymouth Creek,
- The 2012 HBI evaluation identified good water quality in the Main Stem of Bassett Creek (Zane Avenue, Dresden Land, and Irving Avenue) and
- The 2012 HBI evaluation identified fair water quality in the Sweeney Lake Branch of Bassett Creek.
- No locations were evaluated as less than fair water quality in 2012; since 2000, only the 2009 HBI evaluation the North Branch location has identified poor water quality.
- Water quality in the Main Stem of Bassett Creek at the upstream location at Rhode Island from 2008/2009 to 2012 showed significant improvement.

- The Main Stem at Zane Avenue was not sampled during 2008-2009. Water quality changes between 2006 and 2012 were not significant, but indicated an improvement.
- Water quality changes between 2008-2009 and 2012 were not significant at Plymouth Creek (from good to very good) and the Sweeney Lake Branch of Bassett Creek (from fair to fair).
- Water quality changes between 2009 and 2012 at the Main Stem of Bassett Creek at Dresden Lane and Irving Avenue were not significant (both remained in the good range), but indicated degradation.

Notable changes in water quality should prompt a look at stormwater flow patterns, land use changes, and watershed management practices. To identify the actual stressors, water quality monitoring of additional parameters is necessary and will be included in future BCWMC stream monitoring efforts (see Appendix A). Such monitoring will include collection of storm event runoff using automatic samplers and flow loggers. Water quality parameters will include total and dissolved phosphorus, total suspended solids, chloride, and metals.

The MPCA is developing the Macroinvertebrate Index of Biological Integrity (MIBI). The BCWMC will use the MIBI for future biotic monitoring efforts. Ultimately, the BCWMC seeks to re-evaluate historical biotic index values using the MIBI to develop a consistent data record.

2.7.1.3 Watershed Outlet Monitoring Program

In 2000, the BCWMC, in cooperation with Metropolitan Council Environmental Services (MCES), began monitoring the Main Stem of Bassett Creek as part of the MCES' Watershed Outlet Monitoring Program (WOMP). The WOMP is coordinated by MCES and consists of a network of monitoring stations located throughout the Twin Cities Metro Area. The objective of this program is to collect water quality and quantity (stream flow) data needed to assess current conditions, develop target pollutant loads, and provide continued monitoring after BMPs are implemented in the watersheds.

The Bassett Creek WOMP site is located at Irving Avenue, one-fourth mile upstream of the tunnel that carries Bassett Creek beneath downtown Minneapolis to the Mississippi River (see Figure 2-11). Data collection consists of continuous measurements of stream flow, temperature and conductivity, as well as monthly base flow grab samples and storm event composite samples. The samples are analyzed in the MCES laboratory for many water quality parameters including nutrients and sediment. MCES publishes reports documenting the results of this monitoring.

Prior to installation of the WOMP station, the BCWMC collected continuous water quality monitoring data for Bassett Creek in 1980 and 1992, at two different locations.

2.7.1.4 Hennepin County Environment and Energy Department – River Watch

The Hennepin County Environment and Energy Department manages the River Watch program. The program has been in place since 1995, and provides hands-on environmental education opportunities for students in Hennepin County. Each spring and fall, students collect macroinvertebrate data to assess the

overall health of the biological communities within streams throughout Hennepin County. Some of the monitoring stations for Bassett Creek have been in place since 1999. The BCWMC assists with funding and support of this program.

The River Watch program uses the macroinvertebrate data collected by students to provide a letter grade for each site monitored. The grading scale uses three major biotic indices. The Family Biotic Index measures the community of invertebrates and their tolerance to pollution. The EPT (Ephemeroptera, Plecoptera, and Trichoptera) assess the presence of the most sensitive species and indicates the presence or absence of the species. The third index tabulates the number of families present and measures the abundance of families or total diversity of the family units. This information may be used to supplement the BCWMC's own biotic monitoring (see Section 2.7.1.2.1), but uses different biotic indices not directly comparable to the BCWMC's HBI and ICI. While these data are not directly comparable to the BCWMC biotic monitoring data, this program has value as an educational program.

2.7.1.5 Three Rivers Park District/City of Plymouth

Three Rivers Park District (TRPD) and the City of Plymouth have monitored Parkers Lake and Medicine Lake, both located within Plymouth. The TRPD headquarters is within the Plymouth Creek sub-watershed and the TRPD's French Regional Park lies on the north end of Medicine Lake. French Regional Park offers Medicine Lake amenities to the area that include a boat landing and beach. The TRPD has monitored the water quality conditions in Medicine Lake for over 20 years, and has been instrumental in monitoring the water quality of the creeks coming into the lake. The data collected has been used by the BCWMC and the City of Plymouth to develop their Medicine Lake plans and the Medicine Lake TMDL. The TRPD has monitored Parkers Lake since 2001.

Three Rivers Park District, using funds from the Environmental Protection Agency EMPACT Program, operated a Remote Underwater Sampling Station (RUSS Unit) on Medicine Lake from 2001 to 2003. The RUSS unit documented wind-driven de-stratification events on the lake, during which phosphorus released from the bottom sediments is transported to the lake surface where it is used by algae. This monitoring program suggests that the majority of internal loading of phosphorus in the lake appears to come from wind-driven mixing.

The TRPD continues to monitor Medicine Lake annually. When requested by the BCWMC, the TRPD has conducted additional monitoring of the southwest basin on behalf of the BCWMC for minimal cost. On these occasions, the TRPD also collects samples for phytoplankton and zooplankton analysis funded by the BCWMC (see Section 2.7.1.1). The southwest basin is where Plymouth Creek discharges into Medicine Lake. Water quality data for Medicine Lake and the southwest basin, specifically, are presented in Appendix F.

2.7.1.6 Minneapolis Park and Recreation Board

The Minneapolis Park and Recreation Board (MPRB) monitors several lake locations within the BCWMC, including Birch Pond, Wirth Lake, and Spring Lake. The MPRB formerly monitored Bassett Creek as a participant in the MCES's WOMP (see Section 2.7.1.3). The objectives of the MPRB lake monitoring program are to: protect public health, establish a database for tracking water quality trends, quantify and

interpret both immediate and long-term changes in water quality, provide water quality information to develop responsible water quality goals, provide a basis for water quality improvement projects, and evaluate the effectiveness of implemented best management practices.

Most lakes are sampled once per month in February, April, and October, and twice per month during the period of May through September. Historical data is used to calculate the trophic state index (TSI) trends and estimate fertility for each lake. Observations are then made about whether the lake has improving, stable, or degrading water quality indicators.

2.7.1.7 Metropolitan Council (CAMP)

Volunteers have collected water quality data on a number of Twin Cities metropolitan area lakes since 1980 through the Metropolitan Council's Citizen Assisted Monitoring Program (CAMP). On a bi-weekly basis (April - October), citizen volunteers collect a surface water sample for laboratory analysis of total phosphorus, total Kjeldahl-nitrogen, and chlorophyll-a, obtain a Secchi transparency measurement, and provide some user perception information about each lake's physical and recreational condition. Several waterbodies within the BCWMC have been monitored as part of the CAMP program including Medicine Lake, Parkers Lake, Sweeney Lake, Twin Lake, Westwood Lake, Northwood Lake, and South Rice Lake. In recent years, funding for the CAMP monitoring of waterbodies has been provided by the BCWMC and member cities.

For more information about the CAMP program, please see the following website:

<http://www.metrocouncil.org/environment/RiversLakes/Lakes/index.htm>

2.7.1.8 Minnesota Pollution Control Agency (CLMP)

The MPCA's Citizen Lake Monitoring Program (CLMP) is a cooperative program combining the technical resources of the MPCA and the volunteer efforts of citizens who collect water quality data on their lakes. This program provides low-cost Secchi discs to participants for measuring water clarity on an approximate weekly basis.

2.7.1.9 Member Cities

The BCWMC's nine member cities are responsible for managing lakes and ponds not identified as BCWMC priority waterbodies (see Section 2.7.2) to achieve the cities' goals. City management of these waterbodies may include classifying, monitoring, tracking trends, conducting studies, and implementing other lake water quality management actions.

2.7.2 Management and Classification

2.7.2.1 MPCA Impaired Waters

The federal Clean Water Act (CWA) requires states to adopt water quality standards to protect the nation's waters. To that end, the MPCA developed eutrophication criteria for Minnesota lakes and streams to establish water quality goals and determine appropriate uses of the lakes and streams, as outlined in the guidance document *Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report and 303(d) List* (MPCA, 2014).

Standards for lakes vary by MPCA ecoregion and whether the MPCA classifies a lake as “shallow” or “deep.” The MPCA defines “shallow” lakes as having a maximum depth of 15 feet or less or having at least 80% of the lake area shallow enough to support aquatic plants. The MPCA’s listing of waterbodies on the impaired waters 303(d) list depends upon their classification of a waterbody as a wetland, shallow lake, or deep lake. Generally, the MPCA does not list waterbodies classified as wetlands as impaired for biological indicators. In 2014, the MPCA adopted region-based eutrophication water quality standards for streams, including a revised total suspended solids (TSS) standard. Eutrophication-related water quality standards applicable to BCWMC waterbodies are presented in Table 2-7.

The MPCA also established water quality standards for parameters in addition to those presented in Table 2-7; these standards are published in Minnesota Rules 7050 and are applicable to BCWMC lakes, ponds, and streams. Standards for several parameters included in Minnesota Rules 7050 vary according to the MPCA-determined designated use of the waterbody (e.g., drinking water, industrial use).

In compliance with Section 303(d) of the CWA, the MPCA identifies and establishes priority rankings for waters that do not meet the water quality standards. The list of impaired waters, sometimes called the 303(d) list, is updated by the MPCA every 2 years.

Several waterbodies within the BCWMC have been listed on the MPCA impaired waters (303(d)) list for a variety of impairments. Waterbodies on the impaired waters list are required to have an assessment completed that addresses the causes and sources of the impairment. This process is known as a total maximum daily load (TMDL) analysis.

There are currently five lakes and two streams (Main Stem of Bassett Creek and Plymouth Creek) in the Bassett Creek watershed that are included on the MPCA’s draft 2014 impaired waters 303(d) list. Locations of impaired waters are shown in Figure 2-12. Table 2-5 summarizes the impaired waters within the Bassett Creek Watershed. Current impaired waters listings are available from the MPCA website:

www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/impaired-waters-list.html

Table 2-5 Summary of Impaired Waters within the BCWMC (including 2014 proposed listings and Wirth Lake delisting¹)

Waterbody	Impaired Use	Pollutant or Stressor	Year Listed	TMDL Study Target Start	TMDL Study Target Completion	TMDL Study Approved
Parkers Lake ²	Aquatic Consumption	Mercury in Fish Tissue	1998	1998	2025	--
	Aquatic Life	Chloride	2014	2009	2015	--
Medicine Lake ³	Aquatic Consumption	Mercury in Fish Tissue	2004	--	--	2008 ⁴
	Aquatic Recreation	Nutrients/Eutrophication	2004	--	--	2010
Sweeney Lake	Aquatic Recreation	Nutrients/Eutrophication	2004	--	--	2011
	Aquatic Life	Chloride	2014	2009	2015	--
Wirth Lake	Aquatic Consumption	Mercury in Fish Tissue;	1998	--	--	2008 ⁴
	Aquatic Life	Chloride	2014	2009	2015	--
	Aquatic Recreation ¹	Nutrients/Eutrophication	2002	--	--	2010
Northwood Lake	Aquatic Recreation	Nutrients/Eutrophication	2004	2020	2024	--
Bassett Creek (Main Stem)	Aquatic Life	Chloride	2010	2009	2015	--
	Aquatic Life	Fish Bioassessments	2004	2012	2016	--
	Aquatic Recreation	Fecal Coliform	2008	2008	2015	2014 ⁵
Plymouth Creek	Aquatic Life	Chloride	2014	2009	2015	--
	Aquatic Recreation	Escherichia coli	2014	2008	2015	2014 ⁵
North Branch Bassett Creek	Aquatic Recreation	Escherichia coli	2014	2008	2015	2014 ⁵
Spring Lake	Aquatic Life	Chloride	2014	2009	2015	--

¹ Wirth Lake was delisted for aquatic recreation due to nutrients/eutrophication in 2014.

² Mercury impairment for Parkers Lake is not covered by the statewide mercury TMDL due to mercury in fish tissue exceeding a threshold value of 0.57 mg/kg.

³ Medicine Lake is a "high risk water" for chloride impairment per the MPCA's 2014 Metro Chloride Assessment, but is not listed as impaired for chloride.

⁴ covered under the statewide mercury TMDL, approved in 2007.

⁵ covered under the Upper Mississippi River Bacteria TMDL Study and Protection Plan, approved in 2014

2.7.2.2 BCWMC Classification Systems

The BCWMC classified specific waterbodies within the watershed as priority waterbodies based on the desired water quality standards and uses for those waterbodies. The degree to which a waterbody can support a particular recreational use is primarily controlled by the quality of its water. In lakes, wetlands, and streams, nutrients (primarily phosphorus) and suspended solids control what recreational activities can occur in the Bassett Creek watershed. Phosphorus controls the recreational uses of waterbodies because it is the nutrient that limits the growth of algae. High algal growth is a major cause of poor water clarity, which is often the determining factor in the recreational use suitability of a waterbody.

The BCWMC identified 14 priority waterbodies and divided these priority waterbodies into four classes as shown in Table 2-6 and Appendix C. Priority 1 streams include MDNR public waters watercourses within the BCWMC. Waterbodies identified as MDNR public waters lakes (i.e., "P" designation in the public waters identification number) and at least 10 acres in size are classified as Priority 1 or 2 lakes. Priority lakes with public access or adjacent to public land are classified as Priority 1 lakes, while those without public access or adjacent public land are classified as Priority 2 lakes. Priority 1 and 2 lakes are further subdivided based on whether they are classified as "deep" or "shallow" by the MPCA, as deep and shallow lakes are subject to different nutrient water quality standards. Appendix C lists selected characteristics for major BCWMC waterbodies, include those criteria used to identify priority waterbodies.

The BCWMC adopted water quality standards for priority lakes and streams that are consistent with MPCA water quality standards published in Minnesota Rules 7050 (note that Minnesota Rules 7050 applies to waterbodies within the BCWMC regardless of their BCWMC classification). BCWMC water quality standards for priority waterbodies are presented in Table 2-7. The distinction between "deep" and "shallow" lakes is based on MPCA criteria (see Section 2.7.2.1). All deep lakes are considered priority 1 waterbodies. Water quality data collected by the BCWMC will be compared to BCWMC water quality standards to determine the need for water quality improvements. Historically, the BCWMC found that previous water quality goals could not be met without taking measures to control and improve storm water runoff in the subwatersheds draining to the waterbodies. As a result, watershed management, including review of land development, remains a major component in the management program for the lakes and streams of the Bassett Creek watershed.

Per the BCWMC's adoption of water quality performance standards based on the MPCA's MIDS, the BCWMC requires the implementation of BMPs on construction sites throughout the watershed. Such practices are seen as particularly important in areas of the watershed where regional treatment has not been established or is not feasible. Projects must also meet water quality treatment requirements as specified in the MPCA's NPDES Construction Stormwater permit as well as any requirements specified in the member city's MS4 permit.

Table 2-6 BCWMC Management Classifications for Priority Waterbodies

BCWMC Classification	Waterbodies
Priority Streams	• Main Stem Bassett Creek • North Branch Bassett Creek* • Plymouth Creek • Sweeney Lake Branch Bassett Creek
Priority 1 Deep Lakes	• Medicine Lake • Parkers Lake • Sweeney Lake • Twin Lake • Wirth Lake
Priority 1 Shallow Lakes	• Northwood Lake • Westwood Lake
Priority 2 Shallow Lakes	• Cavanaugh (Sunset Hill) Pond • Crane Lake • Lost Lake •

* Includes Bassett Creek Park Pond

Table 2-7 BCWMC Water Quality Standards for Waterbody Classifications

Priority Waterbody Name	BCWMC Classification ¹	BCWMC Water Quality Standards ²							
		Total Phosphorus, summer average (ug/L)	Chlorophyll <i>a</i> , summer average (ug/L)	Secchi Disc Transparency, summer average (m)	Total Suspended Solids (mg/L)	Daily Dissolved Oxygen Flux (mg/L)	Biological Oxygen Demand (5-day) (mg/L)	<i>Escherichia coli</i> (# per 100 mL)	Chloride (mg/L)
Plymouth Creek	Priority 1 Stream	100	18	NA	30	3.5	2	126 ³	230
North Branch Bassett Creek									
Sweeney Branch Bassett Creek									
Main Stem Bassett Creek									
Medicine Lake	Priority 1 Deep Lake	40	14	1.4	NA	NA	NA	126 ³	230
Twin Lake									
Sweeney Lake									
Wirth Lake									
Parkers Lake	Priority 1 Shallow Lake	60	20	1	NA	NA	NA	126 ³	230
Westwood Lake									
Northwood Lake									
Crane Lake									
Lost Lake	Priority 2 Shallow Lake	60	20	1	NA	NA	NA	126 ³	230
Cavanaugh (Sunset Hill) Pond									

¹ Classification as deep or shallow is based on MPCA shallow/deep classification; shallow lakes have a maximum depth of less than 15 feet or littoral area greater than 80% of the total lake surface area.

² BCWMC standards are based on existing MPCA standards included in MN Rules 7050. Revisions to MN Rule 7050 will supersede BCWMC standards. Note that MN Rule 7050.0220 includes water quality standards for additional parameters that are enforced by the MPCA.

³ 126 organisms per 100 mL as a geometric mean of not less than five samples within any month, nor shall more than 10% of all samples within a month exceed 1,260 organisms per 100

2.7.3 Water Quality Modeling

Water quality modeling serves many purposes, including estimating existing pollutant loads to BCWMC waterbodies, and evaluating the potential benefits of implementing water quality improvements within the watershed. This section describes water quality models developed by the BCWMC.

2.7.3.1 Watershed-wide P8 Model

As part of developing lake and stream watershed management plans, the BCWMC developed models to estimate total flow and phosphorus loadings to lakes and streams within the Bassett Creek watershed using the water quality model P8. P8 (Program for Predicting Polluting Particle Passage through Pits, Puddles and Ponds) is a model for predicting the generation and transport of stormwater runoff pollutants in urban watersheds. The BCWMC has updated the P8 models in relation to TMDL studies performed since development of the stream and lake watershed management plans. In 2012-2013, a water quality modeling project was completed to update the existing Bassett Creek P8 models.

Eleven P8 models, distributed throughout the Bassett Creek watershed, were updated to simulate the quantity and quality of water annually added to Bassett Creek during stormwater runoff events (see Figure 2-13). Data required to update the P8 models included watershed information (area, curve number, imperviousness, etc.) and device information (permanent pool area, permanent pool volume, flood pool area, and flood pool volume). Sources of information for the 2012 model construction included data collected from municipalities and other government agencies, information from previously constructed P8 models, field surveys, estimation from GIS, and calculations from XP-SWMM (i.e., outlet rating curve calculations). The P8 modeling results were then compiled and compared to the available monitoring data from the Bassett Creek WOMP station during the water year monitoring periods between 2001 and 2011 to determine whether changes to the modeling were warranted for calibration. More detailed information regarding data sources, model updates, and model calibration is included in a report entitled *Bassett Creek Water Quality Modeling* (BCWMC, 2013).

The updated P8 water quality modeling provides a tool for the BCWMC and member cities to use in tracking the progress of the BCWMC and the member cities towards TMDL implementation for impaired waterbodies, not only within BCWMC, but also downstream of Bassett Creek. When projects are proposed and/or completed, the updated P8 model could be used to estimate the loading reduction that will be achieved by the projects. The updated P8 modeling may also be used to evaluate the effect of proposed projects, such as projects that come under BCWMC review and BCWMC capital improvement program projects (see Table 5-3).

The BCWMC plans to maintain the P8 model for future BCWMC and member city use. Each year, member cities shall provide the BCWMC with plans for BMPs constructed within their city. The BCWMC will update the model annually to incorporate completed BCWMC capital improvements and BMP information provided by the member cities. The BCWMC will develop a summary report of the water quality model results and provide that report to the member cities to assist in their MS4 reporting.

2.8 Water Quantity and Flooding

The BCWMC was originally formed to address flooding issues in the watershed, so flood control was the first major responsibility of the organization. To reduce flooding along the Bassett Creek trunk system, the BCWMC:

- Manages the BCWMC Flood Control Project
- Monitors water levels on the lakes and streams in the watershed
- Establishes flood levels and manages activities in the floodplains
- Reviews development and redevelopment projects to make sure there are no detrimental flooding impacts to the trunk system

The BCWMC defines the trunk system as those reaches, structures, and designated storage facilities shown in Figure 2-14 and Figure 2-15 and listed in Table 2-9.

Beginning in the 1960s, aging stormwater control facilities and rapid urbanization caused the Bassett Creek watershed to experience flooding problems. For decades, flooding caused damages averaging in excess of \$2 million annually to homes, businesses, and recreational areas along Bassett Creek. The worst problem was the 1.5-mile long Bassett Creek Tunnel, which was undersized and severely deteriorated. The Bassett Creek Flood Control Project (BCWMC Flood Control Project), a \$40 million cooperative effort of the US Army Corps of Engineers (USACE), MnDOT, MDNR, the BCWMC, and the member cities addressed these flooding issues.

2.8.1 BCWMC Flood Control Project

The largest structural Flood Control Project undertaken by the BCWMC was the Bassett Creek Flood Control Project. From 1987 – 1996, the USACE constructed the \$40 million Flood Control Project. The project was the cooperative effort of the USACE, MnDOT, MDNR, the BCWMC, and the BCWMC member cities. The project controls flooding in portions of Golden Valley, Plymouth, Minneapolis, and Crystal and reduced flood elevations along the Bassett Creek corridor by 2 feet in Golden Valley, 1½ feet in Crystal, and up to 4½ feet in Minneapolis. The BCWMC Flood Control Project also reduced average annual flood damages by 62 percent. Table 2-8 lists all of the features of the BCWMC Flood Control Project. Figure 2-14 identifies the BCWMC Flood Control Project structures. Note that the BCWMC Flood Control Project differs from the system referred to as the BCWMC “Trunk System.” The extent of the trunk system is presented in Figure 2-15.

The principal feature of the BCWMC Flood Control Project is the new 1.7-mile tunnel through downtown Minneapolis. The tunnel was built in three phases, at a cost of \$28 million. Phase 1 was constructed in 1979, at a cost of \$12 million (\$39 million in 2014 dollars), Phase 2 was constructed in 1990, at a cost of \$2.8 million (\$5.1 million in 2014 dollars), and Phase 3 was constructed in 1992, at a cost of \$13.4 million (\$22.8 million in 2014 dollars). The tunnel diverts Bassett Creek, where it plunges underground at Glenwood and Colfax Avenues in Minneapolis, into the Mississippi River. The original tunnel, some sections of which were built more than a century ago, was undersized and deteriorating. The tunnel could no longer accommodate increased drainage and was on the verge of collapse. Such a collapse would have

caused major flooding. The new tunnel provides cooperative storm drainage for Bassett Creek, Interstate Highways 94 and 394, and portions of the City of Minneapolis. The tunnel empties into the Mississippi River just south (downstream) of St. Anthony Falls.

With the BCWMC Flood Control Project in place, runoff from the watershed area tributary to the old tunnel no longer flows to Bassett Creek. In 2000, the BCWMC, the City of Minneapolis, and the Mississippi WMO entered into a joint and cooperative agreement for a boundary change to reflect these changed drainage conditions (see Appendix I). The boundary change transferred 1,002 acres from the BCWMC to the Mississippi WMO. The City of Minneapolis is currently responsible for maintenance of the old tunnel. The joint and cooperative agreement includes obligations related to the old and new tunnels, and requires BCWMC approval for any modifications affecting peak flows or hydraulic capacity in the new tunnel (see Appendix I).

The BCWMC Flood Control Project also included construction of the following six major features:

- Highway 100 control structure
- Wisconsin Avenue control structure
- Highway 55 control structure
- Markwood/Edgewood area modifications – Edgewood control structure, Edgewood Avenue basin, and Markwood channel improvements
- Golden Valley Country Club control structure
- Medicine Lake outlet structure

The control structures consist of low flow orifices with overflow weirs to restrict flows.

Other principal features of the BCWMC Flood Control Project include the Bassett Creek Park Pond project, replacing ten street crossings, flood-proofing five homes, and making channel improvements. In addition to providing flood control benefits, some of the project features provide water quality benefits (e.g., Bassett Creek Park Pond and the fish barrier at the tunnel). The features of the BCWMC Flood Control Project are shown on Figure 2-14 and listed in Table 2-8. The project also included the monitoring and disposal of hazardous materials from an area of the project where contaminated soils were present (Irving Avenue dump site).

Each control structure leaves the creek virtually unaffected during normal flow conditions. For large storm events, the storage upstream of control structures generally results in higher water levels than under pre-project conditions. Maintenance may be required in storage areas after significant rainfall events. Each control structure lowers peak discharges immediately downstream of the structure. Implementation of all the control structures and the storage they provide resulted in a smaller tunnel and fewer measures needed to increase stream capacity.

In the vicinity of Glenwood Inglewood Waters and the abandoned Fruen Mill, downstream of Glenwood Avenue, the Flood Control Project proposed removal of an existing stone dam and retaining walls and installing a concrete drop structure, new retaining walls, and widening of the creek channel. This work was not supported by the City of Minneapolis and was deleted from the BCWMC Flood Control Project.

The watershed south of 36th Avenue and west of Hampshire Avenue in the City of Crystal, was diverted to a ponding area downstream of 36th Avenue by the construction of approximately 1,150 feet of culvert. Large inlet structures were constructed on 36th Avenue and on each side of Hampshire Avenue and Louisiana Avenue.

Creekside residents immediately benefited from the modifications even prior to the full completion of the BCWMC Flood Control Project. When an 8-inch rainstorm struck the area in July 1987, the Highway 55 control structure, completed just one month previously, protected homes and businesses downstream of the structure from over \$1 million (\$1.9 million in 2014 dollars) in flood damages.

A construction account was set up for the BCWMC Flood Control Project. Cash contributions to the account totaled over \$6.9 million and included contributions from the member cities (assessments), MnDOT (drainage to tunnel), the MDNR (grants), Hennepin County (grant), General Mills (grant), and interest earned on investments. After paying for the project and paying back \$215,000 owed to the BCWMC Administrative account, there was \$1,535,000 remaining in the construction account. The BCWMC decided to use the remaining funds for future work related to the BCWMC Flood Control Project: floodproofing of remaining homes in the floodplain, emergency repairs to the Flood Control Project system, and long-term maintenance and repair of the BCWMC Flood Control Project system.

2.8.1.1 Irving Avenue Dump Site

As part of the Flood Control Project, the City of Minneapolis was required to furnish a disposal site for the material excavated during channel widening and tunnel construction. The site selected for disposal of the fill material was a vacant area located on the south side of Bassett Creek, to the west of the City of Minneapolis impound lot. The site was selected because it could be easily acquired by the city and was close to the tunnel inlet and the channel modifications. Unfortunately, the disposal site was formerly used as an unlicensed dump site (Irving Avenue Dump), primarily for demolition debris. The MPCA designated the site as a hazardous waste site.

The City of Minneapolis and the MPCA prepared a report that summarized information on site history, potential sources of the hazardous wastes, and the extent of contamination at the site. Investigation work at the site identified contaminated soil and shallow groundwater, which appeared to be the result of sporadic dumping of hazardous materials. The contaminants present at the site include trace metals and chemicals generally associated with oil wastes. Since there was limited potential for direct contact with the contaminated soil after it was covered with the clean fill material, the potential risks to human health and environment posed by the site were related to contamination of groundwater and Bassett Creek.

The City of Minneapolis completed additional investigative activities, including determination of any impacts of the site on water quality in Bassett Creek, and determination of groundwater quality and flow

direction. The groundwater monitoring program involved sampling of existing wells and installation and sampling of several new wells. The monitoring well network was used to assess the movement of groundwater contaminants and to determine groundwater quality before and after placement of fill material at the site.

Based on the results of the investigation, the MPCA agreed that the materials could be left in place with a cover over the material ("cap"). The material was left in place with a cap, which will ensure that the material does not contaminate the groundwater at the site.

2.8.2 Other Watershed Flood Control Projects

Other structural flood control projects were undertaken to implement the 1990 BCWMC Plan. The City of Golden Valley and MnDOT cooperatively constructed the Breck stormwater storage area, upstream of Sweeney Lake on the Sweeney Lake Branch of Bassett Creek. The City of Golden Valley also constructed Cortlawn Pond and Ring Ponds, in the headwaters of the Sweeney Lake Branch of Bassett Creek; these ponds provide both flood control and water quality benefits.

Along the Main Stem of Bassett Creek, the cities of Golden Valley and Robbinsdale acquired all of the area around North and South Rice Ponds to preserve this wetland and natural inundation area for temporary stormwater storage. The crossing of the creek at Dresden Lane restricts downstream discharge and causes floodwaters to be temporarily stored in the North and South Rice Ponds area.

Upstream of Trunk Highway 55, the Minneapolis Park and Recreation Board and Soo Line Railroad Company dedicated four easements to the City of Minneapolis for use of the land as flood storage and flowage.

The City of Crystal acquired easements for temporary storage of stormwater in a pond at 36th Avenue and Winnetka Avenue on the North Branch of Bassett Creek, near the New Hope boundary. In the City of New Hope, temporary stormwater storage is provided in Northwood Park along the creek and on Northwood Lake. At the headwaters of the North Branch of Bassett Creek, the City of Plymouth acquired temporary stormwater storage areas and constructed control structures for them in cooperation with land developers.

The City of Plymouth constructed five major stormwater storage sites on or tributary to Plymouth Creek, as called for in the BCWMC 1990 Plan. The City of Minnetonka adopted a wetland preservation ordinance to protect the natural stormwater storage capability of the Oak Knoll wetland and Crane Lake. Sites recognized as flood storage areas within the BCWMC are identified in Figure 2-14 (not all flood storage areas shown in Figure 2-14 are part of the BCWMC Flood Control Project described in Section 2.8.1).

The BCWMC also implements nonstructural flood control measures, which prevent flood damages from occurring along the BCWMC trunk system. Examples of these measures include:

- Monitoring water levels on lakes and streams in the watershed
- Developing models (e.g., XP-SWMM) to assess flood risk

- Review of proposed projects with potential impacts to floodplains
- Establishing policy and/or requirements to:
 - o Set minimum building elevations
 - o Preserve floodplain storage
 - o Limit alteration to existing structures

2.8.3 Regulatory Water Levels and Flow Rates

Following the construction of the BCWMC Flood Control Project, the BCWMC worked with the USACE to approve revised flood profiles along sections of Bassett Creek for the National Flood Insurance Program's Flood Insurance Rate Map (FIRM). The Federal Emergency Management Agency (FEMA) approved the proposed revisions to the FIRM for Bassett Creek in 2002. Minor adjustments to the mapping were finalized in 2003 and were incorporated into the Hennepin County FIRM.

The BCWMC uses the revised flood profiles in its review of improvements and development proposals. Table 2-9 lists the flood profiles and critical event flow rates that are now in effect. When the BCWMC updates flood profiles and flow rates, the BCWMC will use updated precipitation data published in Atlas 14 (see Section 2.2 and Policy 25 in Section 4.2.2).

Prior to the 2004 Plan, the BCWMC compared proposed development to the assumed future land use to determine if additional mitigation of flow rates was required (see Section 2.1). Current BCWMC policy requires no net increase in peak flow rates for specific storm events (see Section 4.0); the current requirements are independent of assumed future land use.

2.8.4 Flood Insurance Studies

The Federal Emergency Management Agency (FEMA) performs flood insurance studies (FIS) and develops flood maps to determine areas prone to flooding during the 100-year (and sometimes 500-year) storm events. Each of the BCWMC member cities has a FIS. The FIS, together with a city's floodplain ordinance, allow the city to take part in the national flood insurance program (NFIP). Homeowners within FEMA-designated floodplains are required to purchase flood insurance. In some cases, homes within FEMA-designated floodplains on the FEMA floodplain maps may actually not be in the floodplain. To waive the mandatory flood insurance requirements for their homes, residents must remove their homes from the FEMA-designated floodplain by obtaining a Letter of Map Amendment (LOMA). Figure 2-16 shows the FEMA and BCWMC mapping of the 100-year floodplain in the BCWMC.

The member cities have prepared local water management plans. These plans have more detailed information regarding storm sewer systems and localized flooding issues. Additional flooding information is also available from the Flood Insurance Studies (FIS) for the cities within the BCWMC.

Table 2-8 Summary of BCWMC Flood Control Project Features

Feature	Location	Year Built	Partners	Cost ¹
Phase I Tunnel: 2nd Street Tunnel	Minneapolis	1979	BCWMC, USACE, MnDOT	\$12,000,000 (\$39,760,000)
Golden Valley Flood Control Project Regent Avenue Crossing Noble Avenue Crossing Minnaqua Drive Bridge Removal Highway 100 Control Structure 32nd Avenue Crossing Brunswick Avenue Crossing 34th Avenue Crossing Edgewood Ave Control Structure & Embankment Edgewood Avenue Storage Basin Georgia Avenue Crossing 36th Avenue Crossing Hampshire Avenue Crossing Markwood Channel Improvements Floodproofing Five Homes	Golden Valley Golden Valley Golden Valley GV/Crystal Crystal Crystal Crystal Crystal Crystal Crystal Crystal Crystal Crystal Crystal Crystal	1981-1984	BCWMC USACE Golden Valley Crystal	\$1,600,000 (\$3,980, ,000)
Douglas Drive Crossing	Crystal	1987	BCWMC, Crystal Hennepin County	\$100,000 (\$220,000)
Wisconsin Avenue Control Structure	Golden Valley	1987	BCWMC Golden Valley	\$100,000 (\$220,000)
Highway 55 Control Structure	Golden Valley	1987	BCWMC, USACE, MDNR, Minneapolis	\$85,000 (\$190,000)
Plymouth Creek Fish Barrier	Plymouth	1987	BCWMC, MDNR, Plymouth Hennepin County	\$60,000 (\$130,000)
Phase 2 Tunnel: Third Ave. Tunnel	Minneapolis	1990	BCWMC, USACE Minneapolis, MDNR MnDOT	\$2,800,000 (\$5,740,000)
Phase 3 Tunnel: Box Culvert Double Box Culvert Channel Improvements	Minneapolis	1992	BCWMC, USACE, Minneapolis MDNR, MnDOT	\$13,400,000 (\$26,360,000)
Markwood/Edgewood Area Modifications Control Structure Edgewood Avenue Basin Markwood Channel Improvements	Crystal	1992	BCWMC, USACE Crystal, MDNR	500,000 (\$850,000)
Westbrook Road Crossing	Golden Valley	1993	BCWMC, USACE Golden Valley, MDNR	200,000 (\$370,000)
Golden Valley Country Club Control Structure	Golden Valley	1994	BCWMC, USACE Golden Valley, MDNR	450,000 (\$810,000)
Bassett Creek Park Pond	Crystal	1995	BCWMC, USACE, Crystal, MnDOT, MDNR	1,300,000 (\$2,360,000)
Medicine Lake Outlet Structure	Plymouth	1996	BCWMC, Plymouth Hennepin County, MDNR	100,000 (\$180,000)

¹ 2014 dollars are included in parentheses

Table 2-9 BCWMC Flood Profiles (elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above the Mississippi River (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
BASSETT CREEK MAIN STEM							
Tunnel Inlet	8,000	809.8	1,280	804.8	660	802.4	400
Van White Memorial Blvd (DS)	---	809.8	1,280	805.0	660	803.0	400
Van White Memorial Blvd (US)	---	809.8	1,410	805.0	660	803.1	400
Irving Ave Bridge (DS)	9,800	809.9	1,280	806.7	660	805.5	400
Irving Ave Bridge (US)	---	809.9	1,400	807.0	660	805.9	400
Cedar Lake Rd (DS)	---	812.9	1,400	810.7	660	809.5	400
Cedar Lake Rd (US)	10,900	813.1	1,400	810.9	660	809.7	400
CP RR Bridge (DS)	---	813.7	1,400	811.5	660	810.2	400
CP RR Bridge (US)	11,600	814.8	1,390	811.5	660	810.3	400
Penn Ave Bridge & Culvert (DS)	12,410	812.9	1,390	812.1	660	810.8	400
Penn Ave Bridge & Culvert (US)	---	814.8	1,390	813.5	660	811.9	400
BNSF RR Bridge(DS)	---	814.7	1,390	813.5	660	811.9	400
BNSF RR Bridge (US)	12,670	814.8	1,390	813.5	660	811.9	400
CP RR Bridge (DS)	13,930	815.8	1,390	814.1	660	812.8	400
CP RR Bridge (US)	---	815.9	1,390	814.2	660	812.9	400
Fruen Mill Dam (DS)	14,150	817.0	1,390	815.5	660	814.9	400
Fruen Mill Dam (US)	---	819.8	1,390	818.0	660	817.2	400
Glenwood Ave (DS)	---	821.8	1,390	819.5	660	818.3	400
Glenwood Ave (US)	14,855	821.8	1,300	819.4	600	818.3	360
Hwy 55 (DS)	16,500	823.2	1,200	820.8	600	819.5	360
Hwy 55 (US)	---	826.5	1,510	823.7	660	822.0	410
Golf Cart Bridge	---	826.5	1,540	823.8	710	822.0	440
CP RR Bridge (DS)	---	826.5	1,540	823.8	710	822.0	440
CP RR Bridge (US)	---	826.6	1,540	823.8	720	822.0	440
Plymouth Ave Bridge	19,500	826.6	1,580	823.8	750	822.1	450
Theodore Wirth Pkwy (DS)	20,480	826.6	1,480	823.8	740	822.1	450
Theodore Wirth Pkwy (US)	---	826.8	1,480	824.9	750	822.5	460
Confluence w/Sweeney Lake Branch (DS)	22,000	827.3	1,480	825.3	780	823.7	470
Confluence w/Sweeney Lake Branch (US)	---	827.3	1,360	825.3	660	823.7	390

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

DS – Downstream

US – Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above the Mississippi River (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
BASSETT CREEK MAIN STEM (continued)							
Golden Valley Rd (DS)	---	828.3	1,360	826.8	660	826.2	390
Golden Valley Rd (US)	23,800	833.7	1,360	828.9	660	827.3	390
Dresden Ln (DS)	---	834.0	1,350	830.4	660	829.5	390
Dresden Ln (US)	---	834.0	1,360	831.2	660	829.8	390
Bassett Creek Dr (DS)	---	834.3	1,310	832.2	620	830.7	380
Bassett Creek Dr (US)	---	837.0	1,310	833.0	620	831.2	380
Noble Ln (DS)	29,200	839.0	1,340	837.1	630	836.4	390
Noble Ln (US)	---	840.0	1,320	837.5	620	836.6	380
Regent Ave (DS)	30,800	843.0	1,320	841.2	620	840.2	380
Regent Ave (US)	---	843.7	1,290	841.4	610	840.3	380
Minnaqua Ave	31,650	844.0	1,270	842.0	600	840.9	380
Hwy 100 Control Structure (DS)	---	844.8	1,310	842.8	590	842.0	400
Hwy 100 Control Structure (US)	34,020	850.9	960	847.3	360	844.6	270
Confluence w/North Branch (DS)	34,400	850.9	960	847.3	360	844.7	270
Confluence w/North Branch (US)	---	850.9	---	847.3	---	844.7	---
Westbrook Rd (DS)	37,000	858.9	820	857.8	480	856.9	310
Westbrook Rd (US)	---	860.1	800	858.2	470	857.2	300
Duluth St (DS)	38,400	861.8	800	860.5	470	859.4	310
Duluth St (US)	---	862.5	780	860.7	460	859.6	300
St. Croix Ave (DS)	39,800	864.3	780	863.1	460	862.1	310
St. Croix Ave (US)	---	864.6	750	863.5	450	862.4	300
CP RR (DS) (Timber Trestle)	41,660	870.2	650	869.2	380	868.6	250
CP RR (US) (& 2 Pedestrian Bridges)	---	870.3	640	869.3	370	868.7	250
Douglas Dr (DS)	---	870.8	640	869.7	370	869.0	250
Douglas Dr (US)	---	871.6	630	870.1	370	869.2	250
Florida Ave (DS)	42,820	872.5	630	870.6	370	869.7	250
Florida Ave (US)	---	872.9	630	870.9	370	869.8	250
Hampshire Ave (DS)	43,410	873.2	630	871.5	370	870.6	250
Hampshire Ave (US)	---	873.8	600	871.8	360	870.8	250
Golden Valley Country Club (DS)	44,320	875.8	600	874.2	360	873.5	250
Golden Valley Country Club (US)	---	880.6	570	878.4	340	875.7	220

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

DS – Downstream

US – Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above the Mississippi River (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
BASSETT CREEK MAIN STEM (continued)							
Pennsylvania Ave (DS)	46,500	881.4	570	879.8	340	879.2	220
Pennsylvania Ave(US)	---	882.5	470	880.5	300	879.7	210
Union Pacific RR (DS)	47,200	883.5	490	882.1	310	881.3	210
Union Pacific RR (US)	---	884.8	370	882.6	230	881.7	170
Winnetka Ave (DS)	48,000	884.8	360	882.8	200	881.9	150
Winnetka Ave (US)	---	885.0	360	883.0	200	882.1	140
Wisconsin Ave (DS)	49,750	885.3	360	883.8	200	883.1	140
Wisconsin Ave (US)	50,100	888.0	290	886.5	170	885.1	120
Golden Valley Rd (DS)	---	888.1	310	886.5	200	885.2	130
Golden Valley Rd (US)	---	888.2	310	886.5	200	885.2	130
Hwy 55 Westbound (DS)	51,250	888.3	330	886.5	210	885.2	150
Hwy 55 Eastbound (US)	---	888.1	420	886.5	250	885.2	150
General Mills Blvd (Boone Ave) (DS)	---	888.1	300	886.7	170	885.5	120
General Mills Blvd (Boone Ave) (US)	---	888.2	230	886.7	110	885.5	80
Hwy 169 (DS)	56,500	888.4	300	887.1	140	886.1	80
Hwy 169 (US)	---	888.5	240	887.1	100	886.1	70
Hwy 55 Ramp (DS)	58,300	888.5	230	887.1	80	886.1	40
Hwy 55 Ramp (US)	---	888.5	230	887.1	80	886.1	30
Hwy 55 Eastbound (DS)	58,500	888.5	230	887.1	80	886.1	30
Hwy 55 Eastbound (US)	---	888.5	230	887.2	80	886.2	40
Hwy 55 Westbound (DS)	---	888.5	230	887.2	80	886.2	40
Hwy 55 Westbound (US)	---	888.5	230	887.2	80	886.2	30
Hwy 169 Ramp to Hwy 55 Westbound (DS)	---	888.6	230	887.2	80	886.2	30
Hwy 169 Ramp to Hwy 55 Westbound (US)	---	888.6	230	887.2	80	886.2	30
Hwy 55 North Frontage Rd (DS)	58,850	888.6	230	887.2	80	886.2	30
Hwy 55 North Frontage Rd (US)	---	888.6	230	887.2	80	886.2	30
Pedestrian Bridge near Cub Foods	---	888.9	230	887.2	80	886.2	30

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

DS – Downstream

US – Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above the Mississippi River (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
BASSETT CREEK MAIN STEM (continued)							
10 th Ave (DS)	---	889.2	230	887.3	120	886.3	60
10 th Ave (US)	---	889.3	230	887.3	130	886.3	60
Union Pacific RR Bridge (DS)	63,450	889.3	230	887.3	130	886.3	60
Union Pacific RR Bridge (US)	---	889.4	230	887.3	80	886.8	30
South Shore Dr (DS)	63,800	889.5	230	887.7	80	887.1	30
South Shore Dr (US)	---	889.5	230	887.7	80	887.1	50
Medicine Lake Dam (DS)	63,960	889.5	230	887.7	80	887.1	30
Inundation Areas							
Theodore Wirth Park	---	826.5	---	823.7	---	822.0	---
South Rice Pond	---	834.2	---	832.1	---	830.5	---
North Rice Pond	---	836.6	---	834.5	---	833.6	---
Grimes Avenue Pond	---	836.7	---	834.5	---	833.6	---
Golden Valley Country Club	---	880.6	---	878.4	---	875.7	---
Brookview Golf Course	---	888.1	---	886.5	---	885.2	---
Westwood Lake	---	889.9	---	888.8	---	888.3	---
Medicine Lake	---	890.4	---	889.5	---	888.8	---

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

DS – Downstream

US – Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above Confluence with Main Stem (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
NORTH BRANCH							
Hwy 100 Control Structure (US)	---	850.9	960	847.3	360	844.6	270
Confluence w/Main Stem (DS)	0	850.9	960	847.3	360	844.7	270
Confluence w/Main Stem (US)	0	850.9	370	847.3	130	844.6	20
29 th Ave (DS)	200	850.9	320	847.3	100	844.7	10
29 th Ave (US)	---	850.9	1,590	847.3	580	844.6	420
Bassett Creek Park Pond		850.9	1,590	847.3	580	844.6	420
32 nd Ave (DS)	2,600	850.9	1,590	847.3	580	844.6	420
32 nd Ave (US)	---	852.7	600	851.2	340	850.1	240
Brunswick Ave (DS)	3,000	852.7	600	851.2	340	850.1	240
Brunswick Ave (US)	---	856.8	560	855.3	330	852.8	230
34 th Ave Culvert (DS)	4,200	861.6	570	861.2	360	860.8	280
34 th Ave Culvert (US)	---	868.0	560	865.1	490	862.9	220
Apartment Dr Crossing (DS)	---	869.0	780	867.4	310	866.9	220
Apartment Dr Crossing (US)	---	870.6	830	869.0	310	867.7	220
Douglas Dr (DS)	4,200	870.6	830	869.0	310	867.7	220
Douglas Dr (US)	---	870.6	440	869.6	240	868.2	180
Edgewood Ave Embankment (DS)	5,600	871.4	440	869.6	240	868.2	180
Edgewood Ave Embankment (US)	---	880.5	390	875.5	220	872.0	190
Georgia Ave (DS)	6,250	880.5	460	875.5	320	872.1	210
Georgia Ave (US)	---	880.8	510	875.5	310	872.8	200
36 th & Hampshire Ave (DS)	6,800	880.8	360	875.5	230	872.8	170
36 th & Hampshire Ave (US)	6,980	881.5	360	876.0	230	875.0	170
Louisiana Ave (Pipe Outlet) (DS)	8,000	883.3	480	882.9	180	881.6	110
Maryland Ave (Pipe)	8,500	886.5	320	885.4	140	882.7	60
Oregon Ave (Pipe)	9,000	888.3	100	885.4	80	883.3	60
CP RR (Pipe)	8,500	889.9	100	886.6	80	884.3	60
Winnetka Pond Control Structure (Pipe Inlet) (US)	9,500	890.2	170	886.9	80	884.6	60
Service Road (DS)	---	890.2	170	886.9	80	884.6	60
Service Road (US)	10,000	890.5	170	887.1	80	884.7	60
Winnetka Ave (DS)	10,600	890.5	240	887.1	130	884.7	80
Winnetka Ave (US)	---	891.2	310	887.6	140	885.0	80

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

DS – Downstream

US – Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above Confluence with Main Stem (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
NORTH BRANCH (continued)							
Boone Ave (DS)	13,500	891.2	730	887.6	190	885.6	140
Boone Ave (US)	---	891.2	330	888.2	200	886.9	150
Northwood Lake	---	891.2	330	888.2	200	886.9	150
Hwy 169 (DS)	16,850	891.8	330	888.4	200	887.1	150
Hwy 169 (US)	---	892.9	330	890.7	200	888.9	150
Rockford Rd (DS)	18,350	892.9	330	890.7	200	888.9	150
Rockford Rd (US)	---	897.1	---	894.8	---	893.3	---
Inundation Areas							
Bassett Creek Park Pond	---	850.9	---	847.3	---	844.6	---
Edgewood Ave Pond	---	880.5	---	875.5	---	872.0	---
Winnetka Pond (DS of Winnetka Avenue)	---	890.2	---	886.9	---	884.6	---
Northwood Park	---	891.2	---	887.6	---	885.0	---
Northwood Lake	---	891.2	---	888.2	---	886.9	---

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

DS – Downstream

US – Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above Confluence with Main Stem (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
SWEENEY LAKE BRANCH							
Confluence w/Main Stem (DS)	0	827.3	1,480	825.3	780	823.7	470
Confluence w/Main Stem (US)	---	827.3	---	825.3	---	823.7	---
Courage Kenny Institute Pedestrian Crossing (DS)	---	827.3	170	825.3	130	823.7	90
Courage Kenny Institute Pedestrian Crossing (US)	---	828.0	190	826.4	140	825.3	100
Courage Kenny Institute Vehicle Crossing & 2 Pedestrian Bridges (DS)	700	828.0	190	826.4	140	825.3	100
Courage Kenny Institute Vehicle Crossing & 2 Pedestrian Bridges (US)	---	830.6	170	828.3	130	826.3	90
Hidden Lakes Pkwy & Courage Kenny Institute Access Rd (DS)	1,330	830.6	170	828.3	130	826.3	90
Hidden Lakes Pkwy & Courage Kenny Institute Access Rd (US)	---	831.8	170	829.1	130	826.8	90
Sweeney Lake Dam (DS)	1,700	831.8	170	829.1	130	826.8	90
Sweeney Lake/Sweeney Lake Dam (US)	---	831.8	170	829.2	130	828.4	90
Union Pacific RR (DS)	6,800	831.8	400	829.2	220	828.4	130
Union Pacific RR (US)	---	836.0	470	831.5	230	829.8	130
Hwy 55 (DS)	---	836.6	830	834.9	500	833.5	320
Hwy 55 (US)	---	838.3	300	836.0	190	834.1	160
CP RR (DS)	9,000	838.3	250	836.0	180	834.1	150
CP RR (US)	---	841.3	250	837.5	220	834.8	170
Breck Pond & Control Structure (US)	9,580	842.4	250	838.3	220	835.3	170
Hwy 100 (DS) (Breck Pond)	10,400	842.4	470	838.3	230	835.3	150
Hwy 100 (US)	---	846.8	490	845.0	220	844.3	140
Turners Crossroad (DS)	10,950	846.8	490	845.0	220	844.3	140
Turners Crossroad (US)	---	857.1	420	851.6	180	848.8	120
Glenwood Pond A	---	857.1	---	851.6	---	848.8	---
CP RR (DS)	---	857.1	180	851.6	50	848.8	30
CP RR (US)	---	857.1	180	851.6	50	848.8	30
Glenwood Pond B ²	---	857.1	---	851.6	---	848.8	---

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

²Normal flows discharge from Ravine Storage Area east through 36" culvert at CP RR to Duck Pond; then north through 48" culvert at Glenwood Avenue to Glenwood Pond B

DS – Downstream

US – Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above Confluence with Main Stem (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
SWEENEY LAKE BRANCH (continued)							
Glenwood Ave (DS) ²	---	857.1	120	851.6	70	848.8	60
Glenwood Ave (US) ²	---	857.1	100	852.0	90	849.4	60
Duck Pond ²	---	857.1	---	852.0	---	849.4	---
CP RR (DS) ²	---	857.1	570	852.0	320	849.4	210
CP RR (US) ²	---	859.3	360	855.9	110	852.9	80
Ravine Storage Area ^{2,4}	---	859.3	120	855.9	70	852.9	60
Cortlawn Pond ⁴	---	873.6	110	873.2	40	871.9	20
East Ring Pond ⁴	---	879.4	180	877.3	50	876.1	20
78" RCP Equalizer	18,800	879.4	480	877.3	180	876.1	80
West Ring Pond ⁴	---	879.4	---	877.3	---	876.1	---
Ravine Storage Area Overflow							
Glenwood Pond B ³	---	857.1	---	851.6	---	848.8	---
CP RR (DS) ³	---	857.1	---	852.0	---	849.4	---
CP RR (US) ³	---	858.9	---	852.3	---	850.2	---
Storage Area ³	---	858.9	---	852.3	---	850.2	---
Glenwood Ave (DS) ³	---	858.9	---	852.3	---	850.2	---
Glenwood Ave (US) ³	---	859.3	---	855.9	---	852.9	---
Ravine Storage Area ^{3,4}	---	859.3	---	855.9	---	852.9	---
Inundation Areas							
Sweeney Lake	---	831.8	---	829.2	---	828.4	---
Twin Lake	---	831.8	---	829.2	---	828.4	---
Breck Pond	---	842.4	---	838.3	---	835.3	---
Cortlawn Pond ⁴	---	873.6	---	873.2	---	871.9	---
East Ring Pond ⁴	---	879.4	---	877.3	---	876.1	---
West Ring Pond ⁴	---	879.4	---	877.3	---	876.1	---

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

²Normal flows discharge from Ravine Storage Area east through culvert at CP RR to Duck Pond; then north through 48" culvert at Glenwood Avenue to Glenwood Pond B

³High flows may discharge from Ravine Storage Area north through culvert at Glenwood Avenue to storage area; then east through 78" culvert at CP RR to Glenwood Pond B

⁴West and East Ring Ponds connected to Cortlawn Pond and the Ravine storage area via a series of storm sewer pipes not listed in this table.

DS – Downstream

US - Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above Medicine Lake (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
MEDICINE LAKE BRANCH (PLYMOUTH CREEK)							
Medicine Lake/Medicine Lake Dam (US)	---	890.4	760	889.5	330	888.8	170
Pedestrian Crossing (US)	---	890.4	750	889.5	330	888.8	310
Pedestrian Crossing (DS)	---	890.5	---	889.5	---	888.8	---
Pedestrian Crossing (US)	---	890.5	---	889.5	---	888.8	---
Pedestrian Crossing (US)	---	890.5	750	889.5	330	888.9	310
West Medicine Lake Dr (DS)	1,300	890.6	810	889.5	340	889.0	200
West Medicine Lake Dr (US)	---	893.6	810	893.1	340	892.6	200
Fish Barrier (DS)	---	916.2	270	915.6	110	915.5	80
Fish Barrier (US)	---	923.0	270	922.1	110	921.7	80
26 th Ave (DS)	7,350	924.9	270	923.5	110	923.1	80
26 th Ave (US)	---	925.6	270	923.8	110	923.2	80
28 th Ave Dike (DS)	---	930.2	270	928.8	110	928.2	80
28 th Ave Dike (US)	---	932.3	290	931.2	110	929.4	80
County Rd 61 (DS)	---	932.3	290	931.2	110	929.4	80
County Rd 61 (US)	---	934.2	270	931.5	130	929.6	80
Xenium Ln (DS)	11,700	934.2	470	931.6	250	930.3	150
Xenium Ln (US)	---	934.6	470	931.7	250	930.4	150
Crowne Plaza DS Crossing (DS)	---	934.6	470	931.7	250	930.4	150
Crowne Plaza DS Crossing (US)	---	935.2	450	931.9	220	930.7	120
Crowne Plaza US Crossing (DS)	---	935.3	450	932.4	220	931.3	120
Crowne Plaza US Crossing (US)	---	936.1	480	933.0	230	931.6	130
I-494 (DS)	13,350	936.5	480	935.3	230	934.6	130
I-494 (US)	---	937.7	460	935.8	210	934.8	120
Annapolis Ln (34 th Ave) (DS)	---	942.0	330	941.1	160	940.4	90
Annapolis Ln (34 th Ave) (US)	---	943.0	320	941.4	160	940.6	90
Fernbrook Ln (DS)	15,850	947.4	320	946.1	160	945.3	90
Fernbrook Ln (US)	---	947.7	320	946.2	160	945.4	90

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

DS – Downstream

US - Upstream

Table 2-9 BCWMC Flood Profiles (continued, elevations in NAVD88 datum), revised Aug 2022¹

Location (Description)	Creek Distance Above Medicine Lake (feet)	100-Year		10-Year		2-Year	
		Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
		(feet)	(cfs)	(feet)	(cfs)	(feet)	(cfs)
MEDICINE LAKE BRANCH (PLYMOUTH CREEK) (continued)							
Plymouth Creek Park Pond Outlet Structure (DS)	---	950.2	320	948.9	160	948.0	90
Plymouth Creek Park Pond Outlet Structure (US)	---	954.8	720	952.4	320	951.2	170
37 th /38 th Ave (DS)	19,750	954.7	720	952.4	320	951.2	170
37 th /38 th Ave (US)	---	954.9	500	952.4	220	951.2	120
County Rd 9 (Rockford Rd) (DS)	21300	954.9	400	952.4	195	955.4	100
County Rd 9 (Rockford Rd) (US)	---	958.5	400	956.5	180	955.4	90
Vicksburg Ln (DS)	22,150	963.1	400	961.3	170	960.2	90
Vicksburg Ln (US)	---	963.8	300	961.5	130	960.3	70
Pedestrian Crossing/41 st Ave Extension (DS)	---	966.0	210	965.0	90	964.6	50
Pedestrian Crossing/41 st Ave Extension (US)	---	966.9	160	965.2	80	964.7	50
Yuma Ln (DS)	---	967.7	150	967.0	80	966.6	50
Yuma Ln (US)	---	968.4	100	967.5	80	967.1	60
Dunkirk Ln (US)	25,300	978.3	140	977.4	60	977.3	40
Dunkirk Ln (DS)	---	983.0	140	982.1	60	980.8	50
Pedestrian Crossing (Boardwalk) (DS)	---	983.2	100	982.3	60	981.3	40
Pedestrian Crossing (Boardwalk) (US)	---	983.2	100	982.3	60	981.5	40
Hwy 55 (DS)	29,150	983.2	100	982.3	60	981.6	40
Hwy 55 (US)	---	984.0	---	982.5	---	981.7	---
Inundation Areas							
Xenium Ln	---	934.6	---	931.7	---	930.4	---
Plymouth Creek Park Pond	---	954.8	---	952.4	---	951.2	---
Turtle Lake	---	967.0	---	965.2	---	964.2	---
Rockford Rd	---	968.4	---	967.3	---	966.7	---
Dunkirk Ln	---	983.0	---	982.1	---	980.8	---
Oak Knoll Pond	---	918.7	---	917.5	---	917.0	---
Crane Lake	---	920.2	---	919.2	---	918.7	---

¹BCWMC 2021 Update XP-SWMM Model, August 2022. The BCWMC intends to update the XP-SWMM Model on an as-needed basis to reflect significant projects and changes within the watershed. The most current version of the model must be used.

DS – Downstream

US - Upstream

2.8.5 Water Quantity Monitoring

2.8.5.1 Lake Levels

The BCWMC has collected water level data on several waterbodies since the 1970s. Water level periods of record and ordinary high water levels (OHWLs), if known, are presented in Table 2-10.

Table 2-9 BCWMC Priority Waterbody Lake Levels, revised May 2017

Priority Waterbody	MDNR Lakefinder Data http://www.dnr.state.mn.us/lakefind/index.html		Normal Water Level (feet, NAVD88 datum)	BCWMC Period of Record
	Period of Record	OHWL (feet, NGVD1929 datum)		
Cavanaugh (Sunset Hill) Pond	--	--	--	--
Crane Lake	--	--	917.3	1974 – present
Lost Lake	--	--	940.2	--
Medicine Lake	1926 – present	889.1	887.9	1972 – present
Northwood Lake	1993 – 1999	885.5	884.8	1993 – present
Parkers Lake	1960 – present	935.9	934.4	1972 – present
Sweeney Lake	1958 – 1999	827.7	827.2	1972 – present
Twin Lake	--	--	827.2	--
Westwood Lake	1974 – 1999	887.8	887.6	1974 – present
Wirth Lake	1883 – 2014	818.9	817.7	2006 – present

The BCWMC typically measures water levels twice per month during the open water period and once per month in winter. More detailed information is available from the MDNR lakefinder website (<http://www.dnr.state.mn.us/lakefind/index.html>) and from the BCWMC, upon request.

During the development of this Plan, Medicine Lake water levels were identified as an area of concern (see Section 3.2). Water level data for Medicine Lake is available dating back to 1926, although water level data was not measured regularly until 1972. From 1972 to 2014, water levels have fluctuated from an observed low of 885.6 feet (NGVD1929 datum) in 1972 to an observed high of 889.7 feet (NGVD1929 datum) in 1991. The average water level over this period is approximately 888 feet (NGVD1929 datum). The normal

water level for Medicine Lake is 887.7 feet (NGVD1929 datum), which is the elevation of the outlet. Figure 2-17 presents Medicine Lake water levels observed since 1972.

2.8.5.2 Stream Gaging and Flow Data

In 2000, the BCWMC, in cooperation with Metropolitan Council Environmental Services (MCES), began monitoring flow and stage in the Main Stem of Bassett Creek as part of the Watershed Outlet Monitoring Program (WOMP, see Section 2.7.1.3). The Bassett Creek WOMP site is located at Irving Avenue, one-fourth mile upstream of the storm sewer tunnel that runs beneath downtown Minneapolis to the Mississippi River (see Figure 2-11). Data collection consists of continuous measurements of stage (which is converted to stream flow using a rating curve), temperature and conductivity.

2.8.6 Water Quantity Modeling

Water quantity modeling is necessary to establish flood levels and determine floodplain extents, design hydraulic structures adequate to meet their intended functions, and assess hydraulic impacts of projects proposed by the BCWMC and other entities. This section describes water quantity models developed by the BCWMC.

2.8.6.1 Watershed-wide XP-SWMM Model

The original hydrologic and hydraulic models of the Bassett Creek watershed were created in the 1970's. Although there have been significant changes in the watershed, there have only been minor updates to these original models, which were developed using the USACE's HEC-1 and HEC-2 programs. In 2012 and 2013, the BCWMC converted the HEC models to XP-SWMM, which is an integrated hydrologic-hydraulic model using the EPA's Storm Water Management Model (SWMM) with an interface developed by XP software. XP-SWMM was used for more detailed modeling in select areas of the watershed.

XP-SWMM allows for calculating both hydrology and hydraulics within one modeling program, rather than requiring two separate programs, as with the HEC-1 and HEC-2 models. The model update was split into two phases, with the first phase in 2012 and 2013 including:

- Updating watershed divides based on recent digital topographic data,
- Modifying hydrologic inputs (because of the changes in watershed divides and available methodology).
- Enhancing detail along the creeks by using updated channel geometry and current bridge and culvert geometry.

The updated XP-SWMM model divides the BCWMC into 55 subwatersheds (see Figure 2-18). This 2012-2013 modeling update did not include further subdividing watersheds, incorporating additional municipal storm sewers, or incorporating additional upstream stormwater storage.

The 2012 XP-SWMM model can be used to compare relative changes in flow rate (i.e., existing vs. proposed conditions runoff rates), or relative changes in water surface elevations (i.e., existing vs.

proposed conditions maximum water surface elevations in the creeks or storage areas). The 2012 XP-SWMM model is not intended to be used to determine absolute flow or water surface results (i.e., flood elevations based on a particular design storm event). Model updates necessary to accurately estimate absolute flow and water surface elevations would require:

- Subdividing the 55 watersheds (from the original HEC-1 model) into approximately 850 watersheds (consistent to the watersheds in the P8 water quality model),
- Incorporating additional municipal storm sewer systems between upstream modeled ponds,
- Integrating detailed storage in modeled ponds upstream of the creek system, and
- Incorporating Atlas 14 precipitation depths (see Section 2.2) and updated soils data (see Section 2.4).

By incorporating these changes, the modeled runoff rates to the creek system will likely more realistically represent actual conditions, resulting in an acceptable calibration. If a second phase of model improvement is implemented, the resultant XP-SWMM model could be used to determine (and compare) absolute water surface elevations and flow rates. The revised model results could be beneficial to the BCWMC and member cities for revising the BCWMC's jurisdictional flood elevations. The results could also be submitted to FEMA for possible use in future Hennepin County flood insurance rate maps. The model could also be useful to the member cities to assess flood elevations at other ponds or wetlands throughout the watershed.

2.9 Natural Communities and Rare Species

Prior to settlement, the Bassett Creek watershed was covered by two major natural communities. From the Mississippi River to Medicine Lake, a predominantly oak forest interrupted by tall grass prairie and marsh covered the watershed. A dense deciduous forest known as the "Big Woods" covered the area west of Medicine Lake. Elm, sugar maple, and basswood are representative Big Woods tree species. Although scattered remnants of this forest are still present throughout much of its original range, only two remnants are present within the BCWMC, according to the map *Natural Communities and Rare Species of Carver, Hennepin, and Scott Counties* (Minnesota County Biological Survey, 1998). Minnesota Land Cover Classification System (MLCCS) information is currently available for the entire Bassett Creek watershed making it a good source of information that can be used as a management tool. Sites of biological significance are shown in Figure 2-10.

Natural vegetation in the Bassett Creek watershed over time has been greatly altered by agricultural development and urbanization. In recent years, due to limited areas for expansion, former agricultural areas have been urbanized. Remaining vegetation in the watershed is typical of that found at the interface between the Eastern Deciduous Forest and the Temperate Grassland. In addition to the forested areas, numerous wetlands were once present in the central and eastern portions of the watershed, but the majority have been drained or filled for development. Remaining wetland areas are concentrated in the western part of the watershed and some are the remnants of approximately 1,500 acres of marsh, which

once existed between Medicine Lake and the southeast corner of the watershed. The county biological survey map notes the presence of a tamarack swamp in Theodore Wirth Regional Park. The National Heritage Information System (NHIS) also notes five occurrences of federally- or state-listed rare animal species in the watershed. Blanding's turtles, trumpeter swans, peregrine falcons, and hooded warblers are rare species that occur in the watershed, and the habitat for these species should be protected and improved where feasible.

2.10 Fish and Wildlife Habitat

2.10.1 MDNR Fisheries Surveys and Stocking

2.10.1.1 Medicine Lake

Medicine Lake offers a diverse sport fish community consisting of black crappie, bluegill, largemouth bass, pumpkinseed, northern pike, walleye, and yellow perch. Fishing access is available from two boat launches, one of which is a public launch maintained by the Three Rivers Park District (see Figure 2-19). Since 1999, the MDNR has stocked walleye every other year. The most recent fish survey was performed by the MDNR in 2012.

The relative abundance and size of northern pike have increased over three surveys from 2006 to 2012. The abundance of walleye is less than average for this type of lake in the 2012 survey, although the sampled fish were of good size. The abundance of yellow perch has steadily declined since 2000. Bluegill and black crappie were caught in average abundances and at average sizes.

Due to the presence of mercury in fish tissue, fish consumption guidelines for Medicine Lake are in effect for bluegill sunfish, bullhead, carp, crappie, largemouth bass, and northern pike.

2.10.1.2 Parkers Lake

Boat access to Parkers Lake is through a city-maintained concrete boat ramp on the north end of the lake and shore access is available from a public fishing pier located on the west side of the lake (see Figure 2-19). The MDNR most recently performed a fish survey in Parkers Lake in 2007. That survey identified northern pike and bluegill as the most abundant gamefish, but also noted largemouth bass as an important game fish in this lake. Northern pike abundance was at an all-time high for Parkers Lake in 2007. Bluegill abundance was high compared with similar lakes and was the highest bluegill abundance observed for Parkers Lake. Other sunfish species sampled during the 2007 survey include pumpkinseed, hybrid, and green sunfish. Black crappie and yellow bullhead were also present.

Due to the presence of mercury in fish tissue, fish consumption guidelines for Parkers Lake are in effect for bluegill sunfish, bullhead, northern pike, and white sucker.

2.10.1.3 Sweeney Lake and Twin Lake

The MDNR performed a fish survey on Sweeney Lake and Twin Lake in 1991 and an electrofishing assessment of fish on Sweeney Lake in 2013. The 1991 fish survey identified northern pike, largemouth bass, several species of sunfish (pumpkinseed, green, bluegill, and hybrid), crappie, carp, black and yellow

bullhead, and white sucker in both lakes. Golden shiner was the only species identified in Twin Lake but not in Sweeney Lake. Yellow perch and white crappie were present in Sweeney Lake but not in Twin Lake.

In the 2013 MDNR survey of Sweeney Lake, 13 different species were sampled including bluegill, largemouth bass, black crappie, and yellow bullhead as the most abundant, respectively. Seven common carp were netted and measured. One buffalo (*Ictiobus* sp.) was observed but could not be netted. No gizzard shad were sampled in the 4 standard transects. However, areas of "rippling" water were observed off shore. Upon investigation, these "ripples" were found to be caused by schools of gizzard shad. The water was calm and the schools were observed in many areas throughout the lake. All gizzard shad that were shocked ranged from 3 to 5 inches. The MDNR reported that gizzard shad are not common in lakes of this type but they seemed relatively abundant in Sweeney Lake. Gizzard shad are documented as having an impact on game fish population through competition with other forage and game species at the larval stage, and by growing too large for largemouth bass and other sport fish to eat.

The BCWMC performed a trapnet fish survey of Sweeney and Twin Lakes in 2013. The 2013 survey sampled 11 fish species in Sweeney Lake and 10 species in Twin Lake. Bluegill sunfish and black crappie were the most abundant fish observed in Sweeney Lake. Gamefish present in Sweeney Lake included largemouth bass and northern pike. Bluegill sunfish and yellow bullhead were the most abundant fish observed in Twin Lake. The number of fish caught per net was generally lower in Twin Lake than in Sweeney Lake in 2013.

Due to the presence of mercury in fish tissue, fish consumption guidelines for Sweeney Lake are in effect for largemouth bass.

2.10.1.4 Wirth Lake

Wirth Lake has a public fishing pier. Wirth Lake is part of the MDNR's Fishing in the Neighborhood program. Fishing in the Neighborhood is aimed at increasing fishing opportunities, public awareness and environmental stewardship within the seven-county metro region. A winter aeration system is operated by the MPRB to maintain oxygen levels to maintain fish populations through the winter.

Wirth Lake was most recently surveyed by the MDNR during the summer of 2012. Bluegill abundance has increased since 2007 and considered average for this lake type. The bluegill population is dominated by smaller fish and bluegill growth rates were below average. Black crappie abundance has increased since 2007 and considered average for this lake type. Northern pike abundance was less than 2007, but still considered average for this lake type; the population is dominated by larger individuals. Yellow perch abundance has increased since 2007 and considered average for this lake type. Other fish species sampled in the 2012 survey include black bullhead, brown bullhead, green sunfish, largemouth bass, pumpkinseed, and yellow bullhead.

Walleye have been sampled in past surveys but none were captured in 2012 despite stocking adult walleye every five years (most recently in 2007 and 2012). Walleye fingerlings were stocked in 2011 and 2008.

Due to the presence of mercury in fish tissue, fish consumption guidelines for Wirth Lake are in effect for carp, crappie, northern pike, walleye and white sucker.

2.10.2 Aquatic Plant (Macrophyte) Monitoring

Aquatic plants, or macrophytes, are a natural and integral part of most lake communities. A lake's aquatic plants, generally located in the shallow areas near the shoreline of the lake provide habitat for fish, insects, and small invertebrates, provide food for waterfowl, fish and wildlife, produce oxygen, provide spawning areas for fish, help stabilize and protect shorelines from wave erosion, and provide nesting sites for waterfowl.

The BCWMC has performed macrophyte surveys of most of its priority waterbodies. Macrophyte surveys are generally performed during the same year as BCWMC chemical water quality monitoring and include two surveys (typically June and August). Macrophyte monitoring includes the identification of key invasive macrophytes (e.g., curlyleaf pondweed and Eurasian watermilfoil) that are present in the waterbodies.

Curlyleaf pondweed is an invasive aquatic macrophyte that displaces native aquatic species. Because of the timing of its growth and die-back cycle, curlyleaf pondweed can be a significant source of phosphorus in a lake during the mid-summer months. Eurasian watermilfoil is another invasive macrophyte that can displace native species and significantly interfere with the recreational uses of a lake by forming dense mats at the water surface.

Eurasian watermilfoil has been identified in the following BCWMC waterbodies:

- Medicine Lake
- Parkers Lake
- Wirth Lake

Curlyleaf pondweed has been identified in the following BCWMC waterbodies:

- Crane Lake
- Lost Lake
- Medicine Lake
- Northwood Lake
- Sweeney Lake
- Twin Lake
- Westwood Lake

- Wirth Lake

Future macrophyte monitoring efforts planned by the BCWMC are described in the BCWMC monitoring plan (see Appendix A). Curlyleaf pondweed management actions in Medicine Lake are described in Section 2.6.4.5).

2.10.3 Wetland Health Evaluation Program

Hennepin County coordinates the Wetland Health Evaluation Program (WHEP). Through the program, volunteers are trained and work as part of a community-based team to collect data on wetland plants and macroinvertebrates using sampling methods and evaluation metrics developed by the MPCA to evaluate wetland health. Metrics are developed for vegetation and invertebrates and converted to an A through F grade (Hennepin County grading scale) or a poor/moderate/excellent rank (MPCA grading scale).

Generally, cities utilize WHEP data as baseline data for specific sites to monitor changes over time. BCWMC member cities have periodically participated in WHEP. BCWMC member cities and partners most recently participating in WHEP include the City of Minnetonka and the Minneapolis Park and Recreation Board.

2.11 Pollutant Sources

The sources of water pollution in the Bassett Creek are many and varied. There are many permitted sites, hazardous waste generators, and contaminated sites within the BCWMC. The MPCA maintains a database of these sites, which includes permitted sites (air, industrial stormwater, construction stormwater, wastewater discharge), hazardous waste generating sites, leak sites, petroleum brownfields, tank sites, unpermitted dump sites, and sites enrolled in the Voluntary Investigation and Cleanup (VIC) program. This information is available online through the MPCA's What's In My Neighborhood program, and is presented in Figure 2-20. The location of these potentially contaminated or hazardous waste sites should be considered as sites are redeveloped and BMPs are implemented. The presence of soil contamination at many of these sites, if not removed, may limit or prevent infiltration as a stormwater management option

In contrast to sites with known hazards, non-point source pollution cannot be traced to a single source or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and in atmospheric transport. Discharge from stormwater pipes is considered a non-point source discharge as the pollutants coming from the pipe are generated across the watershed contributing to the pipe, not at a single location. Point sources frequently discharge continuously throughout the year, while non-point sources discharge in response to precipitation or snowmelt events. For most waterbodies, non-point source runoff, especially stormwater runoff, is the major contributor of pollutants. Table 2-4 summarizes the principal pollutants found in stormwater runoff and provides example sources and possible impacts of each pollutant.

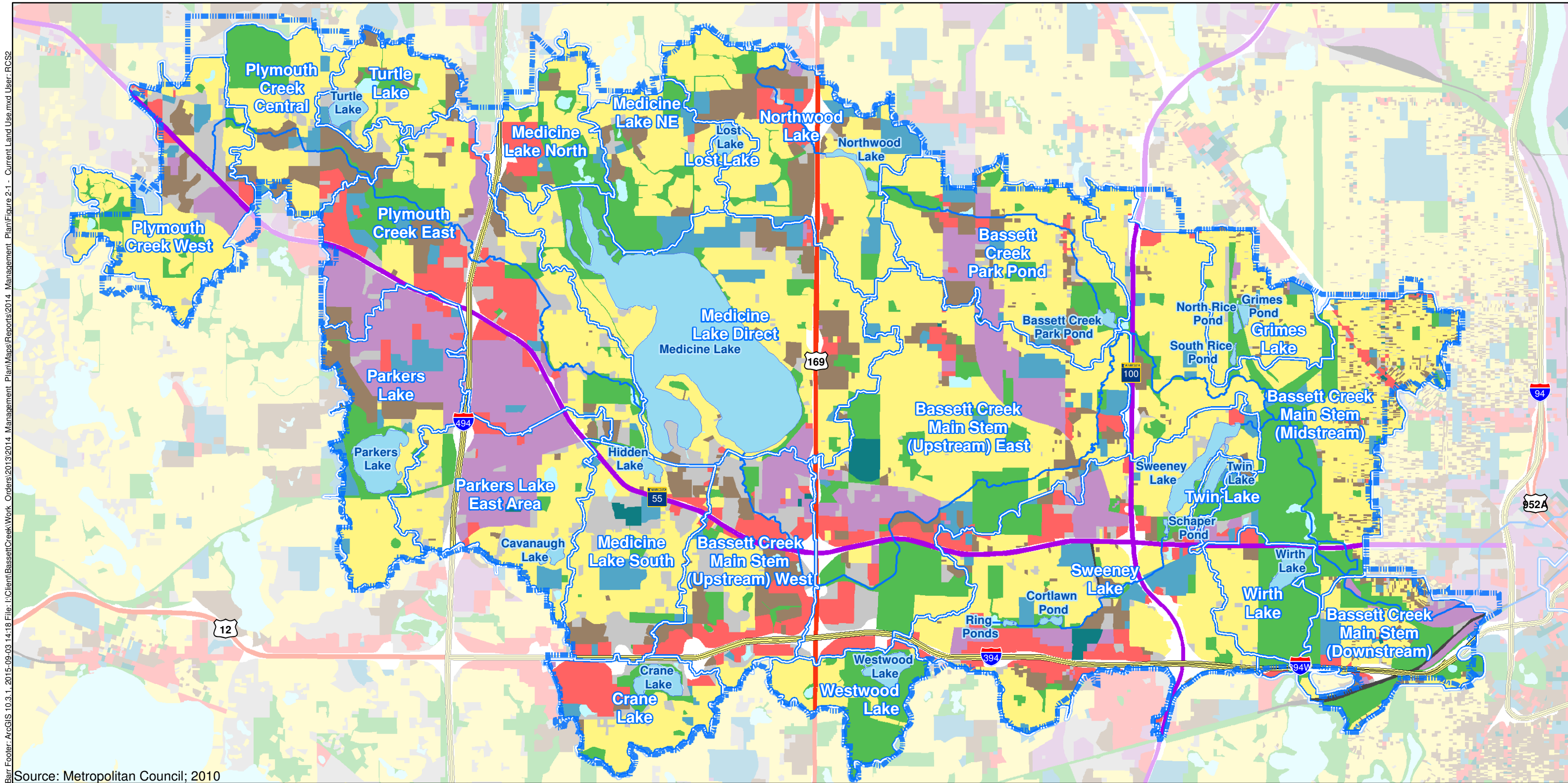
Some areas within the BCWMC are served by subsurface sewage treatment systems (SSTS). Failing or substandard SSTS may be a non-point source of pollutants. Improperly sited, installed or maintained systems may achieve inadequate treatment of sewage. In addition to the public health risks of untreated

or inadequately treated sewage (e.g., contamination of wells), sewage contains the nutrient phosphorus, which if discharged into waterbodies can cause excessive algae and aquatic plant growth leading to degradation in water quality. The MPCA implements an SSTS regulatory program to manage the environmental and public health impacts of SSTS.

More information about potential pollutant sources is available from the MPCA website:

<http://www.pca.state.mn.us/index.php/data/wimn-whats-in-my-neighborhood/whats-in-my-neighborhood.html>

Bar Footer: ArcGIS 10.3.1, 2015-09-03 14:18 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Map\Figure 2-1 - Current Land Use.mxd User: RC52



- 
BCWMC Jurisdictional Boundary


Major Subwatersheds


Creeks
- Metropolitan Council 2010 Generalized Landuse**

 Agricultural

 Single Family Residential

 Multifamily Residential

 Commercial

 Industrial

 Institutional
-  Mixed Use

 Park, Recreational or Preserve

 Rights-of-Way (i.e., Roads)

 Railway (inc. LRT)

 Vacant or Unknown

 Water

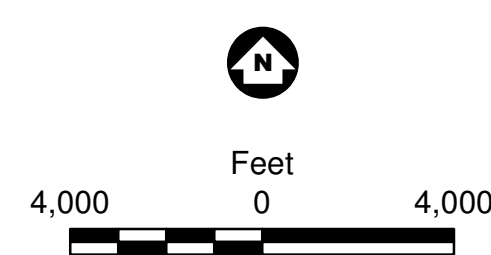
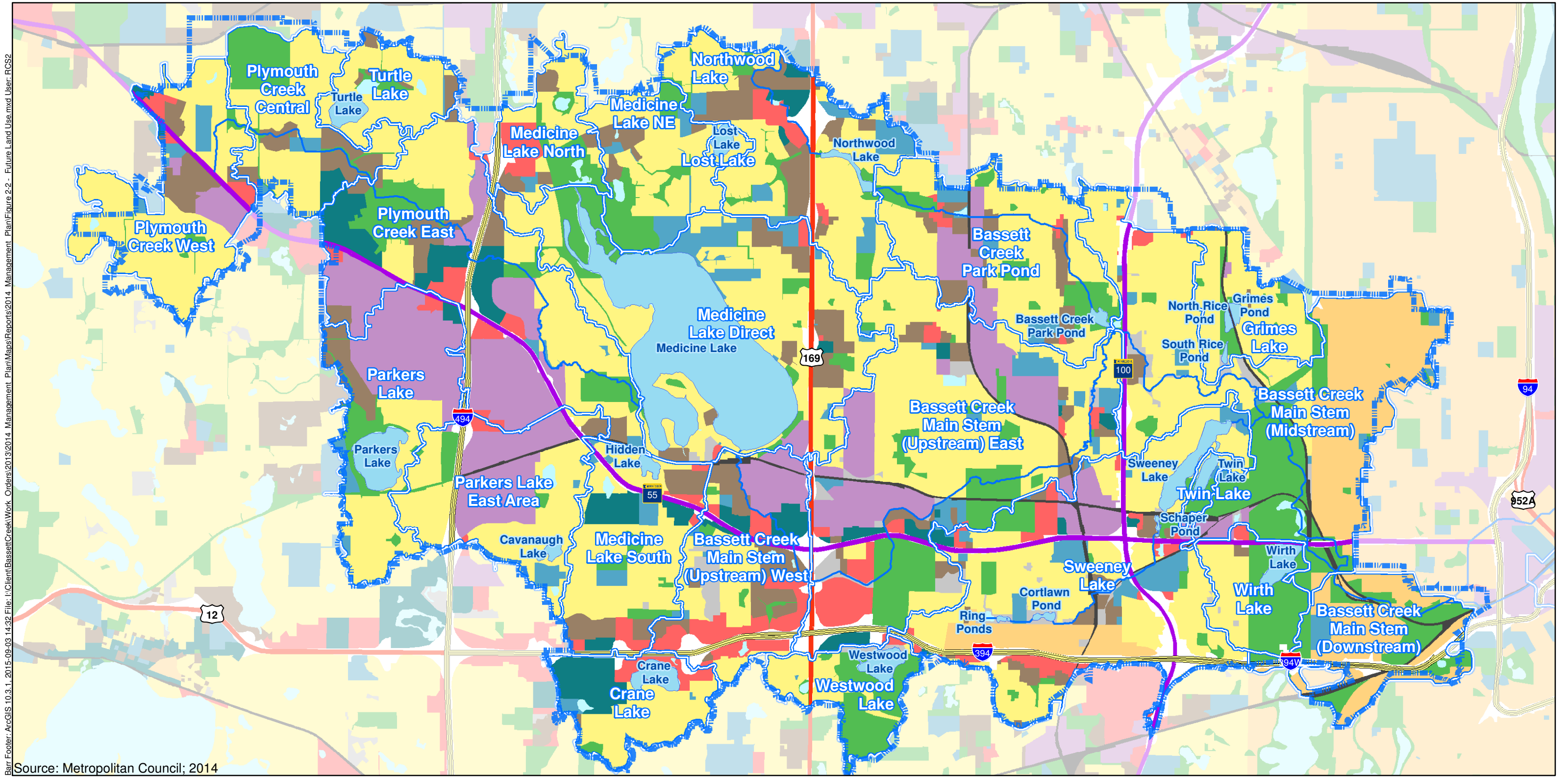


Figure 2-1
2010 LAND USE
Bassett Creek Watershed
Management Commission
2015 Management Plan



**Bassett Creek Watershed
Management Commission**

Bar Footer: ArcGIS 10.3.1, 2015-09-03 14:32 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Map\PlanFigure 2-2 - Future Land Use.mxd User: RCS2



Source: Metropolitan Council; 2014

- | | | |
|-------------------------------|---|-----------------------------|
| BCWMC Jurisdictional Boundary | Metropolitan Council - Planned Land Use | Institutional |
| Major Subwatersheds | Single Family Residential | Mixed Use |
| Creeks | Agricultural | Park and Recreation |
| | Urban Residential | Rights-of-Way (i.e., Roads) |
| | Multifamily Residential | Railway (inc. LRT) |
| | Commercial | Vacant or Unknown |
| | Industrial | Open Water |

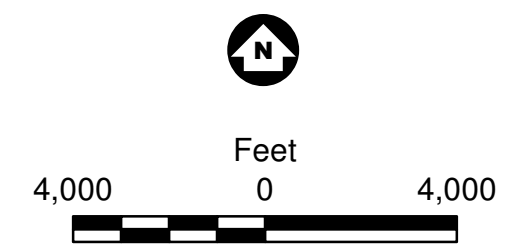


Figure 2-2
2030 LAND USE
Bassett Creek Watershed
Management Commission
2015 Management Plan



**Bassett Creek Watershed
Management Commission**

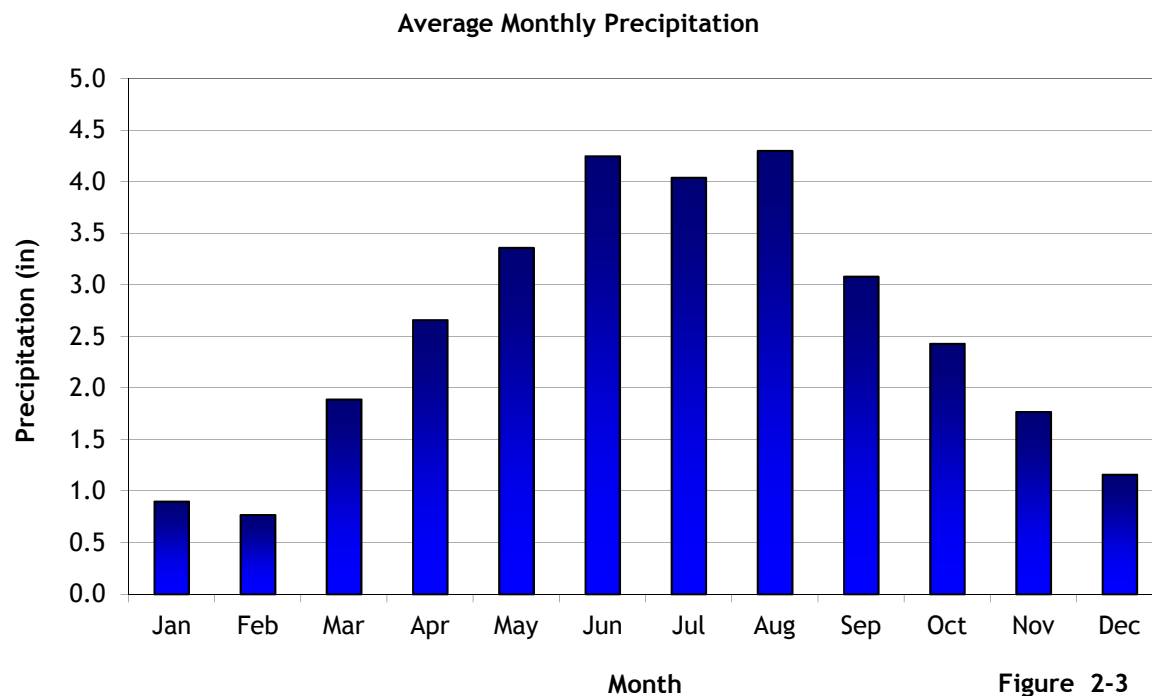
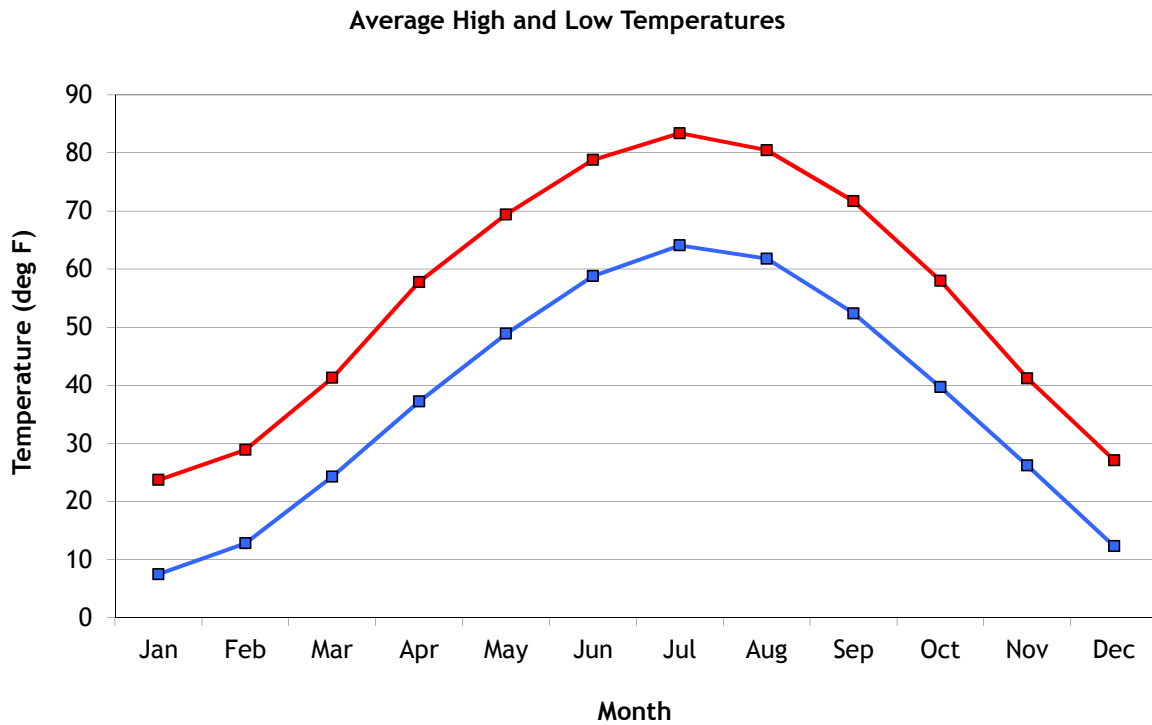
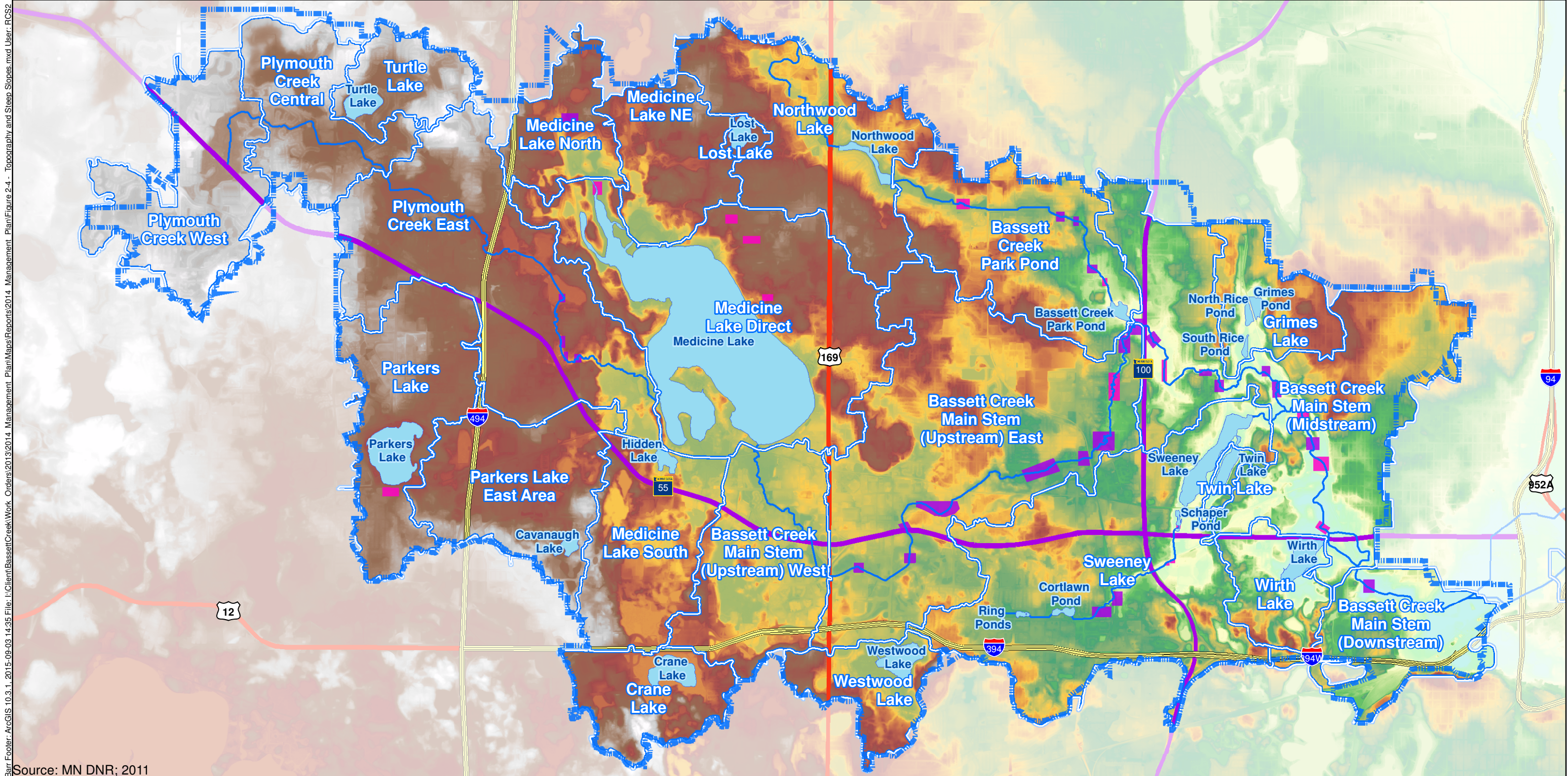


Figure 2-3
Average Monthly High & Low
Temperatures and Precipitation
for Minneapolis-St. Paul
International Airport
(1981-2010)

Bar Footer: ArcGIS 10.3.1, 2015-09-03 14:35 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Map\Reports\2014 Management Plan\Figure 2-4 - Topography and Steep Slopes.mxd User: RCSR



Source: MN DNR; 2011

- BCWMC Jurisdictional Boundary
 - Major Subwatersheds
 - Creeks
 - Erosion
 - Sedimentation
- MN DNR LiDAR, 2011**
(Feet)
High : 326.101
Low : 243.034

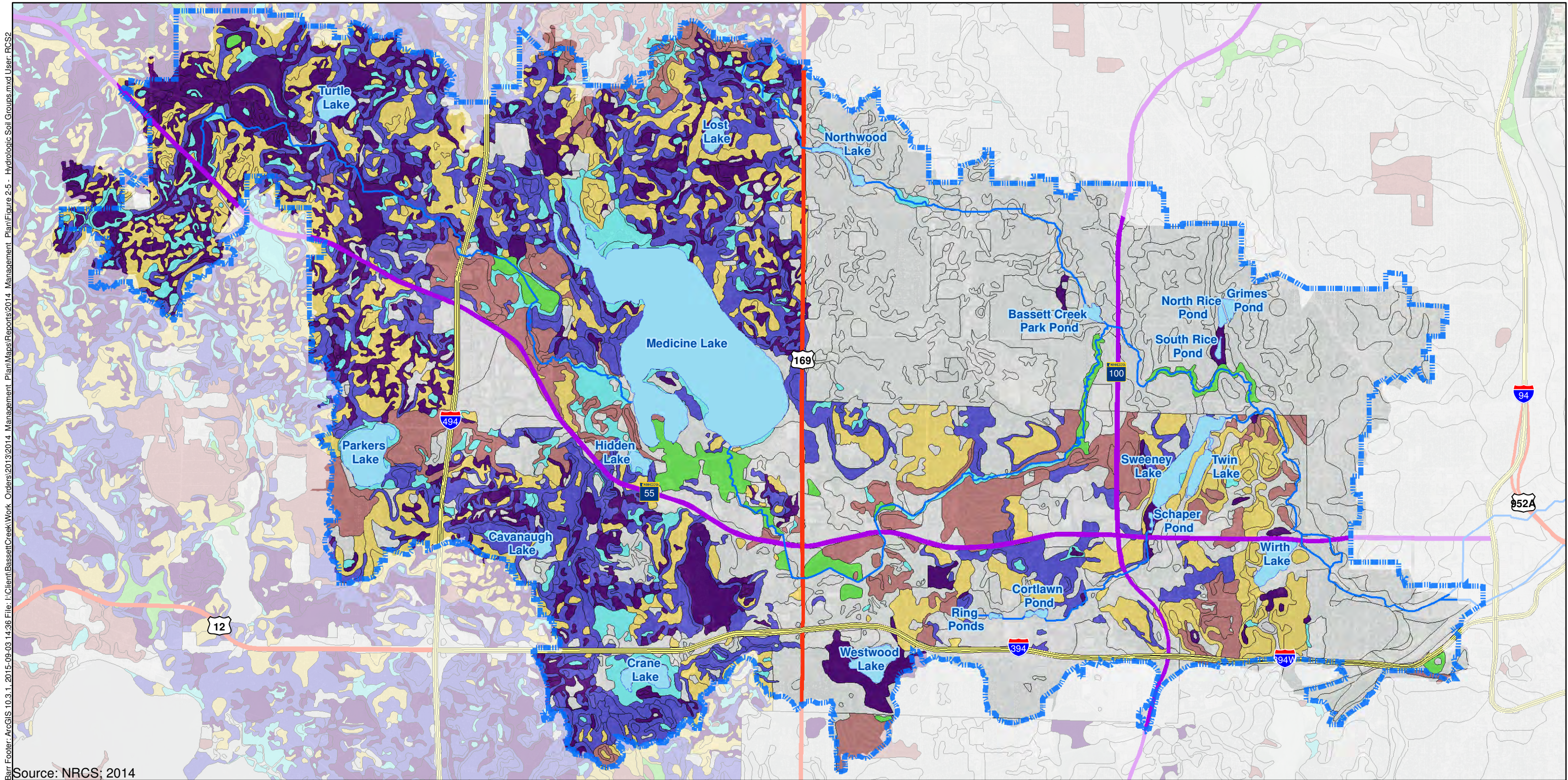
Erosion and sedimentation sites are based on figure 13 of the 2004 plan.



Figure 2-4

TOPOGRAPHY
Bassett Creek Watershed
Management Commission
2015 Management Plan

Bar Footer: ArcGIS 10.3.1, 2015-09-03 14:36 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Maps\Reports\2014 Management Plan\Figure 2-5 - Hydrologic Soil Groups.mxd User: RCSP



Source: NRCS; 2014

- BCWMC Jurisdictional Boundary
- Creeks

Hydrologic Soil Groups

- A
 - A/D
 - B
 - B/D
 - C
 - C/D
 - Not rated or not available
- High Permeability
- Low Permeability

See section 2.4.1 of the plan for more information on hydrologic soil groups.



Feet

4,000 0 4,000

Figure 2-5

HYDROLOGIC SOIL GROUPS
Bassett Creek Watershed
Management Commission
2015 Management Plan



**Bassett Creek Watershed
Management Commission**

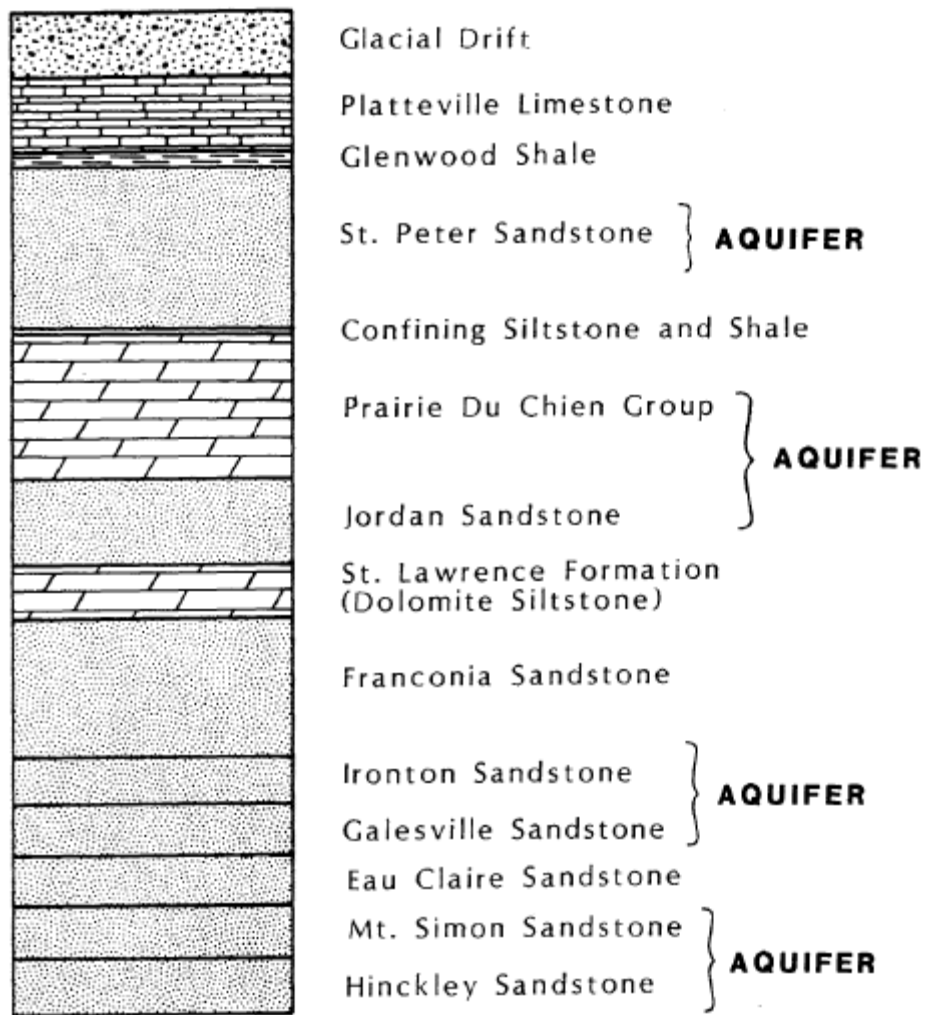
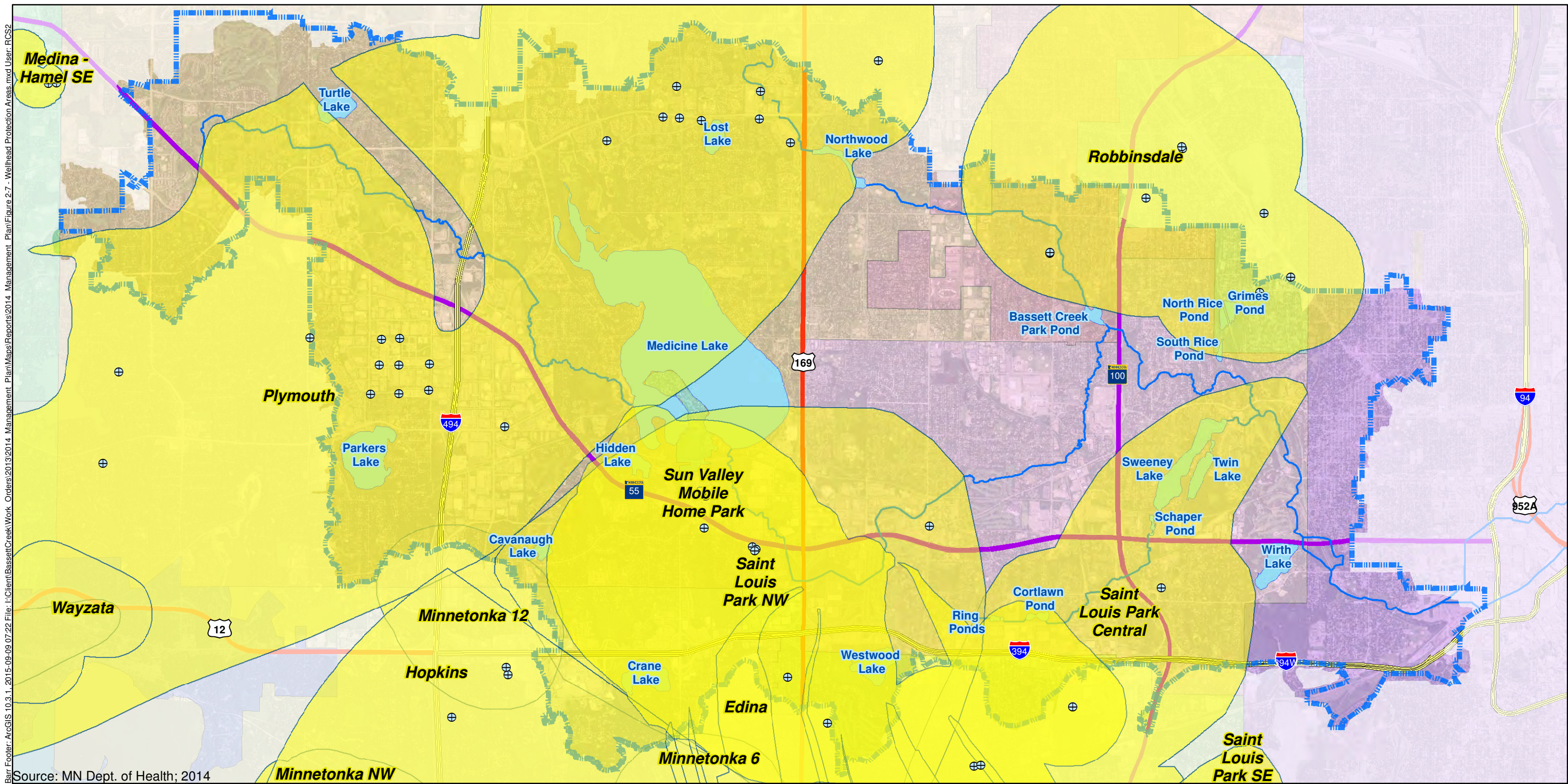


Figure 2-6
Generalized Geologic Section

Bar Footer: ArcGIS 10.3.1, 2015-09-09 07:22 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Maps\Reports\2014 Management Plan\Figure 2-7 - Wellhead Protection Areas.mxd User: RCS2



- BCWMC Jurisdictional Boundary
- Creeks
- Wellhead Protection Area (WHPA)
- Municipal Wells

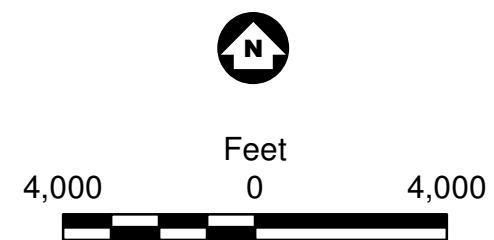
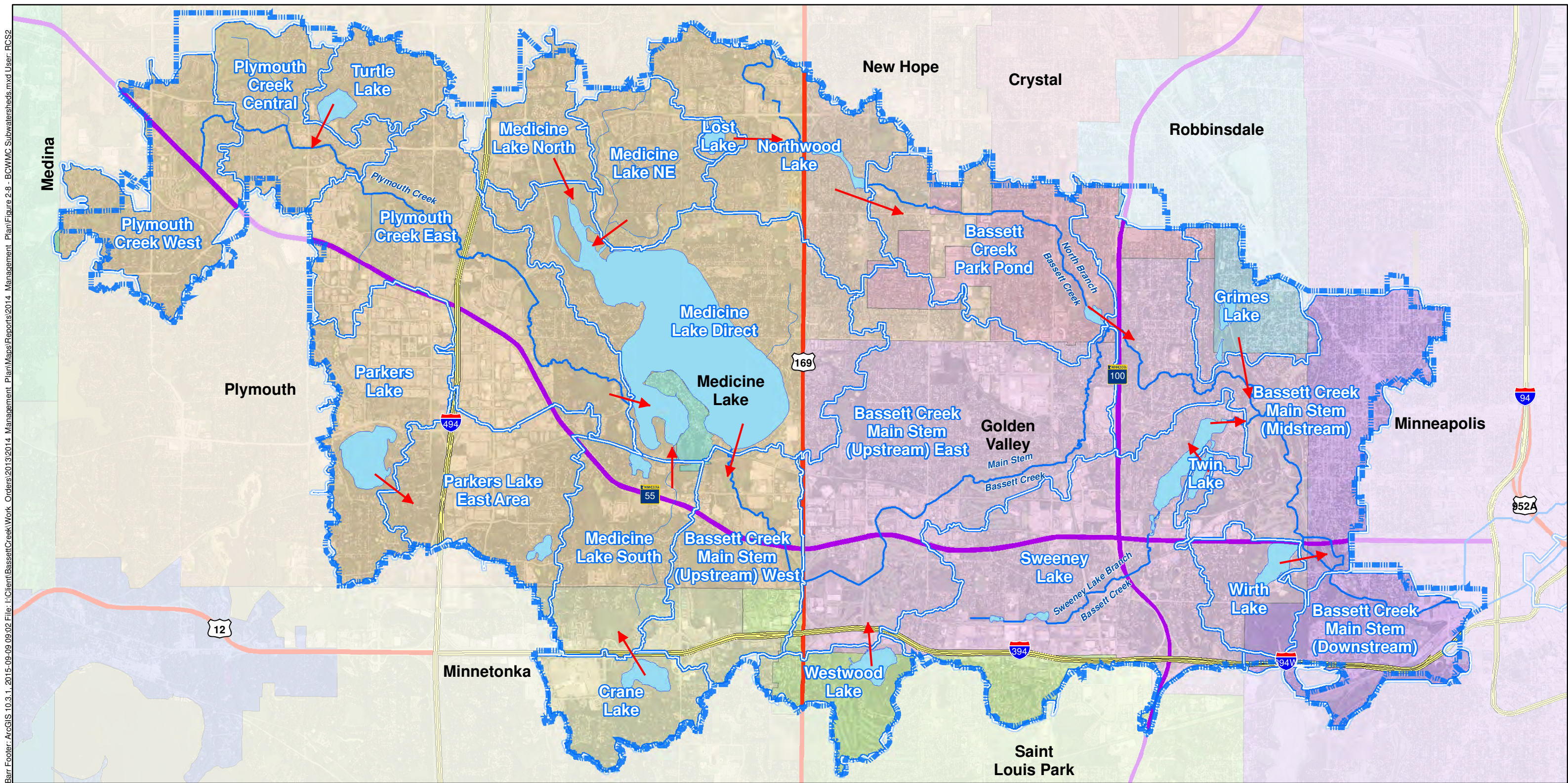


Figure 2-7
WELLHEAD PROTECTION AREAS
Bassett Creek Watershed
Management Commission
2015 Management Plan



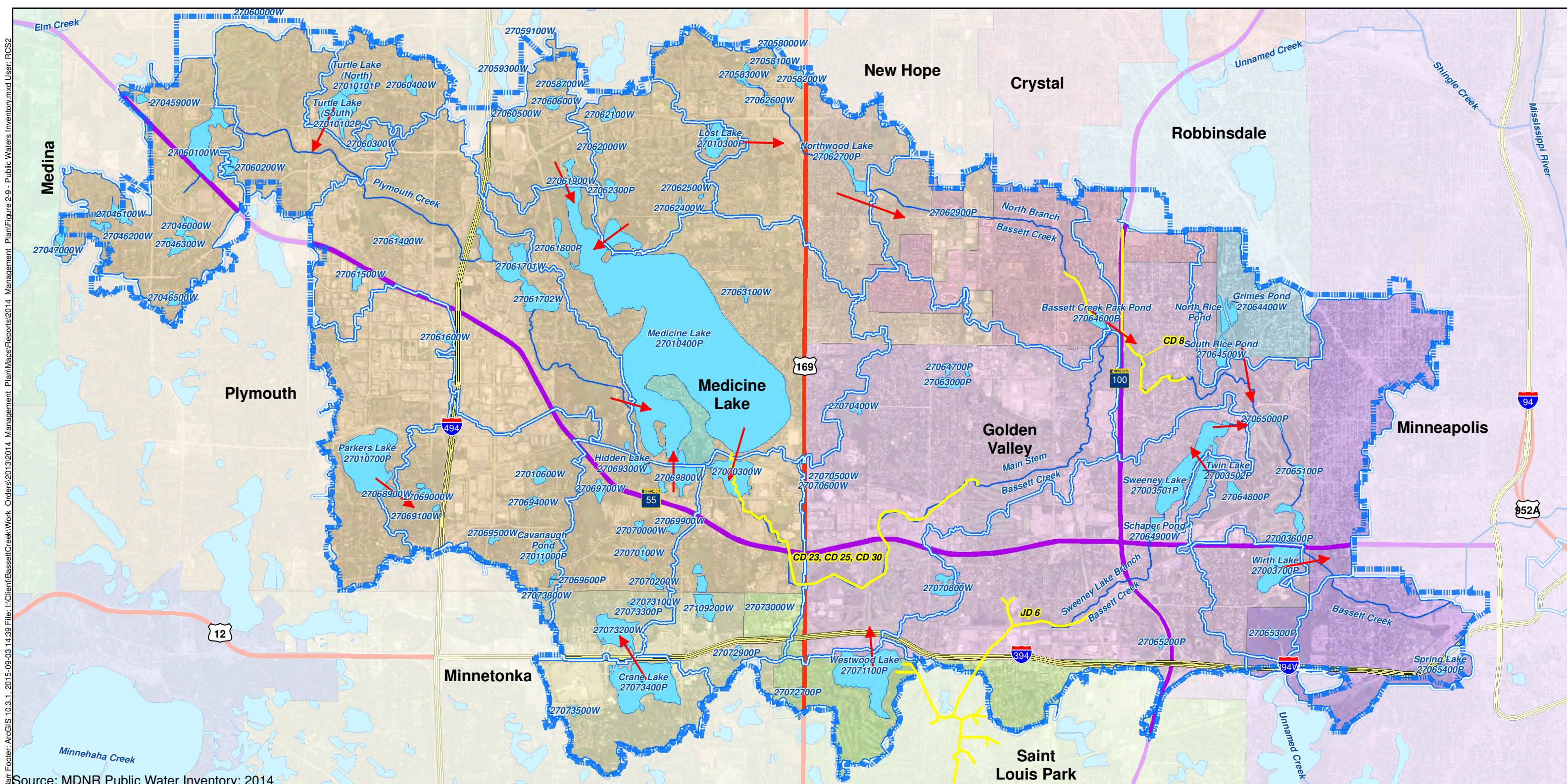
- BCWMC Jurisdictional Boundary
- Major Subwatersheds
- Lakes and Ponds
- BCWMC Priority Streams
- Other Streams
- Flow Directions



Figure 2-8

BCWMC MAJOR SUBWATERSHEDS
AND DRAINAGE PATTERNS
Bassett Creek Watershed
Management Commission
2015 Management Plan

Bar Footer: ArcGIS 10.3.1, 2015-09-03 14:39 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Maps\Reports\2014 Management Plan\Figure 2-9 - Public Waters Inventory.mxd User: RC82



Source: MDNR Public Water Inventory; 2014

- BCWMC Jurisdictional Boundary
- Major Subwatersheds
- Flow Directions
- Public Water Inventory Basins
- Public Water Inventory Watercourses
- Public Ditches

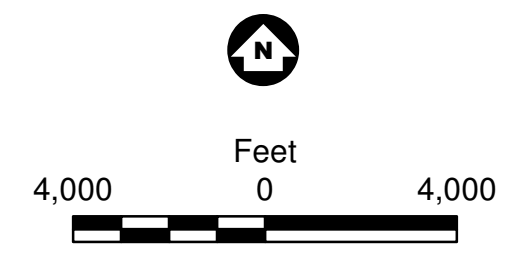
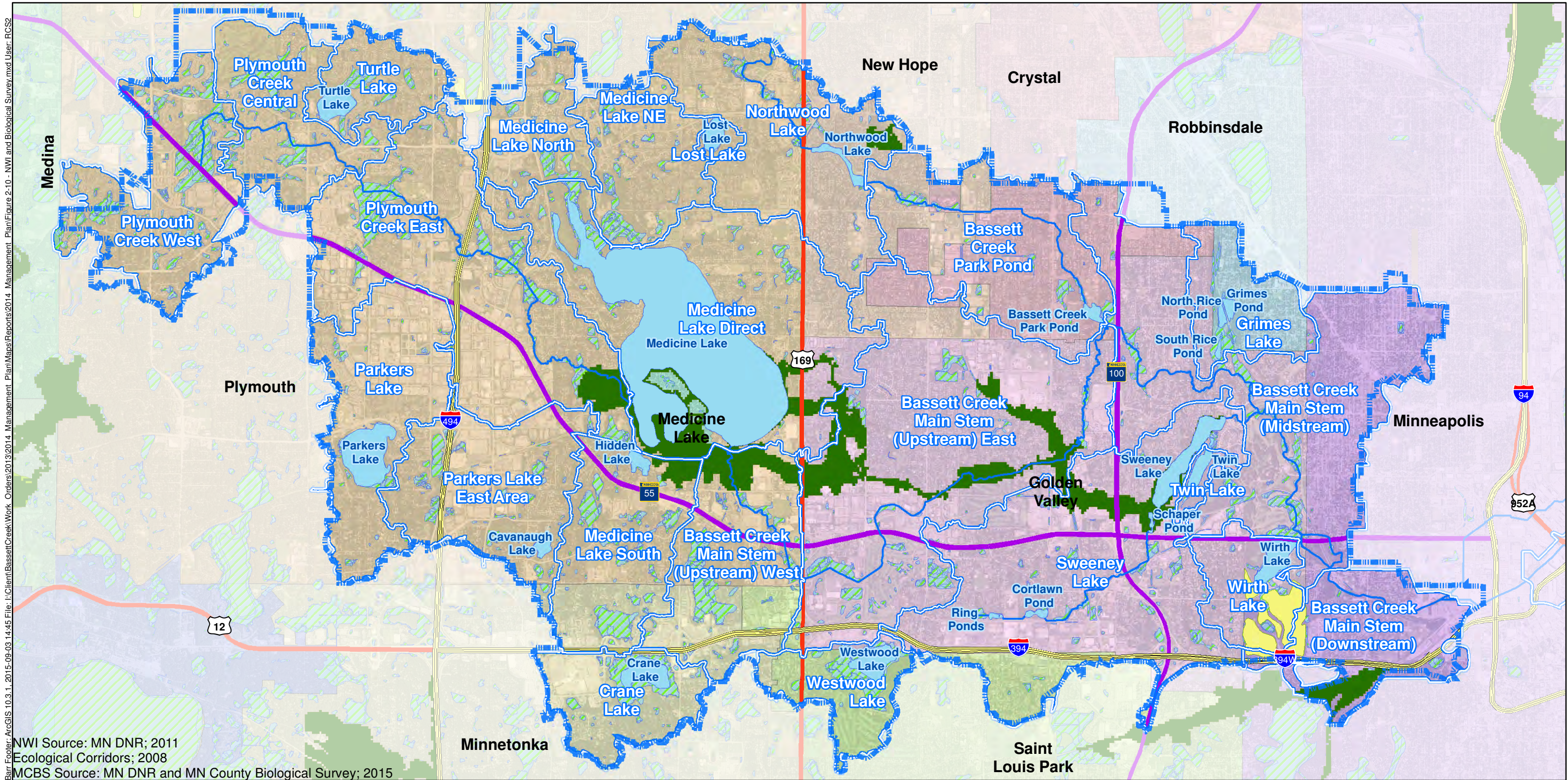


Figure 2-9

PUBLIC WATERS INVENTORY
AND PUBLIC DITCHES
Bassett Creek Watershed
Management Commission
2015 Management Plan



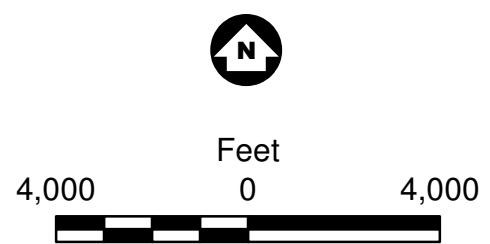
Bar Footer: ArcGIS 10.3.1, 2015-09-03 14:45 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\BassettCreek\MapFigure 2-10 - NWI and Biological Survey.mxd User: RC52

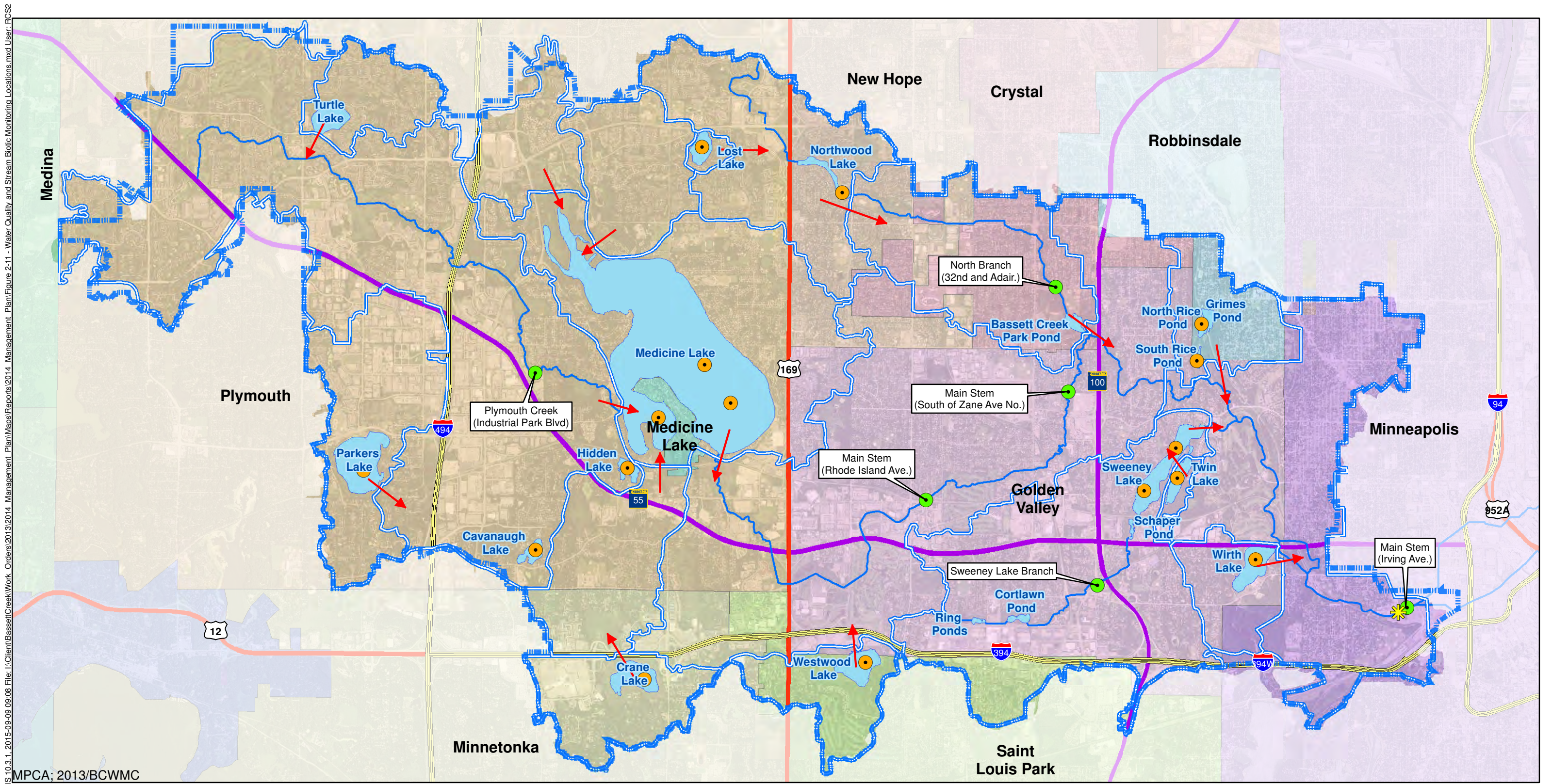


NWI Source: MN DNR; 2011
Ecological Corridors; 2008
MCBS Source: MN DNR and MN County Biological Survey; 2015

- BCWMC Jurisdictional Boundary
- Major Subwatersheds
- Creeks
- Wetlands (MN DNR NWI East Central Update)
- Ecological Corridors
- Sites of Biodiversity Significance (MCBS)**
- Outstanding
- High
- Moderate
- Below

See section 2.6.3 and section 2.9 of the plan for more information about the data presented in this figure.





- MPCA; 2013/BCWMC
- BCWMC Jurisdictional Boundary
 - Major Subwatersheds
 - Flow Directions
 - Creeks
 - Chemical Water Quality Monitoring Station (BCWMC or Citizen Assisted Monitoring Program)
 - Biotic Monitoring Locations (BCWMC)
 - Watershed Outlet Monitoring Program (WOMP) Station

See section 2.7.1 of the plan for more information regarding the monitoring programs and locations illustrated in this figure.

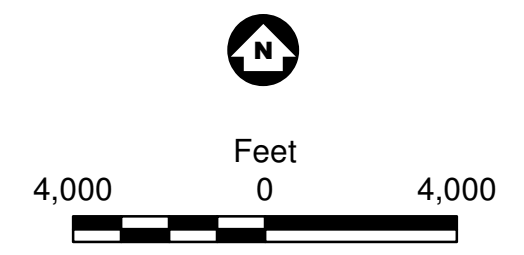
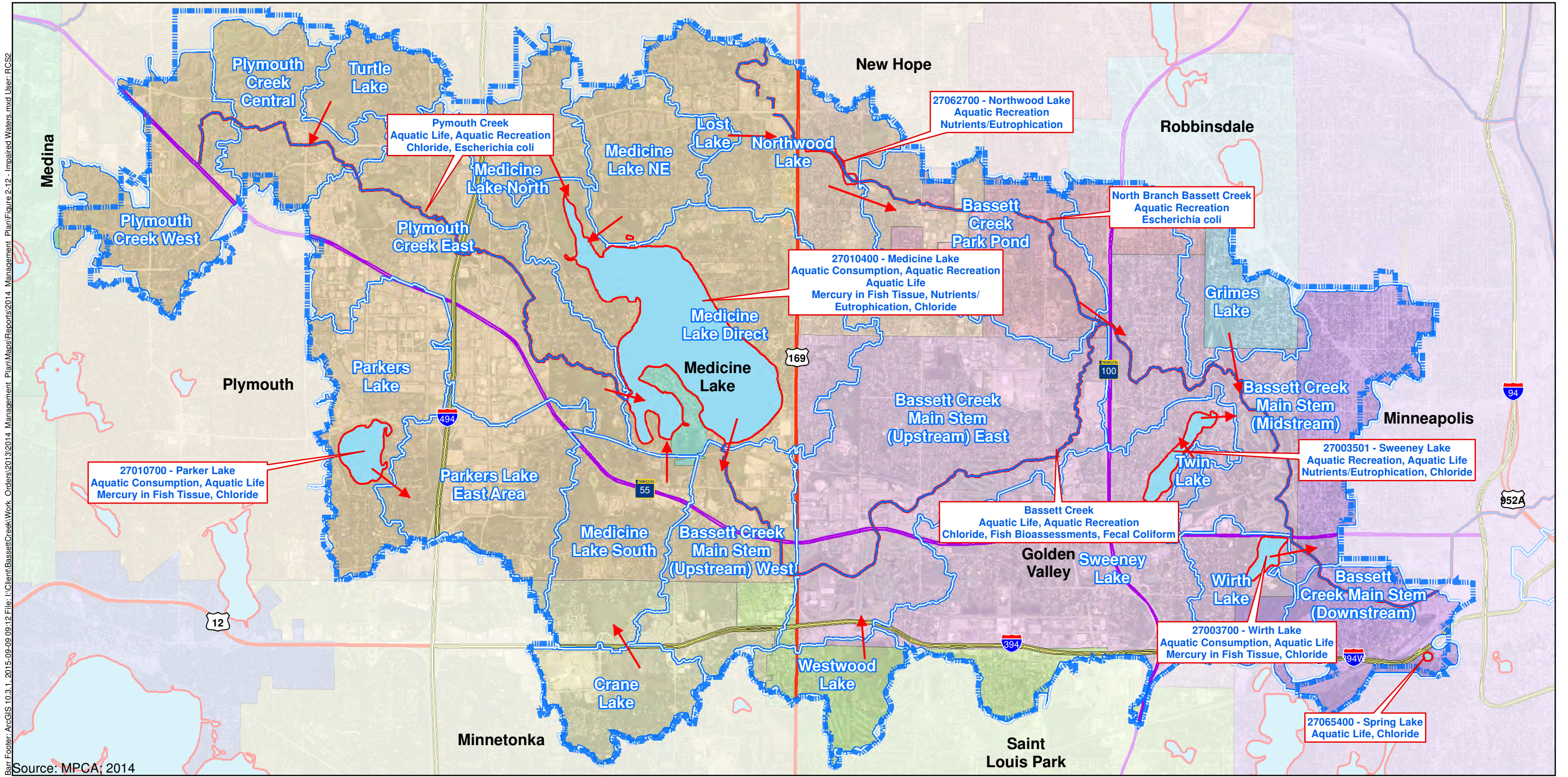


Figure 2-11
WATER QUALITY AND STREAM BIOTIC MONITORING LOCATIONS
Bassett Creek Watershed Management Commission
2015 Management Plan

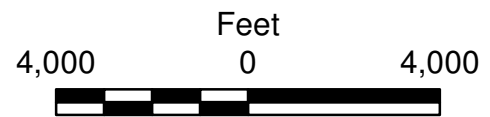
Bar Footer: ArcGIS 10.3.1, 2015-09-09 09:12 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\BassettCreek\MapFigure 2-12 - Impaired Waters.mxd User: RCS2



- BCWMC Jurisdictional Boundary
- Major Subwatersheds
- Flow Directions
- Impaired Streams
- Impaired Lakes

North Branch Bassett Creek
Aquatic Recreation
Escherichia coli

← Name/Public Waters ID
← Impaired Uses
← Pollutant/Stressors



Data based on the 2014 MPCA 303(d) Impaired Water List. See section 2.7.2.1 of the plan for more information about impaired waters and the MPCA's 303(d) Impaired Waters List.

Figure 2-12
MPCA 303(d) IMPAIRED WATERS
Bassett Creek Watershed
Management Commission
2015 Management Plan

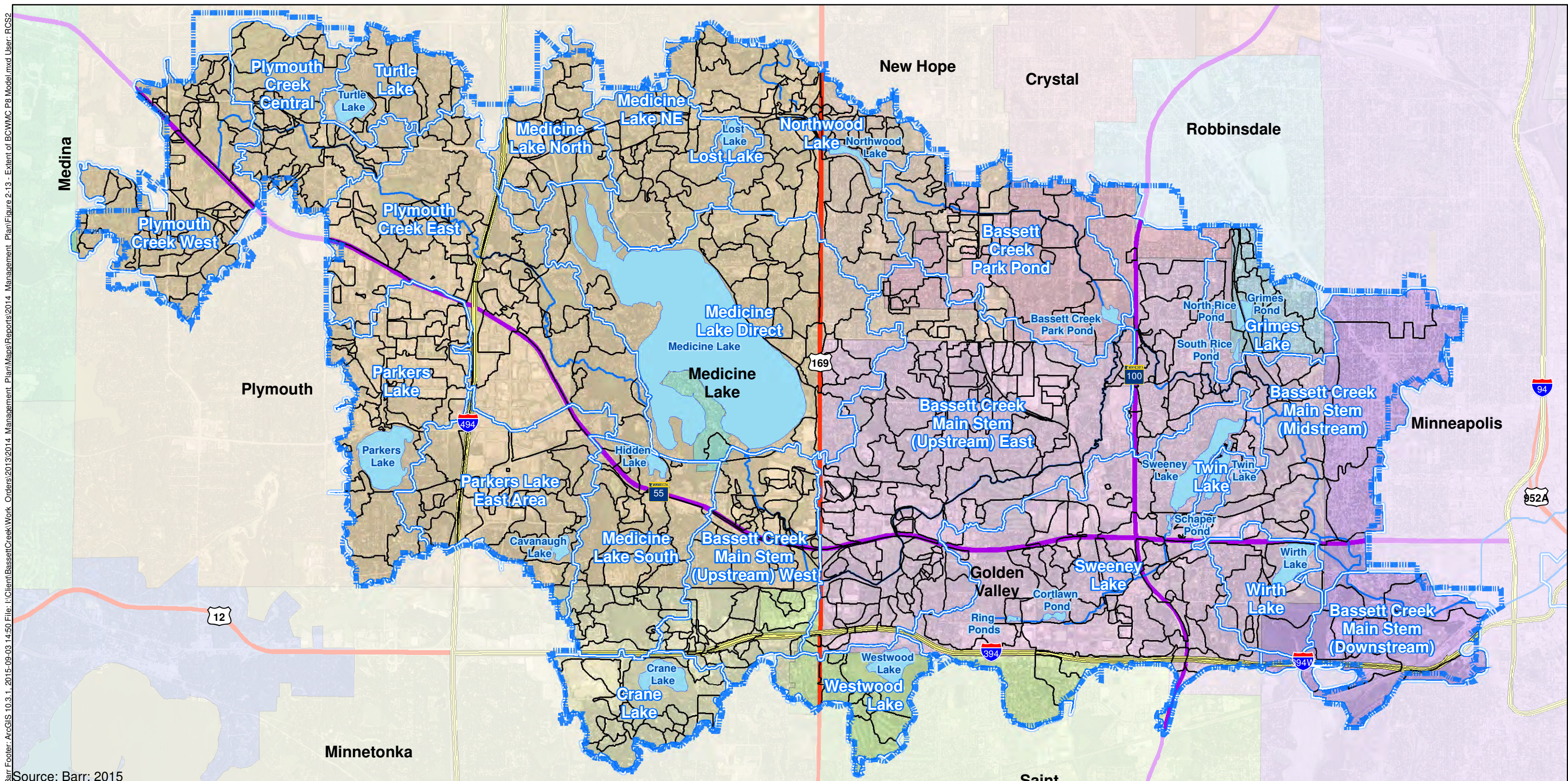


Figure 2-13

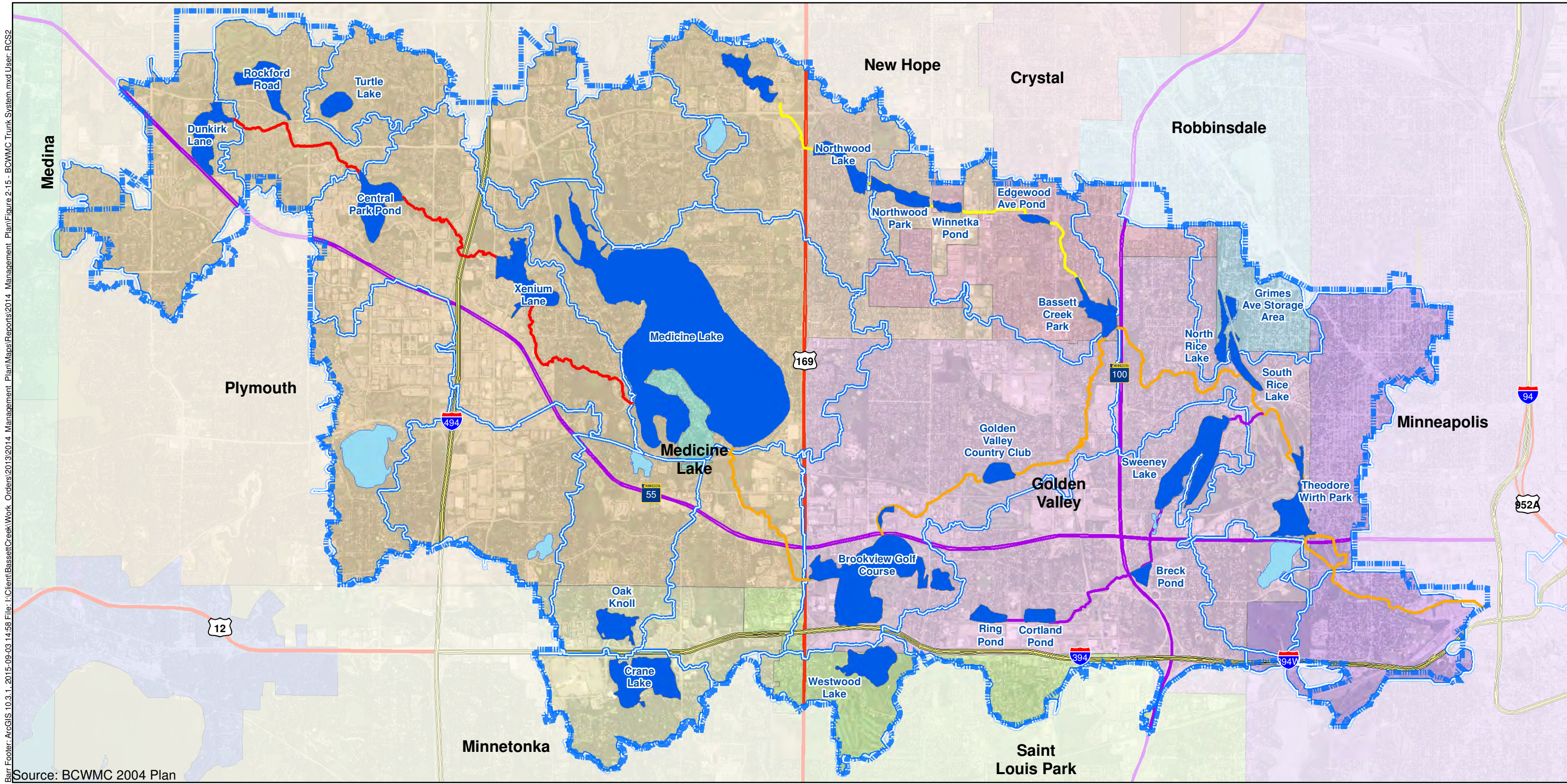
WATERSHEDS USED IN
BCWMC P8 MODEL
Bassett Creek Watershed
Management Commission
2015 Management Plan


**Bassett Creek Watershed
Management Commission**

See section 2.7.3.1 for more information about the BCWMC watershed-wide P8 Water Quality Model.



Bar Footer: ArcGIS 10.3.1, 2015-09-03 14:58 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Maps\Reports\2014 Management Plan\Figure 2-15 - BCWMC Trunk System.mxd User: RCS2



- BCWMC Jurisdictional Boundary
- Major Subwatersheds
- Trunk System Components**
 - Main Stem Bassett Creek
 - North Branch Bassett
 - Plymouth Creek
 - Sweeney Branch Bassett Creek
- Designated Water Quantity and Water Quality Storage Facilities (From Fig. 15 of 2004 Plan)

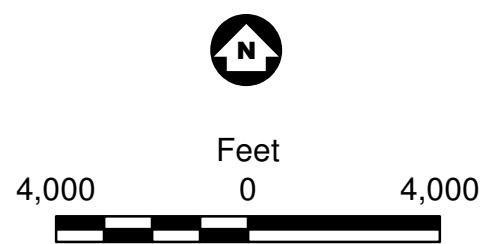
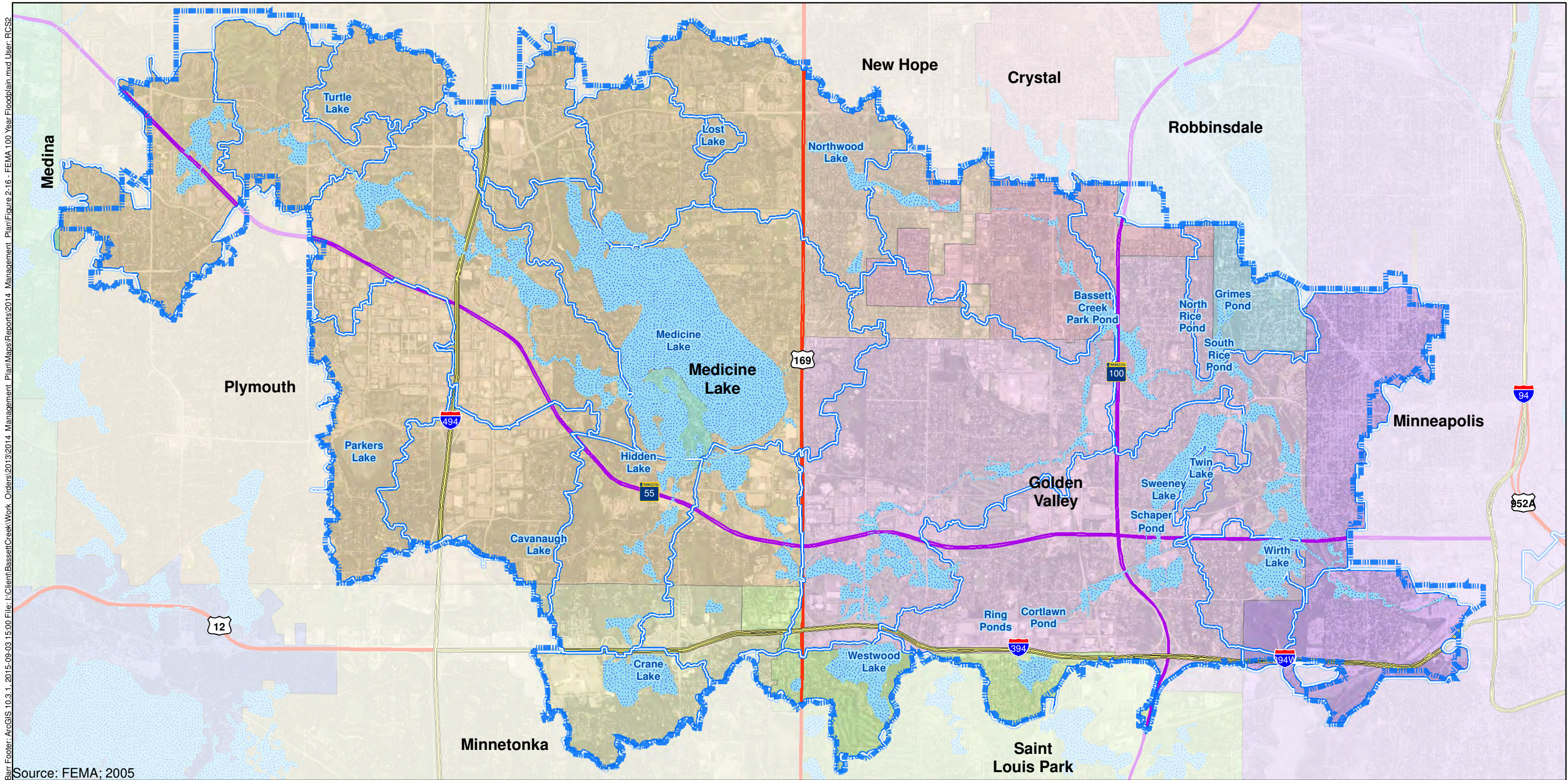


Figure 2-15
BCWMC TRUNK SYSTEM
Bassett Creek Watershed
Management Commission
2015 Management Plan

**Bassett Creek Watershed
Management Commission**

Bar Footer: ArcGIS 10.3.1, 2015-09-03 15:00 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Maps\Reports\2014 Management Plan\Figure 2-16 - FEMA 100 Year Floodplain.mxd User: RCS2



Source: FEMA; 2005

- BCWMC Jurisdictional Boundary
- Major Subwatersheds
- FEMA 100 Year Floodplain

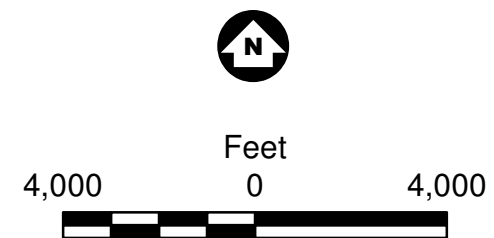


Figure 2-16

FEMA 100-YEAR FLOODPLAIN
Bassett Creek Watershed
Management Commission
2015 Management Plan

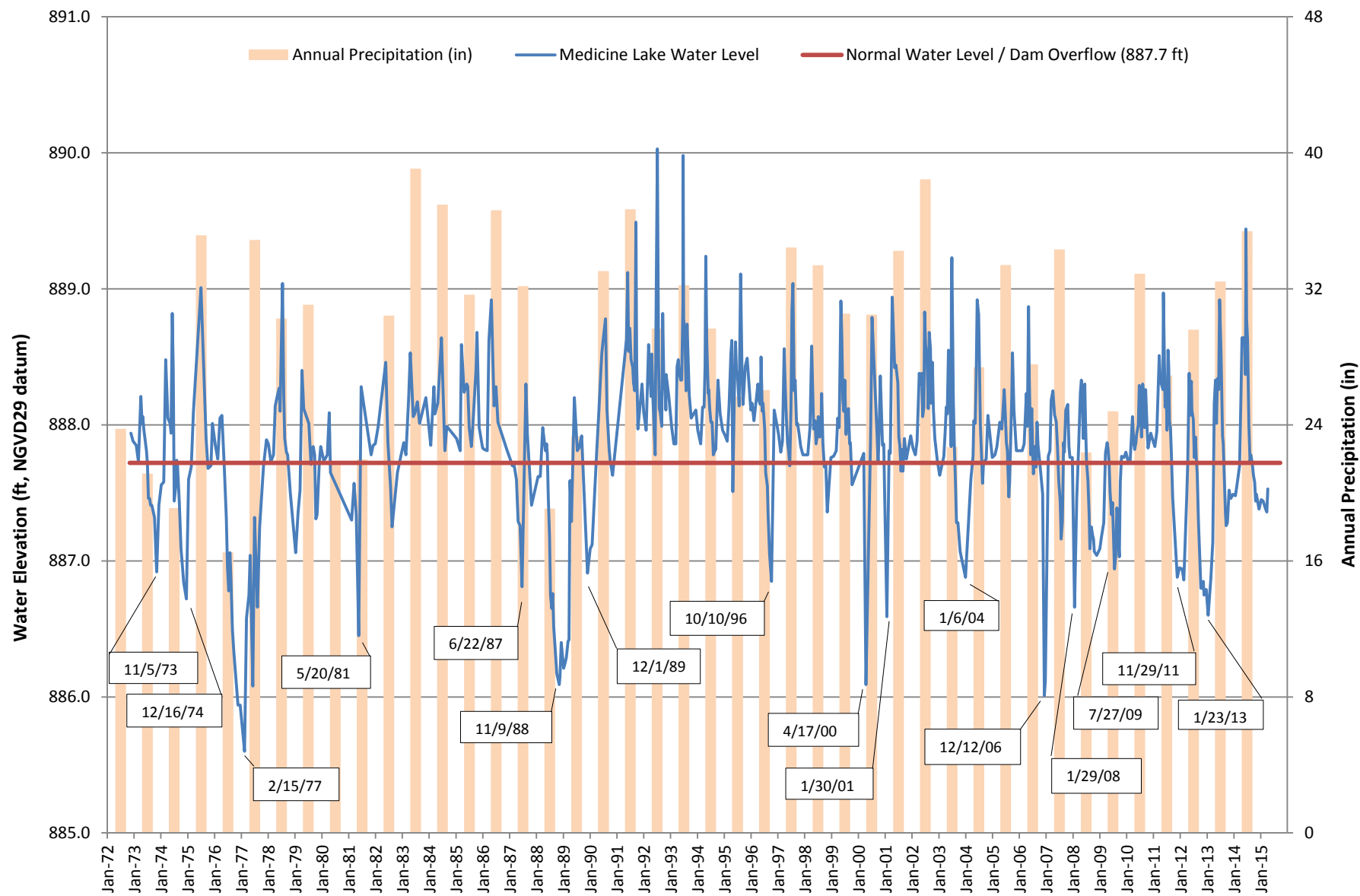
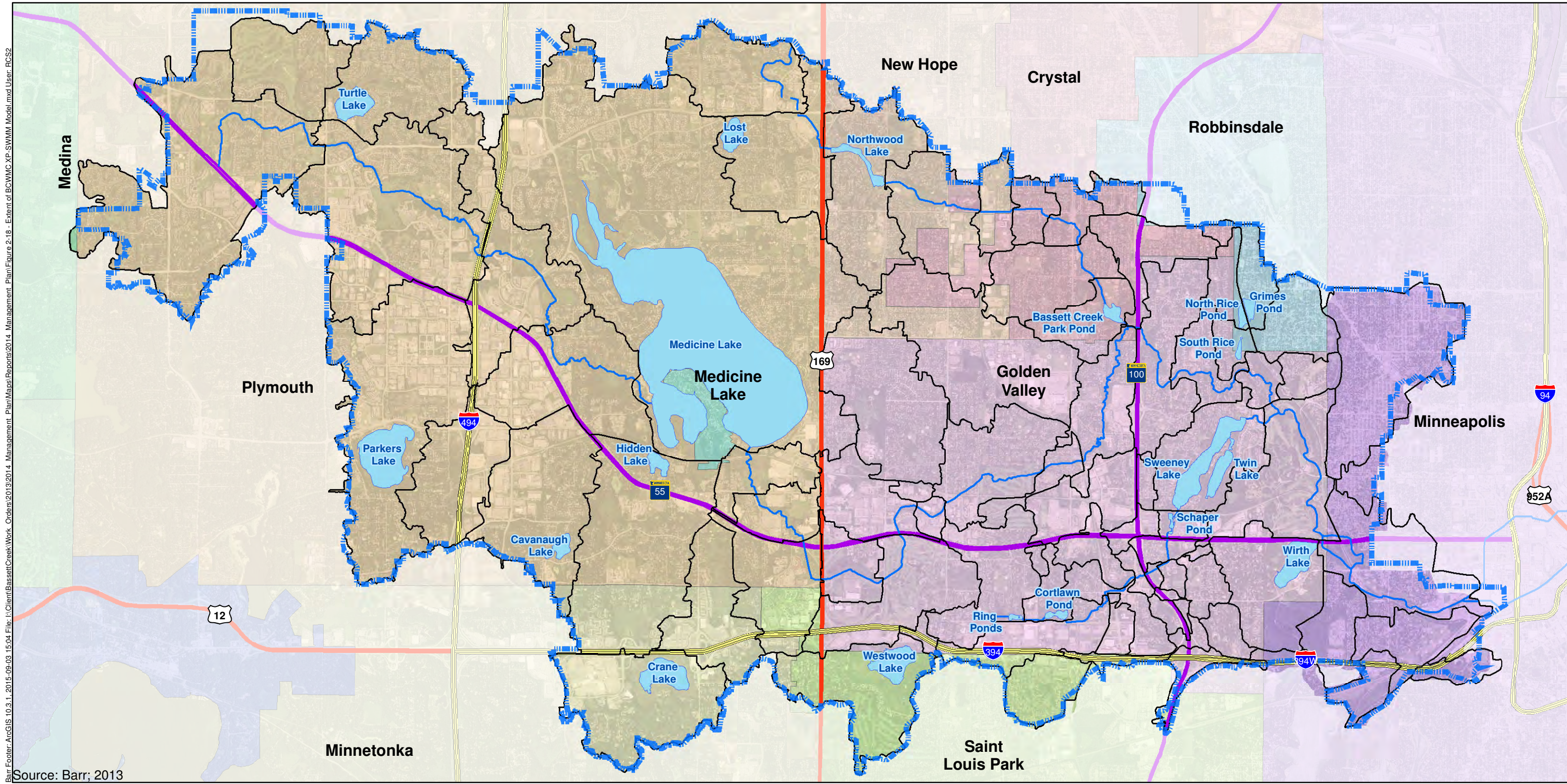


Figure 2-17
Medicine Lake Water Level and
Precipitation (1972-2015)

Sources: MDNR lakefinder, Minnesota Climatology Working Group, BCWMC

Bar Footer-ArcGIS 10.3.1, 2015-09-03 15:04 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Map\Figure 2-18 - Extent of BCWMC XP-SWMM Model.mxd User: RGS2



Source: Barr, 2013

- BCWMC Jurisdictional Boundary
- Watersheds Used in XP-SWMM Model
- Creeks
- Lakes and Ponds

See section 2.8.6.1 for more information about the BCWMC watershed-wide XP-SWMM hydrologic and hydraulic model.

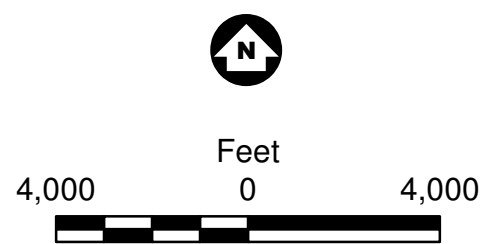
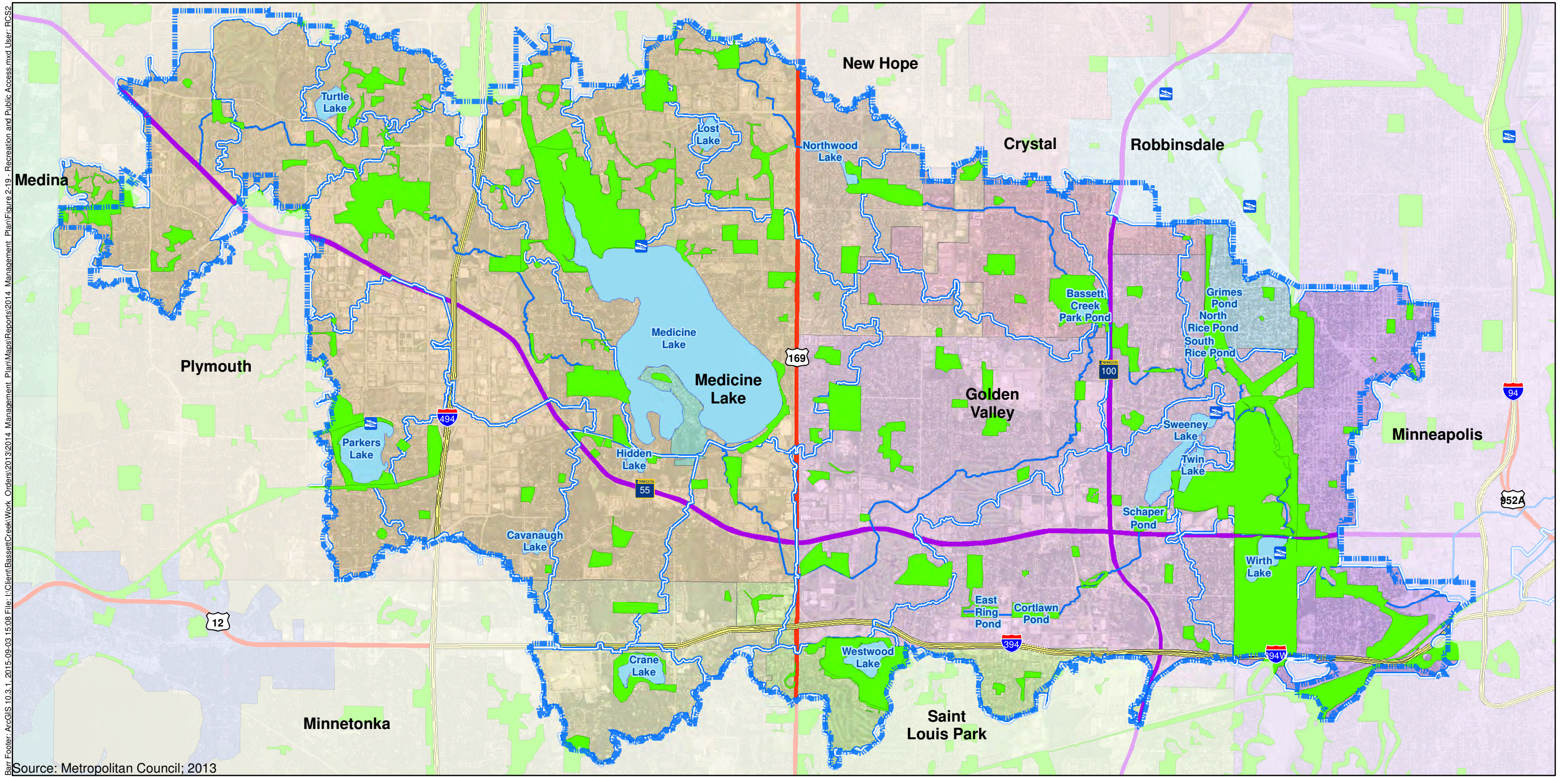


Figure 2-18

WATERSHEDS USED IN
BCWMC XP-SWMM MODEL
Bassett Creek Watershed
Management Commission
2015 Management Plan



Bar Footer: ArcGIS 10.3.1, 2015-09-03 15:08 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Maps\Reports\2014 Management Plan\Figure 2-19 - Recreation and Public Access.mxd User: RCS2

- BCWMC Jurisdictional Boundary
- Major Subwatersheds
- Boat Access
- Creeks
- City or Regional Park

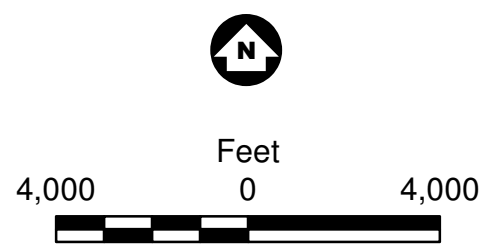


Figure 2-19

RECREATION AREAS AND
PUBLIC BOAT ACCESS
Bassett Creek Watershed
Management Commission
2015 Management Plan

Bar Footer: ArcGIS 10.3.1, 2015-09-03 15:14 File: I:\Client\BassettCreek\Work Orders\2013\2014 Management Plan\Maps\Reports\2014 Management Plan\Figure 2-20 - Pollutant Sources.mxd User: RCS2

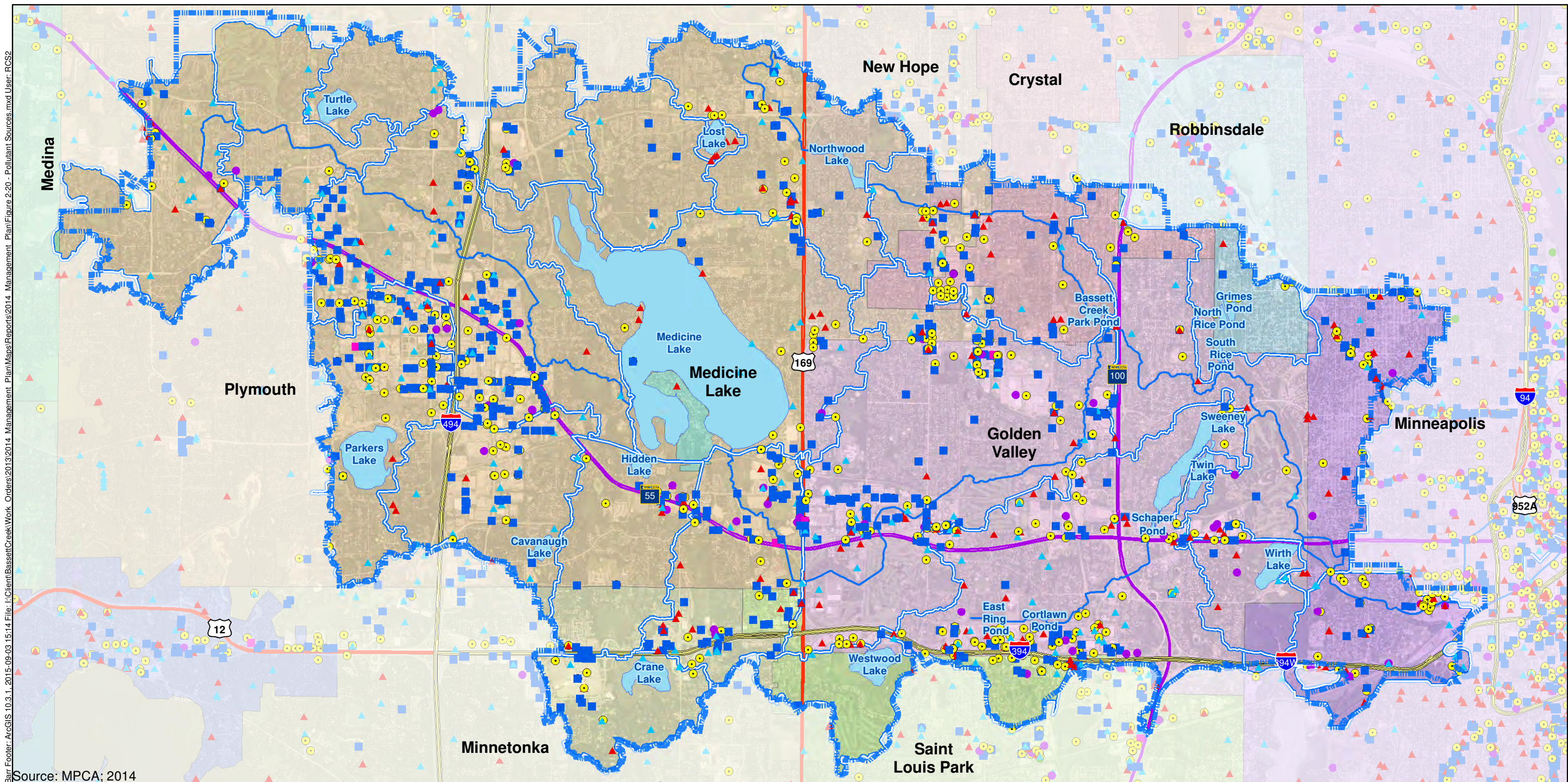


Figure 2-20

POLLUTANT SOURCES
Bassett Creek Watershed
Management Commission
2015 Management Plan

BCMWC 2015 Watershed Management Plan

Section 3 – Assessment of Issues and Opportunities

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3.0 Assessment of Issues and Opportunities

This section of the Plan presents and discusses the issues and opportunities facing the Bassett Creek Watershed Management Commission (BCWMC), organized by various water topic categories. Issue identification was an important task in development of this Plan, and included a gaps analysis, the development of a Gaps Analysis document (see Appendix D), and a rigorous public participation process called the Watershed Assessment and Visioning Exercise (WAVE). The WAVE included an online survey with 174 respondents, a small group discussion and issues identification session in each city with city officials and/or city staff, a Watershed Summit event where the public prioritized issues, and a prioritization of issues by the Commission, Technical Advisory Committee (TAC) members, and technical partners (see Appendix E for WAVE results). The key issues identified through this process are among the following topic areas: 1) water quality; 2) water quantity and flooding; 3) erosion/sedimentation; 4) streams; 5) wetlands, habitat, and shoreland areas; 6) groundwater; 7) education and outreach; and 8) implementation and responsibilities (administration). The issues are discussed in the respective topical subsections below.

3.1 Water Quality

Pollutants are discharged to surface waters as either point sources or non-point sources. Point source pollutants discharge to receiving surface waters at a specific point from a specific identifiable source. Discharges of treated sewage from a wastewater treatment plant or discharges from an industry are examples of point sources. Unlike point sources, non-point source pollution cannot be traced to a single source or pipe. Instead, pollutants are carried from land to water in stormwater or snowmelt runoff, in seepage through the soil, and in atmospheric transport. All these forms of pollutant movement from land to water make up non-point source pollution.

For most waterbodies, non-point source runoff—especially stormwater runoff—is a major contributor of pollutants. As urbanization increases and other land use changes occur in the watershed, nutrient and sediment inputs (i.e., loading) from stormwater runoff can far exceed the natural inputs to waterbodies. In addition to phosphorus and sediment, stormwater runoff may contain pollutants such as chlorides, oil, grease, chemicals (including hydrocarbons), nutrients, metals, litter, and pathogens, which can severely reduce water quality.

For lakes, ponds, and wetlands, phosphorous is typically the pollutant of major concern. Land use changes resulting in increased imperviousness (e.g., urbanization) or land disturbance (e.g., urbanization, construction, or agricultural practices) result in increased amounts of phosphorus carried in stormwater runoff. In addition to watershed (stormwater runoff) sources, other possibly significant sources of phosphorus include atmospheric deposition, internal loading (e.g., release from anoxic sediments, algae die-off, aquatic plant die-back, and fish-disturbed sediment), and failing subsurface sewage treatment systems (SSTS).

As phosphorus loadings increase, it is likely that water quality degradation will accelerate, resulting in unpleasant consequences such as profuse algae growth or algal blooms. Algal blooms, overabundant

aquatic plants, and the presence of nuisance/exotic species, such as Eurasian watermilfoil, purple loosestrife, and curlyleaf pondweed, interfere with ecological function as well as recreational and aesthetic uses of waterbodies. Phosphorus loadings must often be reduced to control or reverse water quality degradation.

The Minnesota Pollution Control Agency (MPCA) is the state regulatory agency primarily tasked with protecting and improving water quality in Minnesota. In its enforcement of the federal Clean Water Act (CWA), the MPCA administers the Municipal Separate Storm Sewer System (MS4) permit program (see Section 5.1.3.3). All BCWMC member cities are required to maintain an MS4 permit from the MPCA and annually submit an MS4 report to the MPCA. The numerous and expanded requirements of the MPCA's MS4 permit present opportunities for the BCWMC to cooperate with member cities to prevent redundancy in implementing or reporting on activities related to water quality.

In administering the CWA in Minnesota, the MPCA also maintains a list of impaired waters (see Section 2.7.2.1). The MPCA performs Total Maximum Daily Load (TMDL) studies to address impaired waters. A watershed restoration and protection strategy (WRAPS) is similar to a TMDL and may examine other waterbodies in the watershed in addition to impaired waterbodies. Both TMDLs and WRAPSs may result in implementation plans to address water quality issues of the affected waterbodies. Future TMDL and/or WRAPS implementation presents an opportunity for the BCWMC to coordinate water quality improvement efforts between the member cities, especially for waterbodies with intercommunity drainage areas.

Improving and protecting water quality is a primary focus of the BCWMC. Prior to the development of this Plan, the BCWMC and its member cities implemented several projects aimed at improving water quality (see Table 5-5). During the development of this Plan, the BCWMC, member cities, and other stakeholders identified the following issues/opportunities (see Appendix D – Gaps Analysis):

- Lack of consistency between BCWMC water quality standards ("Level I") and other applicable standards, such as the MS4 permit
- Updates needed in the list of acceptable best management practices (BMPs) in the *BCWMC Requirements for Improvements and Development* (BCWMC Requirements document, see Appendix H)
- Interest in implementing an infiltration performance standard
- Need for additional clarity in Total Maximum Daily Load (TMDL) study roles
- Maintenance responsibilities for water quality improvement projects
- Exploring partnerships for water quality monitoring

In addition to the Gaps Analysis, the public weighed in on water quality issues through the WAVE. Survey respondents ranked water pollution, water clarity, and sedimentation among their highest concerns for

waterbodies in the watershed. Reducing stormwater runoff volumes, contaminants, and algal blooms were viewed by the public as having the most positive impact on water quality. When prioritizing issues at the Watershed Summit, the public ranked the effects of stormwater runoff and degraded water quality as the 3rd and 4th highest priorities, respectively. Meanwhile, the BCWMC Commissioners, TAC members, and technical partners ranked the effects of stormwater runoff and degraded water quality as their 1st and 3rd highest priorities, respectively (see Appendix E).

In this Plan, the BCWMC addresses the above issues through its policies and implementation program. Specifically, the BCWMC identified strategic waterbodies, updated its water quality monitoring program, established policies, and adopted the MPCA's Minimal Impact Design Standards (MIDS) and Flexible Treatment Options performance standards.

3.2 Water Quantity and Flooding

In a natural, undeveloped setting, the ground is often pervious, which means that water (including stormwater runoff) can infiltrate into the soil. Land development dramatically changes how stormwater runoff moves in the local watershed. The changes begin during construction, when clearing and grading of the site results in less infiltration, higher rates and volumes of stormwater runoff, and increased erosion. As construction continues, ground surfaces become covered with impervious materials (e.g., asphalt and concrete) that prevent infiltration of water into the soil. As a result, the rate and volume of stormwater runoff from the site further increases, which can create significant problems for downstream water resources. Further, the reduced amount of infiltration means less water is being recharged into the groundwater system, which can result in decreased baseflows in creeks and streams and, potentially, a loss to the long-term sustainability of groundwater drinking supplies.

If the land drains to a landlocked basin, the additional volume of runoff can increase the water level and flood level of the basin. If the land drains to a stream, the additional runoff volume can cause the stream to flow full for longer durations, which increases the erosion potential. The increase in runoff rates from sites can also increase flooding risks and erosion.

Although both high-water levels (flooding) and low-water levels are of concern to watershed residents and public officials/staff, more concern and attention is usually paid to flooding because it is a greater threat to public health and safety and can result in significant economic losses. Flooding may cause other damages that are harder to quantify, including the following:

- Flooding of roads so they are impassable to emergency vehicles and residents
- Shoreline erosion
- Destruction of riparian habitats and vegetation such as grass, shrubs, trees, etc.
- Unavailability of recreational facilities for use by the public (e.g., inundation of shoreline) and/or restricted recreational use of waterbodies

- More strain on budgets and personnel for repairing flood-damaged facilities and controlling public use of facilities during flooding events
- Alterations to the mix and diversity of wildlife species as a result of inundation of habitats

Of special concern is flooding on landlocked waterbodies, which prolongs the damages and impacts. When there is no surface outlet, runoff which collects in these depressions is removed only by seepage and evaporation. As water tables rise during periods of above-average precipitation, seepage out of landlocked basins can also decrease. As a result, landlocked basins are subject to wide variations in water levels and their 100-year floodplains typically cover large areas. Landlocked basins can also provide benefits. The long-lasting seepage from landlocked basins provides important groundwater recharge benefits. Also, landlocked basins do not discharge surface waters to downstream basins, which could otherwise be negatively impacted by the additional stormwater volume. Lost Lake is the largest landlocked basin in the BCWMC (see Section 2.6.4.4).

Aging stormwater control facilities and rapid urbanization caused the Bassett Creek watershed to experience flooding problems beginning in the 1960s. Severe storms in the summers of 1974, 1978, and 1987 resulted in millions of dollars in damage to homes and infrastructure. A modest storm (2.5 inches over 24 hours) in the spring of 1975 was exacerbated by wet antecedent conditions, again resulting in damage to homes. In a 1982 design memorandum, the US Army Corps of Engineers (USACE) estimated the damages sustained by Bassett Creek flooding were approximately \$4 million per year (extrapolated to 2014 dollars). The worst problem was the 1.5-mile long Bassett Creek Tunnel, which was undersized and severely deteriorated.

To address the major flooding along Bassett Creek, the BCWMC cooperated with the USACE, Minnesota Department of Transportation (MnDOT), Minnesota Department of Natural Resources (MDNR), and its member cities to construct the Bassett Creek Flood Control Project (see Section 2.8.1). Although major flooding along Bassett Creek has been addressed, some homes remained in the floodplain following the construction of the Flood Control Project. In addition, the BCWMC and member cities are aware of local flooding issues within the watershed that are not adjacent to Bassett Creek (e.g., DeCola Ponds, Medicine Lake Road).

The current flood control issues include maintenance and repair of the Flood Control Project system, flood-proofing or removal of homes that are remaining in the floodplain, and implementing appropriate stormwater volume and rate controls during development and redevelopment to prevent additional flooding.

Low water levels on Medicine Lake is another water quantity-related issue where the BCWMC has been involved in recent years. The following list summarizes the recent involvement of the BCWMC:

- In 2009, lake residents requested that the BCWMC address low water levels in the lake because of the impact on some recreational activities. The lake residents requested that the BCWMC analyze the effect of altering the height of the lake's outlet structure (i.e., raising the elevation) on lake levels.

- In 2009, the BCWMC Engineer summarized and reported data on recent precipitation and lake levels throughout the Metro Area.
- In 2012, the BCWMC presented further information on the dam and the history of water levels in Medicine Lake.
- In 2014, in response to continued requests from lake residents for the BCWMC to perform a study of the effect of alterations to the Medicine Lake outlet structure on lake water levels, the BCWMC Engineer prepared a list of components likely needed for such a study.
- In 2014, the BCWMC hosted a Medicine Lake stakeholder meeting that included presentations from technical experts about the lake and its various issues, including water levels.

During the development of this Plan, the BCWMC, member cities, and other stakeholders identified the following issues/opportunities (see Appendix D – Gaps Analysis):

- Opportunity to update precipitation frequency estimates from TP-40 to Atlas 14 figures
- Opportunity to clarify and update rate control performance standards
- Inconsistency between BCWMC-determined 100-year flood elevations and FEMA’s 100-year flood elevations
- Opportunity to incorporate flood control objectives into other capital projects

In addition to the Gaps Analysis, the public weighed in on water quantity and flooding issues through the WAVE. Survey respondents ranked flooding quite low in their list of concerns for waterbodies. However, they ranked the stability of water levels among their highest concerns – with most respondents referring to water levels on Medicine Lake. When prioritizing issues at the Watershed Summit, participants ranked Medicine Lake water levels as a high priority, while flooding and water levels in other areas of the watershed ranked 7th out of 10 issues. Meanwhile, the BCWMC Commissioners, TAC members, and technical partners ranked water quantity and flooding as a top priority, just below the effects of stormwater runoff on water quality (Appendix E).

In this Plan, the BCWMC addresses the above issues through its policies and implementation program. Specifically, the BCWMC updated policies addressing rate control, clarified maintenance responsibilities for elements of the Flood Control Project, and seeks to update its floodplain and flood elevations to reflect the most current precipitation data.

3.2.1 Floodplain Management

Floodplain management is the management of development and other activities in or near the floodplain to prevent flood damages. The MDNR defines floodplain management as *“the full range of public policy and action for ensuring wise use of the floodplains. It includes everything from collection and dissemination*

of flood control information to actual acquisition of floodplain lands, construction of flood control measures, and enactment and administration of codes, ordinances, and statutes regarding floodplain land use.”

Minnesota law defines the floodplain as the land adjoining lakes, water basins, rivers, and watercourses that has been or may be covered by the “100-year” or “regional” flood. Floodplains of larger basins and streams are mapped by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps (FIRMs), which are included in community Flood Insurance Studies (FIS). The BCWMC reviews proposed activities in designated floodplain, as described in the BCWMC Requirements document.

Floodplains within the BCWMC were established prior to the publication of the National Oceanic and Atmospheric Administration’s (NOAA) Atlas 14 precipitation data (see Section 2.2). Updating BCWMC floodplains based on current precipitation data may increase floodplain areas within the BCWMC and result in additional structures located within the floodplain.

As development and redevelopment occur within the watershed, appropriate rate and volume controls are necessary to avoid creating future flooding issues or exacerbating existing flooding issues. The BCWMC established rate control performance standards as described in Policy 31 (see Section 4.2.2) and its Requirements document. Volume control is directly addressed through the BCWMC’s adoption of the MPCA’s Minimal Impact Design Standards (MIDS) and Flexible Treatment Options performance standards.

3.3 Erosion and Sedimentation

Sediment is a major contributor to water pollution. Stormwater runoff from streets, parking lots, and other impervious surfaces carries suspended sediment consisting of fine particles of soil, dust, and dirt. Abundant amounts of suspended sediment are carried by stormwater runoff from actively eroding areas.

Although erosion and sedimentation are natural processes, they are often accelerated by human activities, especially during construction activities. Prior to construction, the existing vegetation on the site intercepts rainfall and slows down stormwater runoff rates, which allows more time for runoff to infiltrate into the soil. When a construction site is cleared and graded, the vegetation (and its beneficial effects) is removed. Also, natural depressions that provided temporary storage of rainfall are filled and graded, and soils are exposed and compacted, resulting in increased erosion, sedimentation, and decreased infiltration. As a result, the rate and volume of stormwater runoff from the site increases (*Minnesota Urban Small Sites BMP Manual*, 2001). The increased stormwater runoff rates and volumes cause increased soil erosion, which releases significant amounts of sediment that may enter water resources.

Regardless of its source, sediment deposition decreases water depth, degrades water quality, smothers fish and wildlife habitat, and degrades aesthetics. Sediment deposition can also wholly or partially block culverts, manholes, storm sewers, etc., causing flooding. Sediment deposition in detention ponds and wetlands also reduces the storage volume capacity, resulting in higher flood levels and/or reducing the amount of water quality treatment provided. Suspended sediment carried in water can cloud lakes and streams and disturb aquatic habitats. Sediment also reduces the oxygen content of water and is a major source of phosphorus, which is frequently bound to the fine particles. Erosion also results in

channelization of stormwater flow, increasing the rate of stormwater runoff and further accelerating erosion.

As erosion and sedimentation increase, the stormwater management systems (e.g., ponds, pipes) require more frequent maintenance, repair, and/or modification to ensure they will function as designed. In recognition of these issues, the BCWMC reviews projects which result in more than 200 yards of cut or fill or more than 10,000 square feet of grading. For these projects, the BCWMC requires an erosion and sediment control plan meeting requirements specified in the BCWMC Requirements document.

In addition to meeting BCWMC and member city requirements, owners and operators of construction sites disturbing 1 or more acres of land must obtain a National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit from the MPCA. Owners/operators of sites smaller than 1 acre that are a part of a larger common plan of development or sale that is 1 acre or more must also obtain permit coverage. A key permit requirement is the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) with appropriate best management practices (BMPs). The SWPPP must be a combination of narrative and plan sheets that: (1) address foreseeable conditions, (2) include a description of the construction activity, and (3) address the potential for discharge of sediment and/or other potential pollutants from the site. The SWPPP must include the following elements:

- Temporary erosion prevention and sediment control BMPs
- Permanent erosion prevention and sediment control BMPs
- Permanent stormwater management system
- Pollution prevention management measures

A project's plans and specifications must incorporate the SWPPP before applying for NPDES Permit coverage. The permittee must also ensure final stabilization of the site, which includes final stabilization of individual building lots.

During the development of this Plan, the BCWMC, member cities, and other stakeholders identified the following issues/opportunities (see Appendix D – Gaps Analysis):

- Outdated references to the NPDES Construction Stormwater Permit
- Opportunity to refine triggers for BCWMC review of erosion and sediment control plans and coordinate erosion and sediment control inspections with member cities
- Accumulation of sediment deltas downstream of stormwater system outfalls

In addition to the Gaps Analysis, the public weighed in on sedimentation and erosion issues through the WAVE. Survey respondents ranked shoreline erosion and sedimentation among their highest concerns for waterbodies in the watershed. When prioritizing issues at the Watershed Summit, the public ranked degraded habitats as their 2nd highest priority, especially noting the issues of eroded streambanks and

sedimentation. Meanwhile, the BCWMC Commissioners, TAC members, and technical partners ranked degraded streams and shorelines (mostly due to erosion) as the 5th most important issue out of 10 issues (Appendix E).

In this Plan, the BCWMC addresses the above issues through its policies and implementation program. Specifically, the BCWMC updated policies to reference current state requirements for erosion and sediment control, deferred inspection of erosion and sediment control practices on BCWMC-reviewed projects to member cities, and established a policy to address sediment deltas downstream of intercommunity stormwater outfalls.

3.4 Streams

Increased rates and volumes of runoff, resulting from urbanization and other activities, can degrade a stream's hydrology and physical condition, its water quality, its function as aquatic habitat, and can reduce the amount of groundwater flowing to a stream. Negative impacts resulting from increased development are summarized in Table 3-1, developed from information published in the *Minnesota Stormwater Manual*.

Hydrologic, geomorphic, and water quality changes can impact the overall ecological health of streams. Insects and other inhabitants are indicators of stream health. Some insects can only survive in high quality water, whereas others can survive in much poorer quality of water. A healthy stream has a good diversity of insects and stream inhabitants. The BCWMC monitors macroinvertebrates in Bassett Creek to assess overall stream health (see Section 2.7.1.1.2).

Streambank, ravine and gully erosion degrade the appearance, usability, ecological health and water quality of streams. The BCWMC has implemented erosion control and stabilization capital projects along Bassett Creek. To prevent potential future impacts to BCWMC streams, the BCWMC reviews projects that may affect the water surface elevation, shoreline, or streambank areas. The BCWMC reviews projects located within in the floodplains of BCWMC creeks and streams, per the BCWMC Requirements document.

During the development of this Plan, the BCWMC, member cities, and other stakeholders identified the following issues/opportunities (see Appendix D – Gaps Analysis):

- Opportunity to create a more comprehensive approach to prioritizing stream restoration projects
- Opportunity to emphasize soft armoring techniques for streambank restoration and stabilization projects

In this Plan, the BCWMC addresses the above issues through its policies. Specifically, the BCWMC updated policies related to capital project selection and prioritization, placed an emphasis on specific stream restoration and stabilization practices referenced by the Minnesota Department of Natural Resources (MDNR), and created a policy requiring buffers along streams during some development and redevelopment projects.

Table 3-1 Impacts of Urbanization on Streams

Type of Impact	Specific Impacts
Stream Hydrology Impacts	• Increased frequency of bankfull and near bankfull events: Increased runoff volumes and peak flows increase the frequency and duration of smaller bankfull and near bankfull events, which are the primary channel forming events. • Increased flooding: Increased runoff volumes and peak flows also increase the frequency, duration and severity of out-of-bank flooding. • Lower dry weather flows (baseflow): Reduced infiltration of stormwater runoff could cause reduced shallow groundwater inflow during dry weather periods resulting in less baseflow in streams.
Stream Geomorphology Impacts	• Stream widening and bank erosion: Stream channels widen to accommodate increased runoff and higher stream flows from developed areas. More frequent small and moderate runoff events undercut and scour the lower parts of the streambank, causing the steeper banks to slump and collapse during larger storms. • Higher flow velocities: Higher flow velocities result in increased streambank erosion rates, which can cause a stream to widen many times its original size. • Stream downcutting: Streams accommodate higher flows by downcutting their streambed. This causes instability in the stream profile, or elevation along a stream's flow path, which increases velocity and triggers further channel erosion both upstream and downstream. • Loss of riparian canopy: As streambanks are gradually undercut and slump into the channel, the vegetation (e.g., trees, shrubs) that had protected the banks are exposed at the roots. This leaves them more likely to be uprooted or eroded during major storms, further weakening bank structure. • Changes in the channel bed due to sedimentation: Due to channel erosion and other sources upstream, sediments are deposited in the stream as sandbars and other features, covering the channel bed, or substrate, with shifting deposits of mud, silt and sand. • Increase in the floodplain elevation: To accommodate the higher peak flow rate, a stream's floodplain elevation typically increases following development in a watershed. Property and structures that had not previously been subject to flooding may now be at risk.

Table 3-1 Impacts of Urbanization on Streams

Type of Impact	Specific Impacts
Aquatic Habitat Impacts	• Degradation of habitat structure: Higher and faster flows can scour channels and wash away entire biological communities. Streambank erosion and the loss of riparian vegetation reduce habitat for many fish species and other aquatic life, while sediment deposits can smother bottom-dwelling organisms and aquatic habitat. • Loss of pool-riffle structure: Streams draining undeveloped watersheds often contain pools of deeper, more slowly flowing water that alternate with “riffles” or shoals of shallower, faster flowing water. These pools and riffles provide valuable habitat for fish and aquatic insects. Increased flows and sediment loads from urban watersheds can replace pools and riffles with more uniform streambeds that provide less varied aquatic habitat. • Reduced baseflows: Reduced baseflows that may result from increased impervious cover in a watershed and the loss of rainfall infiltration into the soil and water table adversely affect in-stream habitats, especially during periods of drought. • Increased stream temperature: Runoff from warm impervious areas (e.g., streets and parking lots), storage in impoundments, loss of riparian vegetation and shallow channels can all cause an increase in temperature in urban streams. Increased temperatures can reduce dissolved oxygen levels and disrupt the food chain. Certain aquatic species, such as trout, can only survive within a narrow temperature range. • Decline in abundance and biodiversity: When there is a reduction in various habitats and habitat quality, both the number and the variety, or diversity, of organisms (e.g., wetland plants, fish, and macroinvertebrates) are also reduced. Sensitive fish species and other life forms disappear and are replaced by those organisms that are better adapted to the poorer conditions. Fish and other aquatic organisms are impacted not only by the habitat changes brought on by increased stormwater runoff quantity, but are often also adversely affected by water quality changes.

3.5 Wetlands, Habitat, and Shoreland Areas

Diverse wetland systems and shoreland areas are critical components of a healthy hydrologic system and positively affect soil systems, groundwater and surface water quality and quantity, wildlife, fisheries, aesthetics, and recreation. The benefits of wetlands and shoreland can be compromised by hydrologic alterations, exotic and invasive species, and erosion and sedimentation. The effectiveness of wetland communities for wildlife habitat, and for human appreciation, is greatly increased when they are physically or functionally connected with other native communities.

Wetlands are a key element of the hydrologic system. Wetlands have several functions that can provide hydrologic and water quality benefits, including:

- Maintaining stream baseflow

- Recharging groundwater
- Providing flood storage and attenuating peak flows
- Providing erosion protection
- Physically filtering particulates (and pollutants attached to particulates) from runoff
- Biologically removing nutrients from runoff in some wetlands and at certain times of the year

Development of land and other human activities can affect the hydrology in wetlands and shoreland areas. Numerous wetlands within the BCWMC have already been affected by hydrologic alterations, both direct and indirect. Some of the activities that can affect wetland hydrology include:

- Ditching and drain tiling; often for agricultural purposes, but also for flood control
- Groundwater pumping; typically from surficial aquifers, but also from confined aquifers
- Lowering natural outlet elevations; thereby draining water from areas that naturally flooded
- Reducing the volume of water reaching a wetland through watershed diversions
- Filling, which can impact remaining wetland areas by increasing water level fluctuations
- Removing wetland vegetation; often to improve access or for aesthetic reasons

Wetlands and shoreland areas are important for protecting and maintaining downstream water quality and the ecological integrity of the communities that inhabit these areas. Overloading wetlands beyond their natural capacity with water, sediment, or nutrients can diminish their effectiveness in providing water quality benefits. Most natural wetland systems have developed with relatively low levels of sediment and nutrient inputs (riparian wetlands located in floodplains are an exception). When land use and/or upstream hydrologic systems become altered, the hydraulic, natural sediment, and nutrient loads can (and often do) increase in magnitude and frequency. These changes may result in tipping the ecological balance to benefit non-native and invasive plant species, thereby reducing the benefits to wildlife, fisheries, amphibians, and humans. Degraded water quality in wetlands can pass on to downstream waters, contributing to degradation of additional resources.

Wetlands and shoreland areas provide valuable habitat for many types of wildlife including waterfowl, songbirds, raptors, mammals, fish, and many species of amphibians. It is difficult to determine the value of wetlands for wildlife due to the specialized requirements of each species. However, it is possible to determine wildlife, fisheries, and amphibian habitat values in a general sense. Maintaining and improving wildlife viability requires that water resources and land management activities consider the life cycles of various animals. By considering habitat benefits or detriments when approaching water resources projects, the BCWMC has the opportunity to enrich the ecological fabric of the area.

The overall ecological health of wetland and shoreland areas can be significantly impacted by the presence or absence of vegetated buffers (see Section 3.5.1) and aquatic invasive species (see Section 3.5.2).

During the development of this Plan, the BCWMC, member cities, and other stakeholders identified the following issues/opportunities (see Appendix D – Gaps Analysis):

- Opportunity to develop more comprehensive wetland management regulatory controls
- Opportunity to develop more comprehensive buffer width requirements
- Opportunity to address protection of rare and endangered species
- Need to clarify the BCWMC's role in managing aquatic invasive species (AIS)

In addition to the Gaps Analysis, the public weighed in on wetlands, habitat, and aquatic invasive species (AIS) issues through the WAVE. Survey respondents ranked the spread of AIS as their #1 concern, while "abundance and diversity of wildlife" ranked in the middle of the issues. When prioritizing issues at the Watershed Summit, the public ranked degraded habitats as their 2nd highest priority, especially noting AIS. Meanwhile, the BCWMC Commissioners, TAC members, and technical partners ranked the lack of biodiversity and wetlands as their 8th and 9th highest priorities out of 10 issues (see Appendix E).

In this Plan, the BCWMC addresses the above issues through its goals, policies and implementation program. Specifically, the BCWMC requires member cities to adopt wetland management ordinances meeting specific criteria, requires minimum buffer widths for high quality wetlands and priority waterbodies (see Policy 68, Section 4.2.6), developed policies addressing its role in the management of aquatic invasive species (see Policy 72 in Section 4.2.6 and Policy 79 in Section 4.2.8), and developed a policy to cooperate with the MDNR and others to protect and report rare and endangered species.

3.5.1 Wetland and Shoreland Buffers

Buffers are upland, vegetated areas located adjacent to wetlands and shoreland areas. Many of the hydrologic, water quality, and habitat benefits achieved by wetland and shoreland areas are directly attributable to or dependent on the presence of buffers. Vegetation and organic debris shield the soil from the impact of rain and bind soil particles with root materials, reducing erosion. Vegetation obstructs the flow of runoff, thereby decreasing water velocities, allowing infiltration, and reducing the erosion potential of stormwater runoff. Leaf litter from vegetation can also increase the organic content of the soil and increase adsorption and infiltration. As a physical barrier, vegetation also filters sediment and other insoluble pollutants from runoff. Vegetation scatters sunlight and provides shade, reducing water temperature in the summer, limiting nuisance algae growth, and reducing the release of nutrients from the sediment. Buffers also have habitat benefits; native plants provide the best food and shelter for native wildlife, fish, and amphibians. Buffers provide needed separation and interspersed areas for animals, to reduce competition and maintain populations.

The presence of adequate buffers surrounding wetland and shoreland areas is critical to preserving the ecological functions and environmental benefits of downstream waterbodies, including wetlands. Establishing buffers in developed areas may be difficult, as existing structures may be located within the desired buffer area. Redevelopment offers an opportunity to establish adequate buffers in areas that are already developed.

3.5.2 Aquatic Invasive Species (AIS)

The term “invasive species” describes plants, animals, or microorganisms within lakes and streams that are non-native and that 1) cause or may cause economic or environmental harm or harm to human health, or 2) threaten or may threaten natural resources or the use of natural resources in the state (Minnesota Statutes Chapter 84D.01). Aquatic invasive species (AIS) is a term given to invasive species that inhabit lakes, wetlands, rivers, or streams and overrun or inhibit the growth of native species. Aquatic invasive species pose a threat to natural resources and local economies that depend on them.

The presence of non-native species and invasive species can impair the ecological, aesthetic, and recreational functions of aquatic, wetland and shoreland areas. Not all non-native species are invasive; “invasive” refers to those non-native species that are able to out-compete, displace, and even eliminate native species (i.e., some “non-native” species to the region are able to coexist with native species).

Under direction from the Minnesota Legislature, the MDNR established the Invasive Species Program in 1991. The program is designed to implement actions to prevent the spread of invasive species and manage invasive aquatic plants and wild animals (Minnesota Statutes 84D). The goals of the MDNR Invasive Species Program are to:

1. Prevent the introduction of new invasive species into Minnesota
2. Prevent the spread of invasive species within Minnesota
3. Reduce the impacts caused by invasive species to Minnesota’s ecology, society, and economy

As part of its Invasive Species Program, the MDNR maintains a list of waters infested with specific AIS (MDNR Designation of Infested Waters, 2013 as amended). The MDNR list includes several BCWMC priority waterbodies as infested with Eurasian watermilfoil, including:

- Medicine Lake
- Parkers Lake
- Wirth Lake

In 2014 the MN Legislature approved Statute 477A.19, instituting a new county aid tax bill that will provide \$4.5 million in 2014 and \$10 million a year in 2015 and years after to Minnesota counties to help prevent the spread of aquatic invasive species. Find more information at <http://www.dnr.state.mn.us/invasives/ais/prevention.html>.

The MDNR's list of AIS infested waterbodies may not include all known AIS occurrences within the BCWMC. The MDNR infested waters list does not include curlyleaf pondweed, which has been identified in several BCWMC waterbodies.

Of the AIS identified in the BCWMC, curlyleaf pondweed is of special concern due to its potential as a source of internal phosphorus loading. This submersed aquatic plant grows vigorously during early spring, outcompeting native species for nutrients. After curlyleaf pondweed dies out in early to mid-summer, decay of the plant releases nutrients and consumes oxygen, exacerbating internal sediment release of phosphorus. This process may result in algal blooms during the peak of the recreational use season, which further inhibit native macrophytes by reducing water clarity and blocking sunlight necessary for growth.

Invasive aquatic animals present in the BCWMC include common carp, which can degrade water quality, especially in shallow lakes and wetlands. Carp feeding techniques disrupt shallow-rooted plants, which can reduce water clarity and possibly release phosphorus bound in sediment, leading to increased algal blooms and a decline in native aquatic plants. Common carp are also present in the Mississippi River. Common carp are typically spread between lakes by the accidental inclusion and later release of live bait, but can also migrate through natural or built channels as adults.

Zebra mussels have not been identified in BCWMC waterbodies, but are present in several surrounding watersheds. Zebra mussels can cause problems for lakeshore residents and recreationists by clogging water intakes and attaching to motors and possibly clogging cooling water areas. Zebra mussel shells can cause cuts and scrapes if they grow large enough on rocks, swim rafts and ladders. Zebra mussels can also attach to native mussels, killing them. Zebra mussels filter plankton from the surrounding water, which can result in improved water clarity and result in more aquatic vegetation. In large populations, zebra mussel filter feeding could impact the food chain, reducing food for larval native fish. Zebra mussels are typically spread as adult mussels attached to boats or aquatic plants, or as larvae carried in bait buckets, bilges, or any other water moved from an infested lake or river.

Based on their potential environmental impact and the difficulty of eradication once a waterbody is infested, the BCWMC is interested in preventing the spread of AIS and managing the AIS already present in BCWMC waterbodies. To this end, this Plan clarifies the BCWMC's role as a supporter of collaborative AIS management efforts (see Policy 79 in Section 4.2.8) and continues BCWMC monitoring for AIS as part of its ongoing monitoring efforts.

3.5.3 Member City Wetland Management and Wetland Classification

The BCWMC currently acts as the local governmental unit (LGU) responsible for administering the Wetland Conservation Act (WCA) in the Cities of St. Louis Park, Robbinsdale, and Medicine Lake. The remaining BCMWC member cities serve as the LGUs for their own communities.

Per the requirements of WCA, each BCWMC member city must maintain a comprehensive wetland inventory or inventory, classify, and assess the functions and values of wetlands on an as-needed basis. The BCWMC adopts the Minnesota Rapid Assessment Method (MnRAM) and encourages member cities

to use this method when performing functions and values assessments. The BCWMC encourages member cities to complete comprehensive wetland management plans as part of their local water management plans.

Wetland management performance standards implemented through member city ordinances are a primary means for protecting BCWMC wetlands. To promote consistency in wetland management, the BCWMC requires that member cities develop and implement wetland protection ordinances (or other local controls applicable to wetlands) that:

- Consider the results of functions and values assessments
- Are based on comprehensive wetland management plans, if available
- Include performance standards for wetlands classified as Preserve or Manage 1 similar to BWSR guidance that address:
 - bounce
 - inundation
 - runoff control

Section 4.2.6 of this Plan describes other wetland management policies of the BCWMC.

3.6 Groundwater

Groundwater is a finite resource with inputs and outputs. The input is generally rainwater and snowmelt that seeps into the ground (recharge). The outputs can be groundwater that is pumped out for human use and groundwater that naturally discharges to lakes, wetlands, and streams. The inputs and outputs need to be managed to ensure a sustainable groundwater supply. While rainfall and snowmelt are variable factors the BCWMC cannot control, the amount of rainfall or snowmelt that becomes recharge is affected by land use. Development generally results in larger impervious areas and more compacted soils, thus decreasing opportunities for infiltration and recharge. In addition, population increases may result in additional groundwater appropriations to meet municipal demands.

Long-term well data collected by the MDNR, United States Geological Survey (USGS), and others identifies declines in groundwater levels across the state. In response to mounting concern about groundwater supply, the MDNR published a draft strategic plan identifying strategies and actions intended to achieve sustainable use of groundwater resources (MDNR, 2013), and established three pilot Groundwater Management Areas (GWMA's).

The BCWMC recognizes that surface water resources and groundwater resources are interdependent. Precipitation and snowmelt that infiltrate the ground surface may ultimately discharge to streams, lakes, and wetlands. Groundwater levels that are higher than the water level of adjacent surface waters create a gradient (or head differential) driving groundwater flow toward the surface water. When groundwater

levels are lower than adjacent surface water elevations, the gradient is reversed and surface water recharges groundwater. The rate of inflow and outflow from surface waters to groundwater is a function of the difference in water level as well as soil and bedrock characteristics. The temporal and spatial variability of each of these factors make it extremely difficult to quantify the exchange of water between surface waters and the groundwater.

The interaction of groundwater and surface water can have negative consequences on either resource. Contaminated groundwater discharged to surface waters may have a direct impact on surface water quality and/or habitat. Declines in groundwater levels may result in decreased baseflow to streams, which can in turn result in decreased water quality and ecosystem function. Decreased baseflow is especially problematic for streams supporting fish populations (e.g., trout streams), as decreased baseflow may result in higher stream temperatures. Lower water levels in lakes may limit recreational use, reduce habitat areas, and result in increased growth of aquatic plants including invasive species (via an increased littoral zone).

Maintaining clean, safe groundwater supplies is critical to human and environmental health and to the economic and social vitality of communities. Groundwater can be contaminated by commercial and industrial waste disposal, landfills, leaking underground storage tanks, subsurface sewage treatment systems (SSTS), mining operations, accidental spills, feedlots, and fertilizer/pesticide applications.

Prevention of groundwater contamination through best management practices is critical. Once contaminated, groundwater may remain contaminated for long periods of time. Groundwater clean-up is expensive and technically complex, even when feasible. Increased public awareness of the importance of drinking water protection on the public's general health and well-being is critical to promote practices that protect the quality of groundwater.

While infiltration is often a preferred method of stormwater treatment, it may have negative consequences in areas with vulnerable groundwater resources. To protect these resources, the BCWMC requires that infiltration practices be implemented with consideration of guidance provided by the MPCA in its NPDES General Construction Stormwater permit (2013, as amended) and MIDS guidance (2013, as amended), and the Minnesota Department of Health's (MDH), *Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas* (2007) (see Policy 48 in Section 4.2.3).

During the development of this Plan, the BCWMC, member cities, and other stakeholders identified the following issues/opportunities (see Appendix D – Gaps Analysis):

- Opportunity to expand or clarify the BCWMC's role in groundwater management
- Lack of information regarding protection of groundwater resources as related to infiltration practices (e.g., MIDS)
- Opportunity to include groundwater protection guidance developed by the Minnesota Department of Health (MDH)

In addition to the Gaps Analysis, the public weighed in on groundwater issues through the WAVE. When prioritizing issues at the Watershed Summit, the public ranked groundwater as their lowest priority out of 10 issues. Meanwhile, the BCWMC Commissioners, TAC members, and technical partners ranked groundwater as their 4th highest priority out of 10 issues (see Appendix E).

In this Plan, the BCWMC addresses the above issues through its policies. Specifically, the BCWMC policies identify the BCWMC's role as a collaborator in the development of groundwater management strategies (see Policy 47 in Section 4.2.3) and cite guidance for infiltration practices intended to protect groundwater resources (see Policy 48 in Section 4.2.3).

3.7 Education and Outreach

Public education and outreach plays an important role in protecting water resources. Education and public outreach provides opportunities for the BCWMC to raise awareness of its role in managing water resources and increase public confidence in its expertise. The BCWMC and member cities also use education and outreach to raise awareness of the impact that individuals, businesses, and organizations can have on the watershed, both positive and negative, and reinforce positive actions.

The BCWMC performs its education and public outreach duties through a variety of means. The BCWMC Education and Outreach Plan describes the topics, key messages, and implementation methods used by the BCWMC to educate its target audiences (see Appendix B). The BCWMC also maintains a website containing meeting minutes, contact information, and reports and studies, including the watershed management plan. The BCWMC website also contains links to other reference and educational material. More information is available at the BCWMC website: <http://www.bassettcreekwmo.org/>

During the development of this Plan, the BCWMC, member cities, and other stakeholders identified the following issues/opportunities (see Appendix D – Gaps Analysis):

- Opportunity to identify specific training opportunities for member city staff
- Opportunity to update or establish metrics to track progress towards educational goals
- Opportunity to incorporate latest technology in distributing information and engaging the public
- Opportunity to establish educational programs/events in association with projects or programs
- Opportunity to expand education programs to address TMDL implementation and specific citizen concerns (e.g., value of studies versus projects)
- Opportunity to further develop educational partnerships with member cities

In addition to the Gaps Analysis, the public weighed in on education and outreach issues through the WAVE. Sixty-one percent (61%) of survey respondents indicated they did not receive enough information about Commission projects. When prioritizing issues at the Watershed Summit, the public ranked a lack of

information and education as their 6th most important issue out of 10 issues, as did the BCWMC Commissioners, TAC members, and technical partners (Appendix E).

In this Plan, the BCWMC addresses the above issues through its policies and implementation program. Specifically, the BCWMC Education and Outreach Plan (see Appendix B) identifies the BCWMC's target audiences and types of messages the BCWMC seeks to convey, the methods or actions the BCWMC will perform or support, and evaluation methods to track success. As described in the Education and Outreach Plan, the BCWMC will also seek collaborative groups and partners to help achieve the goals set out in the plan. Some of the partners include Metro Blooms, West Metro Watershed Alliance, Metropolitan Council, Metro WaterShed Partners, various schools, and Hennepin County. Many of the activities will be designed to meet member city MS4 education, outreach, and citizen participation goals.

3.8 Implementation and Responsibilities

Because the BCWMC is a joint powers organization, many of the responsibilities for implementing activities, programs, and projects are delegated to the member cities. The BCWMC and its administrator are responsible for coordinating these responsibilities to ensure implementation of the goals and policies of this Plan. The following sections address key management and coordination issues for successful plan implementation.

During the development of this Plan, the BCWMC, member cities, and other stakeholders identified the following issues/opportunities (see Appendix D – Gaps Analysis):

- Opportunity to establish quantifiable goals and policies
- Opportunity to quantify the costs of regulatory controls on cities
- Opportunity to clarify roles and re-evaluate maintenance/replacement responsibilities and funding mechanisms for the Commission's Flood Control Project
- Opportunity to develop a mechanism for evaluating member city implementation of Commission policies and requirements
- Lack of active management of public ditches may delay or complicate BCWMC projects involving public ditches
- Opportunity to incorporate Minnesota rules and statutes affecting watershed organizations that have been updated since the 2004 Plan
- Opportunity to identify and maximize cooperative relationships with agencies, organizations and adjacent WMOs
- Opportunity to refine the Commission's capital improvement program (CIP) implementation and funding process

In addition to the Gaps Analysis, the public weighed in on governance, management and funding issues through the WAVE. When prioritizing issues at the Watershed Summit, the public ranked the issues of governance, management and funding as their 8th most important issue out of 10 issues. Meanwhile, the BCWMC Commissioners, TAC members, and technical partners ranked these issues as their 7th out of 10 issues (see Appendix E).

In this Plan, the BCWMC addresses the above issues through its policies (Section 4) and implementation program (Section 5), which detail the delegation of responsibilities and further define the roles of the BCWMC and its member cities. Section 5.1 details the major responsibilities of the BCWMC, including:

- Reviewing improvements and developments
- Management of the BCWMC Trunk System (see Table 2-9 and Figure 2-15) and BCWMC Flood Control Project (see Tables 2-8 and Figure 2-14)
- Implementing the BCWMC capital improvement program (CIP)
- Reviewing and assisting with intercommunity planning and design
- Dispute resolution
- Reporting and evaluation
- Monitoring
- Total maximum daily load (TMDL) implementation

Section 5 of the Plan addresses the implementation responsibilities of the member cities versus the BCWMC and clarifies the role of the BCWMC and member cities regarding specific topics, including maintenance of the Flood Control Project (see Section 5.1.1.3). Section 5.2.1.1 describes the process for implementing the CIP program.

3.8.1 Maintenance of Stormwater Systems and Projects

Member cities and other MS4 permit holders are generally responsible for maintaining their stormwater management systems. Member cities manage these systems according to system maintenance plans detailed in each city's Stormwater Pollution Prevention Program (SWPPP) and local water management plan. Proper maintenance of the stormwater system will ensure that the stormwater system provides the necessary flood control and water quality treatment.

Other entities are responsible for maintaining the stormwater systems in the BCWMC that are within their jurisdiction, including:

- MnDOT is responsible for major maintenance and reconstruction of stormwater infrastructure associated with state highways. In the BCWMC, these locations include Interstate 494, Interstate 394, US Highway 169, Highway 100, and Highway 55.
- Hennepin County is responsible for maintaining only the “mainline” culvert crossings in their county state aid highways (CSAHs), including County Roads 4, 6, 9, 24, 61, 66, 70, 73, 81, 101, 102, and 156. Cities may maintain these mainline culvert crossings by agreement with the county. Cities are responsible for maintaining storm sewer catch basins and leads in the county roads.
- Owners of private stormwater facilities are responsible for maintaining their facilities in proper condition, consistent with the original performance design standards and any maintenance agreements with member cities.

The BCWMC and member cities are jointly responsible for management and maintenance of the BCWMC Flood Control Project. Responsibilities for routine maintenance and major rehabilitation or replacement are detailed in Section 5.1.1.3 and in the policies listed in Section 4.2.2. Member cities are responsible for routine maintenance of BCWMC Flood Control Project features located within their city, including debris removal (see Policy 24 in Section 4.2.2) and repairs that are primarily aesthetic improvements (see Policy 62 in Section 4.2.5).

Maintenance responsibilities for BCWMC-ordered water quality improvement projects are typically defined in the cooperative agreement between the BCWMC and the member city for each project. Generally, member cities are responsible for routine maintenance of BCWMC projects located in their city. The BCWMC will work with member cities to resolve issues related to BCWMC project maintenance or replacement as they arise.

3.8.2 Public Ditches

Judicial ditches and county ditches are public drainage systems established under Chapter 103E of Minnesota Statutes and are under the jurisdiction of the county (see Section 2.6.2). The BCWMC and member cities currently manage public ditches according to the policies listed in Section 4.2.7. Per Minnesota Statute 363B.61, cities or watershed management organizations (WMOs) within Hennepin County may petition the county to transfer authority over public ditches to the city or WMO.

The limitation that the BCWMC cannot own property (per the Joint Powers Agreement) prevents the BCWMC from petitioning Hennepin County to transfer authority over public ditches to the BCWMC. Hennepin County may transfer authority over public ditches to the member cities, if the member cities request such action (see Policy 75 in Section 4.2.7).

3.8.3 Funding and Financing

The extent to which the BCWMC may implement projects and programs to achieve its goals is limited by the availability of funding. The BCWMC is funded by public dollars collected by its member cities and Hennepin County and through grants from government agencies (which are also ultimately taxpayer-funded). The BCWMC has a duty to its taxpayers to spend its funds in a responsible manner that considers

the relative benefits, per dollar, of its actions. The benefits of effective water resource management are extremely difficult to quantify in dollars (e.g., increased wildlife habitat or recreational use). Despite this, the BCWMC will continue to evaluate the relative cost/benefit through its CIP implementation process, using best professional judgment and drawing on resources including consultants, advisory committees, and other cooperating entities.

BCMWC 2015 Watershed Management Plan

Section 4 – Goals and Policies

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4.0 Goals and Policies

This section presents the goals set by the Bassett Creek Watershed Management Commission (BCWMC) in the pursuit of its mission and the policies established by the BCWMC to achieve these goals. The policies establish responsibilities for the BCWMC and member cities and serve as decision-making guidelines.

Policies address topic areas including:

- Water quality
- Flooding and rate control
- Groundwater management
- Erosion and sediment control
- Stream restoration and protection
- Wetland management
- Public ditches
- Recreation, habitat and shoreland management
- Education and outreach
- Administration

4.1 BCWMC Goals

The BCWMC established goals to address the purposes established for watershed management organizations in Minnesota Statutes 103B (see Section 1). These goals include:

- Manage the surface water resources of the watershed to meet or exceed state standards and BCWMC water quality goals for wetlands, lakes, and streams.
- Improve the quality of stormwater runoff reaching the Mississippi River by reducing nonpoint source pollution.
- Protect and enhance fish and wildlife habitat in the BCWMC.
- Take into account aesthetics and recreational opportunities within the watershed when completing BCWMC projects.
- Reduce stormwater runoff volume for the purposes of improving water quality.
- Protect against flood risks along the Bassett Creek trunk system.
- Protect human life, property, and surface water systems that could be damaged by flood events.
- Reduce stormwater runoff rates and volumes to minimize flood problems, flood damages, and the future costs of stormwater management systems.
- Provide leadership and assist member cities with coordination of intercommunity stormwater runoff issues.

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- Notwithstanding that which occurs from natural processes, minimize erosion and sedimentation to protect the BCWMC's water resources and health, safety and welfare.
 - Maintain or improve shoreland integrity and implement stream restoration measures to maintain or enhance ecological functions as well as human health, safety, and welfare.
 - Increase the quality and quantity of wetlands in the BCWMC.
 - Protect the quantity and quality of groundwater resources.
 - Manage public ditches in a manner that recognizes their current use as urban drainage systems and as altered natural waterways.
 - Raise awareness of the BCWMC's existence and its role in protecting and improving water quality, minimizing flooding, and preserving the watershed's ecological functions and aesthetics.
 - Strengthen public confidence in the BCWMC's expertise and enable meaningful public participation in the planning process and ongoing projects conducted by the BCWMC.
 - Raise awareness of the impact that individuals, businesses, and organizations have upon water resources and motivate these audiences to change personal/corporate behavior that has a negative impact on the watershed.
 - Minimize the spread and manage the adverse impacts of harmful aquatic invasive species.
 - Develop a greater understanding of climate change and its impact on water resources, including stormwater infrastructure capacity and flooding, and develop strategies to appropriately manage future impacts.

4.2 BCWMC Policies

The BCWMC established policies to guide the BCWMC and its member cities towards the achievement of the BCWMC's goals. Policies serve as decision-making guidelines and establish responsibilities for the BCWMC and its member cities. Policies are grouped by primary topic area, but may address multiple topics and goals.

4.2.1 Water Quality Policies

1. The BCWMC will classify priority waterbodies based on desired water quality standards and other uses of the waterbodies. Table 2-6 lists the management classifications of the priority waterbodies.
2. The BCWMC adopts MPCA water quality standards (Minnesota Rules 7050, as amended) for BCWMC priority waterbodies (see Table 2-7).

3. Member cities shall classify other waterbodies according to the BCWMC classification system and include this information in their local water management plans.
4. The BCWMC will work with stakeholders to manage its priority waterbodies to meet the applicable water quality goals of the BCWMC.
5. The BCWMC and the member cities will implement the improvement options listed in the BCWMC's CIP (Table 5-3) to address the water quality of priority waterbodies based on feasibility, prioritization, and available funding (see policy 110 regarding CIP prioritization criteria).
6. The BCWMC will prioritize water quality improvement projects that are most effective at achieving water quality goals, including non-structural BMPs and education.
7. The BCWMC will cooperate with member cities, the MPCA and other stakeholders in the preparation of total maximum daily load (TMDL) studies for waterbodies on the MPCA's current or future impaired waters 303(d) list, including Northwood Lake and Bassett Creek. The BCWMC will work to align TMDL implementation items into its Watershed Management Plan to achieve efficiency. The BCWMC will work with the cities to evaluate funding options for the TMDL studies.

The BCWMC may append future studies to this Plan with the intent that they serve as the equivalent to a TMDL study.

8. The BCWMC will continue to identify opportunities to achieve and maintain excellent water quality in priority waterbodies.
9. The BCWMC will continue to monitor its priority waterbodies on a rotating schedule as described in the BCWMC Monitoring Plan (Appendix A). Monitoring may include biota, vegetation, and water chemistry (e.g., nutrients, chloride in streams). The objective of the monitoring is to detect changes or trends in the water quality over time and the effectiveness of efforts to preserve/improve water quality. The BCWMC will determine the appropriate frequency of monitoring under programs funded by the BCWMC.
10. For every year sampling is conducted for the BCWMC's lakes and/or streams, the BCWMC will compile the available monitoring data, include the data in an annual report available on the BCWMC website, and submit the data to the MPCA in an appropriate format.
11. The BCWMC will coordinate monitoring efforts with other programs including:
 - Member city monitoring
 - Metropolitan Council Citizen Assisted Monitoring Program (CAMP) and Watershed Outlet Monitoring Program (WOMP)
 - Three Rivers Park District monitoring

- Minneapolis Park and Recreation Board monitoring
 - Minnesota Pollution Control Agency Citizen Lake Monitoring Program (CLMP) and other monitoring
 - Hennepin County River Watch Program
12. The BCWMC requires all stormwater to be treated in accordance with the MPCA's Minimal Impact Design Standards (MIDS) performance goal for new development, redevelopment, and linear projects. If the MIDS performance goal is not feasible and/or is not allowed for a proposed project, then the project proposer must implement the MIDS flexible treatment options, as shown in the MIDS Design Sequence Flow Chart, or BCWMC approved alternative.
 13. The BCWMC will review projects and developments to evaluate compliance with the MPCA's Minimal Impact Design Standards (MIDS) performance goals, triggers, and flexible treatment options (which are adopted by the Commission as BCWMC water quality management standards) if the projects are located in member cities that have not adopted the MIDS performance goals, triggers, and flexible treatment options, or at the request of the member city. For projects located in member cities that have adopted the MIDS performance goals, triggers, and flexible treatment options, the member cities shall review projects for conformance with MIDS water quality treatments standards, unless Commission review is requested by the member cities.
 14. The BCWMC requires public agencies to comply with water quality management standards and policies presented in this Plan in order to maintain or improve water quality of stormwater runoff.
 15. Member cities shall not allow the drainage of sanitary sewage or non-permitted industrial wastes onto any land or into any watercourse or storm sewer discharging into Bassett Creek.
 16. The BCWMC will maintain a water quality model (e.g., P8) for the watershed. Each year, member cities shall provide the BCWMC with plans for BMPs constructed within their city. The BCWMC will update the model annually to incorporate completed BCWMC capital improvements and BMP information provided by the member cities. The BCWMC will develop a summary report of the water quality model results and provide that report to the member cities to assist in their MS4 reporting.
 17. The BCWMC encourages member cities to implement best management and good housekeeping practices to minimize chloride loading to surface water and groundwater resources, utilizing emerging technology, as appropriate.
 18. The BCWMC will assist and cooperate with member cities, MPCA, MDNR, MnDOT, other watersheds and other stakeholders in implementing projects or other management actions resulting from the Minnesota Pollution Control Agency's Twin Cities Metro Chloride Project or future chloride TMDL.

4.2.2 Flooding and Rate Control Policies

19. The BCWMC will maintain a Flood Control Emergency Repair Fund for funding emergency repairs of the BCWMC Flood Control Project features.
20. The BCWMC will maintain a Long-Term Maintenance Fund with annual assessments. The BCWMC will use the Long-Term Maintenance Fund to fund major repairs and major maintenance of the BCWMC Flood Control Project features (Flood Control Project features are listed in Table 2-8).
21. The BCWMC will regularly inspect the BCWMC Flood Control Project system, including water level control and conveyance structures, and perform the follow-up reporting. This is part of the BCWMC's annual water quality and flood control programs (see Table 5-4).
22. During the first five years of Plan implementation, the BCWMC will work with the member cities to determine responsibilities for major rehabilitation and replacement of the BCWMC Flood Control Project features and establish the associated funding mechanisms.
23. The BCWMC will finance major maintenance and repair of water level control and conveyance structures that were part of the original BCWMC Flood Control Project on the same basis as the original project. New road crossings of the creek that were installed as part of the project will be maintained by the city where the structure is located.
24. Member cities shall be responsible for routine maintenance and repair of BCWMC Flood Control Project structures located within each city. Each member city shall be responsible for routine cleaning, including removal of debris, brushing, and tree removal from the BCWMC Flood Control Project features located within their city.
25. The BCWMC will reevaluate flood elevations and flood risk to affected properties based on the most recent NOAA precipitation data (e.g., Atlas 14) and will determine actions for protection, including partnering with and applying for grants from Federal and State agencies.
26. When implementing BCWMC flood risk reduction projects, the BCWMC will identify properties prone to flooding. The most effective and reasonable solutions as approved by the member city will be evaluated. Solutions to be considered may include purchase of the properties, with attention to impact on tax base and other community factors.
27. The BCWMC will develop criteria for the allocation of funding for flood risk reduction projects, which may include the purchase of property prone to flooding.
28. The BCWMC will monitor or coordinate with other entities to monitor water levels on the primary lakes in the watershed. Water levels on Bassett Creek and other waterbodies will be monitored periodically during flooding events.
29. The member cities must implement the BCWMC's development policies, including minimum building elevations of at least 2 feet above the 100-year flood level for new and redeveloped

structures, as outlined in the BCWMC's *Requirements for Improvements and Development Proposals* document (BCWMC, 2015, as revised).

30. The BCWMC encourages property owners to implement best management practices to reduce the volume of stormwater runoff beyond the minimum requirements imposed by the city's MS4 permit, NPDES construction stormwater permit and MIDS performance goal adopted by the BCWMC. Examples of stormwater runoff volume reduction methods include:

- Reducing the amount of planned impervious surface (as areas develop).
- Reducing the amount of impervious surface (during redevelopment).
- Additional infiltration and/or evapotranspiration.
- Stormwater reuse.

31. The BCWMC and member cities must require rate control in conformance with the Flood Control Project system design and this Plan.

The BCWMC requires cities to manage stormwater runoff so that future peak flow rates leaving development and redevelopment sites are equal to or less than existing rates for the 2-year, 10-year, and 100-year events.

32. The BCWMC requires the retention of on-site runoff from development and redevelopment projects consistent with the MPCA's Minimal Impact Design Standards (MIDS) performance goals. These include the retention of:

- 1.1 inches of runoff from impervious areas for new development creating more than 1 acre of new impervious area
- 1.1 inches of runoff from new or fully reconstructed impervious areas for redevelopment creating one or more acres of new or fully redeveloped impervious area
- 0.55 inches of runoff from new or fully reconstructed impervious areas for linear projects creating one or more acres of new or fully redeveloped impervious area (or 1.1 inches from the net increase in impervious area, whichever is greater)
- If an applicant is unable to achieve the performance goals due to site restrictions, the MIDS flexible treatment options approach shall be used, following the MIDS design sequence flow chart.

For all other projects, the BCWMC encourages the use of infiltration, filtration, or other abstraction of runoff from impervious areas for all development and redevelopment projects as a best practice to reduce stormwater runoff.

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33. The BCWMC will revise floodplain elevations along the trunk system as necessary to reflect channel improvement, storage site development, or requirements established by appropriate state or federal governmental agencies.
 34. The BCWMC will allow only those land uses in the BCWMC-established floodplain that will not be damaged by floodwaters and will not increase flooding. Allowable types of land use that are consistent with the floodplain include recreation areas, parking lots, temporary excavation and storage areas, public utility lines, agriculture, and other open spaces.
 35. The BCWMC prohibits the construction of basements in the floodplain; construction of all other infrastructure within the floodplain is subject to BCWMC review and approval.
 36. The BCWMC prohibits permanent storage piles, fences and other obstructions in the floodplain that would collect debris or restrict flood flows.
 37. Where streets, utilities, and structures currently exist below the 100-year floodplain, the BCWMC encourages the member cities to remove these features from the floodplain as development or redevelopment allows.
 38. The BCMWC requires that projects within the floodplain maintain no net loss in floodplain storage and no increase in flood level any point along the trunk system. The BCWMC prohibits expansion of existing non-conforming land uses within the floodplain unless they are fully flood-proofed in accordance with codes and regulations.
 39. The BCWMC requires member cities to maintain ordinances that are consistent with BCMWC floodplain standards. Member cities must submit ordinances to the BCWMC for review.
 40. The BCWMC will review changes in local water management plans, comprehensive land use plans, and other plans, for their effect on the adopted floodplain and Flood Control Project, when such plans are submitted to BCWMC.
 41. The BCWMC will update, as necessary, the existing flood profile to reflect any increases resulting from modifications to a flood storage site or the Flood Control Project system, following the approval of those modifications by the BCWMC, local and state agencies, and after a public hearing on the modification plan has been held.
 42. BCWMC will review diversion plans to determine the effect of the proposal on the Bassett Creek watershed and such plans will be subject to BCWMC approval. With respect to diversions, the BCWMC:
 - Prohibits any diversions of surface water within, into, or out of the watershed that may have a substantial adverse effect on stream flow or water levels at any point within the watershed.

- Requires that plans for intra- or inter-watershed diversions must include an analysis of the effects of the diversion on flooding, water quality and aesthetic quality along the creek.
 - Requires effort be made to ensure that there is no fish migration from one watershed to another.
43. The BCWMC will pursue opportunities to collaborate with state agencies and other entities in the development of action plans (or similar management tools) related to the response of surface water and groundwater resources to long-term changes in precipitation and hydrology.
44. The BCWMC will continue to monitor water quantity and quality in the watershed and will seek opportunities to contribute BCWMC data to other datasets, for the purpose of assessing the response of surface water and groundwater resources to long-term changes in precipitation and hydrology.

4.2.3 Groundwater Management Policies

45. The BCMWC will review all MDNR groundwater appropriation permit applications in the BCWMC excluding applications for temporary appropriations permits.
46. The BCWMC will work with member cities to consider a program to review development or redevelopment projects which include long-term dewatering within 1,000 feet of priority waterbodies.
47. The BCWMC will collaborate with local and state agencies if/when these agencies develop a groundwater action plan in an effort to gain a better understanding of groundwater-surface water interaction and develop management strategies that consider the protection of both resources. The role of the BCWMC may include:
- Collaborate with local and state agencies to identify data gaps and attempt to fill those gaps through collection of groundwater level data and/or surface water flow data.
 - Coordinate with appropriate local and state agencies to develop a groundwater budget for the watershed.
 - Coordinate with appropriate local and state agencies to develop and utilize tools to assess surface water impacts and groundwater impacts of groundwater use (e.g., refinement of the Metro groundwater model, synchronization of the BCWMC XP-SWMM model with groundwater models).
48. To protect groundwater quality, the BCWMC requires infiltration practices to be implemented in accordance with the following guidance for determining the feasibility of infiltration:
- NPDES General Construction Stormwater Permit (2013, as amended)

- Minimal Impact Design Standards (MIDS) Design Sequence Flow Chart (2013, as amended)
- Minnesota Department of Health's *Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas* (MDH, 2007)

The BCWMC recommends that infiltration practices be designed with consideration for the following guidance:

- BCWMC's *Requirements for Improvements and Development Proposals* (BCWMC, 2015, as revised)
- Minnesota Pollution Control Agency's *Minnesota Stormwater Manual* (http://stormwater.pca.state.mn.us/index.php/Main_Page)

49. The BCWMC encourages member cities to educate residents regarding the importance of implementing BMPs to protect groundwater quality and quantity.

50. Member cities shall share groundwater elevation data, where available, with the BCWMC.

4.2.4 Erosion and Sediment Control Policies

51. Member cities shall continue managing erosion and sediment control permitting programs and ordinances as required by their NPDES MS4 permit and the NPDES Construction Stormwater General Permit. These programs must address:

- Permitting and inspection of erosion controls
- Erosion and sediment control at individual building sites
- Requirements and procedures for reviewing, approving, and enforcing erosion control plans

52. The BCWMC will review projects and developments to evaluate compliance with BCWMC erosion and sediment control standards.

The types of projects that must be submitted to the BCWMC for review, the BCWMC's review procedure, submittal requirements, guidelines, design criteria, etc. are provided in the BCWMC's document *Requirements for Improvements and Development Proposals* (BCWMC, 2015, as revised).

53. The BCWMC requires preparation of erosion control plans for construction projects meeting the applicable BCWMC threshold. Erosion control plans shall meet the standards given in the NPDES Construction Stormwater General Permit (as amended), and shall show proposed methods of retaining waterborne sediments onsite during the construction period, and shall specify methods and schedules for restoring, covering, or re-vegetating the site after construction.

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54. Member cities shall perform regular erosion and sediment control inspections for projects triggering BCWMC review and subject to BCWMC erosion and sediment control standards. The member cities will annually report to the BCWMC regarding compliance with BCWMC standards as part of annual MS4 reporting or as requested by the Commission.
 55. The BCWMC requires local water management plans to describe existing and proposed city ordinances, permits, and procedures addressing erosion and sediment control.
 56. The BCWMC will work with member cities to evaluate end-of-pipe sediment sources and controls. Following adequate source control, the BCWMC may fund removal of end-of-pipe sediment deltas downstream of intercommunity watersheds, or facilitate collaboration among responsible parties to remove these deltas.

4.2.5 Stream Restoration and Protection Policies

57. The BCWMC will continue to maintain a Channel Maintenance Fund through an annual assessment. This fund will be used to help finance minor stream maintenance, repair, stabilization and restoration projects and/or portions of larger stream restoration projects.
58. The Channel Maintenance Fund may also be used to finance the BCWMC's share of maintenance projects that have a regional benefit, or to partially fund smaller, localized projects that cities wish to undertake.
59. Major stream and streambank stabilization and restoration projects will be considered and prioritized by the BCWMC for inclusion in its annual CIP. Stabilization and restoration projects may include any or all of the following components:
 - Restoration of a stream or streambank area to the designed flow rate
 - Restoration or stabilization of a stream or streambank area that has either resulted in damage to a structure, or where structural damage is likely
 - Restoration or stabilization of a stream or streambank to reduce erosion, improve water quality, and improve riparian or in-stream habitat
 - Restoration or stabilization of a stream or streambank to address flooding, mitigation of water quality impairment, or minimizing the potential for water quality impairment
60. Recognizing their benefits to biodiversity and more natural appearance, the BCWMC will strive to implement stream and streambank restoration and stabilization projects that use soft armoring techniques (e.g., plants, logs, vegetative mats) as much as possible and wherever feasible.
61. The BCWMC will consider improving natural habitat and navigability, and will consider the needs of pedestrians when planning and implementing near-stream and in-stream projects, and when rehabilitating existing projects.

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62. The member cities are responsible for funding maintenance and repairs that are primarily aesthetic improvements.
 63. The BCWMC will take into account aesthetic and habitat values of future flood control and stabilization/restoration projects.
 64. Member cities shall maintain and enforce buffer requirements adjacent to priority streams for projects that will result in more than 200 yards of cut or fill, or more than 10,000 square feet of land disturbance. Buffer widths adjacent to priority streams must be at least 10 feet or 25 percent of the distance between the ordinary high water level and the nearest existing structure, whichever is less.

Allowable land uses, and vegetative criteria for buffers are specified in the BCWMC's *Requirements for Development and Redevelopment* (BCWMC, 2015, as amended). Member cities may allow exemptions for public recreational facilities parallel to the shoreline (e.g. trails) up to 20 feet in width, with that width being added to the required buffer width.

4.2.6 Wetland Management Policies (with amendments effective Aug 2020)

65. The BCWMC requires member cities to inventory, classify and determine the functions and values of wetlands, either through a comprehensive wetland management plan or as required by the Wetland Conservation Act (WCA).

Member cities shall maintain a database of wetland functions and values assessment results.

The BCWMC encourages member cities to complete comprehensive wetland management plans as part of their local water management plan or as an implementation task identified in their local water management plan. Completed comprehensive wetland management plans shall be submitted to the BCWMC for review and comment.

66. The BCWMC requires member cities to develop and implement wetland protection ordinances that consider the results of wetland functions and values assessments, and are based on comprehensive wetland management plans, if available. For wetlands classified as Preserve or Manage 1 (or comparable classification if BWSR's Minnesota Rapid Assessment Method (MnRAM) is not used), member cities are encouraged to implement standards for bounce, inundation, and runout control that are similar to MnRAM; member cities are encouraged to apply standards for other wetland classifications.
67. The BCWMC recommends that cities use the Minnesota Rapid Assessment Method (MnRAM) (or similar) wetland assessment method and wetland management classification system. Member cities are encouraged to use such a method for all wetland assessment and classification, but are not required to perform reassessments for wetlands already assessed.

68. Member cities shall maintain and enforce buffer requirements for projects containing more than one acre of new or redeveloped impervious area. Average minimum buffer widths are required according to the MnRAM classification (or similar classification system):

- An average of 75 feet and minimum of 50 feet from the edge of wetlands classified as Preserve (or comparable classification if BWSR's MnRAM is not used)
- An average of 50 feet and minimum of 30 feet from the edge of wetlands classified as Manage 1 (or comparable classification if BWSR's MnRAM is not used)
- An average of 25 feet and minimum of 15 feet from the edge of wetlands classified as Manage 2 or 3 (or comparable classification if BWSR's MnRAM is not used).

Allowable land uses and vegetative criteria for buffers are specified in the BCWMC's *Requirements for Development and Redevelopment* (BCWMC, 2015, as amended).

Member cities may allow exemptions for public recreational facilities parallel to the shoreline (e.g. trails) up to 20 feet in width, with that width being added to the required buffer width.

69. The member cities are required to manage wetlands in accordance with the WCA. The BCWMC will assist the member cities with managing wetlands in accordance with the WCA, as requested. The MnDOT is the LGU within its right-of-ways.

70. The BCWMC will serve as the local governmental unit (LGU) responsible for administering the WCA for member cities, as requested (currently Medicine Lake, Robbinsdale, and St. Louis Park).

71. The BCWMC prefers any wetland mitigation to be performed within the same subwatershed as the impacted wetland.

72. The BCWMC requires that member cities annually inspect wetlands classified as Preserve (or comparable classification if BWSR's MnRAM is not used) for terrestrial and emergent aquatic invasive vegetation, such as buckthorn and purple loosestrife, and attempt to control or treat invasive species, where feasible.

73. The BCWMC encourages member cities to pursue wetland restoration projects, as opportunities allow.

74. The BCWMC encourages member cities to participate in wetland monitoring programs (e.g., Wetland Health Evaluation Program).

4.2.7 Public Ditch Policies

75. The BCWMC encourages member cities to petition Hennepin County to transfer authority over public ditches in the BCWMC to the member cities (per MN Statute 383B.61). If authority is transferred to the member cities, the BCWMC and cities will manage these drainages similar to

other BCWMC waterways, in accordance with the BCWMC's latest adopted Plan. Until authority over public ditches is transferred, the BCWMC will continue to recognize Hennepin County's jurisdiction over public ditches in the BCWMC.

- 76. In consideration for the original function of public ditches to provide drainage of agricultural lands, the BCWMC will support the efforts of other entities to pursue legislation abandoning public ditches on land zoned non-agricultural.
- 77. The BCWMC will manage abandoned or transferred public ditches that are part of the trunk system consistent with the policies of this Plan. Member cities will be responsible for management of abandoned or transferred public ditches that are not on the trunk system, but are currently part of their municipal drainage system.

4.2.8 Recreation, Habitat, and Shoreland Management Policies

- 78. The BCWMC will consider developing and implementing a shoreland habitat monitoring program for its Priority 1 lakes to monitor biological and physical indicators and to recommend management actions (to cities or for the Commission's consideration) based upon monitoring results. If implemented, monitoring may include assessment of upland and aquatic vegetation, buffer zones, erosion, sedimentation, and the presence of non-native invasive species.
- 79. The BCWMC will support and collaborate with other entities (e.g., agencies, lake association, cities, counties) to manage and prevent the spread of aquatic invasive species; BCWMC services may include point-intercept surveys of aquatic vegetation, feasibility studies, technical analysis, education, exploring funding options, and applying for grants. The BCWMC will not manage increased growths of native aquatic vegetation resulting from improved water quality.
- 80. The member cities are responsible for shoreland regulation and are required to adopt MDNR-approved shoreland ordinances, in accordance with the MDNR's priority phasing list.
- 81. The BCWMC will promote the protection of natural and native shoreland areas, including the preservation of lakeshore and streambank vegetation during and after construction projects, and the establishment and maintenance of buffers adjacent to priority waterbodies. The BCWMC will seek opportunities to restore disturbed shorelines and streambanks to their natural state where feasible.
- 82. The BCWMC encourages cities to develop and maintain water-related recreational features (such as trails adjacent to waterbodies and water access points), with consideration for buffers, use of pervious surfaces, and other best management practices to reduce runoff.
- 83. The BCWMC will take into account aesthetics, habitat, and recreation benefits during CIP project selection and prioritization, and when considering how a project might address multiple Commission goals (see policy 110).

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84. The BCWMC will encourage public and private landowners to maintain, preserve or restore open space and native habitats such as wetlands, uplands, forests, shoreland, streambanks, and prairies for the benefit of wildlife through education and by providing information on grant programs.
 85. Member cities shall consider opportunities to maintain, enhance, or provide new open spaces and/or habitat as part of wetland creation or restoration, stormwater facility construction, development, redevelopment, or other appropriate projects.
 86. The BCWMC will cooperate with the MDNR and other entities, as requested, to protect rare and endangered species under the State's Endangered Species Statute. The BCWMC will review the Natural Heritage Information System during the design phase of Commission projects.
 87. The BCWMC will submit data, as available, and encourages others to submit data regarding occurrences of rare and endangered species and native plant communities to the State's Natural Heritage Information System.
 88. The BCWMC will consider implementing a grant or cost-share program to fund the establishment of buffers adjacent to priority waterbodies.
 89. Member cities shall adopt State buffer and/or shoreland management requirements for public waters in incorporated areas, if and when they are promulgated.

4.2.9 Education and Outreach Policies

90. The BCWMC will develop an education and outreach plan (see Appendix B). The education and outreach plan will identify key messages about watershed management and guidance for distributing that information to specific stakeholder audiences using various, targeted methods. The BCWMC will regularly review its education and public involvement plan and update it, as necessary.
91. The BCWMC will develop and maintain standard BCWMC messaging items to increase awareness of the BCWMC and its role.
92. The BCWMC will evaluate the success of its education and public involvement plan.
93. The BCWMC will recruit volunteers to conduct monitoring and participate in activities sponsored or promoted by the BCWMC and will provide training as needed (e.g., Citizen Assisted Monitoring Program, River Watch, adopt-a-stream, adopt-a-wetland programs).
94. The BCWMC will support cooperative educational and volunteer programs, such as the West Metro Water Alliance, Blue Thumb, River Watch, Metro Blooms, Metro Watershed Partners, Citizen Assisted Monitoring Program, Wetland Health Evaluation Program, etc.
95. The BCWMC will develop and implement a recognition program (certificates, letters of appreciation, events, thank you ads, etc.) for BCWMC volunteers.

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96. The BCWMC will update and maintain its website and use it to communicate with and provide information to the public.
 97. The BCWMC will seek opportunities to incorporate education and public involvement efforts into all of its proposed projects.
 98. The BCWMC will seek opportunities to use a citizen advisory committee to complete tasks meaningful to the Commission.
 99. The BCWMC will distribute BCWMC meeting notices and agendas to city officials and key staff. The meeting notice and/or agenda will include a description of the key discussion item(s).
 100. The BCWMC will post informational signs at BCWMC projects during construction.

The BCWMC will consider installing permanent informational signs at BCWMC watershed projects, major BCWMC waterbodies, monitoring sites, demonstration projects, adopt-a-stream/wetland sites, etc.

The BCWMC will work with cities and other road authorities to install stream identification signs along roads at stream crossings.
 101. The BCWMC will regularly hold watershed tours for the Commission and the public.
 102. The BCWMC will tailor its communications and educational strategies to present complex and/or technical issues in a manner that is appropriate for the audience.

4.2.10 Administration Policies

103. The BCWMC will fund 100 percent of eligible project costs for those projects listed in the 10-year CIP (Table 5-3). Eligible project costs are listed in Table 5-1. The Commission will determine eligibility of project costs following the completion of a feasibility study for the project. The projects will be funded in accordance with the BCWMC joint powers agreement and (specifically) Minnesota Statutes 103B.251. The BCWMC will follow the process for ordering projects as outlined in its joint powers agreement and summarized in Section 5.2.1.1.
104. The Commission will review projects that trigger BCWMC review. The types of projects that must be submitted to the BCWMC for review, the BCWMC's review procedure, submittal requirements, guidelines, design criteria, etc. are provided in the BCWMC's document *Requirements for Improvements and Development Proposals* (BCWMC, 2015, as revised).
105. At the request of the member cities, the BCWMC will review projects that would not otherwise trigger review per the BCWMC's *Requirements for Improvements and Development Proposals* (BCWMC, 2015, as revised).

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106. The BCWMC will review local water management plans for compliance with this Plan's goals and policies.
 107. The BCWMC will annually evaluate member cities' compliance with the goals and policies of this Plan (see Section 5.1.1.6). The BCWMC will take appropriate administrative or legal action in response to non-compliance.
 108. The BCWMC will review applications for MDNR Work in Public Waters Permits.
 109. The BCWMC will annually review and update its 10-year CIP. The BCWMC will re-evaluate new or proposed additions to the CIP annually or as new data or opportunities develop, with consideration for the criteria outlined in policy 110.
 110. The BCWMC will consider including projects in the CIP that meet one or more of the following "gatekeeper" criteria.
 - Project is part of the BCWMC trunk system (see Section 2.8.1, Figure 2-14 and Figure 2-15)
 - Project improves or protects water quality in a priority waterbody
 - Project addresses an approved TMDL or watershed restoration and protection strategy (WRAPS)
 - Project addresses flooding concern

The BCWMC will use the following criteria, in addition to those listed above, to aid in the prioritization of projects:

- Project protects or restores previous Commission investments in infrastructure
- Project addresses intercommunity drainage issues
- Project addresses erosion and sedimentation issues
- Project will address multiple Commission goals (e.g., water quality, runoff volume, aesthetics, wildlife habitat, recreation, etc.)
- Subwatershed draining to project includes more than one community
- Addresses significant infrastructure or property damage concerns

The BCWMC will place a higher priority on projects that incorporate multiple benefits, and will seek opportunities to incorporate multiple benefits into BCWMC projects, as opportunities allow.

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111. The BCWMC defines the trunk system as the collection of waterbodies and natural or constructed conveyances listed in Table 2-9 of this Plan.
 112. The BCWMC may review proposed changes to member city development regulations (e.g., zoning and subdivision ordinances) at its discretion or the request of the member cities.
 113. Member cities must inform the BCWMC regarding updates to city ordinances or comprehensive plans that will affect stormwater management. Stormwater management elements of the member cities' comprehensive plans must conform to the BCWMC Plan.
 114. The BCWMC will annually assess its progress towards the goals presented in this plan, using quantitative metrics where appropriate. The BCMWC will provide this analysis, or a summary, to BWSR, as part of its annual reporting.
 115. The BCWMC will work with member cities to assess the financial impact of regulatory controls and identify areas where the BCWMC may assist member cities in meeting the requirements of their MS4 permits.
 116. The BCWMC will periodically review its capital improvement program (CIP) process and revise the process, as necessary.
 117. The BCWMC will assist in calculating or calculate when necessary, the apportionment of costs between adjoining communities for water resource projects with intercommunity participation.
 118. The BCWMC will assist member cities in resolving watershed management disputes, as requested. The BCWMC will follow the dispute resolution procedure described in Section 5.1.1.5 of this Plan.
 119. The BCWMC will maintain a Technical Advisory Committee (TAC) to promote communication and cooperation between the BCWMC and member cities. Member cities shall appoint a technical advisor to the TAC and encourage the technical advisor to attend BCMWC meetings.
 120. The BCWMC will continue to rely on member cities to implement the BCWMC's policies at the time of development and redevelopment. Member cities shall inform developers and other project applicants regarding BCWMC requirements.
 121. The BCWMC will continue to rely on member cities to issue permits. Member cities shall permit only those projects that conform to the policies and standards of the BCWMC. The BCWMC will review proposed projects after the member city has provided preliminary approval (indicating compliance with the member city's local water management plan) and submitted a signed BCWMC application form to the BCWMC. Member cities shall not issue construction permits, or other approvals, until the BCWMC has approved the project.

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122. For CIP projects that have been ordered by the Commission, the BCWMC requires member cities to acquire and maintain easements, right-of-way, or interest in land necessary to implement and maintain projects upon order of the BCWMC (the cost of land acquisition may be eligible for Commission reimbursement, see Table 5-1).

BCMWC 2015 Watershed Management Plan

Section 5 – Implementation

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5.0 Implementation

This section describes the responsibilities of the Bassett Creek Watershed Management Commission (BCWMC) and the responsibilities the BCWMC has delegated to its member cities. Many agencies have jurisdiction within the BCWMC; the roles and responsibilities of those agencies relevant to the management of water resources are also discussed in this section. This section presents the BCWMC implementation program, including its capital improvement program (CIP) and other implementation responsibilities (e.g., BCWMC Flood Control Project system maintenance, local water management plan review, etc.).

5.1 Responsibilities

5.1.1 BCWMC Responsibilities

The BCWMC serves many water resource management roles, as listed in Minnesota Statutes 103B and summarized in Section 1. While the BCWMC is the entity ultimately responsible for fulfilling the duties of Minnesota Statutes 103B, the BCWMC seeks to collaborate with its member cities, community groups, and others to achieve its goals. The BCWMC will work closely with its nine member cities to assign responsibility for water resource issues to most efficiently and effectively use the cities' and the Commission's planning and implementation resources. In an effort to achieve its goals through enhanced collaboration, the BCWMC will continue to:

- Partner with member cities in the management of surface and groundwater resources for the benefit of residents, businesses, and other stakeholders within the watershed and region.
- Work with residents, citizen advisory groups, and member cities to establish goals and identify, prioritize, and implement initiatives that will preserve and improve water resources within the watershed.
- Collect, develop, and distribute information regarding surface water and groundwater resources in the watershed to assist member cities in the preparation of local plans for the management of water resources and to educate residents, businesses and others about their collective impact on water resources.

The BCWMC has many specific responsibilities, as identified in policies (see Section 4) and as described in the following sections. Major responsibilities of the BCWMC include:

- Review of improvements and developments
- Management of the BCWMC Flood Control Project (see Table 2-8 and Figure 2-14) and Trunk System (see Table 2-9 and Figure 2-15)
- Implementation of the BCWMC capital improvement program (CIP)
- Intercommunity planning and design review and assistance

- Dispute resolution
- Reporting and evaluation
- Monitoring
- Total Maximum Daily Load (TMDL) implementation

5.1.1.1 Review of Improvements and Developments

Cooperation between the BCWMC, the member cities, and concerned stakeholders is critical to effectively facilitate the management of the watershed's water resources. The BCWMC does not have a permit program. The BCWMC Plan and the BCWMC *Requirements for Improvements and Development Proposals* (as amended) (Requirements document) establish goals, standards, and requirements that the member cities must incorporate into their official controls (e.g., ordinances). The BCWMC relies on its member cities to review improvement (e.g., redevelopment projects) and development proposals for compliance with BCWMC requirements, when applicable, and to issue permits only after compliance has been determined.

Member cities must inform the BCWMC of improvements or land development proposals that trigger review per the BCWMC Requirements document (see Appendix H). Consistent with BCWMC policies (see Section 4) and the joint powers agreement (see Appendix G), the BCWMC will review projects meeting specific triggers for compliance with BCWMC requirements as described in this Plan and in the BCWMC Requirements document. The BCWMC will provide information and assistance in the preliminary planning stages of these improvements or land development proposals at the request of member cities or project proposers; however, because of the large number of developments requiring review, a review procedure is necessary. Prior to BCWMC conducting its formal review, city staff completes their review and establishes that the improvement or development proposal conforms to their local municipal ordinances and regulations. The BCWMC will then review the proposal and submit their comments and recommendations to the city and other appropriate governmental agencies prior to the city or other governmental agency giving their final approval or disapproval, or the granting of any required permits.

The BCWMC established criteria (or "triggers") for the types of projects that require BCWMC review (e.g., projects located in floodplains, projects disturbing greater than 10,000 square feet). Projects generating more than one acre of new or redeveloped impervious area must also meet the Minnesota Pollution Control Agency's (MPCA) Minimal Impact Design Standards (MIDS) water quality performance standard or Flexible Treatment Option (FTO) process, which is adopted by the BCWMC. The BCWMC's review procedure, submittal requirements, guidelines, design criteria, and other relevant information are provided in the BCWMC's *Requirements for Improvements and Development Proposals* (as amended) (see Appendix H). The Requirements document was updated to incorporate the policies and requirements established in this Plan. For projects located in member cities that have adopted the MIDS performance standard, the member city shall review the project for compliance with the MIDS water quality performance standards.

The BCWMC also reviews applications to the Minnesota Department of Natural Resources (MDNR) for public waters work permits.

5.1.1.2 Implementation of the BCWMC Capital Improvement Program

The BCWMC is responsible for managing its capital improvement program (CIP), which includes the development and implementation of capital projects to address water quality, flooding, and other issues within the watershed. The CIP is presented in Table 5-3. The processes the BCWMC uses to manage the CIP are described in Section 5.2.1.1.

5.1.1.3 Management of the BCWMC Trunk System and Flood Control Project

The BCWMC is responsible for managing the trunk system, which is defined as the watercourses and waterbodies listed in Table 2-9 and shown in Figure 2-14 and Figure 2-15. The BCWMC requires that all modifications to the trunk system be made in accordance with the joint powers agreement (JPA) (see Appendix G) and to the applicable requirements and procedures included in this Plan.

The BCWMC and member cities are jointly responsible for the BCWMC Flood Control Project. The Flood Control Project is defined as the structures and storage areas shown in Figure 2-14 and listed in Table 2-8. The BCWMC annually inspects the Flood Control Project, including water level control and conveyance structures, as part of its annual programs (see Table 5-4). The BCWMC maintains funds for emergency repairs and major repair/maintenance of the BCWMC Flood Control Project, including:

- Flood Control Emergency Repair Fund (fund amount currently maintained at up to \$500,000)
- Flood Control Project Long-term Maintenance Fund (fund amount currently maintained at up to \$1,000,000)

The BCWMC will finance major maintenance and repair of water level control and conveyance structures that were part of the original BCWMC Flood Control Project on the same basis as the original project. New road crossings of the creek that were installed as part of the project will be maintained by the city where the structure is located. Member cities are responsible for routine maintenance and repair of BCWMC Flood Control Project structures located within each city; this includes the removal of debris, brush, and trees. The BCWMC will work with member cities to determine responsibilities for major rehabilitation and replacement of the BCWMC Flood Control Project features and establish the associated funding mechanisms (see policy 22, Section 4.2.2).

The BCWMC may construct and fund modifications to existing BCWMC Flood Control Project structures and new features that increase the benefits provided by the Flood Control Project system. The BCWMC requires that all modifications to the Flood Control Project be performed according to provisions of the JPA and requirements described in this Plan.

For all proposed modifications to the BCWMC Flood Control Project system or the trunk system, including existing control structures, structures along the trunk system, and structures between storage sites, the following are applicable:

- All proposed changes must be submitted to the BCWMC for review and approval.
- The location and design of the control structure, including all proposed culverts or other controls, shall also be subject to BCWMC approval.
- The effect of the 100-year storm on the control structure, the trunk system and the storage site must be assessed by the project proposer to ensure that the design does not result in the improper operation of flood storage areas (see Figure 2-14).
- If required, the BCWMC shall modify the Flood Control Project, and the cost of the required modifications will be assessed against the municipality necessitating the modification.
- The BCWMC will not approve changes to the BCWMC Flood Control Project system that would result in effects to the Flood Control Project system components that cannot be resolved.

A joint and cooperative agreement (JCA, see Appendix I) between the BCWMC, Mississippi Watershed Management Organization (Mississippi WMO), and the City of Minneapolis defines additional management obligations for the old tunnel and new tunnel, both of which are part of the BCWMC Flood Control Project. Section 5.1 of the JCA requires the City of Minneapolis to maintain 50 cfs capacity in the old tunnel during the 100-year storm event to accommodate the overflow of stormwater that cannot be accommodated in the new tunnel. Section 6 of the JCA includes obligations relating to the new tunnel, which require BCWMC approval prior to increasing the drainage area tributary to the new tunnel, adding connections or outlets to the new tunnel, and altering the runoff to the new tunnel for the 10-, 50-, or 100-year rainfall event (see Appendix I) .

5.1.1.4 Intercommunity Planning and Design

The BCWMC relies on the member cities for primary management of runoff and water management issues. The BCWMC will provide leadership and assist member cities with intercommunity water management issues (e.g., stormwater runoff planning and design), or at the request of the member cities. To this end, the BCWMC will:

- Review city local water management plans for consistency with BCWMC goals and intercommunity consistency.
- Assist in calculating or calculate, when necessary, the apportionment of costs between adjoining cities for water resource projects with intercommunity participation. This role applies to both water quantity and water quality issues.

5.1.1.5 Dispute Resolution

If watershed management disputes should arise between the BCWMC member cities, these disputes may be referred to the BCWMC for resolution. Although the BCWMC's joint powers agreement does not specifically give the BCWMC the power to decide such disputes, the BCWMC will hear the disputes and endeavor to reach a mutually agreeable solution whenever possible. Under the joint powers agreement,

the BCWMC's findings and recommendations are not binding unless the parties to the dispute wish to make a prior agreement to that effect. The BCWMC has established the following policies regarding the procedures for the hearing of such disputes:

1. The BCWMC will mediate inter-community disputes relating to watershed management problems within the Bassett Creek watershed.
2. Disputes will be referred to a committee of three BCWMC members or alternate members from member communities who are not parties to the dispute. Members will be appointed by the BCWMC chair or vice-chair, which will also appoint one of the three members as the chair of the committee.
3. The committee chair will call a meeting where each party to the dispute will be allowed to present its suggestions to resolve the dispute.
4. The committee may consult with the members of the BCWMC staff and TAC and will prepare findings and recommendations to resolve the dispute.
5. The committee's recommendation will be presented to the full BCWMC, which may accept, reject, or amend the recommendation before forwarding the findings and recommendations to the parties of the dispute.

Disputes between a member city and the BCWMC regarding the allocation of project costs shall be resolved using the procedure describe in Section VII, Subd. 6 of the JPA (see Appendix G).

5.1.1.6 Reporting and Evaluation

The BCWMC is responsible for evaluating its progress in achieving its goals and reporting annually to the Board of Water and Soil Resources (BWSR), per Minnesota Rules 8410.0150. Within the first 120 days of the calendar year, the BCWMC must submit to BWSR an activity report for the previous calendar year; the BCWMC also posts this report to its website. The BCWMC must submit an audit report for the previous fiscal year within 180 days of the end of the BCWMC fiscal year. The required contents of the annual activity report are specified in Minnesota Rules 8410. Generally, the BCWMC's annual report includes:

- An assessment of the previous year's annual work plan that indicates whether the stated activities were completed, including the expenditures of each activity with respect to the approved budget (unless included in the audit report)
- A work plan and budget for the current year specifying which activities will be undertaken
- At a minimum of every two years, an evaluation of progress on goals and the implementation actions, including the capital improvement program, to determine if amendments to the implementation actions are necessary
- A summary of significant trends of monitoring data

The BCWMC will annually review member city compliance with the goals, policies, and requirements established in the BCWMC Plan. This action may include:

- Evaluation of the status of local water plan adoption and local implementation of activities required by the watershed management organization
- Review of member city ordinance revisions addressing management of water resources (e.g., wetlands, erosion and sediment control), including their enforcement
- A review and summary of member city permits and variances issued or denied and violations under rule or ordinance requirements of the organization or local water plan
- Review of member city annual MS4 reports
- Self-reporting by member cities using criteria or checklist established by the BCWMC

The annual review process provides an opportunity for the BCWMC to assess the effectiveness of its goals and policies. If the BCWMC determines that programmatic changes are necessary, the BCWMC may amend the Plan to reflect the needed changes and/or adopt new rules or policies that require the cities to effect the needed changes via city regulatory controls. If annual review of member city practices reveals implementation inconsistent with the BCWMC Plan, the BCWMC will take administrative or legal action to ensure that BCWMC rules and policies are being implemented by the member cities.

The BCWMC will continue to maintain its website, as required by Minnesota Statute 8410.0150. The website will contain the location, time, agenda, and minutes for organization meetings; contact information for the organization staff; the current watershed management plan; annual activity reports; rules and requirements; a list of the BCWMC Commissioners, Alternate Commissioners, and designated officers; and a list of employees including postal and electronic mailing addresses and telephone numbers. Additional content may be made available at the BCWMC website in accordance with the BCWMC Education and Public Outreach Plan (see Appendix B). The website will be kept current on a monthly basis or more frequently.

The BCWMC website is located at: www.bassettcreekwmo.org

5.1.1.7 Monitoring

The BCWMC will continue to monitor water quantity and water quality of waterbodies within the BCWMC, focusing on priority waterbodies (see Section 2.7.2.2). The BCWMC will coordinate its monitoring efforts with other programs (see policy 11, Section 4.2.1). Water quantity monitoring efforts may include flow monitoring of the Main Stem of Bassett Creek and water level monitoring in several lakes. Water quality monitoring may include detailed water chemistry performed at regular intervals, zooplankton and phytoplankton sampling in lakes, aquatic plant monitoring of lakes, and invertebrate monitoring in streams. Water quality and quantity monitoring programs are described in Section 2.7.1 and Section 2.8.5 of the Plan, respectively, and in the BCWMC Monitoring Plan (see Appendix A).

5.1.1.8 Total Maximum Daily Load (TMDL) Implementation

There are several waterbodies located within the BCWMC that are listed in the MPCA's impaired waters 303(d) list. To address impaired waters and protect designated uses, the MPCA utilizes total maximum daily load (TMDL) analyses (see Section 3.1). The BCWMC has participated in TMDL studies for Wirth Lake, Medicine Lake, and Sweeney Lake. In each case, the BCWMC cooperated with the MPCA in the development of TMDL reports. For the Medicine Lake TMDL, the BCWMC is the "convener" of a categorical waste load allocation (WLA) shared by the member cities. As the convener, the BCWMC cooperates with the member cities to identify and implement water quality improvements to achieve the desired reduction in pollutant loading, and helps cities report progress towards the WLA to the MPCA annually. For the Wirth Lake TMDL, the BCWMC assumed the initial lead role in implementing the actions recommended in the TMDL implementation plan (the Wirth Lake outlet project). For the Sweeney Lake TMDL, the implementation strategy in the report calls for the BCWMC to take a lead role in implementation efforts for the categorical wasteload allocations and the (internal) load reductions, and in working directly with member cities to identify funding sources and to prioritize projects and other efforts.

The BCWMC will continue to participate in future TMDL studies and may assume a lead role in carrying out the resulting TMDL implementation plans, if appropriate.

5.1.2 Member City Responsibilities

The success of the BCWMC is dependent upon its leadership and the cooperation of the nine member cities. The BCWMC relies on the member cities to perform many roles, as specified in the BCWMC's administrative policies (see Section 4.2.10), the JPA, or BCWMC actions. Generally, these roles and responsibilities include:

1. **Commissioner and Alternate Commissioner appointment:** Each member city is entitled to appoint one commissioner and one alternate commissioner to the BCWMC. See Section 1.4 for information about commissioner appointments and terms.
2. **Technical Advisory Committee (TAC):** The BCWMC amended its bylaws in July 2001 to allow each member city to appoint a technical advisor to the BCWMC. The TAC helped maintain continuity as the BCWMC transitioned to citizen leadership, and continues to provide an important opportunity for communication between the member cities and the BCWMC. The technical advisors are welcome to ask questions and express opinions at Commission meetings, but are not allowed to vote. It is the responsibility of each member city to appoint a technical advisor and encourage the technical advisor to attend the BCWMC and TAC meetings (see policy 119, Section 4.2.10). The TAC meets regularly to discuss and provide recommendations on topics and issues assigned by the Commissioners.
3. **Project Review & Permitting:** Each member city is responsible for incorporating the BCWMC's requirements into its official controls and implementing BCWMC policies at the time of development and redevelopment. Member cities shall inform developers and other project applicants that BCWMC review of their project may be required and will direct applicants to the

BCWMC, the Requirements Document, and more information online at <http://www.bassettcreekwmo.org>. BCWMC staff will ensure that developers and project applicants have first contacted appropriate city staff before reviewing or discussing details of the proposed project.

Member cities shall permit only those projects that conform to the policies and standards of the BCWMC. The BCWMC will review developer's submittals and other proposed projects only after the applicant demonstrates that the project has received preliminary approval from the member city, indicating compliance with the city's local water management plan. Once the proposed project has received preliminary approval from the city, the BCWMC Application Form shall be signed by city staff and submitted to the BCWMC for its review. The signed application form authorizes the BCWMC or its staff to commence its review. Following BCWMC review, the BCWMC or its staff will send a letter of approval or disapproval to each member city, stating that the proposed project meets the requirements of the BCWMC Plan or stating how the proposed project does not meet BCWMC requirements. Member cities shall not issue construction permits, or other approvals, until the BCWMC has approved the project (see policy 121, Section 4.2.10).

4. **Local Water Management Plan:** Each member city is required to prepare a local water management plan that conforms with the BCWMC Plan. The BCWMC is required to review and approve each local water management plan. See Section 5.3.1 for more information about local water management planning and requirements.
5. **Official Controls (Ordinances):** Each member city is required to update its ordinances (or other official controls) to conform to and implement the requirements of the BCWMC and the policies presented in this Plan (see Section 4). Affected ordinances/controls may include erosion and sediment control, wetland management, floodplain/zoning, stormwater management, and others.
6. **Capital Improvement Projects:** Member cities implement the capital improvement projects listed in Table 5-3, upon order by the BCWMC (see policy 4, Section 4.2.1).
7. **Land Acquisition:** Member cities acquire the necessary easements or right-of-way or interest in land upon order of the BCWMC (see policy 122, Section 4.2.10). The cost of land acquisition may be eligible for BCWMC reimbursement according to Table 5-1).
8. **Finances:** Each member city is required to contribute annually to the BCWMC general fund (see Section 5.2.2.1).

5.1.3 Agency Responsibilities

Various units of government are involved in regulating water resource related activities and have jurisdiction overlapping that of the BCWMC. The roles of these agencies are described in this section and summarized in Table 5-2.

5.1.3.1 Minnesota Department of Natural Resources (MDNR)

The MDNR Division of Ecological and Water Resources manages water resources through a variety of programs related to lakes, rivers and streams, watersheds, wetlands, groundwater, and climate. The MDNR administers the Public Waters Work Permit Program, the Water Use (Appropriation) Permit Program, and the Dam Safety Permit Program. MDNR Fisheries administers the Aquatic Plant Management Program and other fishery related permits. The MDNR is involved in enforcement of the Wetland Conservation Act (WCA) and is responsible for identifying, protecting and managing calcareous fens. The MDNR also has model shoreland ordinances that cities and counties can adopt.

Public Waters

The MDNR's Public Waters Work Permit Program (Minnesota Statutes 103G) requires an MDNR permit for any work below the Ordinary High Water Level (OHWL) or any work that will alter or diminish the course, current, or cross-section of any public water or public waters wetland, including lakes, wetlands, and streams. For lakes and wetlands, the MDNR's jurisdiction extends to designated U.S. Fish and Wildlife Service Circular #39 Types 3, 4, and 5 wetlands which are 10 acres or more in size in unincorporated areas, or 2.5 acres or more in size in incorporated areas. The program prohibits most filling of public waters and public waters wetlands for the purpose of creating upland areas. The Public Waters Work Permit program was amended in 2000 to minimize overlapping jurisdiction with the WCA. Under certain conditions, work can be performed below the OHW level without a Public Waters Work Permit. Examples include docks, watercraft lifts, beach sand blankets, ice ridge removal/grading, riprap, and shoreline restoration. The MDNR public waters in the BCWMC are shown in Figure 2-9.

Water Appropriations and Transport

The MDNR regulates surface water and groundwater usage rate and volume as part of its charge to conserve and use the waters of the state. For example, suppliers of domestic water to more than 25 people or applicants proposing a use that exceeds 10,000 gallons per day or 1,000,000 gallons per year from surface water or groundwater sources must obtain a Water Appropriation Permit from the MDNR. Appropriation Permits from the MDNR are not required for domestic uses serving less than 25 persons for general residential purposes. An additional permit is required to appropriate or transport water from waters designated as infested with invasive species, regardless of the volume appropriated or transported.

Groundwater

In addition to regulating appropriations from groundwater, the MDNR is also responsible for mapping sensitive groundwater areas, conducting groundwater investigations, addressing well-interference problems, and maintaining the observation well network.

Dam Safety

The MDNR administers the state's Dam Safety Program (MN Rules 6115.0300 – 6115.0520), which applies to all impoundments that pose a potential threat to public safety or property. Dams 6 feet or lower in height and dams that impound 15 acre-feet or less of water are exempt from the rules. Dams less than 25

feet high that impound less than 50 acre-feet of water are also exempt, unless there is a potential for loss of life. The dam safety rules require that the downstream impacts of a dam failure be analyzed under high-flow conditions (i.e., greater than a 100-year flood).

Other Regulations

In addition to permit programs, the MDNR oversees the Floodplain Management Program, the Public Waters Inventory Program, the Shoreland Management Program, the Flood Damage Reduction Grant Program, the Wild and Scenic Rivers Program, various surface and groundwater monitoring programs, and the Climatology Program.

Questions concerning the MDNR's role in water resource management should be directed to the MDNR Division of Ecology and Water Resources, Metro Region, 1200 Warner Road, St. Paul, MN 55106 (651-259-5774). More information is available at the MDNR website: <http://www.dnr.state.mn.us>

5.1.3.2 Minnesota Board of Water and Soil Resources (BWSR)

BWSR oversees the state's watershed management organizations (both joint powers and watershed district organizations), oversees the state's Soil and Water Conservation Districts, and administers the rules for the WCA and metropolitan area watershed management. BWSR also administers the Clean Water Fund (CWF) grant program, funded by the Clean Water Land and Legacy amendment passed in 2008. The purpose of the CWF is to protect, enhance, and restore water quality in lakes, rivers, and streams and to protect groundwater and drinking water sources from degradation. Applicants eligible for CWF grants include counties, watershed districts, watershed management organizations, soil and water conservation districts, and cities working under a current BWSR-approved and locally adopted local water management plan.

Questions concerning BWSR's role in water resource management should be directed to the Minnesota Board of Water and Soil Resources, 520 Lafayette Road North, St. Paul, MN 55107 (651-296-3767). More information is available at the BWSR website: <http://www.bwsr.state.mn.us>

5.1.3.3 Minnesota Pollution Control Agency (MPCA)

The MPCA administers the State Discharge System/National Pollutant Discharge Elimination System (NPDES) Permit program (point source discharges of wastewater), the NPDES General Stormwater Permit for Construction Activity, the NPDES General Industrial Stormwater Permit Program, the NPDES Storm Water Permit Program, and the individual sewage treatment system regulations (7080 Rules). The MPCA also reports the state's "impaired waters" to the U.S. Environmental Protection Agency. Spills should be reported directly to the MPCA.

The MPCA administers and enforces laws relating to pollution of the state's waters, including groundwater. The MPCA monitors ambient groundwater quality and administers subsurface sewage treatment system (SSTS) design and maintenance standards. The MPCA is responsible for administering the programs regulating construction and reconstruction of SSTS. The MPCA requires an inspection

program for SSTS that meets MPCA standards. Minnesota Rules 7080 govern administration and enforcement of new and existing SSTS. The Tanks and Spills Section of the MPCA regulates the use, registration, and site cleanup of underground and above-ground storage tanks.

The MPCA resumed selective administration of the Section 401 of the Clean Waters Act – Water Quality Certification Program in 2007. The program is primarily administered by the U.S. Army Corps of Engineers (USACE). Section 401 Certification is required to obtain a federal permit for any activity that will result in a discharge to navigable waters of the United States. Formal applications for 401 Certification must be sent to the MPCA.

Municipal Separate Storm Sewer System (MS4) Permitting

The federal Clean Water Act (CWA) established the National Pollutant Discharge Elimination System (NPDES) to regulate point sources of pollution, with the MPCA as the delegated permitting authority. This program was later expanded to include both point and non-point sources of pollution, including the regulation of stormwater runoff, and created a two-phase comprehensive national program to address stormwater runoff. Phase I of the program was implemented in 1990 and covered two general categories of stormwater discharge including 11 categories of industrial activities (including construction) and Municipal Separate Storm Sewer Systems (MS4s) serving populations of 100,000 or more. A few years later, Phase II of the program was implemented. Phase II was a broader program that included smaller construction sites, municipally owned or operated industrial activities, and many more municipalities (MS4s).

In 2013, the MPCA reissued the MS4 General Permit, which replaced the Phase II permit. The permit focus shifts from permit program development to increasing emphasis on measured progress and beginning some of the implementation measures. Some of the requirements of the reissued MS4 permit include:

- More stringent construction related erosion control
- Post-construction controls to reduce volume, total phosphorus, and total suspended solids
- Documented enforcement response procedures
- Submittal of additional information on all stormwater ponds and outfalls
- Inventories of municipal facilities that could contribute pollutants to stormwater discharges

All of the member cities within the BCWMC are required to maintain an MS4 permit from the MPCA. As part of the permit program, each member city must annually submit an MS4 report to the MPCA. The numerous and expanded requirements of the MPCA's MS4 permit present opportunities for the BCWMC to cooperate with member cities to prevent redundancy in implementing or reporting on activities related to water quality.

More information about the MPCA's stormwater program can be found at the MPCA's website:

<http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/index.html>

Impaired waters and Total Maximum Daily Loads (TMDLs)

In administering the CWA in Minnesota, the MPCA also maintains a list of impaired waters (see Section 2.7.2.1). The CWA requires the development of a total maximum daily load (TMDL) study for impaired waterbodies. A TMDL is a threshold calculation of the amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL establishes the pollutant loading capacity within a waterbody and develops an allocation scheme amongst the various contributors, which include point sources, non-point sources, and natural background levels, as well as a margin of safety. As a part of the allocation scheme a waste load allocation (WLA) is developed to determine allowable pollutant loadings from individual point sources (including loads from storm sewer networks). A load allocation (LA) establishes allowable pollutant loadings from non-point sources and natural background levels in a waterbody.

A watershed restoration and protection strategy (WRAPS) is similar to a TMDL and may examine other waterbodies in the watershed in addition to impaired waterbodies. Both TMDLs and WRAPSs may result in implementation plans to address water quality issues of the affected waterbodies. Approved TMDLs within the BCWMC are listed in Table 2-5 – note that in 2014 the MPCA recommended to the USEPA that Wirth Lake be removed from the list of waters impaired by nutrients. The USEPA is expected to agree with this recommendation.

Future TMDL and/or WRAPS implementation presents an opportunity for the BCWMC to coordinate water quality improvement efforts between the member cities, especially for waterbodies with intercommunity drainage areas. Depending upon its role in future TMDLs, the BCWMC may be responsible for reporting project implementation and TMDL progress to the MPCA as the TMDL implementation authority. Under such an arrangement, efforts may be made to eliminate any redundancies between the BCWMC and member cities in TMDL reporting to the MPCA.

Guidance for Dredged Materials

The MPCA considers material excavated below the OHW level of waterbasins, watercourses, public waters, or public waters wetlands (as defined by Minnesota Statutes 103G.005) to be dredged material. Dredged material is defined as waste and regulated by the MPCA. The MPCA provides guidance for the management of dredged material on its website: <http://www.pca.state.mn.us/index.php/water/water-types-and-programs/wastewater/dredged-materials-management.html>

In 2012, the MPCA developed specific guidelines for the removal of sediment from stormwater ponds. Guidance for the removal of sediment from municipal stormwater ponds differs from guidance for other dredged materials in three primary ways:

1. Permits are not required when performing routine maintenance on stormwater conveyance and collection systems.
2. The MPCA does not need to be notified of sediment removal activities. The MPCA recommends that cities keep records and documentation of sediment removal projects.

3. Best management practices were revised to include guidance from cities that have experience performing sediment removal projects.

Disposal options for sediment dredged from municipal stormwater ponds vary according to the level of contamination present in the excavated material. The document provides guidance for collecting samples and testing sediment, and calculating chemical concentrations relative to soil reference values (SRVs). The number of samples to be collected depends on the surface area of the pond. More detailed information regarding the disposal of sediment from stormwater ponds is available from the MPCA website:

<http://www.pca.state.mn.us/index.php/view-document.html?gid=18075>

Questions concerning MPCA's role in water resource management should be directed to the Minnesota Pollution Control Agency, 520 Lafayette Road, St. Paul, MN 55155-4194 (651-296-6300). More information is available at the MPCA website: <http://www.pca.state.mn.us>

5.1.3.4 Minnesota Department of Health (MDH)

The MDH is the official state agency responsible for addressing all public health matters, including drinking water protection. The MDH administers the Well Management Program, the Wellhead Protection Program, and the Safe Drinking Water Act rules. The MDH also issues fish consumption advisories. The MDH is responsible ensuring safe drinking water sources and limiting public exposure to contaminants. Through implementation of the federal Safe Drinking Water Act, the MDH conducts the Public Water Supply Program, which allows the MDH to monitor groundwater quality and train water supply system operators. The 1996 amendments to the federal Safe Drinking Water Act require the MDH to prepare source water assessments for all of Minnesota's public water systems and to make these assessments available to the public.

Through its Well Management Program, the MDH administers and enforces the Minnesota Water Well Code, which regulates activities such as well abandonment and installation of new wells. The MDH also administers the Wellhead Protection Program, which is aimed at preventing contaminants from entering public water supply wells.

The Wellhead Protection Program rules (Minnesota Rules 4720.5100 to 4720.5590) went into effect in 1997. These rules require all public water suppliers that obtain their water from wells to prepare, enact, and enforce wellhead protection plans (WHPPs, see Section 2.5.3). The MDH prepared a prioritized ranking of all such suppliers in Minnesota. Regardless of the ranking, Minnesota Rules 4720 required all public water suppliers to have initiated wellhead protection measures for the inner wellhead management zone prior to June 1, 2003. All cities within the BCWMC have MDH-approved WHPPs. If a city with an existing WHPP drills a new well and connects it to the distribution system, the WHPP must be amended.

Wellhead protection plans include: delineation of groundwater "capture" areas (wellhead protection areas), delineation of drinking water supply management areas (DWSMA), an assessment of the water supply's susceptibility to contamination from activities on the land surface, management programs such as identification and sealing of abandoned wells, and education/public awareness programs. As part of its

role in wellhead protection, the MDH developed the guidance document “Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas” (MDH 2007, as amended).

Questions concerning the MDH’s role in water resource management should be directed to the Minnesota Department of Health, P.O. Box 64975, St. Paul, MN (651-201-5000). See the Minnesota Department of Health website for more information about these programs:
<http://www.health.state.mn.us/divs/eh/water/index.html>

5.1.3.5 Minnesota Environmental Quality Board (EQB)

The EQB administers the state’s environmental review program, including Environmental Assessment Worksheets (EAW), Environmental Impact Statements (EIS), and Alternative Urban Area-wide Reviews (AUAR). With respect to water resources, the EQB is responsible for developing the state water plan, a state water monitoring plan, biennial water policy and priorities reports, and biennial reports on trends in water quality and availability and research needs. Questions concerning the EQB’s role in water resource management should be directed to the Minnesota Environmental Quality Board, 520 Lafayette Road North, St. Paul, MN 55155 (651-296-9027). More information is available at the EQB website:
<http://www.eqb.state.mn.us>

5.1.3.6 Minnesota State Historic Preservation Offices (SHPO)

Following the National Historic Preservation Act of 1966, Minnesota’s State Historic Preservation Office (SHPO) was established by state statute in 1969. The director of the Minnesota Historical Society serves as State Historic Preservation Officer. The mission of the SHPO is to preserve and promote Minnesota history by identifying, evaluating, registering, and protect Minnesota’s historic and archaeological properties and assisting government agencies in carrying out their historic preservation responsibilities. The SHPO maintains the National Register of Historic Places (NRHP) for the state. This includes several listed or eligible to be listed places within the BCWMC. To ensure the protection of places eligible for listing or listed in the NRHP, SHPO review is required for all state and federally funded projects, and all United States Army Corps of Engineers (USACE) projects.

Questions concerning SHPO’s role in historical resource management should be directed to the Minnesota State Historic Preservation Office, 345 Kellogg Boulevard West, St. Paul, MN 55102-1903 (651-259-3450). More information is available at the SHPO website: <http://www.mnhs.org/shpo/>

5.1.3.7 Minnesota Department of Transportation (MnDOT)

The MnDOT is responsible for major maintenance and reconstruction of storm water infrastructure associated with state highways. In the BCWMC, these locations include Interstate 494, Interstate 394, US Highway 169, Highway 100, and Highway 55.

Questions concerning MnDOT’s role in water resource management should be directed to the Minnesota Department of Transportation, 395 John Ireland Boulevard, St. Paul, MN 55101-1638 (651-296-3000). More information is available at the MnDOT website: <http://www.dot.state.mn.us>

5.1.3.8 U.S. Army Corps of Engineers (USACE)

The USACE administers several regulatory permit programs, including Section 10 of the Rivers and Harbors Act permit program, the Section 404 permit program, and Section 401 Certifications. The USACE updated Section 10 of the Rivers and Harbors Act Permit and the Section 404 Permit in March 2012 to streamline the requirements of the Clean Water Act (CWA). The updated permits provide expedited review of projects that have minimal impact on the aquatic environment. These projects may include linear transportation projects, bank stabilization activities, residential development, commercial and industrial development, aids to navigation, and some maintenance activities. Permit programs are described briefly in this section.

Through Section 10 of the Rivers and Harbors Act, the USACE is responsible for administering this program, which regulates the placement of structures and/or work in, or affecting, navigable waters of the United States.

The Federal Clean Water Act requires that anyone who wants to discharge dredged or fill material into U.S. waters, including wetlands, must first obtain a Section 404 Permit from the USACE. Examples of activities that require a Section 404 Permit include: construction of boat ramps, placement of riprap for erosion protection, placing fill in a wetland, building a wetland, construction of dams or dikes, stream channelization, and stream diversion. When Section 404 Permit applications are submitted to the USACE, the applications are typically posted for the U.S. Fish and Wildlife Service, the U.S. Forest Service, the U.S. EPA, and other federal agencies to review and provide comments. The USACE evaluates permit requests for the potential impact to various functions and values of the wetland.

Section 401 Certification is required to obtain a federal permit for any activity that will result in a discharge to navigable waters of the United States. The program is primarily administered by the USACE along with the MPCA. A Section 401 Water Quality Certification may be granted if the applicant demonstrates that the proposed activity “will not violate Minnesota’s water quality standards or result in adverse long-term or short-term impacts on water quality.” Greater protection is given to a category of waters designated by the MDNR as Outstanding Resource Value Waters (ORVW). The waters in this category have received this designation because of their exceptional value. These waters include such groups as scientific and natural areas, wild, scenic and recreational river segments, and calcareous fens.

Questions concerning the USACE’s role in water resource management should be directed to the U.S. Army Corps of Engineers, St. Paul District, 180 East 5th Street, St. Paul, MN 55101-1678 (651-290-1678). More information is available at the USACE website: <http://www.usace.army.mil/>

5.1.3.9 The Metropolitan Council

The Metropolitan Council provides regional planning and wastewater services (collection and treatment) for the seven county metropolitan area. The Metropolitan Council also operates the Citizen Assisted Monitoring Program (CAMP), which monitors lake water quality, and the Watershed Outlet Monitoring Program (WOMP), which monitors stream flow and water quality (see Section 2.7.1).

Questions concerning the Metropolitan Council's role in water resource management should be directed to the Metropolitan Council, 390 Robert Street North, St. Paul, MN 55101 (651-602-1000). More information is available from the Metropolitan Council's website: <http://www.metrocouncil.org/>

5.2 Implementation Program

5.2.1 Implementation Program Components

Table 5-3 and Table 5-4 are a comprehensive list of the projects, activities, and programs that comprise the BCWMC implementation program. Table 5-3 is the BCWMC's 10-year capital improvement program (10-year CIP). Table 5-4 lists the BCWMC's annual water quality and flood control programs, administrative actions, and education actions (i.e., non-capital projects). Table 5-5 lists the past accomplishments of the BCWMC.

5.2.1.1 Capital Improvement Program and Project Implementation

Table 5-3 lists the capital improvement projects the BCWMC plans to implement over the next 10 years. Many of the capital projects listed in Table 5-3 are water quality improvement projects. The current 10-year CIP is an estimate, and includes projects that may not be completed in the next 10 years.

In addition to Table 5-3, the BCWMC maintains a "working version" of its CIP that covers a 5-year period. As part of the annual BCWMC budgeting process, the BCWMC reviews its working CIP to consider whether new projects should be added to the CIP or whether project implementation dates and funding sources should be changed, as necessitated by changing priorities, funding availability, partnering opportunities, or other factors. New projects suggested by the BCWMC or member cities are sent to the TAC for consideration. The TAC develops a draft working CIP which is reviewed and revised by the BCWMC. Following another round of TAC review, the BCWMC approves the working CIP. In evaluating projects for inclusion in the working CIP, the BCWMC and TAC will consider the criteria identified in Policy 110 (see Section 4.2.10). The BCWMC focuses its resources on projects that primarily address water quality and water quantity (i.e., flooding) issues; additional benefits are considered when identifying and prioritizing projects.

Once a project has been added to the BCWMC's working CIP, the BCWMC goes through a process outlined for capital improvement projects as outlined in the JPA. This process begins with the preparation of a feasibility study, estimating costs (including costs eligible for reimbursement by the BCWMC), and issuing a report on the proposed project. The BCWMC develops a one-page project summary for all projects added to the working CIP (available from the Commission). Project-related costs incurred by member cities and eligible for reimbursements are listed in Table 5-1 (see Policy 122, see Section 4.2.10).

Following receipt of the feasibility report, the BCWMC must hold a public hearing on the proposed project, giving at least 45 days' notice to the clerk of each member city. After the hearing, the BCWMC may order the project by a two-thirds vote of its members. If the BCWMC decides to proceed with a project included in its CIP (Table 5-3) following the feasibility study process and public hearing, the BCWMC will certify a levy to Hennepin County for the cost of the project as determined during the

feasibility study process, and apply for grant funds, if applicable. The BCWMC begins project implementation through an agreement with the member city where the project is located.

Table 5-1 Project Costs Eligible for BCWMC Reimbursement

Project costs eligible for reimbursement from BCWMC:	Other project costs that will be considered for whole or partial reimbursement on a project by project basis*:
Feasibility study costs	Easement acquisition
Pre-project planning, monitoring (e.g., fish surveys, feasibility study review/follow-up)	Property acquisition
Plan amendment costs	Utility relocation
Grant application & administration costs	City improvements associated with the project but not directly tied to the goals of the BCWMC (e.g. trails, pedestrian bridges, signage)
Permitting costs and fees	Contaminated soils/groundwater remediation
Engineering and design costs (plans & specs)	City staff time and expenses (if not requested prior to levy certification)
Construction costs	Wetland mitigation or replacement
Project bidding & advertising fees	Art/aesthetic improvements directly associated with the project
Construction administration & observation costs	
Warranty period monitoring costs – e.g., wetland monitoring, vegetation monitoring, post-construction inspection	
City staff time and expenses (if requested prior to levy certification)	
Other BCWMC administration and engineering time, including tracking CIP project budget, engineering plan review and reviewing reimbursement requests	
Transfer to BCWMC administrative fund for CIP administrative expenses, as designated by the Commission	

*The BCWMC will consider the cost effectiveness of the project including the cost per pound of pollutant removal relative to guidance to be established by the BCWMC (for water quality projects), along with partnerships, grant opportunities, and other factors in determining reimbursement of other project costs.

For projects not currently included in its BWSR-approved CIP (Table 5-3), the BCWMC must initiate a plan amendment to add the project to its CIP (Table 5-3) prior to certifying a levy to Hennepin County. The amendment process is described in Section 5.5 and requires a public hearing. Inclusion of a project in the

BCWMC CIP Table 5-3 allows the BCWMC to certify a levy to Hennepin County for the project, as well as apply for various grant funds. Following adoption of the plan amendment, the BCWMC will proceed with certifying a levy to Hennepin County, and project implementation as described above.

The BCWMC may implement the projects listed in Table 5-3 at a different time than shown in the table (e.g., year 2020 rather than 2018) as circumstances dictate. For example, the availability of grants and partnerships could result in either acceleration or delay of projects. The BCWMC will consider such shifts in the time schedule to also be consistent with the Plan and not require a plan amendment.

5.2.1.2 Programs

Table 5-4 presents the on-going programs implemented by the BCWMC, which generally include:

- Administrative responsibilities
- Monitoring programs
- Flood Control Project activities
- Education programs

Table 5-4 presents the estimated cost for each program over the 10 year life of this Plan. Note that estimated costs for education, monitoring, and other actions may vary according to future revisions to the Education and Outreach Plan (see Appendix B) and the Monitoring Plan (see Appendix A).

5.2.1.3 Annual Reporting

Per Minnesota Statute 103B, the BCWMC reports its accomplishments and progress toward goals in an annual report submitted to the Minnesota Board of Water and Soil Resources (BWSR) and posted on the BCWMC website (see also Section 5.1.1.6).

5.2.2 Financial Considerations

This section provides a brief summary of the funding sources available to the BCWMC, followed by a discussion of the BCWMC proposed method(s) of funding the various items in its implementation program (Table 5-3 and Table 5-4).

5.2.2.1 Funding Mechanisms Available to the BCWMC

Ad Valorem Tax

Minnesota law (Minnesota Statutes 103B.231) requires watershed districts and joint powers WMOs within the metropolitan area to prepare a watershed management plan. The statute requires that a capital improvement program be part of the watershed management plan. Another statute (Minnesota Statute 103B.251) allows WMOs to certify capital improvements to the county for payment, if those improvements are included in the WMO's watershed management plan. The county then issues bonds and levies an ad valorem tax on all taxable property in the WMO (or subwatershed unit of the WMO) to pay for the projects. This process requires sufficient lead time and coordination with the County, as formal County

approval of any amendments to a WMO's plan and associated levy amounts is required. A WMO may also raise funds through direct ad valorem taxation (Minnesota Statutes 103B.241), but only if the WMO is specifically listed as a special taxing district in Minnesota Statutes 275.066. If a WMO is given taxing authority, the WMO may also accumulate funds to finance improvements as an alternative to issuing bonds (Minnesota Statutes 103B.241).

Emergency Projects

Minnesota law allows local units of government or WMOs to declare an emergency and order work to be done without a contract, and without levy limits (Minnesota Statutes 103B.252).

BCWMC General Fund

Through the BCWMC JPA, each member city contributes annually to the BCWMC general fund. The general fund is to be used for administrative purposes and certain operating expenses. Each city's annual contribution is based 50 percent on the assessed valuation of property in the watershed and 50 percent on the ratio of area of each member city within the watershed to the total BCWMC area. The general fund is used to pay for general BCWMC administrative expenses, monitoring program, watershed management plan development, TMDL involvement, special studies, and various projects (e.g., XPSWMM model and P8 model). The general fund may also be used to pay for routine repair and maintenance of facilities. The general fund could also be used to pay for the administrative expenses related to a capital project, such as preparing feasibility reports, conducting hearings, educating the public about the capital projects, etc.

CIP Project Funding – BCWMC Improvement Fund

The BCWMC JPA calls for the establishment of an improvement fund for each improvement project ordered by the BCWMC. In accordance with the current JPA, the BCWMC may use one of the following three methods to apportion project costs to the member cities:

1. Negotiated settlement among the member cities.
2. Use the same basis as the BCWMC general fund (50 percent property value/50 percent watershed area), which can be varied (by a two-thirds vote of the BCWMC) under certain circumstances, and with credits given for land acquisition. Any member city unhappy with the cost allocation may appeal the decision and submit it for arbitration.
3. If the project is certified to the county for payment using Minnesota Statutes 103B.251, the costs will be apportioned according to a levy on all taxable property in the watershed.

Channel Maintenance Fund

The BCWMC maintains a channel maintenance fund. Each year, funding is set aside to help member cities off-set the cost of minor stream maintenance, repair, stabilization, and restoration projects, and portions of larger stream restoration projects. The BCWMC transfers \$25,000 per year from the General Fund to this fund; those monies are part of the member cities' contribution to the BCMWC general fund.

Flood Control Project Long-term Maintenance Fund

The BCWMC maintains a long-term maintenance fund for its Flood Control Project. This fund was originally started with a portion of the funds remaining from the construction of the Flood Control Project. Each year, funding is set aside to help off-set the cost of maintenance of the Flood Control Project. The BCWMC has estimated the long-term replacement cost of the Flood Control Project and will clarify maintenance and replacement responsibilities between the BCWMC and the member cities (see Policy 22, Section 4.2.2). The BCWMC transfers \$25,000 per year from the General Fund to this fund; those monies are part of the member cities contribution to the BCMWC general fund. The BCWMC seeks to maintain the fund balance at (but not exceed) \$1,000,000.

Flood Control Project Emergency Fund

The BCWMC maintains this fund to address emergency repairs to the Flood Control Project. This fund was created using a portion of the remaining funds from the original construction of the Flood Control Project. The BCWMC does not add to this fund on an annual basis.

5.2.2.2 Past and Proposed Funding Mechanisms

In the past, the BCWMC has used the BCWMC general fund for administrative costs, monitoring, education, studies, and select projects. The BCWMC's Bassett Creek Flood Control Project was financed through a combination of state and federal grants and member city contributions (see Section 2.8.1).

The implementation program of this Plan includes both capital (structural) projects and nonstructural activities. The capital projects will be funded in accordance with the joint powers agreement, as described in Section 5.2.2.1. In particular, the BCWMC proposes to finance all of the capital improvement projects listed in Table 5-3 through an ad valorem tax levied by Hennepin County (per Minnesota Statutes 103B.251). The BCWMC will also seek grants, partnerships, etc. to reduce the BCWMC's share of the project costs.

If individual cities wish to fund their share of the project costs using a different funding source than the proposed ad valorem tax levy, Hennepin County would need to establish taxing districts based on city boundaries. The BCWMC will explore this possibility with Hennepin County if requested by member cities. If Hennepin County is willing to set up these separate taxing districts, the BCWMC will allow the cities to use this funding option.

Since the BCWMC proposes to finance the capital projects using Minnesota Statutes 103B.251 (an ad valorem tax levied by Hennepin County), BCWMC and the county will follow the process outlined in the statute. This process includes BCWMC forwarding a copy of the improvement plan to the county board prior to the BCWMC's public hearing on the project.

The nonstructural activities listed in Table 5-4 will be financed through the BCWMC general fund, as described in Section 5.2.2.1. In accordance with the JPA, the BCWMC must adopt a budget before July 1st of each year and decide upon the total amount needed for the general fund. Budget approval requires a

two-thirds vote (six Commissioners). The cities have until August 1st to register any objections to the budget.

5.2.2.3 Member City Funding

Funding mechanisms available to the member cities include:

- City General Funds
- Special Assessments
- Ad Valorem Taxes
- Stormwater Utility
- Development Fees
- Tax Increment Financing
- Hennepin County Grants (e.g., Natural Resource Grants, Environmental Response Fund)

5.2.2.4 State Funding Sources

In addition to stormwater utility fees, taxes, assessments, and the other funding sources discussed above, the cities and/or the BCWMC could obtain funding from various state sources, such as grant and loan programs. The city could use loans for projects instead of city-issued bonds. The following paragraphs list various state-funded sources, grouped according to the state agency that administers the various funding programs.

The **Board of Water and Soil Resources** (BWSR) administers several grant programs, including the Clean Water Fund (CWF) program; cities and WMOs are eligible for CWF grants.

The **Minnesota Pollution Control Agency** (MPCA) administers the Clean Water Partnership (CWP) grant and loan program, USEPA funded Section 319 programs (including a TMDL implementation grant program), the Surface Water Assessment Grant program, Phosphorus Reduction Grant program, and the Clean Water State Revolving Fund program.

The **Minnesota Department of Natural Resources** (MDNR) administers many grant programs that could be appropriate for the cities or WMOs, including the Flood Hazard Mitigation Grant Assistance program, the Parks and Trails Legacy Grant program, trail grants programs, aquatic invasive species prevention grants and other aquatic plant management grant programs, shoreland habitat restoration grant program, and dam safety program. Funding for many of these programs changes after each legislative session.

Other state funding programs include the Legislative-Citizen Commission on Minnesota Resources' (LCCMR) funds for non-urgent demonstration and research projects, the Minnesota Department of

Employment and Economic Development's (DEED) Contaminant Cleanup Development Grant Program, the Minnesota Department of Transportation (MnDOT) State Aid Funds, and ISTEA funds.

5.2.2.5 Federal Funding Sources

The BCWMC and member cities may also receive funding from various federal sources, a few of which are discussed in the following paragraphs.

The **U.S. Environmental Protection Agency** (USEPA) has discretionary funds available through each division and program area of the USEPA and administers the Clean Lakes Program (CLP) established by Section 314 of the Clean Water Act; the CLP is similar to the MPCA's Clean Water Partnership program. The USEPA also administers the 604b Grant Program that targets water quality improvements in urban areas, and the Environmental Education Grant that finances local environmental education initiatives.

The **U.S. Army Corps of Engineers** administers the Planning Assistance to States (Section 22) program, the Project Cooperation Agreement (PCA) program, also known as the LCA (Local Cooperation Agreement) program for construction of Flood Control Projects, the Section 14 bank protection program, the Flood Plain Management Services Program, and the Aquatic Plant Control Program and provides many GIS products through its GIS Center.

The **U.S. Fish and Wildlife Service** administers the North American Wetlands Conservation Fund, as part of the North American Wetlands Conservation Act (WCA), and the Partners for Wildlife Grant Program.

The **Natural Resource Conservation Service** (NRCS) has funds available for technical assistance on various surface water projects, operations and maintenance, inspections and repairs. The NRCS also administers the Environmental Quality Incentives Program (EQIP), which was established through the 1996 Farm Bill Program.

The **Federal Emergency Management Agency** (FEMA) has funds available to restore areas (including water resources) damaged or destroyed by a disaster.

5.2.2.6 Private Funding Sources

In addition to state and federal funding sources, some private funding sources may be available. Examples include (but are not limited to):

- Ducks Unlimited and Pheasants Forever funds are available for projects that enhance, create, or protect waterfowl or pheasant habitat,
- Individual entities needing to provide wetland mitigation in compliance with the Wetland Conservation Act (WCA) may have funds and/or technical resources available to restore or create wetland function and values lost or intended to be destroyed as part of a project.
- Service organizations (e.g., Lions Club and Elks), youth groups (e.g., Boy/Girl Scouts), Adopt-a-Highway/River cleanup groups, and sportsman clubs may also provide funds or assistance.

5.3 Impacts on Local Government

This section discusses how the BCWMC's implementation program will affect local government in terms of cost and administrative issues.

The BCWMC's intention is to minimize the duplication of efforts with member cities, and to limit additional requirements imposed upon local units of government as much as possible while still accomplishing the BCWMC's purposes and implementing the Plan. The BCWMC Plan's capital improvements (listed in Table 5-3) will be implemented by the member cities, but will be funded through a Hennepin County tax levy requested by the BCWMC. These improvements would not affect the member cities' finances directly since the tax levy would not apply towards the cities' levy limits. However, there would be a financial impact to the residents of the member cities that reside in the BCWMC watershed.

As in the past, the BCWMC's implementation of its annual water quality, flood control, and education programs will be funded through the BCWMC's general fund, as will its engineering and administrative services. Since the member cities contribute funds directly to the BCWMC general fund, this has a direct financial impact on the member cities.

In placing requirements on the member cities, the BCWMC recognizes the associated financial burden, and seeks to most efficiently utilize finite financial resources to accomplish its goals. Some BCWMC policies place increased responsibility on member cities (see Section 4). Some of the implementation program elements reflect the goals, policies, and requirements of state and regional units of government that local units of government would need to address regardless.

Some of the member cities already have ordinances in place that address many of the BCWMC requirements. Applicable ordinances address shorelands, floodplains, wetland protection, stormwater management, erosion control, and stormwater system maintenance. Local governments must adopt the MDNR's shoreland regulations, if required by the MDNR.

The BCWMC is not increasing the wetland regulation burden for the member cities since those cities that are already acting as the Local Government Unit for the WCA will continue to do so (no change).

5.3.1 Local Water Management Plans and Official Controls

It is anticipated that most of the member cities will need to revise their local plans and official controls to bring them into conformance with the BCWMC's revised Plan, Minnesota law (Minnesota Statutes 103B), and Minnesota Rules (Minnesota Rules 8410). BCWMC member cities must revise and adopt local water management plans according to the timeline established in MN Rules 8410 and Minnesota Statutes 103B.235. The BCWMC requires member cities to revise their official controls and management programs (e.g., ordinances) affected by the BCWMC Plan within 2 years of adoption of the BCWMC Plan.

A member city can assume as much management control as it wishes through its approved local water management plan. The BCWMC assumes that the member cities will continue to be the permitting authority for all land alteration activities (see Section 5.1.1.6). To continue as the permitting authority, the

local government must outline its permitting process in its local water management plan, including the preliminary and final platting process.

5.3.1.1 Requirements for Local Water Management Plans and Official Controls

Local water management plans are required to conform to Minnesota law (Minnesota Statutes 103B.235), Minnesota rules (Minnesota Rules 8410), and the BCWMC Plan. Minnesota Rules 8410 and Minnesota Statutes 103B.235 Subd. 2 include specific requirements for local water management plan contents.

The policies and goals established in each city's local water management plan must be consistent with the BCWMC Plan. The section of the local plan covering assessment of problems must include those problems identified in the BCWMC Plan that affect the city. The corrective action proposed must consider the individual and collaborative roles of the BCWMC and its member cities and must be consistent with the BCWMC Plan. A city may use all or part of the BCWMC Plan when updating its local plan.

Local units of government are to maintain stormwater systems (storm sewers, ponding areas, ditches, water level control structures, etc.) under their jurisdiction in good working order to prevent flooding and water quality problems. The BCWMC requires that local plans assess the need for periodic maintenance of public works, facilities and natural conveyance systems, including the condition of public ditches constructed under Minnesota Statutes 103D or 103E, if they are under the cities' jurisdiction.

The BCWMC also requires local water management plans to assess the need to establish a waterbody management classification system to provide for water quality and quantity management. If a different classification system than the BCWMC classification system is used, it must be correlated to the BCWMC system and approved by the BCWMC. Local plans must evaluate the need for other management programs, if necessary.

The local water management plan must identify official controls and programs (e.g., ordinances, management plans) which are used to enforce the policies and requirements of the BCWMC. Member city ordinances, management programs, and other official controls required by the BCWMC Plan must be implemented within 2 years of BCWMC Plan adoption. Revisions to local water management plans or local controls that are potentially inconsistent with the BCWMC plan must be submitted by the member cities to the BCWMC for review.

The BCWMC reserves the right to recommend to a member city that a project the BCWMC considers to be inconsistent with the local management plan be denied.

Section 4 of the BCWMC Plan (Goals and Policies) describes other requirements for local water management plans (local plans).

5.3.1.2 BCWMC Review of Local Water Management Plans

Before a member city adopts its local water management plan, the new or revised plan must be submitted to all of the affected watershed management organizations, the Metropolitan Council, and Hennepin County (if the County adopts a groundwater plan) for concurrent review. Within 60 days of receipt of the

local plan, the BCWMC will review the local plan for conformance with the BCWMC Plan. As part of its review, the BCWMC will take into consideration any comments received from the Metropolitan Council and the County. The BCWMC will approve or disapprove all or part of the local plan within the 60-day time frame, unless the city agrees to an extension. If the BCWMC does not complete its review, or fails to approve/disapprove the plan within the allotted time, and the city has not given an extension, the local plan will be considered approved (per Minnesota Rules 8410 and Minnesota Statutes 103B.235, Subd. 3 and 3a).

Once the BCWMC approves the local plan, the local government must adopt and implement its plan within 120 days and amend its official controls within 180 days of plan approval. Each member city must notify the BCWMC (and the other affected WMOs) within 30 days of plan adoption and implementation, and adoption of necessary official controls.

Any amendments to the local plan must be submitted to the BCWMC for review and approval prior to their adoption by the member city. The BCWMC review process for amendments is the same as for the original or revised local plan.

5.4 Plan Approval and Adoption

This Plan was submitted to the member cities, the BWSR, the MPCA, the MDNR, the Minnesota Department of Agriculture (MDA), the Minnesota Department of Health (MDH), the Metropolitan Council, the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Transportation (MnDOT), and Hennepin County for review, in accordance with Minnesota statutes. The BCWMC held a public hearing on the Plan on May 21, 2015; BWSR approved the Plan on August 27, 2015; the BCWMC formally adopted this Plan on September 17, 2015.

5.4.1 Stakeholder and Public Involvement

Input from review agencies and other public stakeholders was solicited during the development of this Plan. Prior to drafting the Plan, the BCWMC compiled recommendations regarding technical changes needed in the BCWMC Plan; this compilation is referred to as the "gaps analysis" (see Appendix D). The gaps analysis considered responses to the Plan notification letter received from the BWSR, MDNR, Metropolitan Council, and Three Rivers Park District.

The gaps analysis considered concerns raised by the BCWMC commissioners, as well as responses from the BCWMC Technical Advisory Committee to a series of five surveys distributed from 2010 through 2012 and addressing the following topics:

- Public education and involvement
- Erosion and sediment control
- Flood and rate control
- Public education and involvement
- Water quality
- Wetlands

- Funding
- Groundwater
- Planning process
- Public ditches
- BCWMC/City responsibilities
- BCWMC/City evaluation, accountability and enforcement
- New issues not otherwise raised

The BCWMC gathered input from the residents, elected and appointed officials, city staff, state agencies and other partners through its Watershed Assessment and Visioning Exercise (WAVE) process. The WAVE process included soliciting input via an online survey and hosting a series of 11 small group meetings. The small group meetings were held with city councils, city commissions, lake associations, neighborhood associations, and other resident groups at different locations within the watershed in spring 2013. The objectives of these meetings were to:

- Gather input from member communities to guide the development of the BCWMC Plan
- Gather the thoughts and ideas about issues facing BCWMC water resources from watershed residents, elected and appointed officials, city staff, state agencies, and other partners
- Understand how the Commission can improve water resources while serving the member communities effectively and efficiently
- Prioritize watershed issues to inform the development of goals and policies in the BCWMC Plan

The results of the survey and workshops were presented at a “summit” meeting in June 2013, attended by the member city representatives, commissioners, review agencies, and the public. The outcome of the summit was a prioritized list of issues facing the BCWMC. The BCWMC commissioners considered the results of the summit in the development of Plan. Survey responses and summit ranking results are provided in Appendix E.)

Following the June 2013 summit, the BCWMC began in earnest developing sections of the Plan, facilitated by its Plan Steering Committee. The Plan Steering Committee was comprised of Commissioners, TAC representatives, and BCWMC staff. The Plan Steering Committee provided direction to BCWMC staff and preliminary review of draft Plan sections prior to review and discussion with the TAC, state review agencies, and the full BCWMC Board of Commissioners. The Plan Steering Committee hosted workshops to discuss draft Plan content. Workshops were attended by commissioners and alternates, city staff, and review agencies. Plan sections were revised per the comments received at these workshops.

The BCWMC Plan was submitted for formal 60-day review in November 2014 and revised per comments received during that period. Comments received during the formal review period can be found on the BCWMC website (www.bassettcreekwmo.org).

5.5 Plan Revision and Amendment

This Plan remains in effect for ten (10) years from the year it was approved and adopted, unless it is superseded by adoption and approval of a succeeding Plan. All amendments to this Plan must follow the procedures set forth in this section, or as required by revised laws and rules. Plan amendments may be proposed by any person to the BCWMC, but only the BCWMC may initiate the amendment process. The BCWMC may amend its Plan in the interim if either changes are required or if problems arise that are not addressed in the Plan, or if new projects need to be added to the CIP (see Section 5.2.1.1).

In accordance with Minnesota Statutes 103B.231, Subd. 3a, BWSR may develop a priority schedule for the revision of water management plans. BWSR uses the schedule to inform WMOs of when they will be required to revise their plans. If BWSR does not notify a WMO that a plan revision is required and the plan expires, Minnesota Statutes 103B.231, Subd. 3a states that the existing plan, authorities, and official controls of the WMO remain in full force and effect until a revision is approved. The same statute also allows a WMO to submit a draft plan revision for review prior to BWSR's scheduled date. If BWSR fails to adjust its priority review schedule and begin review of the submitted plan within 45 days of plan submittal, the WMO may adopt and implement their plan without formal BWSR approval.

Minnesota Rules 8410 provide additional information regarding plan amendments. Minnesota Rules 8410 requires WMOs to evaluate the implementation actions periodically. The BCWMC will review its implementation program annually. A plan amendment is required to add a project to the CIP (Table 5-3). A plan amendment is not required if projects listed in Table 5-3 are implemented at a different time than shown in the table.

5.5.1 General Amendment Procedure

The BCWMC will follow the plan amendment process described in Minnesota Statutes 103B.231, Subd. 11 unless the proposed amendment is considered a minor amendment according to the criteria described in Minnesota Rules 8410. In accordance with Minnesota Statutes 103B.231, Subd. 11, the plan amendment process is the same as the Plan review process, and is as follows:

1. The BCWMC must submit the amendment to the member cities, Hennepin County, the state review agencies (Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, Minnesota Department of Agriculture, and the Minnesota Department of Health), the Metropolitan Council, and the Minnesota Board of Water and Soil Resources, for a 60-day review.
2. The BCWMC must respond in writing to any concerns raised by the reviewers.
3. The BCWMC must hold a public hearing on the proposed amendment.
4. The BCWMC must submit the final revised amendment and response to comments to the BWSR for a 90-day review and approval.

The BCWMC will consider sending drafts of proposed amendments to all plan review authorities to receive input before establishing a hearing date or beginning the formal review process.

The BCWMC may update its Requirements document (see Appendix H), Education and Outreach Plan (see Appendix B), and Monitoring Plan (see Appendix A) without performing a plan amendment.

5.5.2 Minor Plan Amendments

The BCWMC will follow the following review process for minor plan amendments, provided that the amendment meets the criteria for a minor amendment as established in Minnesota Rules 8410:

1. The BCWMC will send copies of the proposed minor plan amendment to the affected local cities, the Metropolitan Council, Hennepin County (if the amendment is a minor amendment to the BCWMC capital improvement program), and the state review agencies for review and comment.
2. The BCWMC will hold a public meeting to explain the amendments and publish a legal notice of the meeting twice, at least 7 days and 14 days before the date of the meeting. The BCWMC will also provide mailed notice of the public meeting to the city clerk of each member city. The notice will be mailed not less than 45 days before the public meeting.
3. If the proposed amendment is a minor amendment to the BCWMC capital improvement program, Hennepin County must approve the minor amendment.
4. For proposed amendments with a project cost greater than \$500,000, the County review period will be 75 days. The BCWMC will submit detailed feasibility reports for these projects to the County along with the request for a minor plan amendment.

The minor plan amendment process is more streamlined than the general plan amendment process, since it requires only one (30-day) review.

5.5.3 Amendment Format and Distribution

The BCWMC will prepare and distribute plan amendments in a format consistent with Minnesota Rules 8410. The BCWMC will maintain a distribution list of everyone who receives a copy of the Plan. Within 30 days of adopting an amendment, the BCWMC will distribute copies of the amendment to everyone on the distribution list and post the amendment on the BCWMC website. The BCWMC may consider sending drafts of proposed amendments to all plan review authorities to seek their comments before establishing a hearing date or commencing the formal review process, if schedule allows.

Table 5-2 Permit Authority of Agencies with Jurisdiction within the BCWMC

Agency	Type of Approval	Description
Federal		
U.S. Army Corps of Engineers (USACE) Note: Section 401 Certification is implemented in coordination with the MPCA.	Section 10 of the Rivers and Harbors Act	Applies to placement of structures and/or work in, or affecting, navigable waters of the United States.
	Section 404 Permit	Applies to the discharge of dredged or fill material into waters of the United States. There are two types of Section 404 permits: regional and nationwide general permits, and individual permits.
	Section 401 of the Clean Water Act Water Quality Certification	Applies to activities that require a Corps of Engineers Section 10, Corps of Engineers Section 404 or Federal Energy Regulatory Commission permit. These activities must first obtain Section 401 water quality certification.
State		
Minnesota Department of Natural Resources (MDNR)	Public Waters Work Permit	Applies to any work that will alter the course, current or cross-section of any MDNR public water lake, wetland or watercourse; also applies to any work below the ordinary high water mark of MDNR public waters.
	Groundwater or Surface Water Appropriation Permit	Applies to suppliers of domestic water to more than 25 people or for any use of groundwater or surface water that exceeds 10,000 gallons/day or 1,000,000 gallons/year.
	Dam Safety Permit	Applies to impoundments that pose a potential threat to public safety or property. Dams 6 feet high or less and dams that impound 15 acre-feet of water or less are exempt from the rules. Dams less than 25 feet high that impound less than 50 acre-feet of water are also exempt unless there is a potential for loss of life.
	Riprap Shore Protection Permit	Applies to the placement of riprap shore protection or placement of fill to recover shoreland lost to erosion.
	Aquatic Plant Management Permit	Applies to chemical or mechanical removal of aquatic plants, including submerged, emergent, and floating vegetation.
	Fisheries Permit	Applies to transport and stocking of fish and the removal of rough fish.
Minnesota Environmental Quality Board (EQB)	Environmental Assessment Worksheet	Broad environmental assessment required for certain proposed developments and other activities.
Minnesota Department of Health (MDH)	Well Management Program	Applies to drilling of new water wells and sealing of abandoned water wells. Includes Wellhead Protection Program.
	Safe Drinking Water Act	Applies to construction of new water wells and other public water supply systems
Minnesota Pollution Control Agency (MPCA)	State Discharge System/National Pollutant Discharge Elimination System (NPDES) Permit	Applies to all discrete sources of wastewater discharge to surface waters, including sanitary wastewater, process wastewater, etc.
	NPDES/SDS Construction Stormwater Permit	Applies to construction activities that disturb 1 or more acres of land.

Table 5-2 Permit Authority of Agencies with Jurisdiction within the BCWMC

Agency	Type of Approval	Description
Minnesota Pollution Control Agency (MPCA)	NPDES General Industrial Stormwater Permit	Applies to certain industrial/ commercial activities that come into contact with stormwater. Requires preparation of stormwater pollution prevention plan.
	NPDES General Storm Water Permit for small Municipal Separate Storm Sewer Systems (MS4s) Note: Minneapolis is a large MS4 and operates under an individual permit.	Applies to municipal storm sewer systems serving populations fewer than 100,000 located in urbanized areas, MnDOT, counties, and other public systems (e.g., universities). Requires permittees to implement public education programs, detect and eliminate illicit discharges, control construction site and post-construction stormwater runoff on sites that disturb 1 or more acres of land, and address pollution prevention at municipal operations.
	NPDES Phase 1 MS4 Storm Water Permit	Applies to municipal storm sewer systems serving populations over 100,000 (in Minnesota, only Minneapolis and St. Paul). Requires practices similar to permit for small MS4s, plus additional requirements.
	Permit for disposal of dredged material (permit not required for stormwater ponds)	Applies to material excavated at or below the ordinary high water level of waterbasins, watercourses, public waters, or public waters wetlands (note: specific guidance provide for material removed from stormwater ponds).
	Section 401 of the Clean Water Act Water Quality Certification	Applies to activities that require a Corps of Engineers Section 10, Corps of Engineers Section 404 or Federal Energy Regulatory Commission permit. These activities must first obtain Section 401 water quality certification.
Note: Section 401 Certification is implemented in coordination with the USACE.		

Table 5-4 BCWMC Annual Implementation Program (non-CIP)

Implementation Program Item		Cost ¹ by Year of Implementation										
			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Admin.	Administration (non-technical)		\$140,000	\$137,000	\$137,000	\$137,000	\$137,000	\$137,000	\$137,000	\$137,000	\$137,000	\$137,000
Engineering & Monitoring	Technical Services		\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000	\$120,000
	Development/Project Review (offset by fees)		\$65,000	\$65,000	\$65,000	\$65,000	\$65,000	\$65,000	\$65,000	\$65,000	\$65,000	\$65,000
	Development/Project Review (non-fee)		\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
	Commission/TAC meetings		\$14,500	\$14,500	\$14,500	\$14,500	\$14,500	\$14,500	\$14,500	\$14,500	\$14,500	\$14,500
	Surveys/Studies		\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
	Detailed Water Quality Monitoring ³		\$76,000	\$63,000	\$137,000	\$101,000	\$45,000	\$106,000	\$76,000	\$45,000	\$131,000	\$101,000
	Water Quantity Monitoring		\$11,500	\$11,500	\$11,500	\$11,500	\$11,500	\$11,500	\$11,500	\$11,500	\$11,500	\$11,500
	Flood Control Project Inspections ⁵		\$10,000	\$10,000	\$10,000	\$29,000	\$10,000	\$10,000	\$10,000	\$10,000	\$29,000	\$10,000
	Watershed Inspections (for ESC in cities, etc.)		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
	WOMP Implementation ²		\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000
	Municipal Plan Review		\$8,000	\$8,000	\$8,000							
	Management Plan Update									\$40,000	\$40,000	\$40,000
	Annual updates to P8 model		\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
	TMDL Work		\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
	Modeling to update flood levels (Policy 25)		\$85,000	\$85,000	\$85,000							
	Flood protection funding criteria (Policy 27)					\$5,000						
	Habitat Monitoring Program (Policy 78)		\$5,000									
	Aquatic Invasive Species Work (Policy 79)		\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
	Groundwater Work (Policies 46 & 47)		\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
Education	Annual Report/Publications		\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000
	Website Maintenance		\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
	Watershed Education Partnerships		\$15,500	\$15,500	\$15,500	\$15,500	\$15,500	\$15,500	\$15,500	\$15,500	\$15,500	\$15,500
	Education and Public Outreach ⁴		\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000	\$17,000
	Public Communications		\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000

Table 5-4 BCWMC Annual Implementation Program (non-CIP)

Implementation Program Item		Cost ¹ by Year of Implementation										
			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Maintenance	Annual allocation to Channel Maintenance Fund		\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
	Annual allocation to Flood Control Project Long-Term Maintenance Fund		\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
	Flood Control Project rehabilitation and replacement plan (Policy 22)		\$5,000									
Total Annual Cost (non-CIP)			\$724,500	\$698,500	\$772,500	\$667,500	\$587,500	\$648,500	\$618,500	\$627,500	\$732,500	\$683,500

Notes:

All costs presented in 2015 dollars

¹ All of the items in this table are funded under the BCWMC General Fund

² Cost-sharing provided by the Metropolitan Council for operation of WOMP station. Costs shown include only the BCWMC share of the costs.

³ Estimated annual costs may vary based on revisions/updates to the BCWMC Monitoring Plan.

⁴ Estimated annual costs may vary based on revisions/updates to the BCWMC education and outreach plan.

⁵ Inspection of the double box culvert at the tunnel entrance performed every 5 years (2019, 2024); inspection of the deep tunnel is performed every 20 years (next planned for 2028).

Table 5-5 Past BCWMC Accomplishments (since approval of 2004 Plan)

Implementation Item	Project No Table 12-2 of 2004 Plan (as amended) ¹	Year Implemented ²	Status / Description
Administrative and Review Activities			
Review projects for consistency with BCWMC requirements	NA	Ongoing	Number of development proposals reviewed: • 2007 – 26 • 2008 – 31 • 2009 – 13 • 2010 – 28 • 2011 – 32 • 2012 – 37 • 2013 – 41
Review of member city local water management plans	NA	Periodic	• 2006 – Minneapolis • 2008 – Golden Valley, Minnetonka, New Hope, Plymouth • 2009 – St. Louis Park, Crystal 2010 – Robbinsdale, Medicine Lake
Complete minor and major plan amendments as necessary to update the Capital Improvement Program (CIP)	NA	Ongoing	Annually (2004 – 2013)
Erosion Control Inspections	NA	Ongoing	Performed monthly at construction sites within the watershed 2004 – 2013.
Flood control project inspections	NA	Annual	Performed annually; results are summarized and provided to appropriate municipalities and MnDOT.
Inspection of the double box culvert at the entrance to the Bassett Creek tunnel	NA	Every 5 years	Performed in 2004, 2009, and 2014.
Bassett Creek tunnel inspection	NA	2008	Performed every 20 years in coordination with City of Minneapolis, MnDOT, and U.S. Army Corps of Engineers
Long-term maintenance of the Flood Control Project	NA	Ongoing	Funded by annual assessments. Portion of funds used to complete Sweeney Lake outlet project (see Table 5-5).
Complete annual report, submit to BWSR and post to website	NA	Annually	Completed annually; available at BCWMC website.
Apply for grants and/or assist in city application for grants	NA	Ongoing	The BCWMC has received multiple grants for projects, including: • \$360,000 BWSR Clean Water Fund for stream restoration projects on Plymouth Creek and Bassett Creek Main Stem (2010) • \$75,000 BWSR Clean Water Fund for Wirth Lake outlet modifications (2010) \$217,500 BWSR Clean Water Fund for Bassett Creek Main Stem restoration projects (2011)
Complete annual audit and submit to BWSR	NA	Annually	Completed annually.
Update BCWMC Watershed Management Plan	NA	2012-	The BCWMC began updating its 2004 Watershed Management Plan in 2012, including establishing a Steering Committee and public participation process.

Table 5-5 Past BCWMC Accomplishments (since approval of 2004 Plan)

Implementation Item	Project No Table 12-2 of 2004 Plan (as amended) ¹	Year Implemented ²	Status / Description
			Plan approval and adoption expected in 2015. A gaps analysis was completed in 2012.
Water Quality and Quantity Monitoring and Studies			
Detailed lake water quality monitoring (Note that additional water quality monitoring is performed by other entities with varying levels of cooperation by the BCWMC)	NA	Annual	BCWMC performed detailed monitoring of waterbodies within the watershed on a rotating schedule: • 2007 – Crane Lake, Westwood Lake • 2008 – Sweeney Lake, Twin Lake • 2009 – Sweeney Lake, Twin Lake, Northwood Lake, North Rice Pond, South Rice Pond • 2010 – Medicine Lake • 2011 – Crane Lake, Westwood Lake • 2012 – None • 2013 – Northwood Lake, North Rice Pond, South Rice Pond • 2014 – Sweeney Lake, Twin Lake
Operate stormwater runoff monitoring station (i.e., WOMP)	NA	Ongoing	Performed in cooperation with the Metropolitan Council and Minneapolis Parks and Recreation Board (MPRB). MPRB's involvement ended in 2012.
Conduct Fish Index of Biological Integrity of Bassett Creek Main Stem	NA	2008	Performed in cooperation with MPCA.
E. coli bacteria monitoring of Bassett Creek Main Stem	NA	2008, 2009, 2010	Performed in cooperation with MPCA. Analysis of monitoring results completed in 2010.
Biotic index monitoring of Bassett Creek Main Stem and tributaries	NA	2006, 2009, 2012	Performed every 3 years at sampling sites on the Main Stem of Bassett Creek, North Branch of Bassett Creek, Plymouth Creek, and Sweeney Lake Branch of Bassett Creek
Lake and stream gauging program (water level readings)	NA	Ongoing	Lake level data collected at Medicine Lake, Sweeney Lake, Parkers Lake, Westwood Lake, Crane Lake, and Northwood Lake. Readings taken twice monthly from April 1 – September 30 and one per month in other months.
Twin Lake internal loading investigation	NA	2010-2011	Investigation included water quality monitoring and sediment analysis of Twin Lake. Report completed in 2011.
Updates to watershed-wide hydrologic/hydraulic model	NA	2012-2013	Converted existing models to a single watershed-wide XP-SWMM model.
Updates to the P8 water quality model	NA	2012-2013	Portions of the existing P8 water quality model were updated to reflect current land use and BMP conditions.
Completion of a <i>Resource Management Plan</i>	NA	2009	BCWMC completed a plan to expedite US Army Corps of Engineers' permitting process for water quality improvement projects in the BCWMC CIP.
Sweeney Lake TMDL Study and Implementation Plan	NA	2007-2010	BCWMC cooperated with the MPCA to undertake the Sweeney Lake TMDL study beginning with Phase I in 2007-2008 and continuing in 2008-2009 with Phase 2.

Table 5-5 Past BCWMC Accomplishments (since approval of 2004 Plan)

Implementation Item	Project No Table 12-2 of 2004 Plan (as amended) ¹	Year Implemented ²	Status / Description
			A draft of the TMDL was completed in 2010. The TMDL was approved by the MPCA and USEPA in 2011.
Medicine Lake TMDL Study and Implementation Plan	NA	2008-2010	BCWMC cooperated with the MPCA to undertake the Medicine Lake TMDL study beginning in 2008 with the MPCA taking the lead role. BCWMC partnered with the MPCA and Three Rivers Park District to develop the TMDL Implementation Plan beginning in 2009. The TMDL was approved by the MPCA and USEPA in 2011.
Wirth Lake TMDL Study and Implementation Plan	NA	2008-2010	BCWMC cooperated with the MPCA to undertake the Wirth Lake TMDL study beginning in 2008 with the MPCA taking the lead role. A draft of the TMDL was completed in 2009. The TMDL was approved by the MPCA and USEPA in 2010
Education and Outreach			
Publishing articles in local newspapers	NA	Ongoing	
Conducting tours of the watershed	NA	Approximately every other year	Conducted tours in 2005, 2007, 2009, 2011, 2014
Co-sponsoring MetroBlooms rainwater garden workshops	NA	2008, 2011 - 2014	
Staffing informational booths at fair, expos, and other events	NA	Ongoing	Events include: - Plymouth Yard/Garden Expo - Plymouth Environmental Quality Fair Golden Valley Days
Participating in Blue Thumb	NA	Ongoing since 2008	Blue Thumb is a local program that encourages homeowners to use native planting, rain gardens, and shoreline stabilization to reduce runoff.
Participating in Metro WaterShed Partners	NA	Ongoing	Including the Minnesota Waters "Let's Keep Them Clean" campaign
Conducting surveys of watershed residents	NA	Periodically	Surveys include a 2007 survey of residents' knowledge of water-related issues and 2013 resident survey intended to guide next generation Plan development.
Participated in watershed education alliance (West Metro Watershed Alliance, WMWA) with four neighboring WMOs	NA	Ongoing since 2009	
Giving away native seed packets	NA	Ongoing	
Participating in the development of educational materials distributed to target audiences	NA	Periodically	Including the "10 Things You Can Do" brochure distributed to member cities (2009 and 2014)
Maintaining the Technical Advisory Committee	NA	Ongoing	The TAC meets about six times per year to review and make recommendations regarding topics assigned by the Commission.
Maintain the BCWMC Website	NA	Ongoing	Continually update website with Commission meeting materials and minutes, technical reports and studies,

Table 5-5 Past BCWMC Accomplishments (since approval of 2004 Plan)

Implementation Item	Project No Table 12-2 of 2004 Plan (as amended) ¹	Year Implemented ²	Status / Description
			and watershed news.
Capital Projects by Watershed			
Medicine Lake			
Construction of wet detention pond to treat runoff from subwatershed BC94B1	ML-1	Pre-2004	Pond constructed by the City of Plymouth prior to 2004 Plan without BCWMC funding.
Reduce goose loading by 75 percent	ML-2	Ongoing	Option 17 in the Medicine Lake Plan. Periodically performed by the City of Plymouth.
Reroute flows from subwatershed BC94 to wet detention pond for BC92	ML-3	2006	Option 9a from the Medicine Lake Plan and included the dredging of accumulated sediment. Performed by the City of Plymouth.
Construction of Medicine Lake East Beach wet detention pond for subwatershed BC107	ML-4	2006	Option 11 from the Medicine Lake Plan. Constructed by the City of Plymouth.
Construction of wet detention pond for subwatersheds BC98, BC98A and BC98B	ML-5	2004	Option 10a from the Medicine Lake Plan. Constructed by the City of Plymouth.
In-lake Herbicide Treatment	ML-7	2004, 2005, 2006, 2008	Herbicide application to treat curlyleaf pondweed was performed in multiple years; a report was published in 2007. Performed by the City of Plymouth.
Construction of Lakeview Park Pond	ML-8	On Hold	Project includes <1 acre pond located in periodically-flooded are of Lakeview park. Pond will provide water quality treatment for an area draining to Medicine Lake currently without treatment.
West Medicine Lake Park Ponds water quality project	ML-11	2010	Project to improve quality of stormwater runoff to Medicine Lake. Constructed by the City of Plymouth
Plymouth Creek			
Channel restoration – Medicine Lake to 26 th Avenue (Plymouth)	PC-1	2010-2012	Project completed by the City of Plymouth. Partially funded by BWSR CWF grant.
Channel restoration –26 th Avenue to 37 th Avenue (Plymouth)	PC-2	Not Implemented	
Parkers Lake			
Improvements to stormwater basin in PL-A13 near Circle Park	PL-6	2010	Project completed by the City of Plymouth as part of street redevelopment.
Wirth Lake			
Dredging of detention pond in subwatershed FR-5	WTH-1	2007	Option 2 in the Wirth Lake Plan
Highway 55 detention pond	WTH-2	Not Implemented	Wirth Lake water quality has improved significantly. In 2014, it was removed from the Impaired Waters List. Project may be considered in future if necessary (see Table 5-3).
In-lake alum treatment of Wirth Lake	WTH-3	Not Implemented	Wirth Lake water quality has improved significantly. In 2014, it was removed from the Impaired Waters List.
Wirth Lake outlet modification to prevent backflow	WTH-4	2012	Project included the addition of two rubber check valves to prevent backflow from Bassett Creek into Wirth Lake under flooding conditions, reducing annual phosphorus loading to Wirth Lake. Project is

Table 5-5 Past BCWMC Accomplishments (since approval of 2004 Plan)

Implementation Item	Project No Table 12-2 of 2004 Plan (as amended) ¹	Year Implemented ²	Status / Description
			part of the Wirth Lake TMDL Implementation Plan. The project was constructed by the City of Golden Valley and was partially funded by a BWSR CWF grant.
Sweeney Lake			
Sweeney Lake outlet replacement	FC-1	2012	Project included stabilization of eroding embankments and replacement of outlet structure to prevent further erosion and maintain lake level for flood control purposes. Funded through BCWMC Flood Control Project Long-term Maintenance Fund and constructed by the City of Golden Valley.
Schaper Pond diversion project	SL-3	2015	Project includes rerouting of inflow from Highway 55 inlet to northwest side of the pond to improve phosphorus removal efficiency within the pond. Project is anticipated to meet required load reduction of the Sweeney Lake TMDL.
Twin Lake			
Pond expansion	TW-1	Not Implemented	Option 1 in the Twin Lake Plan. Project delayed due to site contamination and right-of-way issues.
In-lake alum treatment of Twin Lake	TW-2	2015	<i>Twin Lake Feasibility Study</i> (2013) recommended in-lake alum treatment as the most feasible option to reduce phosphorus and algae in Twin Lake to pre-2008 levels. Pending approval further review of recent water quality data.
Westwood Lake			
Construction of detention/ skimming facility at Flag Avenue	WST-1	2009	Option 1 in Westwood Lake Plan. Constructed by the City of St. Louis Park.
Bassett Creek Park Pond – None Proposed			
Northwood Lake			
Construction of ponds NB-35A, NB-35B, NB-35C and ponds NB-29A, NB-29B	NL-1	In progress	Option 4 in the Northwood Lake Plan. The City of New Hope constructed ponds NB-35A, NB-35B, and NB-35C, but not to degree of Northwood Lake Plan. Construction of ponds NB-29A, NB-29B, and a pond west of Northwood Lake (Jordan Outlet Pond) is planned for 2017-2018.
Four Seasons Mall area water quality project	NL-2	In Progress	Scenario 1 of a 2012 feasibility study. Project includes: - Construction of water quality treatment pond one site - Construction of water quality treatment pond southwest of the mall near the intersection of 40th Avenue N and Pilgrim Lane Restoration of an existing eroding stream channel.
Diversion of Lancaster Lane storm sewer	NL-3	Removed from CIP list	After more analysis, it was determined this project is not needed as the Lancaster Lane stormsewer already discharges to the wetland on the west side of Lancaster.

Table 5-5 Past BCWMC Accomplishments (since approval of 2004 Plan)

Implementation Item	Project No Table 12-2 of 2004 Plan (as amended) ¹	Year Implemented ²	Status / Description
Construction of ponds NB-36A, NB-37A, and NB-38A.	NL-4	2007	Option 5 in the Northwood Lake Plan. Ponds were constructed by the City of New Hope.
Northwood Lake East Pond water quality project	NL-7	2009	The City of New Hope constructed a pond to improve quality of stormwater runoff to Northwood Pond.
Bassett Creek Main Stem			
Construction of Pond BC 10-3	BC-1	2004	This project was completed as part of the Boone Ave and Brookview Golf Course improvement projects in 2004. Project completed without BCWMC funding.
Channel restoration – Crystal Border to Regent Avenue (Crystal/Golden Valley)	2010CR	2011	Project partially funded by a BWSR CWF grant.
Channel restoration – Wisconsin Ave. to Rhode Island Ave. and Duluth St. to Crystal/Golden Valley border	2011CR	2013	
Briarwood / Dawnview water quality improvement project (Golden Valley)	BC-7	2015	This project includes the installation of a stormwater management pond to treat 184 acres of residential area.
Channel restoration – Golden Valley Rd. to Irving Ave. N. (Golden Valley/Minneapolis)	2012CR	In Progress	Project restores streambank on Bassett Creek main stem. Project partially funded by a BWSR CWF grant.
Sweeney Lake Branch of Bassett Creek			
Channel Restoration – from Cortlawn Pond to Turner's Crossroad		2008	Constructed by the City of Golden Valley.
North Branch of Bassett Creek			
Channel restoration – 32 nd Ave. N. to Douglas Dr. N. (Crystal)	2011CR-NB	2013	Restored streambanks from 32 nd Avenue North to Douglas Drive North, in Crystal
Grimes, North Rice and South Rice Ponds			
Construction of Grimes Pond wet detention pond	GR-2	Not Implemented	Option 4 in the Rice and Grimes Ponds Plan
Crane Lake			
Construction of detention/skimming facility at Ramada Inn	CL-1	Not Implemented	Option 1 in the Crane Lake Plan
Construction of wet detention pond at Joy Lane	CL-2	Not Implemented	Project deemed not feasible by the City of Minnetonka in 2008.
Turtle Lake – None Proposed			
Lost Lake – None Proposed			
Flood Control Project			
Perform flood-proofing of homes along Bassett Creek Trunk System		2008	Funded by remaining portion of the Flood Control Project construction funds.

Notes:

¹ Project Number is based on Table 12-2 of the 2004 Plan (as amended). Table 12-2 from the 2004 Plan is updated as Table 5-3 in this Plan.

² Based on year of substantial progress (project completion may occur at a later date).

Table 5-5 Past BCWMC Accomplishments (since approval of 2004 Plan)

Implementation Item	Project No Table 12-2 of 2004 Plan (as amended) ¹	Year Implemented ²	Status / Description
Construction of ponds NB-36A, NB-37A, and NB-38A.	NL-4	2007	Option 5 in the Northwood Lake Plan. Ponds were constructed by the City of New Hope.
Northwood Lake East Pond water quality project	NL-7	2009	The City of New Hope constructed a pond to improve quality of stormwater runoff to Northwood Pond.
Bassett Creek Main Stem			
Construction of Pond BC 10-3	BC-1	2004	This project was completed as part of the Boone Ave and Brookview Golf Course improvement projects in 2004. Project completed without BCWMC funding.
Channel restoration – Crystal Border to Regent Avenue (Crystal/Golden Valley)	2010CR	2011	Project partially funded by a BWSR CWF grant.
Channel restoration – Wisconsin Ave. to Rhode Island Ave. and Duluth St. to Crystal/Golden Valley border	2011CR	2013	
Briarwood / Dawnview water quality improvement project (Golden Valley)	BC-7	2015	This project includes the installation of a stormwater management pond to treat 184 acres of residential area.
Channel restoration – Golden Valley Rd. to Irving Ave. N. (Golden Valley/Minneapolis)	2012CR	In Progress	Project restores streambank on Bassett Creek main stem. Project partially funded by a BWSR CWF grant.
Sweeney Lake Branch of Bassett Creek			
Channel Restoration – from Cortlawn Pond to Turner's Crossroad		2008	Constructed by the City of Golden Valley.
North Branch of Bassett Creek			
Channel restoration – 32 nd Ave. N. to Douglas Dr. N. (Crystal)	2011CR-NB	2013	Restored streambanks from 32 nd Avenue North to Douglas Drive North, in Crystal
Grimes, North Rice and South Rice Ponds			
Construction of Grimes Pond wet detention pond	GR-2	Not Implemented	Option 4 in the Rice and Grimes Ponds Plan
Crane Lake			
Construction of detention/skimmming facility at Ramada Inn	CL-1	Not Implemented	Option 1 in the Crane Lake Plan
Construction of wet detention pond at Joy Lane	CL-2	Not Implemented	Project deemed not feasible by the City of Minnetonka in 2008.
Turtle Lake – None Proposed			
Lost Lake – None Proposed			
Flood Control Project			
Perform flood-proofing of homes along Bassett Creek Trunk System		2008	Funded by remaining portion of the Flood Control Project construction funds.

Notes:

¹ Project Number is based on Table 12-2 of the 2004 Plan (as amended). Table 12-2 from the 2004 Plan is updated as Table 5-3 in this Plan.

² Based on year of substantial progress (project completion may occur at a later date).

BCMWC 2015 Watershed Management Plan

Section 6 – References

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Appendix A

BCWMC Monitoring Plan

BCWMC Monitoring Plan

A.1. Bassett Creek Monitoring Programs

This section describes the different types of monitoring performed by the BCWMC. The planned performance of each type of monitoring in each BCWMC priority waterbody over the next 10-years is outlined in Table MP-5. The types of monitoring performed by the BCWMC (and the respective abbreviations in Table MP-5) include:

- Detailed water quality monitoring (BC-WQ)
- Zooplankton and phytoplankton monitoring (ZOO)
- Aquatic plant (macrophyte) monitoring (PLANT)
- Stream biotic (invertebrate) monitoring (BIO)
- Stream water quality monitoring (SWQ)

A.1.1. Detailed Chemical Water Quality Monitoring

Monitoring Plan ID: BC-WQ

Planned Interval: 3 years (Priority 1 management classification)
5 years (Priority 2 management classification)

Description:

Samples shall be collected from one or two (depending on the lake) lake sampling stations representing the deepest location(s). Lakes shall be monitored on six occasions from April through September. Details follow:

1. One sample shall be collected within two weeks after ice out
2. One sample shall be collected in mid-June
3. One sample shall be collected in mid-July
4. Two samples shall be collected in August, biweekly, during 1st and 3rd weeks
5. One sample shall be collected during the first week of September

To insure the safety of staff collecting the samples, two individuals must be present in the boat and collect the samples during each sample event.

Table MP-1 Parameters measured and depth interval

Parameter	Sample Depth (Meters)	Sampled or Measured During Each Sample Event
Dissolved Oxygen	Surface to bottom (1-meter intervals)	X
Temperature	Surface to bottom (1-meter intervals)	X

Table MP-1 Parameters measured and depth interval

Parameter	Sample Depth (Meters)	Sampled or Measured During Each Sample Event
Specific Conductance	Surface to bottom (1-meter intervals)	X
pH	Surface to bottom (1-meter intervals)	X
Oxidation Reduction Potential (ORP)	Surface to bottom (1-meter intervals)	X
Secchi Disc	Measured from surface	X
Total Phosphorus	0-2 meter composite sample; Above thermocline sample; Below thermocline sample; 0.5 meters above bottom	X
Soluble Reactive Phosphorus	0-2 meter composite sample	X
Total Nitrogen	0-2 meter composite sample	X
Chlorophyll <i>a</i>	0-2 meter composite sample	X
Chloride	0-2 meter composite sample; 0.5 meters above bottom	X

Dissolved oxygen, temperature, specific conductance, pH, oxidation reduction potential (ORP), and Secchi disc transparency shall be measured in the field at depths shown in Table 1. Water samples will be collected for laboratory analysis for total phosphorus, soluble reactive phosphorus, total nitrogen, chlorophyll *a*, and chloride at depths as specified in Table MP-1. Analytical details for phosphorus, nitrogen, and chlorophyll *a* analyses are presented in Table MP-2. All analyses shall attain the MDL, MRL, DUP RPD, Matrix Spike %R and RPD, and Blank Spike %R and RPD shown in Table MP-2.

Table MP-2 Analytical Method Details

Method	Analyte	MDL	MRL	Units	DUP	Matrix Spike		Blank Spike	
					RPD	%R	RPD	%R	RPD
EPA 351.2	Total Kjeldahl Nitrogen	0.17	0.50	mg/L	20	90-110	20	90-110	20
EPA 365.3	Orthophosphate as P	0.0005	0.0060	mg/L	20	75-125	20	80-120	20
EPA 365.3	Phosphorus, Total as P	0.0007	0.010	mg/L	20	75-125	20	80-120	20
SM 10200H	Chlorophyll <i>a</i> - Pheophytin	0.50	0.50	µg/L	20	75-125	20	80-120	20
SM4500 NO3F	Nitrate + Nitrite as N	0.0069	0.020	mg/L	20	75-125	20	80-120	20
16887-00-6	Chloride	0.465	1.0	mg/L	20	90-110	20	80-120	20

A.1.2. Zooplankton and Phytoplankton Monitoring

Monitoring Plan ID: ZOO

Planned Interval: 3 years (Priority 1 management classification)
5 years (Priority 2 management classification)

Description:

Lakes shall be monitored on six occasions from April through September concurrent with water quality sampling events. Phytoplankton will be sampled as a single 0-2 meter composite sample at the location of water quality sampling. Zooplankton will be sampled using a bottom to surface tow with a zooplankton net at the location of water quality sampling.

Phytoplankton analyses shall be completed using the inverted microscope procedure of Utermohl as described by Lund et al. (1958). Subsamples shall be settled in a 5 milliliter inverted microscope settling chamber for approximately 24 hours prior to counting. Replicate fields of view located in a transect across the center of the counting chamber shall be enumerated at a magnification of at least 500 times until the entire transect has been enumerated or at least 500 algal units have been counted. An algal unit is 1 single cell, 1 colony, or 1 filament. Results shall be expressed as units per milliliter. Algal units shown in Table MP-3 shall be identified to the species level and other algal units in the samples shall be identified to the genus level.

Table MP-3 Algal Units Identified to the Species Level

Chlorophyta (Green Algae)	Cyanophyta (Blue-Green Algae)	Bacillariophyta (Diatoms)	Other Algae
<i>Actinastrum Hantzschii</i>	<i>Anabaena affinis</i>	<i>Asterionella formosa</i>	<i>Dinobryon sociale</i>
<i>Ankistrodesmus Brauni</i>	<i>Anabaena flos-aquae</i>	<i>Cocconeis placentula</i>	<i>Cryptomonas erosa</i>
<i>Ankistrodesmus falcatus</i>	<i>Anabaena spiroides v. crassa</i>	<i>Fragilaria capucina</i>	<i>Ceratium hirundinella</i>
<i>Chlamydomonas globosa</i>	<i>Aphanizomenon flos-aquae</i>	<i>Fragilaria crotonensis</i>	<i>Peridinium cinctum</i>
<i>Chlamydomonas pseudopertyi</i>	<i>Coelosphaerium Naegelianum</i>	<i>Gomphonema olivaceum</i>	
<i>Coelastrum microporum</i>	<i>Cylindrospermopsis raciborski</i>	<i>Melosira granulata</i>	
<i>Crucigenia quadrata</i>	<i>Lyngbya limnetica</i>	<i>Stephanodiscus Hantzschii</i>	
<i>Dictyosphaerium Ehrenbergianum</i>	<i>Merismopedia tenuissima</i>	<i>Synedra acus</i>	
<i>Elakatothrix gelatinosa</i>	<i>Microcystis aeruginosa</i>	<i>Synedra ulna</i>	
<i>Oocystis parva</i>	<i>Microcystis incerta</i>		
<i>Pandorina morum</i>	<i>Oscillatoria Agardhii</i>		
<i>Pediastrum Boryanum</i>	<i>Oscillatoria limnetica</i>		
<i>Pediastrum duplex v. clathratum</i>	<i>Phormidium mucicola</i>		

Table MP-3 Algal Units Identified to the Species Level

Chlorophyta (Green Algae)	Cyanophyta (Blue-Green Algae)	Bacillariophyta (Diatoms)	Other Algae
<i>Rhizoclonium hieroglyphicum</i>			
<i>Scenedesmus dimorphus</i>			
<i>Scenedesmus quadricauda</i>			
<i>Selenastrum minimum</i>			
<i>Schroederia Judayi</i>			
<i>Sphaerocystis Schroeteri</i>			
<i>Tetraedron minimum</i>			
<i>Tetraedron muticum</i>			
<i>Treubaria setigerum</i>			

Zooplankton analyses shall be completed using the Sedgwick Rafter procedure described in Standard Methods. Zooplankton shown in Table MP-4 shall be identified to the species level and other zooplankton shall be identified to the genus level. Results shall be expressed as number of zooplankton per square meter.

Table MP-4 Zooplankton Identified to the Species Level

Cladocera	Rotifera
<i>Bosmina longirostris</i>	<i>Asplanchna priodonta</i>
<i>Chydorus sphaericus</i>	<i>Keratella cochlearis</i>
<i>Daphnia galeata mendotae</i>	<i>Keratella quadrata</i>
<i>Daphnia pulex</i>	<i>Kellicottia bostoniensis</i>
<i>Daphnia retrocurva</i>	<i>Polyarthra vulgaris</i>
<i>Diaphanosoma leuchtenbergianum</i>	<i>Trichocerca cylindrica</i>
	<i>Trichocerca multicornis</i>

A.1.3. Aquatic Plant (Macrophyte) Monitoring

Monitoring Plan ID: PLANT

Planned Interval: 3 years (Priority 1 management classification)
5 years (Priority 2 management classification)

Description:

The BCWMC will perform qualitative macrophyte surveys of lakes classified as Priority 1 every 3 years and lake classified as Priority 2 every 5 years (in the same year as detailed BCWMC water quality monitoring). Each lake shall be surveyed twice, in June and August.

Plant surveys will assess the distribution and growth density of all plants. All sampling and data analysis will be conducted according to the methodologies described in the MNDNR protocol for aquatic vegetation surveys. This methodology is based upon the point intercept survey method developed by John Madsen in Aquatic Plant Control Technical Note MI-02, 1999. This method consists of the following:

- A grid of evenly spaced points across the entire lake will be determined and mapped. The minimum number of sample points will be 125. Point spacing will range from 20 meters to 100 meters, depending upon lake size.
- staff will navigate to each point using a global positioning system (GPS) where a double-sided rake attached to a pole or rope will be tossed from a predesignated side of the boat and retrieved to obtain a sample of aquatic vegetation
- All species of aquatic vegetation will be identified and an abundance ranking from 1 to 4 will be assigned to each species based on the method referenced in Aquatic Plant Control Technical Note MI-02, 1999.
- Water depth will be recorded at each sampling location to the nearest tenth of a foot.
- Dominant sediment type will be recorded at each sampling location.

All data will be recorded. In addition to basic parameters and species statistics, the following indices will be reported:

- **Simpson Diversity Index Value**—index used to measure plant diversity, which assesses the overall health of the lake's plant communities. The index, with scores ranging from 0 to 1, considers both the number of species present and the evenness of species distribution. A high score indicates a more diverse plant community.
- **C value**—scale of values used to measure the average tolerance of the plant community to degraded conditions. Plant species are assigned C values on a scale of 0 to 10, with increasing values indicating plants are less tolerant of degraded conditions and, hence, are of better quality. An average of the C values for individual species within a lake's plant community indicates the average tolerance of the community to degraded conditions.
- **Floristic Quality Index (FQI) value**—FQI will be used to assess the quality of the plant communities. FQI considers both the quality of the individual native species found in the lake (C value) and the number of native species collected on the rake. Although Minnesota has not kept a record of FQI values, recorded Wisconsin FQI values range from 3 (degraded plant communities) to 49 (diverse native plant communities). The median FQI for Wisconsin is 22.

June and August data from each lake will be analyzed using Chi Squared analyses to identify any significant changes in species frequency of occurrence between June and August.

A.1.4. Stream Biotic Monitoring (Invertebrate Monitoring)

Monitoring Plan ID: BIO

Planned Interval: 3 years (Priority streams)

Description:

Benthic macroinvertebrate samples have been collected from Plymouth Creek and Bassett Creek (North Branch, Main Stem, and Sweeney Lake Branch). The sampling locations are identified as follows (see Figure 2-11 of the Plan):

- Plymouth Creek at Industrial Park Boulevard in Plymouth
- North Branch of Bassett Creek at 32nd Avenue North and Adair Avenue in Crystal
- Main Stem of Bassett Creek at Rhode Island Avenue in Golden Valley
- Main Stem of Bassett Creek east of Zane Avenue in Golden Valley
- Main Stem of Bassett Creek at Irving Avenue in Minneapolis
- Sweeney Lake Branch of Bassett Creek at Turner's Crossroad in Golden Valley

Minnesota Pollution Control Agency Invertebrate Sampling Procedures (EMAP-SOP4, Rev. 0) will be used to collect macroinvertebrate samples. The MPCA multihabitat method will be used to collect a composite sample from up to five different habitat types to get a sample representative of the invertebrate community at each sample location. The habitats to be sampled may include:

- Hard bottom (riffle/cobble/boulder)
- Aquatic macrophytes (submerged/emergent vegetation)
- Undercut banks (undercut banks/overhanging vegetation)
- Snags (snags/rootwads)
- Leaf Packs

Sampling will consist of dividing 20 sampling efforts equally among the dominant, productive habitats present in each reach. If the 20 sampling efforts are not equally divisible by the number of habitats present, the least dominant of the habitats will receive the lower number of sampling efforts (i.e., the remainder).

A sample effort is defined as taking a single dip or sweep in a habitat (e.g., hard bottom). A sweep is taken by placing the D-net on the substrate and disturbing an area directly in front of the net opening equal to the net width (1 ft²) and allowing dislodged invertebrates to drift into the D-net positioned downstream from the disturbed area. Each sample effort should cover approximately 1 ft² (0.09 m²) of substrate. The 20 sampling efforts will sample a total area of 20 ft² (1.8 m²).

The sampling will proceed from downstream to upstream, sampling the various habitats present. All samples will be preserved in 100 percent reagent alcohol and later identified in the laboratory.

Flow and water quality parameters will be sampled after completion of the macroinvertebrate monitoring. The following parameters will be measured using field instruments: discharge (flow), temperature, dissolved oxygen, specific conductance, turbidity, and pH.

Physical habitat will be assessed using the MPCA method (i.e., Physical habitat and water chemistry assessment protocol for wade-able stream monitoring sites). Habitat will be sampled using the transect point method. Thirteen transects will be established within each sample reach. The sample reach is determined by mean stream width (MSW) and is generally from 150 to 500 meters in length. For the locations in Bassett Creek, the sample reach will be 150 meters in length at sites that allow this length and would be shorter on sites that require a shorter length. The reach segment that is sampled will be documented with global positioning system (GPS) measurements. Four equally spaced points, plus the thalweg (or deepest point along the transect line), will be established along each transect; measurements or visual estimates will be made at each sample point to characterize key components of the physical habitat structure. Variables measured include water depth, depth of fine sediment and water, embeddedness, substrate, percent algae, and percent macrophytes. In addition, visual estimates of the following will be made:

- The amount of cover for fish determined from the percent of transect occupied by undercut banks, overhanging vegetation, woody debris, boulders, submergent macrophytes, emergent macrophytes, and other debris
- The amount of the stream bank that is actively eroding through break down, soil sloughing, or false banks
- The predominant riparian land use within the riparian zone (within 30 meters of the water's edge)
- Riparian buffer width which is the amount of contiguous undisturbed land use within a 10 meter area adjacent to the stream
- Canopy/Shading which is a measure of overhead canopy cover that is shading the stream channel

A complete habitat survey per MPCA methods will occur during 2015. Subsequent habitat surveys will be a modified version of the MPCA methods that only survey parameters that have changed since the 2015 survey. For example, parameters such as predominant land use, riparian buffer width, and canopy/shading will probably not change much over time. However, parameters such as depth of fine sediment, embeddedness, and substrate types are expected to change and should be assessed during each monitoring event.

When the MPCA releases the analysis tools required for calculation of the Macroinvertebrate Index of Biological Integrity (MIBI), the MIBI calculations will be performed. Due to the use of the Hilsenhoff Biotic Index (HBI) and Invertebrate Community Index (ICI) during past monitoring events (prior to the development of the MIBI), HBI and ICI will continue to be calculated after it becomes possible to calculate the MIBI for comparison with the historical record. Until the MIBI can be calculated, HBI and ICI will be calculated to assess the macroinvertebrate community. A trend analysis will be performed on the HBI and ICI data to identify significant changes over time.

A.1.5. Stream Water Quality Monitoring

Monitoring Plan ID: SWQ

Planned Interval: 2 consecutive years of monitoring initiated every 6 years (Priority streams)

Description:

The BCWMC will initiate a stream water quality monitoring program to monitor the chemical water quality of its priority streams. The exact monitoring locations will be determined based on the feasibility of installing automated samplers, but will be consistent with biotic monitoring locations, where possible.

Automated samplers will be installed and operated for two consecutive years (from snowmelt of year 1 through ice-in of year 2). Continuously monitored parameters will include temperature, conductivity, and stage (and may include dissolved oxygen and pH). Automated samplers will collect water quality samples in periods of high flow (i.e., snowmelt and after storm events) and during periods of baseflow. Parameters analyzed will include chloride, fecal coliform, total suspended solids, total phosphorus, and chlorophyll *a*.

A.2. Other Monitoring Programs

A.2.1 Three Rivers Park District Medicine Lake Water Quality

Monitoring Plan ID: TRPD

Planned Interval: Annually in Medicine Lake – Main Basin
3 year intervals in Medicine Lake – Southwest Basin (per BCWMC request)

Description:

The Three Rivers Park District (TRPD) performs chemical water quality monitoring in the main basin of Medicine Lake annually. Sampling is performed approximately every two weeks beginning in early May and extending through September. Profiles of dissolved oxygen, temperature, specific conductance, and pH are measured at 1 meter increments. Total nitrogen, chlorophyll *a*, and Secchi disc transparency are measured from the surface. Total phosphorus and soluble reactive phosphorus are measured at the surface and at depths of 6 meters and 12 meters.

At three year intervals, the BCWMC will request that the TRPD perform additional sampling and analysis in the southwest basin of Medicine Lake. This sampling and analysis will be performed consistent with the TRPD's protocol for monitoring the main basin.

A.2.2 Metropolitan Council Citizen Assisted Monitoring Program (CAMP)

Monitoring Plan ID: CAMP

Planned Interval: Annually in Priority 1 and Priority 2 waterbodies between detailed monitoring events

To be determined in non-Priority waterbodies (as requested by the member cities and approved by the Commission)

Description:

The Metropolitan Council's Citizen Assisted Monitoring Program (CAMP) has been collecting water quality data on a number of Twin Cities metropolitan area lakes since 1980. On a bi weekly basis (April - October), citizen volunteers collect a surface water sample for laboratory analysis of total phosphorus, total Kjeldahl-nitrogen, and chlorophyll-a, obtain a Secchi transparency measurement, and provide some user perception information about each lake's physical and recreational condition. Laboratory analysis of collected samples will be performed consistent with CAMP protocols, as determined by the Metropolitan Council Environmental Services.

The BCWMC will fund the inclusion of Priority 1 and Priority 2 waterbodies in CAMP during years when detailed water quality monitoring performed by the BCWMC is not planned.

A.2.3 Metropolitan Council Watershed Outlet Monitoring Program

Monitoring Plan ID: WOMP

Planned Interval: Annually on the Main Stem of Bassett Creek

Description:

The Watershed Outlet Monitoring Program (WOMP) is coordinated by the Metropolitan Council Environmental Services (MCES) and consists of a network of monitoring stations located throughout the Metro Area. The Bassett Creek WOMP site is located at Irving Avenue, one-fourth mile upstream of the storm sewer tunnel that runs beneath downtown Minneapolis to the Mississippi River.

The Bassett Creek station shelter is equipped with electricity, heat, and telephone modem. The station measures stage using a bubbler and pressure transducer which is connected to a Campbell data logger. The data logger records and calculates the conversion of stage readings into discharge using a rating curve polynomial. The data are averaged over 15-minute intervals and are downloaded via modem.

The Bassett Creek station also uses an ultrasonic transducer, mounted under a bridge to measure stage. The station is equipped with a non-heated tipping bucket rain gauge. An automatic sampler equipped with 1L sample bottles is also housed at the station. When stream stage increases to a chosen trigger depth the data logger controls and activates flow pacing to the sampler. The sampler collects up to 96 flow-weighted samples per storm. Conductivity and temperature are continually recorded

During runoff events the individual flow paced samples are collected and combined into one large sample. Grab samples were taken monthly all year during baseflow conditions. To comply with holding times water quality parameters were selected for analysis based on the elapsed time since the end of sample collection. The samples are analyzed in the MCES laboratory for water quality parameters including total suspended solids, total phosphorus, chloride, and other parameters.

The BCWMC will fund the continued operation of the Bassett Creek WOMP station.

A.2.4 Minneapolis Parks and Recreational Board (Wirth Lake Monitoring)

Monitoring Plan ID: MPRB

Planned Interval: Annually in Wirth Lake

Description:

The Minneapolis Parks and Recreational Board (MPRB) monitors Wirth Lake annually. Monitoring includes one winter sample, one sample in March or April, two samples per month from May through September, and one sample in October. Total Phosphorus, nitrogen, and Secchi depth are measured during all monitoring events. Additional chemical parameters are assessed with less frequency.

All physical measurements and water samples for chemical analyses are obtained from a point directly over the deepest point in Wirth Lake. A multiprobe is used to record temperature, pH, conductivity, and dissolved oxygen profiles at 1 meter intervals. Secchi disk transparency is determined with a black and white 20-cm diameter disk on the shady side of the boat.

Composite surface water samples are collected using a stoppered 2-m long, 2-inch diameter white PVC tube and combined in a white plastic bucket. Water from this mixed sample is decanted into appropriate bottles for analysis. Chlorophyll-*a* samples are stored in opaque bottles for analysis. Total phosphorus, soluble reactive phosphorus, total nitrogen, and chlorophyll-*a* concentrations are determined from the surface composite sample for all sampling trips.

Phytoplankton samples are collected each sampling trip April through October for Wirth Lake.

Phytoplankton are collected from the 0-2 m surface composite sample and stored in an opaque plastic container with a 25% glutaraldehyde preservative solution. Vertical zooplankton tow samples are taken at the sampling station for each lake once per month during the growing season. Zooplankton are collected using a Wisconsin vertical tow net. Samples are preserved 90% denatured histological ethanol to a mix of approximately 50% sample 50% ethanol.

Table MP-5 BCWMC 10-year Monitoring Plan

Water- body Type	BCWMC Management Classification	Waterbody Name	Year										
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Lake	Priority 1 Deep	Medicine Lake	TRPD	TRPD PLANT ZOO	TRPD	TRPD	TRPD PLANT ZOO	TRPD	TRPD	TRPD PLANT ZOO	TRPD	TRPD	TRPD PLANT ZOO
		Parkers Lake	CAMP	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP
		Sweeney Lake	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP
		Twin Lake	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP
		Wirth Lake	MPRB	MPRB	MPRB	MPRB PLANT	MPRB	MPRB	MPRB PLANT	MPRB	MPRB	MPRB PLANT	MPRB
	Priority 1 Shallow	Northwood Lake	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO
		Westwood Lake	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP
	Priority 2 Shallow	Crane Lake	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	CAMP	BC-WQ PLANT ZOO
		Lost Lake	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	CAMP
		Cavanaugh Pond	CAMP	CAMP	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP	CAMP	CAMP	CAMP	BC-WQ/CAMP PLANT ZOO	CAMP
Stream	Priority Stream	Main Stem Bassett Creek	BIO WOMP	WOMP	WOMP	BIO SWQ WOMP	SWQ WOMP	WOMP	BIO WOMP	WOMP	WOMP	BIO SWQ WOMP	SWQ WOMP
		North Branch Bassett Creek	BIO	--	--	BIO SWQ	SWQ	--	BIO	--	--	BIO SWQ	SWQ
		Plymouth Creek	BIO	--	--	BIO SWQ	SWQ	--	BIO	--	--	BIO SWQ	SWQ
		Sweeney Branch Bassett Creek	BIO	--	--	BIO SWQ	SWQ	--	BIO	--	--	BIO SWQ	SWQ

Notes:

TRPD

BC-WQ

CAMP

MPRB

ZOO

PLANT

BIO

SWQ

WOMP

Detailed water quality monitoring performed by Three Rivers Park District of Medicine Lake

Detailed water quality monitoring performed by BCWMC (or contracted party)

Surface water quality monitoring by Metropolitan Council's Citizen Assisted Montioring Program (CAMP), or equivalent program

Detailed water quality and phytoplankton/zooplankton monitoring peformed by Minneapolis Park and Recreation Board

Zooplankton/phytoplankton monitoring performed by BCWMC

Aquatic plant survey performed by BCWMC twice per monitoring season (June and August)

Invertebrate monitoring and biotic index analysis performed by the BCWMC

Automated water quality monitoring of stream locations performeby by BCWMC (or contracted party)

Watershed Outlet Monitoring Program facilitated by Metropolitan Council Environmental Services

Appendix B

BCWMC Education and Outreach Plan

BCWMC Education and Outreach Plan

B.1. Main planning document that supports EOP

Bassett Creek Watershed Management Commission – Watershed Management Plan – September, 2015.

B.2. Executive Summary

The Bassett Creek Watershed Management Commission's (BCWMC) Education and Outreach Plan provides key messages and a guide for disseminating the information in order to educate watershed residents, businesses, policymakers, city staff, educators, students and other interested parties. In particular, the BCWMC aims to change behaviors toward more water-friendly practices and to keep audiences apprised of the following:

- The background, projects, and responsibilities of the BCWMC;
- The water resources of the watershed, their condition, and expectations for future conditions;
- Pollutants, their sources and best management practices necessary to protect and improve water resources;
- Volunteer opportunities related to monitoring or improving water resources;
- Importance of broad input and participation on BCWMC projects, plans, goals, policies, and community outreach methods; and
- Importance of public involvement and understanding of all proposed capital projects and new regulations.

The BCWMC will use its annual operating budget along with collaboration with other entities and possibly grant funding to implement its Education and Outreach Plan. Each year, the Commission's Education Committee will recommend to the Commission a detailed plan of implementation (including timing and tasks) as well as a budget. The Commission's Education Committee, volunteers, and staff will be the primary Plan implementers. The BCWMC will also seek collaborative groups and partners to help achieve the goals set out in the plan. Some of the partners include Metro Blooms, West Metro Watershed Alliance, Metropolitan Council, Metro WaterShed Partners, various schools, and Hennepin County. Many of the activities will be designed to meet member city MS4 education & outreach and citizen participation goals.

B.3. Core Audience

The core audience for each of the education topics and messages below includes several key groups:

- a. Watershed residents
- b. Elected and appointed officials in the watershed
- c. Businesses in the watershed
- d. Recreational water body users in the watershed.
- e. Educators and students in the watershed
- f. Environmental and special interest groups, lake associations, etc.
- g. Local government staff working in the watershed

B.4. Core Avenues of Disseminating Information

There are many ways and venues in which to disseminate educational materials to the various audiences. The primary of these that will be used most frequently include:

- a. BCWMC website
- b. Press releases
- c. Articles in city newsletters or newsletters of other entities
- d. Traveling exhibits and displays
- e. Watershed map, brochures, pamphlets and other written material
- f. Presentations to groups, organizations, and city councils or commissions
- g. Open houses, tours, meetings, workshops, trainings
- h. Permanent educational signs
- i. Participation in member city events (such as Plymouth Yard and Garden Expo, Golden Valley Days, etc.)
- j. Social media
- k. Broadcast or local radio or television spots

B.5. Topics, Key Messages, and Implementation

Topic: BCWMC Background, history, responsibilities and projects
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Audience: Core audience + residents or entities affected by proposed or existing projects of the BCWMC

Key Messages:

- a. Location of the watershed and list of cities in the BCWMC
- b. Location and description of the lakes, streams, and wetlands in the BCWMC
- c. The purpose of the BCWMC along with its history, governance, goals, work program, events, partners, primary contacts, and funding
- d. Information on proposed or existing projects of the BCWMC including renderings and information on expected future conditions and aesthetics (vegetation, sight lines, etc.)

Implementation:

Core avenues of disseminating information +

- a. Maintain BCWMC website with information including:
 - Water resources, monitoring results, TMDL reports
 - Watershed map
 - Annual reports of the BCWMC
 - Budgets and funding
 - BCWMC list of contacts
 - BCWMC capital projects including feasibility studies, designs, opportunities for citizen input
 - Links to helpful websites and partnering organizations

- b. Provide mechanism (open houses, public meetings, site meetings, etc.) for residents or entities to learn about proposed BCWMC projects and provide input early and throughout planning and implementation process
- c. Maintain standard messaging/marketing/branding materials for BCWMC correspondence and displays including:
 - Introduction letter/packet about the BCWMC for new Commissioners and others
 - BCWMC logo
 - BCWMC letterhead with succinct mission statement
 - Standard BCWMC identifying paragraph (to be used in every news release and communication vehicle)
 - Traveling educational display (to be used at fairs, special events, etc. with related focus)
 - Summary of BCWMC annual report (brief.
 - One page fact sheet about the watershed

Topic: The water resources of the watershed, their condition, and expectations for future conditions

Audience: Core audience + focus on residents who live on lakes, streams, and wetlands

Key Messages:

- a. Definition of a watershed and the importance of water resources in the community.
- b. Location of significant water resources in BCWMC (streams, lakes, wetlands)
- c. Data and general information on condition of waterbodies (if known) with water quality trends (if available)
- d. Information on impaired waters and TMDLs
- e. Information on blue green algae and aquatic invasive species
- f. Information on effect of improved water clarity on aquatic plants
- g. General limnological information including algae-zooplankton-fish interactions and phosphorus release from hypolimnion
- h. Information on different streambank restoration techniques and the pros/cons of each method

Implementation:

Core avenues of disseminating information +

- a. Include water monitoring reports and TMDL documents on BCWMC website
- b. Develop fact sheets or less technical reports with monitoring results (for website and dissemination elsewhere)
- c. Install stream identification road signs at stream crossings

Topic: Pollutants, their sources and best management practices necessary to protect and improve water resources

Audience: Core audience + focus on residents who live on lakes, streams, and wetlands and businesses that have a potential for impact on water (lawn care companies, developers, engineers, consultants, etc.)

Key Messages:

- a. Information on types of pollutants with emphasis on nutrients, chlorides, sediment, pesticides, and bacteria
- b. Information on differences between sanitary and storm sewers
- c. Information on importance of soil testing and how/where to use soil tests
- d. Information on how everyday activities from every property can effect water quality
- e. Effects of high nutrients on water quality including elevated possibilities for blue green algae blooms
- f. Major sources of pollutants include:
 - Grass clippings, leaves and fertilizers in street
 - General stormwater runoff and increased volume from hard surfaces
 - Runoff and associated pollutants from parking lots, driveways, rooftops
 - Eroding streambanks
 - De-icing materials
 - Industrial/commercial sites (spills, leaks, waste, vehicles, materials handling)
 - Direct runoff from lawns adjacent to lakes, streams
 - Pet waste, geese, wildlife
 - Trash
- g. Aquatic invasive species can significantly degrade habitat quality and recreational suitability
- h. Best management practices are everyone's responsibility (if we all do a little we can do a lot)
 - Sweeping grass clipping, leaves, and extra deicers from driveways, sidewalks, streets
 - Using environmentally friendly practices around yard and home
 - Installing raingardens, rain barrels, infiltration swales
 - Picking up trash and pet waste
 - Installing buffers along streams, lakes, wetlands
 - Monitoring for aquatic invasive species and remaining vigilant

Implementation:

Core avenues of disseminating information +

- a. Collaborate with West Metro Water Alliance
 - Develop educational materials including best practices brochures and Commercial Property Guidebook
 - Develop water quality problem or violations reporting form for use by residents
 - Develop interactive clean water curriculum for students and present in classrooms upon request
- b. Collaborate with Metro Blooms and Blue Thumb to provide workshops and trainings rain garden installations, native gardens, buffers, rain barrels, etc.
- c. Support Metro WaterShed Partners' Clean Water MN media campaign
- d. Support storm drain stenciling projects
- e. Support installation of storm drains and manhole covers with subwatershed identification and key messages

Topic: Volunteer opportunities related to monitoring or improving water resources

Audience: Recruit volunteers from core audience + focus on residents who live on lakes, streams, and wetlands

Key Messages:

- a. Volunteers are needed to help monitor water quality through the Citizen Assisted Monitoring Program and River Watch and other programs
- b. Volunteers are encouraged to participate on BCWMC committees
- c. Volunteers are needed for BCWMC participation in community events
- d. BCWMC Commissioners and Alternate Commissioners are noted as valuable volunteers
- e. Volunteers are respected and highly regarded by the BCWMC

Implementation:

- a. Support and work with Met Council's Citizen Assisted Monitoring Program for lake monitoring, Hennepin County's River Watch program for teachers and students monitoring streams, Hennepin County's Wetland Health Evaluation Program for wetland monitoring, storm drain stenciling projects, and other programs.
- b. Recruit volunteers through various events, venues and publications (cores avenues)
- c. Annually recognize and thank volunteers with thank you notes and recognition in press releases
- d. Recognize retiring Commissioners or Alternate Commissioners with resolution and certificate
- e. Provide training for volunteer activities, as needed
- f. Support or coordinate clean up events, creek walks, or other events and activities to involve the public

Topic: Importance of broad input and participation on BCWMC projects, plans, goals, policies, and community outreach methods

Audience: Core audience

Key Messages:

- a. The BCWMC values citizen input and needs citizen participation and support to balance interests and protect the watershed
- b. Residents are encouraged to attend BCWMC meetings to be informed and lend comments
- c. Lake associations, civic groups, environmental groups and others are encouraged to be informed and involved with the BCWMC
- d. Local elected officials are encouraged to understand the BCWMC 's Joint Powers Agreement and well as its goals, funding and governance and to lend input

Implementation:

- a. Maintained and updated website
- b. Broad dissemination of BCWMC meeting agendas/materials

- c. Written and verbal communication with residents, elected officials, and groups encouraging participation in meetings and events

Topic: Importance of public involvement and understanding of all proposed capital projects and new regulations

Audience: Core audience + residents, member cities and stakeholder groups potentially affected by a proposed project or regulation

Key Messages:

- a. Information on the location, layout, landscape changes, and effect of proposed projects
- b. Information on the effects and potential costs of proposed regulations

Implementation:

Core avenues of disseminating information +

- a. Notices to lakeshore groups, homeowner associations, boat owners and others directly affected by proposals/projects
- b. Notices to builders/developers and businesses directly affected by proposals/projects
- c. Public hearings prior to policy/project adoption with opportunities for citizen input and questions
- d. Presentations to city officials and key staff
- e. “Before” and “after” photos (or photo renderings) of proposed projects
- f. Policy/project fact sheet to send upon request and distribute at meetings

B.6. Evaluation

The BCWMC will evaluate its success at relaying key messages. Evaluation could take the following forms:

- a. Number of copies of watershed maps, brochures, or written materials that are disseminated.
- b. Approximate number of people attending or contacted through events, tours, open houses, public meetings, etc.
- c. Surveys to test public’s awareness, knowledge, use, and perception of water resources and their use of best practices. Surveys can be implemented in conjunction with cities or other entities or done through the BCWMC
- d. Program/workshop evaluations submitted by participants
- e. Number of volunteers

Appendix C

Characteristics and Classification of Major BCWMC Waterbodies

Appendix C. Characteristics and Classification of Major BCWMC Waterbodies

Name	BCWMC Classification	MDNR Public Waters Classification	Water Surface Area (acres)	Tributary Watershed Area (acres)	Public Beach	Public Access ¹	Listed as 303(d) Impaired Water by MPCA ²	Location of Waterbody ³	Intercommunity Watershed (Cities within watershed) ³	Waterbody Discharges to:	Past BCWMC monitoring (latest year)	Has history of CAMP monitoring with a volunteer	BCWMC Classification per 2004 Plan	MPCA classification, if available	Eligible to be listed as impaired for nutrients/eutrophication ⁴
North Branch Bassett Creek ⁵	Priority Stream	Stream	NA	2625	No	Yes	Yes ²	PL, NH, CR	Yes (PL, NH, CR, GV)	Bassett Creek	Yes (2012)	NA	NA	NA	Yes
Main Stem Bassett Creek	Priority Stream	Stream	NA	2561	No	Yes	Yes ²	PL, GV, CR	Yes (all)	Mississippi River	Yes (2012)	NA	Level 3	NA	Yes
Plymouth Creek	Priority Stream	Stream	NA	5427	No	Yes	No	PL	No	Medicine Lake	Yes (2012)	NA	NA	NA	Yes
Sweeney Branch Bassett Creek	Priority Stream	Stream	NA	1682	No	Yes	No	SP, GV	Yes (SLP, GV)	Bassett Creek	Yes (2012)	NA	NA	NA	Yes
Medicine Lake	Priority 1 Deep Lake	Lake	902	11014	Yes	Yes ¹	Yes ²	PL, ML	Yes (ML,PL, NH,GV,MK)	Bassett Creek	Yes (2013)	Yes	Level 1	Deep	Yes
Parkers Lake	Priority 1 Deep Lake	Lake	97	1065	Yes	Yes ¹	Yes	PL	No	Medicine Lake	Yes (2009)	Yes	Level 1	Deep	Yes
Sweeney Lake	Priority 1 Deep Lake	Lake	67	2397	No	Yes ¹	Yes ²	GV	Yes (GV,SP)	Bassett Creek	Yes (2009)	Yes	Level 1	Deep	Yes
Twin Lake	Priority 1 Deep Lake	Lake	21	131	Yes	Yes	No	GV	No	Sweeney Lake	Yes (2009)	Yes	Level 1	Deep	Yes
Wirth Lake	Priority 1 Deep Lake	Lake	38	405	Yes	Yes	Yes ²	GV	Yes (GV,MP)	Bassett Creek	No ⁶	No	Level 1	Deep	Yes
Northwood Lake	Priority 1 Shallow Lake	Lake	15	1294	No	Yes	Yes	NH	Yes (PL,NH)	Bassett Creek	Yes (2013)	Yes	Level 2	Shallow	Yes
Westwood Lake	Priority 1 Shallow Lake	Lake	38	463	No	Yes	No	SP	Yes (GV,SP,MK)	NA	Yes (2011)	Yes	Level 2	Shallow	Yes
Cavanaugh (Sunset Hill) Pond	Priority 2 Shallow Lake	Lake	13	126	No	No	No	PL	No	NA	Yes (1998)	No	NA	Shallow	Yes
Crane Lake	Priority 2 Shallow Lake	Lake	30	591	No	No	No	MK	No	Medicine Lake	Yes (2011)	No	Level 3	Shallow	Yes
Lost Lake	Priority 2 Shallow Lake	Lake	22	61	No	No	No	PL	No	NA	Yes (1997)	Yes	Level 2	Shallow	Yes
Birch Pond	NA	Lake	4.0	55	No	Yes	No	MP	Yes (GV, MP)	NA	No ⁶	No	NA	Unknown	No
Cortlawn Pond	NA	NA	5.6	457	No	Yes	No	GV	Yes (GV,SP)	Sweeney Branch	No	No	Level 3	Unknown	No
East Ring Pond	NA	NA	2.5	364	No	Yes	No	GV	No	Cortlawn Pond	No	No	Level 3	Unknown	No
Grimes Pond	NA	Wetland	6.1	114	No	Yes	No	RB	No	North Rice Pond	No	No	Level 3	Wetland	No
Hidden Lake	NA	Wetland	9	142	No	No	No	PL	No	Medicine Lake	No	Yes	NA	Deep	No
North Rice Lake	NA	Wetland	3.7	233	No	Yes	No	RB	Yes (CR,GV,MP,RB)	South Rice Pond	Yes (2013)	Yes	Level 3	Wetland	No
Schaper Pond	NA	Wetland	3.4	2070	No	Yes	No	GV	Yes (GV,SP)	Sweeney Lake	No	No	NA	Unknown	No
South Rice Lake	NA	Wetland	3.2	514	No	Yes	No	RB, GV	Yes (CR,GV,MP,RB)	Bassett Creek	Yes (2013)	Yes	Level 3	Unknown	No
Spring Lake	NA	Lake	4.3	43	No	Yes ¹	Yes	MP	No	NA	No ⁶	No	NA	Unknown	No
Turtle Lake	NA	Wetland	28	420	No	Yes	No	PL	No	Plymouth Creek	No	No	Level 2	Wetland	Yes
West Ring Pond	NA	NA	4.8	319	No	Yes	No	GV	No	East Ring Pond	No	No	Level 3	Unknown	No

¹ Public access includes is defined as adjacent public land; motorized boat access is also present at Medicine and Parkers Lake; non-motorized boat access is present at Sweeney Lake and Spring Lake.

² Total Maximum Daily Load (TMDL) studies complete for one or more impairments. For more information see Table 2-5 of the BCWMC Plan.

³ CR = Crystal, GV = Golden Valley, MK = Minnetonka, ML = Medicine Lake, MP = Minneapolis, PL = Plymouth, NH = New Hope, RB = Robbinsdale, SP = St. Louis Park

⁴ To be listed as impaired for nutrients, a lake must be designated as a deep or shallow lake by the MPCA and have a surface area of 10 acres or more.

⁵ For the purposes of BCWMC classification, Bassett Creeek Park Pond is considered part of the North Branch Bassett Creek.

⁶ Wirth Lake, Spring Lake, and Birch Pond are monitored by the Minneapolis Park and Recreation Board.

Appendix D

Gaps Analysis

Memorandum

To: BCWMC Next Generation Plan Steering Committee
From: Karen Chandler and Greg Williams
Subject: DRAFT Gaps Analysis Document (Revised)
Date: December 13, 2012
Project: 23/27-0051.33-2012-404
c: BCWMC Commission

This document, referred to as the Gaps Analysis, includes a list of issues and/or topic areas and subsequent discussion of those issues/topic areas as they relate to the existing 2004 Bassett Creek Watershed Management Commission (BCWMC) Watershed Management Plan (2004 Plan). The Gaps Analysis will guide development of the new Plan by identifying new issues and existing topics from the 2004 Plan that may warrant updating in light of new data, priorities, or regulations. The issues discussed in the Gaps Analysis generally follow the organization of the 2004 Plan, although additional issues not discussed in the 2004 Plan are also included.

Source Documents Reviewed

Several regulatory and BCWMC documents were used to identify issues and potential gaps. Publicly available documents used in this analysis include:

- Minnesota Pollution Control Agency (MPCA) *Draft 2012 MS4 Permit*
- MPCA *Minnesota Stormwater Manual* (2008)
- MPCA National Pollution Discharge Elimination System (NPDES) Construction Stormwater Permit (2008)
- MPCA Minimal Impact Design Standards (MIDS)
 - Memoranda published from 2010 through 2012
- Watershed District and Watershed Management Organization documents
 - BCWMC *Watershed Management Plan* (2004 Plan) (2004)
 - BCWMC *Requirements for Improvements and Development Proposals* (Requirements document) (2008)
 - Shingle Creek Watershed Management Commission *Rules and Standards* (2009)

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- Elm Creek Watershed Management Commission *Watershed Management Plan – Appendix F – Standards* (2008)
 - Minnehaha Creek Watershed District (MCWD) *Regulatory Rules* (2011)
- MPCA Total Maximum Daily Load (TMDL) studies and implementation plans for:
 - Sweeney Lake (2011)
 - Wirth Lake (2010)
 - Medicine Lake (2011)
- National Oceanographic and Atmospheric Administration (NOAA) Rainfall Atlas 14 – Draft (known as the TP-40 update) (October 2012)

Additional information solicited by the BCWMC and used to identify potential gaps includes:

- Comments in response to the BCWMC's notice of Watershed Management Plan update (June 2012) from:
 - Minnesota Board of Soil and Water Resources (BWSR) (letter dated 8/26/2012)
 - Minnesota Department of Natural Resources (MDNR) (letter dated 8/31/2012)
 - Metropolitan Council (letter dated 7/10/2012)
 - Three Rivers Park District (letter dated 9/4/2012)
- Issues identified by the Technical Advisory Committee (TAC) and summarized in a memorandum dated February 8, 2012
- Comments/suggestions solicited from the BCWMC Commissioners and heard at the September 24, 2012 and October 22, 2012 Steering Committee meetings.

Analysis of Gaps by Topic Area

This Gaps Analysis is organized according to the topic areas of the 2004 Plan. Topic areas within this document include Water Quality, Flooding and Rate Control, Erosion and Sediment Control, Stream and Lake Management, Wetland Management, Groundwater, Public Ditches, Public Education and Involvement, and Administration and Implementation. The Stream and Lake Management section of this document approximates the Stream Restoration section of the 2004 Plan, but includes stream and lake management topics not addressed within the 2004 Plan. While issues addressed in this document are categorized into one of the preceding sections, many of the issues have implications for other topic areas.

1.0 Water Quality

Section 4.0 of the 2004 Plan discusses water quality topics in the Bassett Creek watershed, including BCWMC goals and policies, management plans for key waterbodies, and the capital improvement plan

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(CIP) for water quality projects. The policies in this section address waterbody classification, monitoring, and project implementation. This section also references Level I water quality treatment standards and non-degradation standards for redevelopment, which are described in section 6.0 of the BCWMC *Requirements for Improvements and Development Proposals* (Requirements document). Level I standards and non-degradation standards for redevelopment are applicable to projects triggering BCWMC review; Level I standards include design criteria for BCWMC-approved BMPs.

Current Status	Identified Gap	Possible Outcome
<u>Level I Standards</u> The BCWMC's Level I standards (Policy 4.2.2.4-A) are based on Nationwide Urban Runoff Program (NURP) design criteria. These standards are similar to member cities and surrounding WMOs. The water quality attained using Level I standards is based on comparison of post-project site conditions with and without BMPs. The BCWMC's non-degradation policy requires no increase in TP for redevelopment projects that result in increased impervious area.	The BCWMC's policy is not as stringent as the MPCA draft MS4 permit with respect to new development or redevelopment. The MPCA draft MS4 permit requires no net increase in total phosphorus (TP), total suspended solids (TSS), and volume; a reduction is required for redevelopment projects (regardless of the change in impervious area). The MPCA's draft MS4 permit requirements consider comparison of pre-project and post-project conditions, unlike Level I standards.	The TAC cited the importance of establishing quantifiable goals and methods to achieve them, especially with respect to water quality (see Attachment A). The BCWMC may use the planning process to consider changes to its water quality standards for new development and redevelopment, possibly to more closely align them with the MPCA draft MS4 permit. This change would likely require much discussion and therefore a higher level of effort. Changes to the BCWMC water quality standards would require changes to the Plan policy and Requirements document.

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Current Status	Identified Gap	Possible Outcome
<u>Approved BMPs</u> The Requirements document includes a list of approved BMPs that meet Level I standards. Other BMPs may be used with the approval of the Commission.	This list does not explicitly consider “green infrastructure” BMPs such as green roofs, rainwater harvesting and reuse, etc., listed in the MPCA draft MS4 Permit and described in the MPCA’s MIDS documentation. MIDS documents provide additional detail regarding BCWMC-approved BMPs that is not present in the Requirements document (e.g., vegetated versus unvegetated infiltration basins).	The BCWMC may consider expanding its list of acceptable BMPs, or citing the MPCA draft MS4 permit and/or MIDS. Revisions to BCWMC water quality standards (see above) may affect this gap. Such changes may require a moderate level of effort from city/BCWMC staff to define the list. Adding BMPs would require revision to the Requirements document, but may not require changes in Plan policies.
<u>Infiltration</u> The 2004 Plan and Requirements document include infiltration as an approved BMP for stormwater management. However, neither document <u>requires</u> infiltration or prioritizes infiltration as a preferred method for improving water quality or reducing stormwater volume. When infiltration methods are used, the BCWMC's Level I standards require infiltration of the first 0.5 inches of runoff from impervious surfaces.	The MPCA draft MS4 Permit requires permittees to develop stormwater management programs that prioritize “green infrastructure” techniques, including infiltration. MIDS recommends infiltration of the first 1.1 inches of runoff from impervious surfaces (greater than the BCWMC’s 0.5 inches). Minnetonka, St. Louis Park, and Plymouth require infiltration (or other retention) as a means of volume control, and the cities of Crystal, Golden Valley, and Minneapolis encourage infiltration. The MDNR comment letter recommends that the BCWMC evaluate the need for infiltration/abstraction standards.	The BCWMC may use the planning process to determine the level to which infiltration should be required. Encouraging infiltration represents a smaller level of effort, but will require changes to the Plan and Requirements document. Developing and implementing a quantitative infiltration requirement (e.g., 1.1 inches) will require more discussion and a greater level of effort. The TAC identified "encouraging responsible infiltration" as a key role of the BCWMC, but expressed mixed opinions on whether the BCWMC should establish an infiltration or abstraction requirement to address water quality (see Attachment A).

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Current Status	Identified Gap	Possible Outcome
<u>Redevelopment</u> The 2004 Plan includes a redevelopment policy (Policy 4.2.2.4-A) that cites the importance of maximizing the amount of stormwater treatment obtained at the time of development, to avoid costly retrofitting in the future.	The BWSR and MDNR comment letters emphasize the importance of maximizing redevelopment and retrofit opportunities, as well as reduced imperviousness, in order to improve water quality. Because the Bassett Creek watershed is near full development, most opportunities to improve water quality will be through redevelopment projects. The 2004 Plan policy only applies to redevelopment projects that increase impervious area, potentially missing opportunities.	The planning process will allow the BCWMC to identify ways to find and take advantage of redevelopment opportunities, including land use plans and TMDL implementation plans. The BCWMC may consider funding additional treatment provided by redevelopment projects (e.g., performance beyond city standards or X-percent reduction below existing conditions). This will require a moderate to high level of effort, depending on the extent of policy changes (e.g., regarding funding methods).
<u>TMDLs</u> The 2004 Plan includes policies regarding general BCWMC participation in TMDL studies, but is vague regarding the roles and responsibilities the BCWMC will assume.	Since the development of the 2004 Plan, TMDLs have been approved for Sweeney Lake, Wirth Lake, and Medicine Lake, with specific roles and responsibilities assigned to the BCWMC. There is also the potential for increased watershed monitoring (e.g., watershed loading to Medicine Lake) stemming from these TMDLs. Future TMDLs will include Northwood Lake and Bassett Creek. Three Rivers Park District identified the Medicine Lake TMDL implementation plan as a priority for the BCWMC in its comment letter. The TAC cited a need for more clarity regarding how water quality issues are being addressed (e.g., TMDLs) and identification of the responsible party or program (see Attachment A).	The Plan will need to be revised to reflect the BCWMC's current roles in existing TMDLs and position the BCWMC for future roles. The planning process is an opportunity for the BCWMC to clarify responsible parties for non-TMDL water quality issues. Inclusion of existing roles in the Plan will require a moderate level of effort; greater discussion (and therefore a higher level of effort) will be required to define roles related to future TMDLs and non-TMDL water quality issues.

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Current Status	Identified Gap	Possible Outcome
<u>Water Quality Project Maintenance</u> The 2004 Plan provides limited detail regarding the BCWMC's maintenance responsibility for water quality projects. The BCWMC uses the Creek and Streambank Trunk System Maintenance, Repair and Sediment Removal Fund ("Channel Maintenance Fund") to finance the portion of a stream project that provides BCWMC benefits (including water quality); this definition has limited applicability (see also Flooding and Rate Control).	There is lack of understanding regarding the breakdown of maintenance responsibilities between the BCWMC and member cities for water quality projects.	The TAC recommends that the planning process address maintenance responsibilities for water quality management facilities constructed as part of the BCWMC CIP. This will require much discussion regarding policy and funding, and is therefore a high level of effort.
<u>Water Quality Monitoring</u> The 2004 Plan states that the BCWMC will coordinate with others to monitor water quality within the watershed.	There may be missed opportunities to enhance monitoring, education, or other water quality-related programs. In addition, there may be duplication of effort between multiple parties.	The TAC recommends that the BCWMC explore water quality programs and partnerships that build on the existing schedule of rotating monitoring efforts (see Attachment A). As part of the planning process, the BCWMC may develop a list of ongoing monitoring and other water quality programs (by BCWMC and others) to evaluate or prioritize coordination efforts. Generating this list will require a moderate level of effort. Developing coordination will require greater discussion and a high level of effort.

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2.0 Flooding and Rate Control

Section 5.0 of the 2004 Plan addresses flooding and rate control within the watershed, but focuses on the Bassett Creek trunk system (defined in the 2004 Plan). This section includes description of past flooding, the Bassett Creek Flood Control Project, and other flood mitigation projects. The 2004 Plan includes policies regarding floodplain management, as well as policies specifically related to the Bassett Creek Flood Control Project. Section 5.0 of the BCWMC Requirements document includes floodplain regulations applicable to development within the Bassett Creek watershed.

Current Status	Identified Gap	Possible Outcome
<u>Atlas 14 (TP-40 Update)</u> The 2004 Plan references storm events based on recurrence interval (e.g., 10-year event); these are commonly referred to as “design storms”. Table 3.2 lists TP-40 precipitation totals. Section 5.3.1 describes past flooding events with reference to TP-40 recurrence intervals. Several policies in Sections 5.2.2.1 and 5.2.2.2 related to flood protection refer to the 100-year event.	The draft rainfall Atlas 14 (the TP-40 update) includes updated precipitation frequency estimates for Midwestern states, including Minnesota. Although still preliminary, the results include increases in storm event precipitation totals for some storm event. For example, at the Minneapolis-St. Paul Airport, 100-yr 24-hour storm event increases from 6.0 to 7.9 inches. Member city and BCWMC stormwater management policies reference storm events that may be outdated. These changes may affect: - Member city rate controls and other standards - Stormwater infrastructure design criteria - BCWMC policies related to the BCWMC Flood Control Project, trunk system, and floodplain management - Floodplain delineation (FEMA and BCWMC)	The planning process is an opportunity for the BCWMC to determine how it wishes to address changes to precipitation totals presented in Atlas 14. This will require a high level of effort, as the changes have broad (and potentially costly) implications to both the BCWMC and member cities. Incorporation of Atlas 14 will require updates to Plan text and tables, and possibly revised Plan policies. The BCWMC’s consideration of rate control requirements (see Rate Control gap) may also be affected by changes in rainfall amounts.

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Current Status	Identified Gap	Possible Outcome
<u>Rate Control</u> The 2004 Plan specifies that member cities must require “rate control in conformance with the flood control project system” (Policy 5.2.2.2-E).	The existing rate control requirement is vague and has limited scope. The Shingle Creek WMC, Elm Creek WMC, and Minnehaha Creek Watershed District limit post-development runoff rates to pre-project conditions for storm events of specific return intervals. Crystal, Medicine Lake, Minnetonka, and Plymouth require no increase in 2-yr, 10-yr, and 100-yr flow rates (Minneapolis requires no increase in rate from the 5-yr and 100-yr storm events). The TAC recommends that the BCWMC consider strengthening or quantifying policies regarding rate and volume control.	The planning process is an opportunity for the BCWMC to develop quantitative rate control requirements, if desired. Such requirements would necessitate edits to policies in the Plan and the Requirements document. This would require a high level of effort if Atlas 14 results are to be considered in the rate controls (see Atlas 14 / TP-40 Update gap).
<u>Flood Protection</u> The 2004 Plan cites flood protection as a goal of the BCWMC (Section 5.2.1). The TAC feels that modification to the existing flood control project is not a high priority, and that current methods are working.	The TAC recommends that the BCWMC monitor opportunities to incorporate flood control objectives into other projects (see Attachment A).	The BCWMC may consider policies encouraging the consideration or incorporation of flood control objectives into all projects. This would likely require a moderate level of effort and result in changes to the Plan policies.
<u>Flood Elevations</u> The 2004 Plan includes 100-year flood elevations for many locations within the Bassett Creek watershed (Table 5-3).	Differences exist between BCWMC-determined 100-yr flood elevations and Federal Emergency Management Agency (FEMA) 100-yr flood elevations. The TAC recommends the BCWMC continue to monitor differences between BCWMC and FEMA 100-yr flood elevations (see Attachment A).	The BCWMC may consider policies to specify how conflicts between FEMA and BCWMC flood levels will be identified and resolved. This would likely require a moderate level of effort and result in changes to the Plan policies.

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3.0 Erosion and Sediment Control

Section 6.0 of the 2004 Plan focuses on erosion and sediment control and includes applicable BCWMC policies. The BCWMC reviews projects for compliance with erosion and sediment control standards. Requirements for developers are included in Section 7.0 of the BCWMC Requirements document and reference the MPCA's NPDES Construction Stormwater Permit and *Protecting Water Quality in Urban Areas* (superceded by the Minnesota Stormwater Manual).

Current Status	Identified Gap	Possible Outcome
<u>NPDES Construction Stormwater Permit</u> The Requirements document references the current NPDES Construction Stormwater Permit (MPCA, 2008)	The current NPDES Construction Stormwater Permit is scheduled to be updated in 2013 and will likely include new monitoring requirements consistent with federal regulations (more information pending December 17 MPCA informational meeting). This schedule, if it lags, may make it difficult to align the new BCWMC Plan with the permit changes, if desired.	The BCWMC may revise language in the Plan and Requirements document to generally require compliance with the NPDES Construction Stormwater Permit with limited specificity. This will require a moderate level of effort.
<u>Erosion Control Thresholds</u> BCWMC sediment and erosion control standards are triggered by greater than 200 cubic yards of cut or fill or disturbed area greater 10,000 square feet.	Member city thresholds for sediment and erosion control standards are similar to or more stringent than the BCWMC. Similar triggers provide potential opportunity for coordinating inspection efforts with member cities.	The planning process is an opportunity for the BCWMC to revise its erosion and sediment control triggers, if desired. This will require a high level of effort and will require revisions to the Plan policies and Requirements document.
<u>Sediment Deltas</u> The 2004 Plan includes policies describing the use of the Channel Maintenance Fund, which includes removal of accumulated sediment within the trunk system. However, the Plan but does not address sediment accumulation in lakes.	Sediment deltas have accumulated in lakes within the Bassett Creek watershed. Roles, responsibilities and funding sources for addressing sediment accumulation are not defined.	The TAC recommends that the planning process address roles, responsibilities and funding sources for removing these sediment deltas (see Attachment A). This will require a moderate level of effort and will include revisions to Plan policies.

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Current Status	Identified Gap	Possible Outcome
<u>Erosion Control Inspections</u> Member cities and the BCWMC both perform erosion control inspections of development projects.	This process provides BCWMC oversight and helps maintain consistency among all members, but may represent a duplication of effort.	The TAC recommends that the planning process review the purpose and responsibilities for conducting erosion control inspections (see Attachment A). This will require a high level of effort and will include revisions to Plan policies.

4.0 Stream and Lake Management

Section 7.0 of the 2004 Plan addresses stream restoration and includes policies regarding the establishment and use of a Creek and Streambank Trunk System Maintenance, Repair, and Sediment Removal Fund (“Channel Maintenance Fund”). The 2004 Plan and later member city inventories identify areas of bank erosion and sedimentation within Bassett Creek. Other policies emphasize the preservation of habitat and aesthetics. Requirements for streambank erosion and streambed degradation control measures are listed in Section 8.0 of the BCWMC Requirements document. Elements of lake management not directly associated with water quality or flooding are not addressed in the 2004 Plan.

Current Status	Identified Gap	Possible Outcome
<u>Stream Restoration</u> <u>Prioritization Factors</u> The 2004 Plan includes factors for prioritization of stream restoration projects, such as severity of erosion, stability of the site, quantity and quality of affected resources, cost, water quality benefits, and input from member cities.	The MDNR comment letter suggests specific prioritization factors representing a more holistic, ecological approach, including (but not limited to): extent to which the project addresses a systemic problem, breadth of benefits (e.g., habitat, water quality, and channel evolution), location within the watershed, and potential for controversy.	The planning process is an opportunity for the BCWMC to reassess factors for prioritization of stream restoration projects. This will require a moderate level of effort and may result in changes to Plan policies.

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Current Status	Identified Gap	Possible Outcome
<u>Stream Stabilization Methods</u> The 2004 Plan does not require or encourage specific methods for stream stabilization.	The MNDR comment letter discourages the use of “highly-engineered, hard-control solutions” for stream stabilization (e.g., riprap, checkdams) in favor of methods that promote natural functions and reduce maintenance requirements (MDNR draft restoration guidelines are available from Nick Proulx).	The planning process is an opportunity for the BCWMC to encourage natural methods for stream restoration. This will likely require a moderate level of effort and may require changes in Plan policy.
<u>Aquatic Invasive Species (AIS)</u> The 2004 Plan does not address AIS. The role of the BCWMC in AIS management is limited to curlyleaf pondweed control.	The MDNR comment letter identifies aquatic invasive species (AIS) as a significant threat to Minnesota’s lakes and rivers. The Three Rivers Park District comment letter also cites this issue. The Association of Medicine Lake Area Citizens (AMLAC) has also requested BCWMC support of AIS management efforts. The role of the BCWMC in addressing AIS is not well defined.	The planning process provides an opportunity for the BCWMC to define its role with respect to AIS. Roles of the BCWMC could include: - Continued monitoring of waterbodies - Public education and outreach - Financial sponsorship of other groups’ efforts - Management of AIS to preserve or improve recreational uses - Capital projects incorporating AIS control or prevention elements This will require a high level of effort and may require changes to Plan policies.
<u>Rare and Endangered Species</u> Section 3.7 of the 2004 Plan generally describes rare and endangered species within the Bassett Creek watershed.	Protection of rare and endangered species is not addressed within the policies of the 2004 Plan. The MDNR comment letter recommends including goals and policies to address how these resources will be protected.	The planning process is an opportunity for the BCWMC to define policies aimed at the protection of rare and endangered species. This will likely require a moderate level of effort.

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5.0 Wetland Management

Section 8.0 of the 2004 Plan describes wetland management in the Bassett Creek watershed. Member cities act as the local governmental units (LGUs) responsible for administering the wetland conservation act (WCA) with the exceptions of Medicine Lake, Robbinsdale, and St. Louis Park; for those communities, the BCWMC acts as the LGU. The BCWMC Requirements document does not explicitly include requirements for wetlands other than requiring compliance with WCA and “other wetland regulations” (e.g., member city standards).

Current Status	Identified Gap	Possible Outcome
<u>Buffer Widths</u> The 2004 Plan does not include a minimum wetland buffer policy or requirement. The 2004 Plan requires member cities to include a buffer policy in local water management plans.	The Shingle Creek WMC, Elm Creek WMC, and MCWD have created buffer policies for wetlands. In some cases, specific buffer widths are defined for individual waterbodies. Buffer widths vary amongst the BCWMC member cities.	The planning process is an opportunity for the BCWMC to evaluate support for, and the benefits of, a watershed-wide buffer policy for wetlands and other resources (e.g., lakes and Bassett Creek) (see Attachment A). This will require a moderate amount of effort and changes to Plan policies and the Requirements document.
<u>Wetland Regulation</u> Section 8.0 of the 2004 Plan describes BCWMC’s role in wetland management. The BCWMC acts as the LGU for administering WCA in three member cities.	The TAC identified concerns regarding the adequacy of existing regulatory controls and programs.	The TAC recommends that the planning process evaluate the BCWMC’s role regarding wetland issues (see Attachment A). Reassessment of BCWMC’s role will require a moderate level of effort, and may require changes to Plan policies.

6.0 Groundwater

Section 9.0 of the 2004 Plan addresses groundwater issues in the Bassett Creek watershed. The policies in this section require the use of liners or other engineering controls to prohibit undesirable infiltration from detention ponds, but otherwise avoid being prescriptive. The BCWMC reviews all MDNR groundwater appropriation permits within the BCWMC. The BCWMC Requirements document indirectly addresses groundwater protection via design criteria for water quality BMPs.

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Current Status	Identified Gap	Possible Outcome
<u>Groundwater Management Role</u> The 2004 Plan encourages actions by member cities, Hennepin County, and state agencies, but assigns few roles to the BCWMC regarding groundwater management. The 2004 Plan describes the role of other agencies in limited detail.	The BWSR comment letter identifies groundwater as a subject of increasing concern. The BCWMC's role in groundwater management is vague.	The planning process presents an opportunity for the BCWMC to assess and define its role in groundwater management, especially as related to the interaction of groundwater and surface water resources. Roles for the BCWMC could include: - Groundwater level monitoring - Cooperation and coordination with other regulatory entities (e.g., Hennepin County) - Establishing requirements through policies. The TAC recommends that the planning process review the Hennepin County Groundwater Plan for implications to existing or potential future BCWMC policies (see Attachment A). Assessment of the BCWMC's groundwater management role will require a high level of effort and may require changes to Plan policies.
<u>Groundwater Protection/MIDS</u> Section 9.0 of the 2004 Plan contains information about state agency roles pertaining to groundwater protection, including the MPCA.	The recent MPCA's Minimal Impact Design Standards (MIDS) project includes information regarding the protection of groundwater resources as related to infiltration practices. This information is not included in the Plan or Requirements document.	The planning process is an opportunity to incorporate (or reference) site considerations and decision-making tools for groundwater protection developed as part of the MIDS project. This will require a moderate level of effort and may require changes to the Plan policies and Requirements document.

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Current Status	Identified Gap	Possible Outcome
<u>Minnesota Department of Health (MDH) Guidance</u> Section 9.3 of the 2004 Plan references the MDH's Wellhead Protection Program.	The MDH addresses groundwater protection through administration of the Wellhead Protection Program, which requires public water suppliers who obtain water from wells to prepare and enforce wellhead protection plans (WHPPs). The MDH provides a guidance document <i>Evaluation Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas</i> (2007); this document is not referenced by the BCWMC Plan.	The planning process provides an opportunity for the BCWMC to evaluate or incorporate MDH guidance regarding groundwater protection and infiltration. This will require a moderate level of effort and may result in changes to Plan policies and the Requirements document (see above Groundwater Protection/MIDS gap and Infiltration gap in Section 1.0).

7.0 Public Ditches

Section 10.0 of the 2004 Plan contains information and policies regarding public ditches within the Bassett Creek watershed. The BCWMC manages public ditches that are part of the trunk system, while member cities are responsible for the management of public ditches within their municipal drainage systems. The BCWMC was asked by Hennepin County to support legislation (passed in 2008) which streamlines the abandonment of public ditches and the transfer of management responsibility.

Current Status	Identified Gap	Possible Outcome
<u>Public Ditch Management</u> Public ditches within the Bassett Creek watershed remain under the management of Hennepin County, but are not actively managed by the county.	The lack of active management of public ditches by the county results in complications/delays for projects that involve these ditches.	The BCWMC could assume a more active role in the process to abandon these ditches and transfer management authority to the BCWMC and/or member cities. This will require a high level of effort and may result in changes to Plan policies.

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8.0 Public Involvement and Education

Section 11.0 of the 2004 Plan addresses public involvement and education efforts of the BCWMC. The 2004 Plan focused on goals of conveying information regarding the BCWMC and its role, increasing public involvement in the planning process, and affecting public behaviors with water resource impacts. The 2004 Plan identifies specific key messages related to the aforementioned goals.

Current Status	Identified Gap	Possible Outcome
<u>City Staff Training</u> Section 11.0 of the 2004 Plan cites local governmental staff as a target audience for key BCWMC messages.	The MPCA draft MS4 permit's minimum control measures require permittees to implement and document "employee training" programs. The 2004 Plan does not specify training programs targeted at member city staff.	The BCWMC could consider implementing city staff training programs and recordkeeping practices to educate member city staff regarding significant BCWMC issues and best practices. This will require a moderate level of effort.
<u>Evaluation Metrics</u> The 2004 Plan identifies specific metrics to evaluate success of education and outreach programs, as recommended in the BWSR comment letter.	The 2004 Plan includes many key messages and respective target audiences. Specific metrics are not defined for some educational goals, or may be outdated.	The planning process presents an opportunity to evaluate existing metrics and consider ways the BCWMC can demonstrate to the public that it is operating effectively. This will require a moderate level of effort.
<u>Information Distribution</u> The 2004 Plan identifies media and distribution methods used to distribute information (e.g., BCWMC website, fact sheets, television).	The 2004 Plan does not include recent developments in communication technology and behaviors (e.g., social media, mobile computing).	The planning process is an opportunity to incorporate new technologies or methods of interacting with the public. This will require a moderate level of effort and may include revisions to Plan policies.

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Current Status	Identified Gap	Possible Outcome
<u>Project-based Educational Programs</u> Section 11.2.2.4 of the 2004 Plan includes some educational policies linked to specific projects (e.g., before and after project photos, signage at projects). Most educational policies, however, are not linked to specific projects or types of projects.	The BWSR comment letter strongly recommends implementing education and public involvement efforts in support of real actions or projects.	The BCWMC may consider methods to identify and take advantage of public education opportunities associated with specific projects. This will require a moderate amount of effort and may require changes to Plan policies.
<u>Educational Program Topics</u> Section 11.0 of the 2004 Plan identifies several “key messages” and educational topics that the BCWMC prioritized for public broadcast, although the list is not exhaustive.	The TAC expressed interest in expanding education programs subject to available funding (see Attachment A). The TAC suggested educational efforts to address issues including TMDLs, citizen concerns regarding the value of studies versus projects, and concerns of citizens living near low priority waterbodies.	The planning process is an opportunity to identify topics not adequately addressed in the current education program. This will require a moderate level of effort and may require changes to the Plan policies.
<u>Joint Education Programs</u> Policy 11.2.2.4-A of the 2004 Plan addresses the use of joint education/outreach programs and partnerships	The TAC believes there are greater opportunities for partnership between the BCWMC and member cities in developing educational materials, but recommended more clarity of BCWMC and member city roles regarding education and public involvement.	The planning process is an opportunity to reassess potential partnership opportunities and define roles for educational efforts. Identifying opportunities will require a moderate level of effort. Creating partnerships with defined roles may require a high level of effort.

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9.0 Administration and Implementation

Section 12.0 of the 2004 Plan describes administration of the BCWMC and presents the BCWMC implementation program. This section identifies the responsibilities of the BCWMC, including the trunk system, review of improvements, development proposals, and other permits, intercommunity planning and design, and dispute resolution. This section also describes the roles of the member cities and other agencies.

Current Status	Identified Gap	Possible Outcome
<u>Performance Goals</u> The 2004 Plan includes many quantifiable goals and policies (especially those related to water quality, flood control, and public education).	Many goals and policies in the 2004 Plan are presented without a corresponding strategy to quantify performance. The BWSR and Metropolitan Council comment letters cite the need for quantifiable goals and policies related to all water management topics (in addition to water quality).	The TAC suggests that the planning process should explore the need for and purpose of quantifiable goals for water management topics outside of water quality (see Attachment A). This will require a high level of effort.
<u>Financial Impacts of Regulatory Controls</u> BCWMC member cities are subject to regulatory controls stemming from the MPCA draft MS4 permit, WMO requirements, and other agency requirements.	Regulatory controls applicable to BCWMC member cities have financial impacts. The financial impact of such regulation is not adequately defined.	The TAC supports analyzing the financial impact of regulatory controls on member cities (see Attachment A). This will require a high level of effort by the BCWMC and member cities.

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Current Status	Identified Gap	Possible Outcome
<u>Flood Control Project Inspection and Maintenance</u> The BCWMC's <i>Operation and Maintenance Manual for the Bassett Creek Flood Control Project</i> (O&M Manual) requires annual inspection of the flood control project. The BCWMC performs inspections of the flood control project, but member cities are responsible for MS4 reporting.	The MPCA draft MS4 permit includes revised inventory, inspection, and maintenance requirements for stormwater systems. Although the BCWMC is not an MS4, the BCWMC O&M Manual generally satisfies the requirements of the draft MS4 permit. Alignment of the O&M Manual with MS4 requirements may reduce member city inspection efforts. Revisions to the O&M Manual may be required to incorporate elements of the pond assessment included in the draft MS4 permit. The TAC also cited a need for more clarity regarding maintenance policies (see Attachment A).	The planning process is an opportunity for the BCWMC to assess opportunities for streamlining inspections and add clarity regarding maintenance responsibilities. These actions will require a high level of effort and coordination between the BCWMC and member cities.
<u>Flood Control Project Replacement</u> The BCWMC Flood Control Project is aging. Portions of the project may need to be replaced in the future. Funding mechanisms currently exist for maintenance of the Flood Control Project.	It is unclear whether existing funding mechanisms (e.g., Long Term Fund) will be adequate to address increased maintenance and/or eventual replacement of the Flood Control Project system components in the future.	The planning process is an opportunity to re-evaluate the financial considerations for maintenance and replacement for the flood control project. These actions will require a high level of effort and coordination between the BCWMC and member cities, especially if additional funding mechanisms are deemed necessary.

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Current Status	Identified Gap	Possible Outcome
<u>Minnesota Statute 103B</u> The 2004 Plan references Minnesota Statute 103B, which describes the regulatory process for the development and revision (amendment) of watershed management plans.	Minnesota Statute 103B has been revised since the 2004 Plan; the 2004 Plan contains outdated information regarding the Plan amendment process.	The planning process should reference the updated statute and revised plan review process. This will require a minor level of effort.
<u>Member City Responsibilities</u> Section 12.1.2 of the 2004 Plan lists responsibilities for member cities. Section 12.4.2 describes BCWMC review of local water management plans, but does not describe any auditing process.	BWSR requires watershed management plans to clearly define the roles of WMOs and member cities and recommends a “mandatory checklist” for member cities. The TAC cites a need for more clarity regarding the division of responsibilities between the BCWMC and member cities (see Attachment A).	BWSR recommends that the BCWMC develop a defined auditing process for “spot-checking” municipalities for compliance, as well as assessing implementation of local water management plans. This will require a moderate level of effort.
<u>Multi-City Issues</u> Sections 12.1.1.2 and 12.1.1.3 of the 2004 Plan describe the BCWMC’s role regarding intercommunity stormwater planning and dispute resolution, respectively. Section 12.4 of the 2004 Plan states that the BCWMC will review changes to an intercommunity stormwater system that are inconsistent with a city’s approved plan or the BCWMC Plan.	The TAC cited a need for more clarity in determining whether an issue is a BCWMC issue versus member city issue, but expressed little support for expanding the responsibility and oversight of the BCWMC (see Attachment A). Policy changes may be necessary to address multi-city water management issues.	The planning process is an opportunity for the BCWMC to examine multi-city issues and assess whether the BCWMC is the best entity to resolve inter-governmental issues. This will require a moderate level of effort by the BCWMC and member cities.

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Current Status	Identified Gap	Possible Outcome
<u>Project Review Triggers</u> The BCWMC's thresholds and triggers for project review are similar to surrounding WMOs, although Minnehaha Creek Watershed District's threshold is lower.	Within the BCWMC, Crystal and Minnetonka have lower thresholds for review. There may be opportunities to revise review and inspection processes to avoid duplication of efforts, while maintaining an appropriate level of oversight.	The planning process provides an opportunity for the BCWMC to assess whether its existing triggers for project review are appropriate. This will require a moderate level of effort from the BCWMC and member cities.
<u>Cooperative Resource Protection</u> The 2004 Plan does not address ecological corridor, open space or greenway preservation (outside of Bassett Creek itself).	The BWSR comment letter recommends collaboration with other WMOs to pursue programs using bonds for purchasing of ecological corridors, resource protection, easement acquisition or other water management purposes.	The planning process represents an opportunity to analyze and recommend opportunities to maximize cooperative relationships with other regulatory agencies, including adjacent WMOs. Identification of opportunities will require a moderate level of effort.
<u>CIP Oversight</u> Section 4.0 of the 2004 Plan includes policies related to CIP implementation, but is limited to water quality projects. The recently completed CIP process flow chart adds clarity to the existing project implementation process, including Commission oversight.	Section 12.0 of the 2004 Plan does not include policies regarding CIP implementation or funding of BCWMC projects outside of water quality projects. The TAC expressed strong support for an annual review of the CIP and process documentation (see Attachment A).	The planning process is an opportunity to evaluate and refine procedures for inclusion and subsequent implementation of projects in the CIP, including the level of Commission oversight during the process. This will require a moderate level of effort.

Outcomes and Next Steps

Changes in regulations, available data, BCWMC priorities, agency expectations and public perceptions all affect the next generation planning process. This document identifies gaps between the 2004 Plan and the drivers to be resolved in the next generation planning process. The issues described herein should be considered during subsequent steps in the next generation planning process. The Gaps Analysis has identified these issues, but does not contain the necessary information to resolve them. Instead, this

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document should guide discussion by the next generation plan steering committee, commissioners, or other groups during the plan update process.

Attachment A

Technical Advisory Committee Identified Issues

The Technical Advisory Committee (TAC) completed five questionnaires addressing several topics between August 2010 and February 2012. A Barr Engineering memorandum dated February 8, 2012 and presented to the BCWMC at its February 16, 2012 meeting describes the results of those questionnaires. This section provides a summary of those results, listing items that warrant consideration by the BCWMC in the planning process. This list is not comprehensive; additional detail regarding each topic is available in the original memo.

Public Education and Involvement

- Existing programs are working, but there is support for expanding programs subject to funding availability
- There are opportunities for increased partnership between the BCWMC and member cities; greater clarity of city roles is needed

Erosion and Sediment Control

- The new Plan should address roles, responsibilities and funding for removal of sediment deltas in Bassett Creek and lakes
- The BCWMC should review the function and responsibilities for conducting erosion inspections

Flooding and Rate Control

- The BCWMC should monitor opportunities to incorporate flood control objectives into other projects
- Differences between BCWMC and FEMA floodplain elevations should continue to be monitored
- The new Plan should consider strengthening or quantifying policies regarding rate and volume control

Funding

- There is support for analyzing the financial impact of regulatory controls on member cities

Groundwater

- A key role of the BCWMC is to encourage responsible infiltration
- The BCWMC should review the Hennepin County Groundwater Plan for implications on existing or potential future BCWMC policies.

Attachment A

Planning Process

- More clarity is needed on what defines a BCWMC issue versus member city issue
- There is strong support for an annual review of the CIP (and process documentation)
- The planning process should explore the need for and purpose of quantifiable goals for water management topics outside of water quality

Water Quality

- More clarity is needed regarding how water quality issues are being managed and who or what process is responsible for addressing them
- The planning process should address quantifiable water quality goals and methods to achieve them
- The new Plan should address maintenance responsibilities for water quality projects

Wetlands

- The BCWMC's role regarding wetland issues should be considered in the planning process
- The BCWMC should assess whether there is support for stronger buffer requirements

BCWMC/City Evaluation, Accountability, and Enforcement

- There is agreement that the BCWMC and member cities cooperate to establish quantifiable goals and policies for each topic area and monitor them for success

BCWMC/City Responsibilities

- More clarity is needed regarding the division of responsibilities
- There is little support for increasing the responsibility and oversight by the BCWMC

New Issues (Identified since June 2010)

- More clarity is needed regarding maintenance policies
- Opinions are mixed on whether the BCWMC should establish an infiltration or abstraction requirement to address water quality

Appendix E

Results of Public Involvement during Plan Development

Appendix E

2015 Plan Outreach and Public Involvement Summary

The BCWMC gathered input from the residents, elected and appointed officials, city staff, state agencies and other partners through its Watershed Assessment and Visioning Exercise (WAVE) process. The WAVE process included a professionally written press release for local news organizations, soliciting input via an online survey (which resulted in 174 responses), and hosting a series of 11 small group meetings. The small group meetings were held with city councils, city commissions, lake associations, neighborhood associations, and other resident groups at different locations within the watershed in spring 2013.

The results of the survey and workshops were presented at a “summit” meeting in June 2013, attended by the public, lake associations and representatives of the member cities. The outcome of the summit was a prioritized list of issues facing the BCWMC. BCWMC Commissioners, TAC members, partnering organizations and review agencies also prioritized the issues at a subsequent plan development workshop. All of this input was considered in the development of Plan.

Items presented in Appendix D include:

- Watershed Assessment & Visioning Exercise (WAVE) flyer
- Professionally written press release to engage, inform and solicit public input
- List of small group meetings and resulting list of issues
- Results of online survey
- Results of issues ranking through June 2013 Watershed Summit
- Results of issues ranking through Plan Development Workshop



SPEAK FOR THE CREEK

Help set a course for **cleaner waters**

Make a difference in your watershed's future two ways:

1. Take the survey

Ten minutes of your time will help us shape ten years of direction for the future of Bassett Creek, Medicine Lake, Parkers Lake, Sweeney/Twin Lakes, Wirth Lake and many other waterbodies in the Bassett Creek watershed. Go to: <http://www.bassett-creekwmo.org> and let your voice be heard.

2. Attend the Bassett Creek Watershed Summit

Join the conversation and tell us what's important to you. Engage public officials, city planners, engineering staff, lake association members and others in a hands-on **Watershed Assessment Visioning Exercise**. This kind of WAVE is a public participation forum that will help us craft a watershed plan that best addresses the concerns and values of watershed stakeholders...like you.



BASSETT CREEK WATERSHED SUMMIT*

Thursday, June 13, 2013 at 7:00 pm

Plymouth City Hall, 3400 Plymouth Blvd.

*Pre-registration is requested but not required. Email bcra@barr.com or contact Laura Jester at 952-270-1990 for more information.

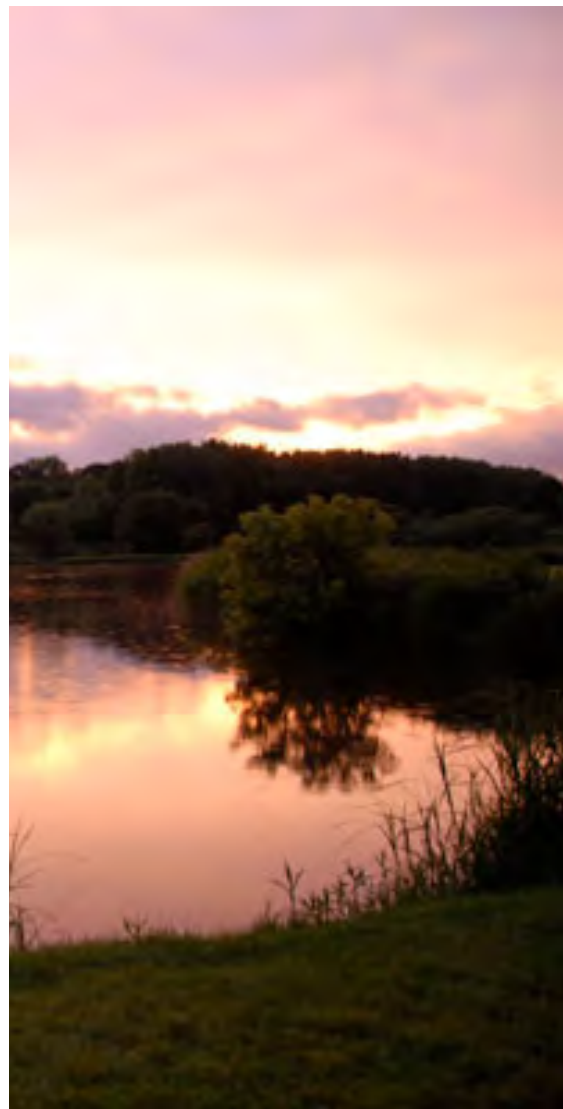


Photo credit: Dan Johnson, Crystal, MN

The Bassett Creek Watershed Management Commission is a local governing body tasked with managing flood control and water quality within the Bassett Creek watershed. The watershed encompasses portions of nine west metro cities including Crystal, Golden Valley, Medicine Lake, Minneapolis, Minnetonka, New Hope, Plymouth, Robbinsdale and St. Louis Park. Learn more about the Bassett Creek Watershed Management Commission at <http://www.bassettcreekwmo.org>.



PRESS RELEASE: For immediate release

February 18, 2013

Contact: Laura Jester 952-270-1990; laura.jester@keystonewaters.com

Wanted: Your Thoughts and Ideas for Lakes and Streams in the Bassett Creek Watershed By Judy Arginteanu

Suffering from insomnia? Read this for a quick cure: Stormwater runoff. Infiltration. Watershed management .

Yawn, right? Feeling sleepy now?

OK, now try this: Shrinking back yards. Stinky creeks. Flooded basements.

Kind of wakes you up again, doesn't it?

That's why the Bassett Creek Watershed Management Commission wants to hear from you. The commission is made up of ordinary residents like you who focus on improving water quality and preventing flooding – issues that affect all of us – in the 40-square-mile Bassett Creek watershed. Every 10 years the commission updates its management plan for protecting and improving the watershed, which includes Medicine, Parkers and Sweeney lakes, Wirth Park, and, of course, Bassett Creek. The commission is starting to update its plan for the next 10 years and needs input from you. Residents and businesses can air their thoughts and concerns through a quick and easy online survey at www.bassettcreekwmo.org, at meetings in their communities, or at a Bassett Creek Watershed Summit scheduled for 7 p.m., June 13, 2013, at the Plymouth City Hall.

If you think your voice won't make a difference, Terrie Christian knows otherwise. When she bought her property on Medicine Lake in the mid-'80s, she found "a very, very sick lake," filling with sediment and full of algae blooms that turned the lake into a smelly mess and drove away walleye and other game fish — not to mention swimmers.

Some 25 years later, through the commission, Christian and other lake-area residents have seen their concerns not only heard, but acted on. While the lake still faces some issues, it's in far better health. The commission needs to hear from people like Terrie on the front lines, who serve as the commission's eyes and ears, says commissioner Ginny Black. "We need people to tell us what they're seeing. We can't be everywhere, all the time." And you don't have to live on a lake, or even take regular walks by a stream, either. For example, you may find your backyard is slipping away because of erosion – caused by what's happening upstream. Or you might have a strong opinion about the importance of green corridors and

parks, says state conservationist Brad Wozney, because how land is used directly affects the quality of water resources.

Citizen input is also a good way to help direct where your tax dollars are going, he says. Plus, he notes, a well-drafted plan – which includes adequate citizen input so the commission can be as specific as possible – can help local governments get state grants for projects, which in turn help local dollars go further toward improvements.

Since the Bassett Creek watershed is mostly developed, the commission focuses on opportunities to retrofit best management practices into the landscape and restore degraded areas along streams. Improving water quality and reducing flooding are the main goals of the Commission. Additional areas of focus come through feedback from people like you.

Those goals are important to people like Deacon Warner, who says he never knew about Bassett Creek until he and his family moved to Minneapolis' Harrison neighborhood (and later to Bryn Mawr). Now he, his wife, and their two kids, 8 and 12 years old, spend much of their time near the creek – walking, kayaking, even skiing along it in winter. “Bassett Creek is like a test microcosm of how we want to treat nature. It's had an incredible history – it used to be incredibly polluted, it was treated as a sewer, it was buried. It seems so important that we don't turn our backs on nature even in our urban environment. We have choices about how we want to treat it,” says Warner.

Terrie Christian would agree. The point, she says, is to speak up: “Citizen input is really important. And it can be really powerful.”

The Bassett Creek watershed covers parts or all of Crystal, Golden Valley, Medicine Lake, Minneapolis, Minnetonka, New Hope, Plymouth, Robbinsdale and St. Louis Park. To see a map of the watershed, find out more about the watershed planning process, answer survey questions, or find out how you can get involved, visit the Bassett Creek Watershed Management Commission's website at www.bassettcreekwmo.org, attend the Bassett Creek Watershed Summit on June 13, or contact their administrator, Laura Jester, at laura.jester@keystonewaters.com or 952-270-1990.

Invitation to the Bassett Creek Watershed Summit

Join us in a conversation about the watershed. Learn the results of the survey, visit with other residents of the watershed, and help us prioritize watershed issues!

**Thursday June 13, 2013
7– 9 p.m.
Plymouth City Hall**

Registration is requested but not required.
Register with bcra@barr.com

Provide Input on the Bassett Creek Watershed

Visit www.bassettcreekwmo.org to complete a survey about your thoughts on water resources in your community!

**BCWMC Watershed Assessment and Visioning Exercise
Small Group Meetings with Member Cities**

SCHEDULE OF MEETINGS:

Date	City/Group	Facilitator
March 8, 2013	Minnetonka City Staff	Linda Loomis, Plan Steering Committee Chair
March 12, 2031	Golden Valley Council Manager Meeting w/ Commission Chairs invited	Linda Loomis, Plan Steering Committee Chair
March 18, 2013	New Hope Council Work Session	Linda Loomis, Plan Steering Committee Chair
March 25, 2013	Crystal Council Work Session	Dan Johnson, BCWMC Commissioner
March 30, 2013	Minneapolis Neighborhoods Public Meeting w/ MPRB	Michael Welch, BCWMC Commissioner & Lisa Goddard, BCWMC Alternate Commissioner
April 10, 2013	Plymouth Environmental Quality Commission w/ Lake Association Presidents invited	Ginny Black, Chair, BCWMC Commission
April 11, 2013	St. Louis Park Staff	Justin Riss, BCWMC Alternate Commissioner
April 18, 2013	Robbinsdale Planning Commission	Linda Loomis, Plan Steering Committee Chair
April 18, 2013	City of Medicine Lake Planning Commission	Ted Hoshal, BCWMC Commissioner
April 25, 2013	Association of Medicine Lake Area Citizens (AMLAC)	Dan Johnson, BCWMC Commissioner
June 18, 2013	Friends of Northwood Lake	Linda Loomis, Plan Steering Committee Chair

RESULTS:

Question 1: What are the indicators of healthy waterbodies?
Wildlife and Plants
1. Abundant and diverse wildlife in and around water
2. Abundant birds, wading birds and waterfowl present, including swans
3. Abundant and diverse vegetation
4. Little or no aquatic vegetation (weeds in water)
5. Healthy fishery, including minnows; that provides good fishing opportunities
6. Natural shoreline with good wildlife habitat
7. Amphibians present
8. Macroinvertebrates (bugs) present
9. No Eurasian watermilfoil or other invasive species present
10. Native species thrive

Water Quality
1. Lack of algae; not slimy
2. No odor
3. Unpolluted
4. Good water clarity
5. Good water temperatures (not too warm)
6. Nice water color
7. Non-oily or greasy
8. Fishable and swimmable (meeting standards)
Physical Aspects of Waterbodies
1. Not clogged with leaves
2. Bottom is not mucky
3. Deep
4. No trash in or along water
5. Nice aesthetics
6. Less streambank or shoreline erosion; shorelines are vegetated
7. No sedimentation
8. No direct stormwater runoff reaching waterbody
9. Not as much flooding
10. No stagnant water, streams are flowing
11. Less flashy
12. Stable water levels in lakes
13. Good oxygen levels in water
Public Enjoyment and Practices
1. Visible public use
2. People enjoying swimming; good swimming beach
3. Includes access for walking and hiking
4. Peaceful
5. Sustainably used by people
6. Residents keep yard fertilizers out of lake
7. Year-round access to lakes (due to consistent water levels)

Question 2: What concerns do you have regarding the waterbodies in your community?
Effects of Individuals
1. Too much trash
2. Too many motorboats
3. Too much pet waste
4. Runoff from yards and streets
5. Too much groundwater consumption
6. Lack of infiltration or diversion in lawns
7. Lack of sense of responsibility and respect/lack of attention from residents and businesses
Development/Infrastructure
1. Salt use
2. Lightrail – encroachment in wetlands
3. Stormwater runoff without filtration or treatment, more treatment ponds needed

4. Concentration of impervious surfaces
5. Chemical and pollutant inputs from runoff
6. Modifications to waterbodies due to development
7. Runoff from older commercial/industrial areas
8. Construction site erosion
9. Effects of housing developments
10. Leaks and spills from railroads
11. Aging infrastructure
12. Effects of dredging
Biology
1. Too many weeds
2. Non-natural shorelines
3. Aquatic invasive species, including rough fish
4. Terrestrial invasive species
5. Too much algae
6. Too many geese
7. Lack of wildlife diversity
8. Lack of buffers
9. Fish consumption advisories
10. Loss of thousands of ash trees in watershed
Physical/Chemical Aspects of Waterbodies
1. Lack of public access and well maintained access
2. Non-consistent water levels
3. Sediment build-up
4. Streambank erosion
5. Increased rainfall events
6. Too much total phosphorus, including internal loading
7. Low water clarity
8. Low water levels on Medicine Lake
9. Bassett Creek south of Glenwood is “terrible”
10. Flooding
11. Groundwater quality and quantity in wells in Medicine Lake
12. Abundance of cattails in ponds resulting in flooding problems
Funding/Governance/Societal
1. Lack of funding
2. Commitment from all 9 cities
3. Lack of education
4. Not enough benefit to not enough people (projects?)
5. Need better prioritization of projects
6. Apathy of public; need to change behavior, actions, habitats of residents
7. Not enough projects in Northwood Lake subwatershed
8. Lack of city-implemented projects like raingardens
9. Need better sources of information
10. Need more tax incentives for better projects
11. Expectations that water quality problems can be solved quickly with a silver bullet
12. Need more land acquisition for flood easements
13. Balance management of recreational lakes vs. scenic ponds
14. Pond management before lake management

15. Balancing habitat with recreation
16. Need to fully study effects of Medicine Lake's possible water level manipulation on the floodplain, water quality, water temperatures, and overall lake health

Question 3: What are the barriers to improving water quality?
Physical
1. Poorly drained soils
2. Flooding
3. Lack of space for water quality projects
4. Zebra mussels
5. Too many weeds
Government
1. Lack of funding and resources
2. Lack of education and knowledge
3. Time
4. Lower priority for decision makers
5. Science of water quality is still young
6. Lack of consensus and common ground on what it takes to improve water quality
7. Government inefficiency
8. Inability to identify the problem and install correct project in correct location
9. Push for development
10. Government agency restrictions
11. Not being willing to dredge
Public
1. Too many motorboats
2. Angry residents
3. Unwillingness to change, self interests
4. Disconnection of public from natural resources
5. Property rights
6. Stigma of environmental issues, in general
7. Public unwilling to give more funding

Question 4: How can we address the barriers to improving water quality?
Information and Education
1. More education, information, outreach to residents
2. Education of children; involve schools
3. Educational signage
4. Public service announcements
5. Neighborhood outreach
6. Sponsorship by companies that make water-related products (boats, motors, etc)
7. Newsletters
8. City celebrations
9. Citizen monitoring programs (CAMP, WHEP)
10. National Night Out as a venue for education and outreach
11. Consistent message among watershed organizations
12. Labeling stormdrains

13. Focused volunteer efforts; organize stakeholder volunteer group
14. City Park and Rec programs focused on water; summer camps
15. Coordinated clean ups among all cities
16. Use natural constituencies and existing groups
17. All 9 cities working together on education and outreach
18. Sponsor events linking water quality to water use
19. Show visual impacts
20. Install paths near projects
21. More trails along creek
22. Start Bassett Creek Farmers Market near creek
Government
1. Streamline permitting; more uniform regulations
2. Be a watershed management organization; not a watershed district
3. Transparency of actual costs
4. Look regionally vs. jurisdictionally
5. Need more scientific proof of negative impacts
6. Reward good behavior
7. Provide small grants



Bassett Creek Watershed Management Commission

SURVEY RESULTS

Thank you to everyone who answered the survey as part of the Watershed Assessment and Visioning Exercise! These answers helped to outline important issues and activities where the Bassett Creek Watershed Management Commission can focus its work over the next ten years. The Commission looks forward to partnering with communities, organizations and residents in continuing to improve and protect the water resources throughout the watershed.

Although the survey is closed, please always feel free to contact the Commission with your thoughts and ideas! Thank you.

A NOTE ABOUT THE SURVEY RESULTS:

- This online survey was available through the Bassett Creek Watershed Management Commission's website for approximately 3 ½ months from the end of February 2013 to mid-June 2013.
- 174 people completed the survey.
- The results below include answers to the open ended questions but all personal or identifying information was removed from the responses so that individuals remain anonymous.

Bassett Creek Watershed Management Commission

7800 Golden Valley Road | Golden Valley, MN 55427 | www.bassettcreekwmo.org | Established 1968

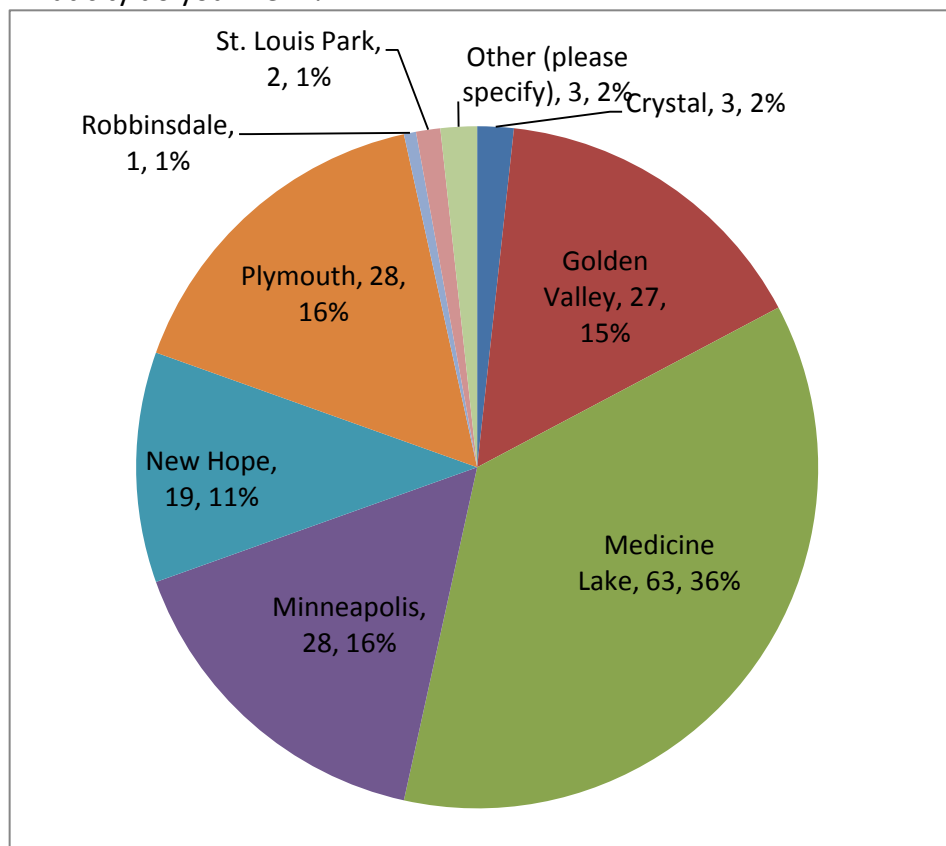
Crystal | Golden Valley | Medicine Lake | Minneapolis | Minnetonka | New Hope | Plymouth | Robbinsdale | St. Louis Park

Bassett Creek Watershed Management Commission

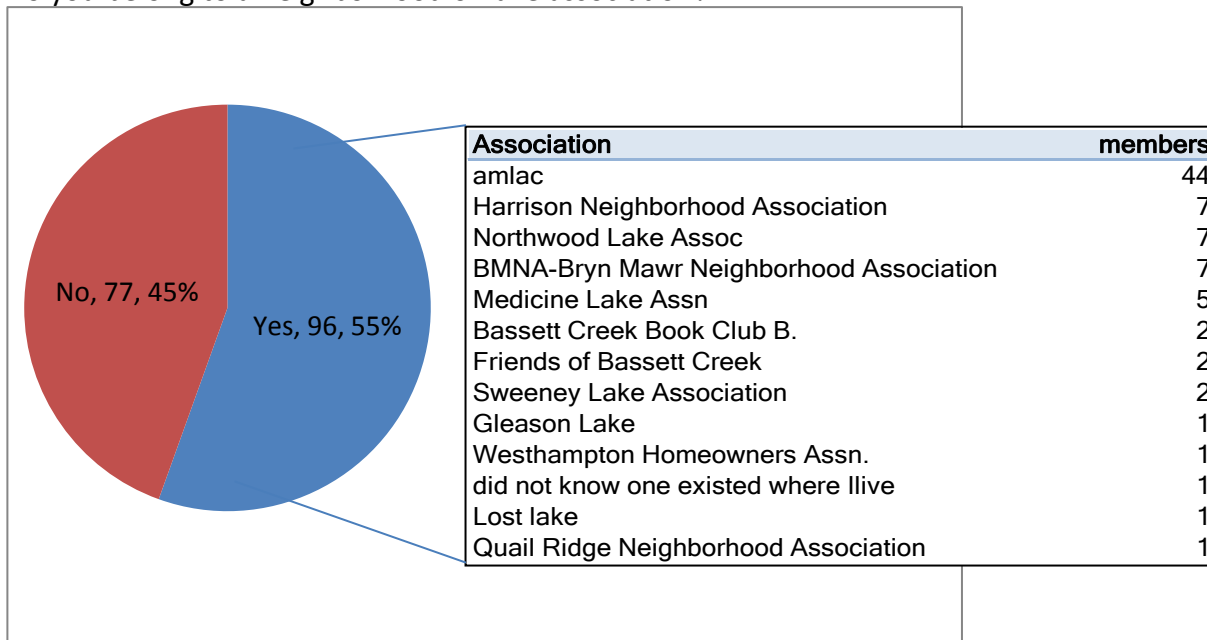
Watershed Assessment and Visioning Exercise (WAVE) Survey

FINAL RESULTS: 6/24/2013 (174 responses)

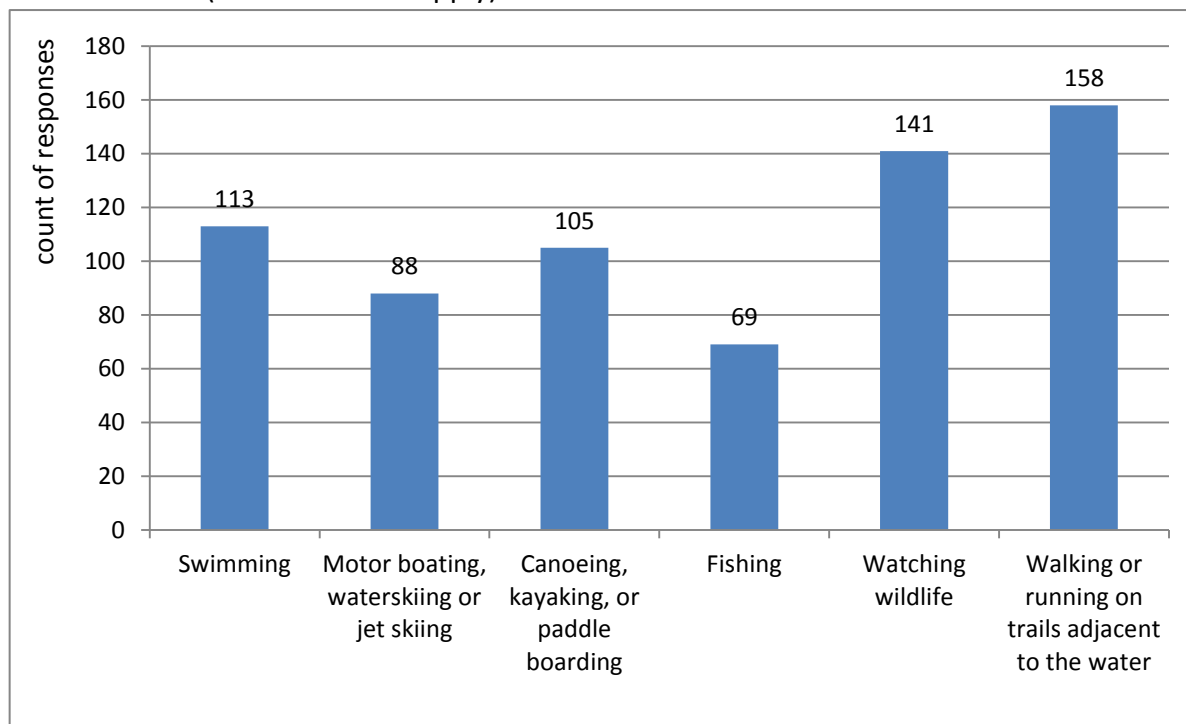
1. What city do you live in?



2. Do you belong to a neighborhood or lake association?

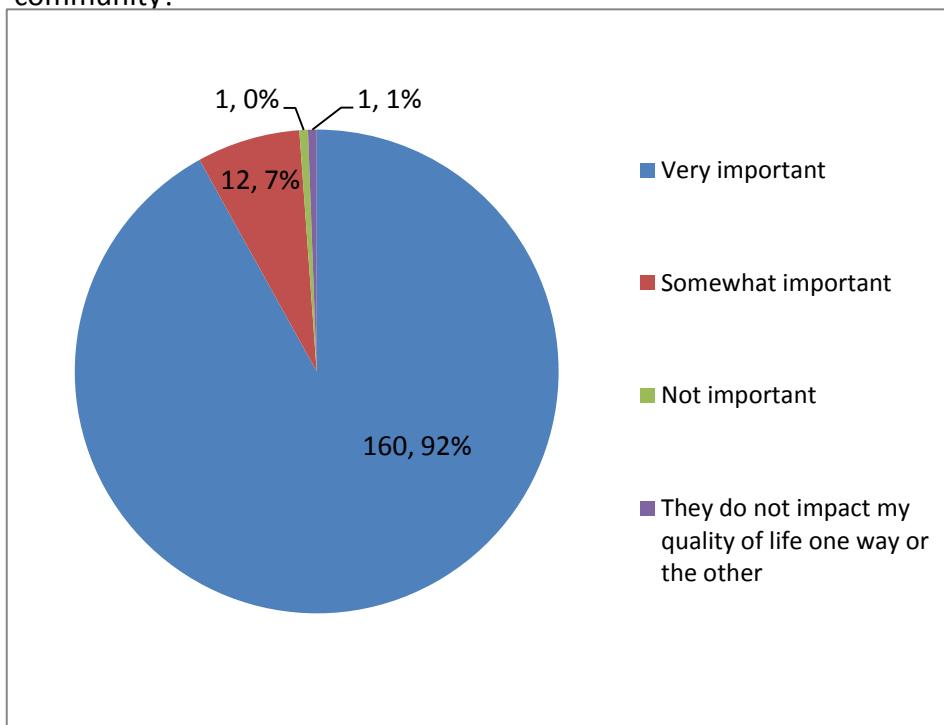


3. How do you use the lakes, streams, ponds and wetlands in your community or surrounding communities? (Choose all that apply)



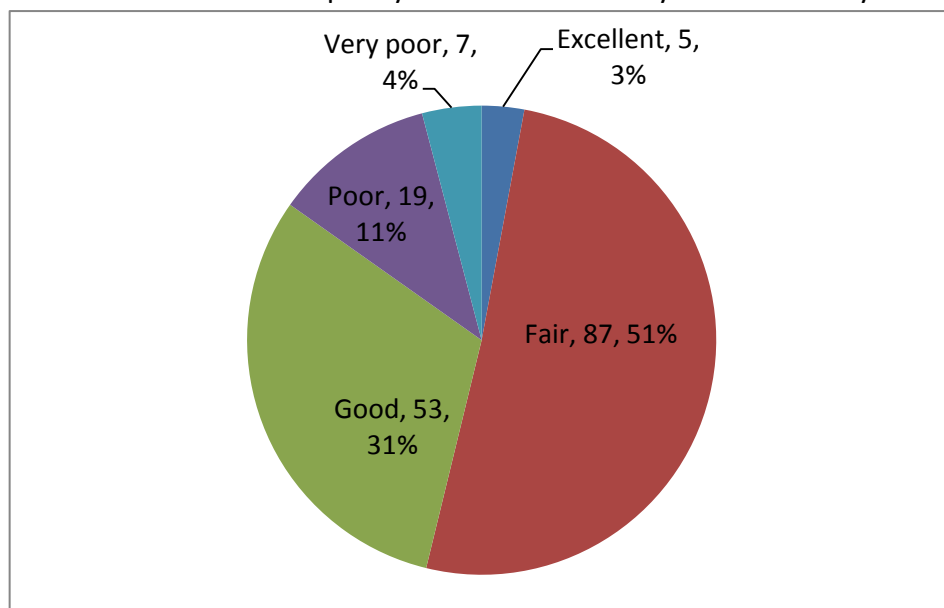
see narrative report (page 6) for "In what other ways do you use water resources in your community"

4. How important are the lakes, streams, ponds and wetlands to your quality of life in your community?



see narrative report (page 7) for "HOW do the water resources impact life in your community"

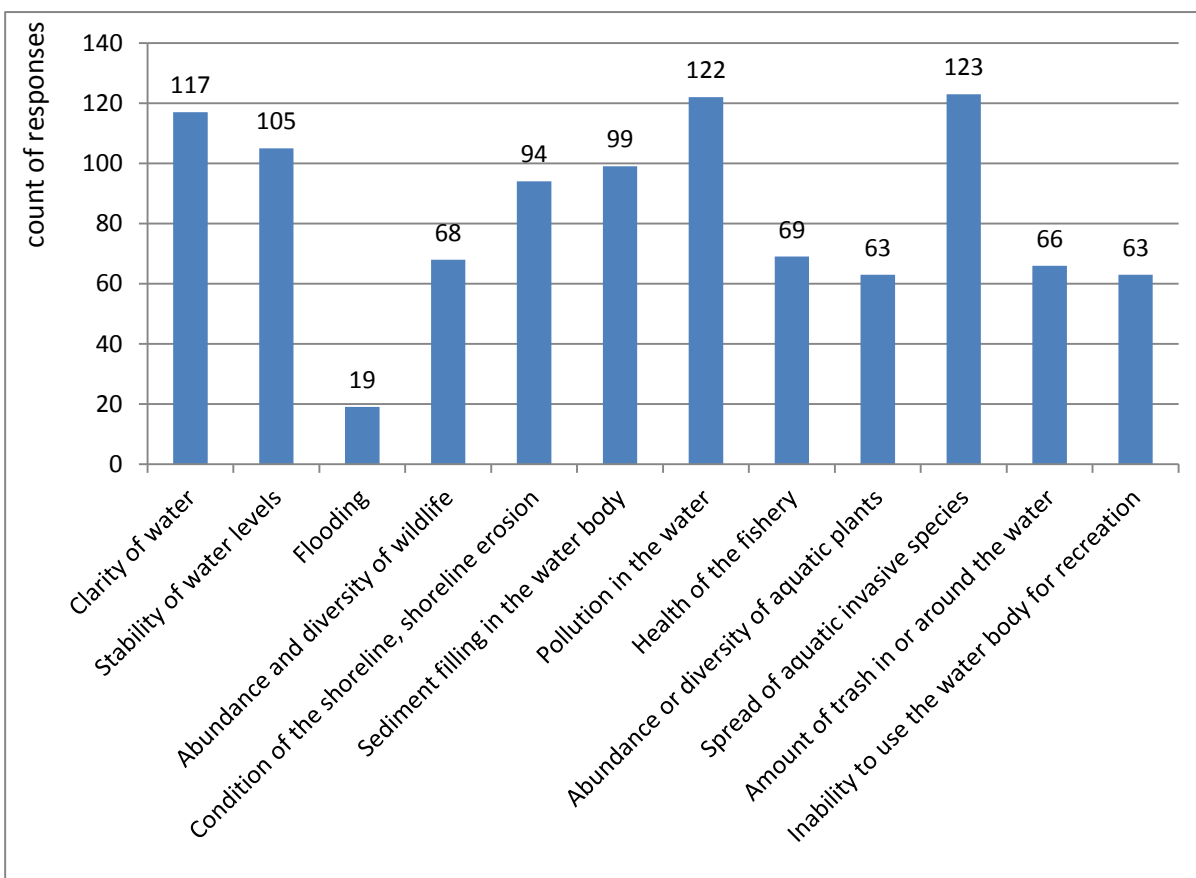
5. Please rank the overall quality of water bodies in your community.



see narrative report (page 11) for "5a. Why do you believe the water resources currently have this quality?"

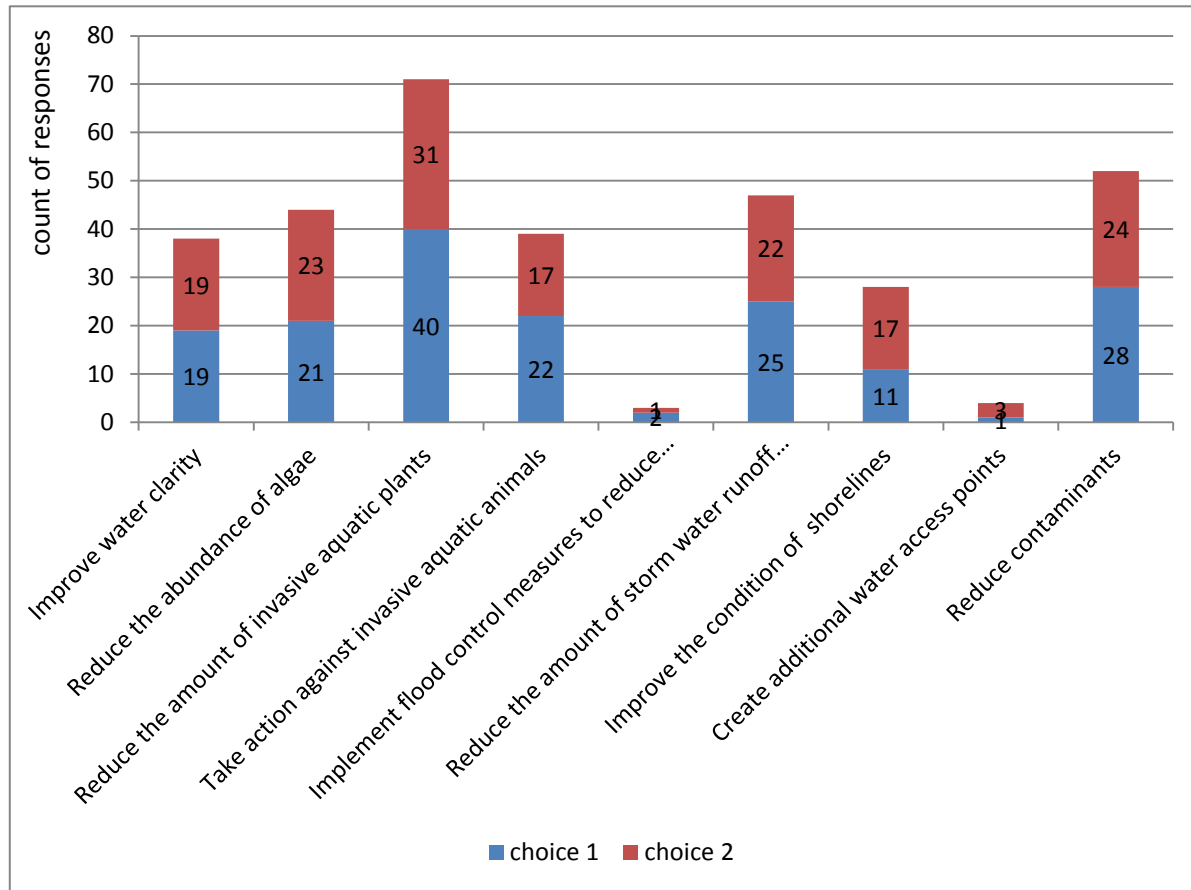
see narrative report (page 16) for "5b. Are there one or two water bodies that stand out?"

6. What concerns you about the condition of the lakes, streams, ponds and wetlands in your community? (Choose all that apply)

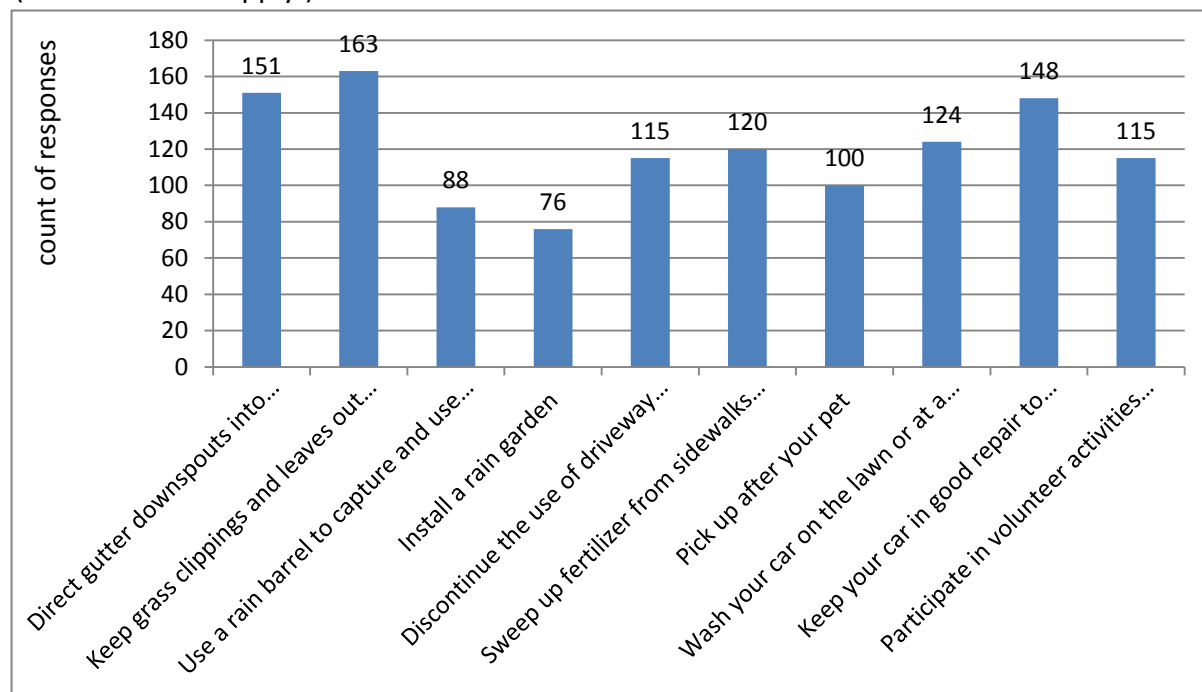


see narrative report (page 19) for additional open ended responses to this question

7. What results will make the biggest difference in the overall quality of water bodies in your community? (Choose two)



8. What actions are you willing to take around your home and yard to improve water quality? (Choose all that apply.)



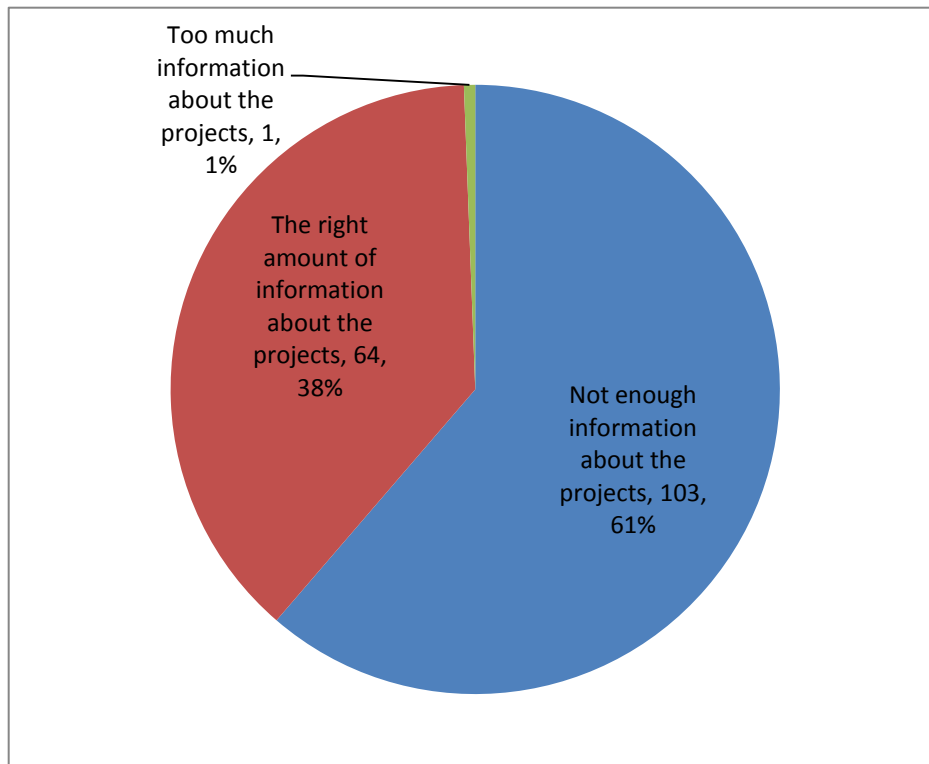
9. If you had a question or concern about the water bodies in your community, who would you contact? - Open-Ended Response

see narrative report (page 20)

10 How do you learn about water projects going on in your community? - Open-Ended Response

see narrative report (page 23)

11 Do you feel that in terms of information about water projects being done in your community you receive:



12 How would you like to receive information about water projects going on in your community? - Open-Ended Response

see narrative report (page 26)

13 Considering the water bodies in your community, what are your major concerns or issues that should be addressed? - Open-Ended Response

see narrative report (page 29)

14 What actions should be taken to address your issues and who should take those actions? - Open-Ended Response

see narrative report (page 34)

15 Other comments about water resources - Open-Ended Response

see narrative report (page 39)

**3. How do you use the lakes, streams, ponds and wetlands in your community or surrounding communities?
(Choose all that apply) - In what other ways do you use water resources in your community?**

Narrative responses - how you use the lakes, streams, ponds and wetlands

Bassett Creek is in my back yard, it is a landscape feature and plays an important role in my everyday life. I sit by the creek all summer listening to the babbling brook and loving it.

biking

Biking around the lakes also

biking around trails adjacent

Biking on the bike trail

Cross country skiing adjacent to creeks and lakes and on frozen lakes

Cross country skiing in winter

cross-country skiing

drinking water - well

Education

Enjoyment of nature

I also introduce friends to these resources

I breath the atmosphere with water vapor in it as well as pine tree resins when those are available for breathing

I enjoy the recreational value of the ice in winter, and in general enjoy the view!

Ice skating and skiing

It just soothes the soul.

Operate the aeration system on Sweeney Lake, and live on the lake since 1965.

photography, education of youth, religious experiences

playing at shore

private wells

Runs through our property

sailing

Sailing at French Lake Park

Sailing, picnics

serenity and peacefulness of the natural resource of the water itself

snorkeling,

snowmobiling

Snowshoeing in winter

the creek and pond are important to me as a chance to connect with the beauty of nature.

the view

We live on the Peninsula and it is harder each year to boat and enjoy the lake (even the view) with the amount of lake weed and low levels of the lake

Well- Drinking water

Winter xc skiing, snow shoeing and dog walks

Xc skiing and ice skating

(blank)

water lawn

Biking on those same trails, too.

I live on the lake with 170 feet of lakeshore

sailing (small 16 ft) sailboat

Biking, Rollerblading, Ice skating, sailing

4. How important are the lakes, streams, ponds and wetlands to your quality of life in your community? - If you chose "Very Important" or "Somewhat Important", describe HOW do the water resources impact life in your community?

Narrative responses - HOW water resources impact life in your community

a significant criteria to our livability and property values

Access to minimally impaired lakes, rivers, and creeks sets my community apart from others and is a fundamental component of our high quality of life.

Adds to the beauty of the area

As a lake-shore owner, I am always concerned about the health of the lake. It is a constant point of neighborhood gatherings year round.

As a property owner on Medicine Lake of 28 years I have a knowledge, experience and vested interest in the Bassett Creek Watershed.

attract wildlife

Bassett Creek is very important to my quality of life in my community because it adds beauty, draws wildlife, and provides nourishment for the trees and plants. It adds to the value of our property. It is so important for all animals -- including humans -- to have fresh, flowing water nearby as it nourishes all of us..

Bassett Creek runs right along the edge of my yard, with the wetlands behind it. We are VERY, VERY concerned about the impact of the light rail line (D1 locally preferred alternative) on the wetlands and water quality of the creek. This line will run RIGHT THRU the wetlands adjacent to the existing Northern rail line which will be moved 25 feet closer to our property. This MAJOR construction project can only do harm to our existing watershed. Numerous neighbors will support your efforts, so please keep us in mind. Nothing good can come of this for the wetlands area in GV. Please keep me posted: . Thanks.

Beauty, part of my identity, interest, naturalize the urban landscape

Bodies of water are vibrant eco systems that support wildlife and promote safe clean living. Water resources make me aware of how precious and fragile our eco systems are in supporting our lifestyles that rely on constant access to water supplies and sewer/waste disposal providing healthy living.

Clean water resources make my community a much more desirable place to live because of their natural beauty, the wildlife they attract, and recreational opportunities.

critical

Drinking water, Wildlife, outdoor recreation, home value improvement, quality of life.

Effects our quality of life.

Environmentally and economically important for both our and future generations.

From when I rise in the AM to when I go to sleep it is a part of my life. The watershed plays a huge part in my mental and physical well being. The sites, sounds, and wildlife help to form my life.

Having the ability to go out back door and enjoy such a wonderful natural resource is a wonderful privilege. We have definitely noticed a difference in the lake since moving here 16 years ago. Low lake levels and increasing weeds are the two biggest concerns.

I live next to one of Golden Valley's ponds, and it provides a natural area adjacent to my home.

I live on Medicine lake and am impacted daily by use and the views. I want the lake to be usable for many years for the next generations

I live on the creek. I love the wildlife, the moving water and the feel of being in a park preserve while being 15 minutes from downtown.

I love to be in nature. Woods, water, and wildlife are essential to my wellbeing. I don't belong to a gym (and I don't enjoy that environment). I prefer to walk on wooded trails and kayak on lakes, streams, and rivers.

I swim every morning before work in Medicine Lake. I canoe or kayak on the lake. I love to canoe down Bassett Creek.

impacts our decisions on recreation

In all seasons the lake dominates our view, and activities. If the levels are low, that impacts. If the level is high it impacts. Ice allows a whole different set of activities.

it allows education to youth, quality of life and relaxing to take away stress of daily life.

It brings neighbors together. In Medicine Lake we have a strong sense of community that would not exist without the lake.

Narrative responses - HOW water resources impact life in your community

It's sad to see all the algae and to talk with my kids about how the poor choices are negatively impacting the local wildlife

lakefront beauty recreational opportunities

Living near a watershed is extremely important to me. Living in MN means almost certainly being near a body of water of some kind, so living near a well managed watershed is extremely gratifying. Being a responsible steward of the environment is a value I have, and to be rewarded by living in a neighborhood dense with wildlife is an immediate reward and inspiration to continue to have those values.

Look at it all day and every day. I started the aeration by neighbors in 1973 and still do it with 10 air compressors around the lake shore.

Maintenance of a good water level in Medicine Lake is most important to me. I do not want to see our lake start to dry out like other lakes in the Metro area. Greater study of the impact of the silt ponds and the height of the dam needs to be accomplished. Furthermore, the boat launch at French regional park needs to be improved - it is almost too shallow to use during the later summer months.

Markedly improve the quality of my life in physical fitness and happiness. We moved to MN to enjoy these resources.

Medicine Lake is integral to the city I live in (Medicine Lake) and the surrounding areas, it is one of the things that ties our community together, it is critical for recreation, relaxation, bonding with family and friends, and the trails around the lake are great for biking, walking and running. The lake is the main reason we live here.

Medicine Lake unites residents of the surrounding communities for recreation and a healthy lifestyle. It is a refuge for an enormous amount of wildlife, both year round and migratory.

My children and their friends played in Bassett Creek all summer long. Our neighborhood has group picnics on the banks, the creek plays a major role as a beautiful gathering place for all. Both Rice Lake and Bassett Creek are hubs for wildlife that enrich our lives. We have huge snapping turtles, crayfish, and otters, deer and fox come to drink and great birds such as woodpeckers, owls and eagles abound. The local wildlife in and around the creek & lakes taught my children not only the names of the birds and animals but also to love and respect nature.

My family and friends love boating, water skiing, and just playing in the water. These activities greatly contribute to our quality of life.

natural amenity

oasis from the daily drive, rush and tasks. oasis from development, from concrete, from road vehicles, from people in a nervous, dangerous hurry.

Open space

Our family enjoys spending time in the water or near the water. I don't want to live in a place where there are not outdoor spots like lakes, streams, and wetlands because I enjoy accessing this places regularly.

Our recreation centers around the lake. We ice skate and cross country ski on it in the winter. In the summer we boat on it and use the bike trails to travel around it. It is enjoyable in all seasons and for many reasons.

people swim in Wirth Lake and fish pretty much wherever they can. we walk along the creek and lake

Property value!!!!!!

Property values and quality of life

Provide respite from urbanization, important for the wildlife and fish, silent sports

Recreation, relaxation, sense of peace when viewing

Sailing and motorboating are important hobbies for our family. And closer to home, lakes, streams and trails are central to our enjoyment of the outdoors, especially the amenities around Wirth Lake.

The bodies of water make my community unique in beauty and restorative qualities for a happy life, thus I am more productive and useful to the community.

The City of Medicine Lake exists as a lake community. Nearly every resident lives on the lake and uses the lake in both summer and winter. The lake is a major reason most residents moved to this city.

The recreational use of Medicine lake greatly enhances my family life but allowing us great opportunities to spend time as a family and with friends. It also gives us the opportunity to teach our children water safety and respect for the environment.

The secretary for Bassett Creek is proposing to get or already is getting \$50,000.00 for this work and I think that while green jobs are a good thing this is excessive financial gain without true return. I look at the trees that were cut down around Theo Wirth as an example of this unchecked activity that has its costs and is unaccounted for in your reports and "visioning processes".

The streams and lakes add value to my life as a nearby retreat or piece of beauty

The wildlife that I have seen along Bassett creek. The wild plants along the creek and pond. Taking my grandkids for nature walks. They have seen big turtles in the creek and egrets nesting near by. The quiet beauty.

Narrative responses - HOW water resources impact life in your community

They are a HUGE reason we live here. Mental, physical, and spiritual health are all easier to maintain when we're kayaking, swimming, or walking/hiking/running along a body of water. And the wetlands provide habitat for wildlife that we also really appreciate.

They provide beautiful views, appealing walks, and cover for local wildlife.

This clean water resource keeps some wildlife close to us even in the inner city making waking along the creek relaxing, interesting and even educational.

Usable Water resources are the reason we were drawn to the community.

Water features are beautiful and make people happy!

Water is my backyard....we do not go away on vacations....this IS our vacation.

Water quality, invasive plant species, or excessively low water level can make it difficult to get out on to the lake from shore. Excessively high water level can damage our lakeshore, especially when combined with the wave action from boats.

Way to enjoy being outdoors; exercising.

We bought our home on the basis of it being near the Medicine Lake and love "lake life"

We live on Bassett Creek Drive and having the creek enriches our lives everyday.

We live on Bassett Creek and enjoy the wildlife it brings. Periodically the creek floods and we are concerned about the water quality.

We live on Med Lake and love all the opportunities it provides.

we live on the lake so the water resources impact us daily

We moved here in 1968. I rent out boats plus provide space for people to keep their own boats at the lake through a conditional use permit with the City of Plymouth.

We purchased our home with Bassett Creek running through our back yard specifically because of tranquility it offered us. My husband has had many surgeries over the last 3 years. With our home bordering on the park wetlands and having the creek view has been very therapeutic for his slow and difficult recovery,

We use them almost daily, esp. in the Spring and Summer.

(blank)

Everything is about the water

Water clarity and quality

It encourages people to be more active and spend time near the water. It creates nice places to run or walk. Having nature makes a place seem better.

They provide breaks in the patterned residential areas, calming traffic. They help control flooding. They support wildlife. They protect from loss, and give purpose to, walking/biking trails.

having recreational water near by our home is important.

wildlife habitat redwing blackbirds, frogs, turtles, swifts, herons major flood control

We pay high taxes to live on the lake. It provides 365 days a year of joy of some kind whether it be using the lake, looking at the lake, watching the wildlife in and around the lake. It makes paying high taxes worth it. We're financially invested! Watching the lake level drop every summer certainly puts stress on the lakeshore owners who only get 4 solid months per year to enjoy using their boats and lake toys of all kinds.

We have lived on Medicine Lake for over 20 years. The lake is a Major asset to our family, the City of Plymouth and the nearby communities. The water level has struggled to maintain an adequate level the past few years which has caused the lake to be much less usable for the tax payers that take advantage of it.

I believe there are only two in New Hope and I do not live within walking distance of either.

since I live on Medicine Lake, my family, friends, children, neighbors, all use the lake daily year around. It is a resource we use year around.

Personally, they are very important, as we live on the lake. And as a community they are even more important. We have wonderful public access to Medicine Lake and I think it's important that it stays this way. However, I often see boaters who aren't familiar with our shallow lake speed through our bay (which can fall to 2-3 ft depth) and either hit their props at full speed, or be surprised when they wipe out skiing and realize they are in hip-deep water.

Quality of life; utilize the lake 100%; water level is an issue and need to raise level of the dam

They provide an important environmental service, as well as aesthetics and recreation to enjoy.

To play in for me, my family and my golden retrievers

I have lived or have friends who live on various points of the Bassett Creek Watershed -- Westwood Lake, Plymouth, Bryn Mawr. The access to the natural beauty, flora and fauna was a major reason in choosing to live where I do -- I walk by the Creek or lake daily.

I live on Medicine Lake and am fortunate to see the lake every day, in every season. We must take very good care of our resources; they are greatly impacted by our actions.

Narrative responses - HOW water resources impact life in your community

The aesthetic and environmental qualities of waters profoundly affect property owners' quality of life. Clean water provides wildlife, recreation opportunities and an environment generally that improves property values and makes living in a particular community more fun.

Green living things are healthy to humans. Studies have shown benefits include healing cancer, healing mental health. Suicide prevention. Okay ... strange studies I have read, but they are just healthy to our well-being. (partly why businesses rent plants.)

property taxes are higher on a lake, that helps everyone but the value is not there. Now to answer your question it the best thing God and Man has done your the betterment of person health,life, for all ages.

The resources provide entertainment, relaxation, and pure enjoyment of our surroundings

Northwood Lake in New Hope is a hidden gem. When I moved here 41 years ago, every house on the lake owned and used a canoe. But in the years since, thanks to community growth to the west of us, it has become dirty, silted, weedy and smelly and shallow. I still love to sit and enjoy the solitude and privacy it affords. I watch blue herons, egrets, Canadian geese, all kinds of other waterfowl, muskrats, turtles, American bald eagles, and birds too numerous to mention. This lake had added value to my neighborhood and I would love to see it improved to its former condition.

Life style

For gathering and creating a family atmosphere around the lake.

The lake, trails and water-adjacent parks provide a sense of community and also lead to healthier lifestyles.

Attraction to liveing near water has been characteristic of my family for many years. Water is a visibly active part of the environment which I find attractive. As well as an integral part of natural cycles.

We are on or by the water every day. We would never have moved here if it weren't for the lakes and adjacent trails and amenities.

They help to keep the civil in civilization. The water is there for all people, animals and plants to enjoy and use. I find the water to be a calming influence. It is, however, disturbing to see the water covered with a green algae film.

Provide areas for wildlife, increase aesthetics, recreation

It's a critical natural resource, not only for us (humans) to enjoy, but that wildlife depends on too. We need to do a better job protecting it.

We use the local lakes such as Medicine lake as backgroud scenery for our walks

I do a lot of kayaking in the local lakes and streams- including Bassett Creek. I also do a lot of swimming in the lakes. And, I really like to swim in and kayak on clean, clear,non-polluted and natural water with a good natural habitat of native plants, fish, and other stream and lake denizens.

habitat for wildlife, recreation, beauty

5a. Why do you believe the water resources currently have this quality? - Open-Ended Response

Narrative Response - WHY this water quality

accumulated run off from yards as the creek flows into and through the lake. invasive species are a growing factor.
low water levels
Attention is paid to water quality. More restoration is required for wildlife, water quality.
Bassett Creek (and Bassett Creek Park) has not been maintained. Renovation is needed.
Bassett creek is clear but some lakes on route are impaired. Eloise Butler has been 'de-watered' by 394 construction.
Bassett creek seems to be neglected when compared with other creeks like minnehaha.
BCWC does not have a good handle on pollution and water level control on Medicine Lake at all.
Boaters bring in invasive species from other lakes. Medicine Lake is also optimized for boating, not fish and wildlife.
Check our property taxes.
Clarity of water and stability of water levels would be top two concerns.
Commercial and housing construction has been allowed to continue without proper consideration for wetlands. Developers have been allowed to skirt laws by trading wetlands leading to concentrations of building without proper drainage. Antiquated highway drainage continues to flow directly into our waterways.
Community members try to care for the water resources. A few years ago a group was formed to monitor Rice Lakes and we put out news letters and raised money to have Alum (sp?) treatments to reduce algae. The city of Golden Valley newsletter also has helpful hints to help keep our water safe & healthy.
Control of lawn fertilizers with phosphorus, shore-landscaping with more native lake plants, neighbors not dumping caustic materials in storm drains, better watershed management
Curly pond weed
Development has greatly degraded water over the years
don't know what the water quality is.
Effort and attention on the part of the community
Friends of Bassett Creek have had a significant influence in obtaining resources and volunteers to keep the creek alive and well.
From 1950 to today, the water quality has improved for numerous reasons, however the largest was due to the discontinued usage of sewer systems and septic systems drainage into the lake. Improvement in out/in board motors. Community awareness. Retention ponds etc.
Government agencies have NOT coordinated between themselves to control Medicine Lake water quality.
Heavily used and inundated by runoff from roads that have been heavily salted in winter and yards that are over fertilized in summer. Additionally a lack of commitment and leadership from most politicians to ask for money to maintain quality resources.
Human Impact, and mainly our collective ignorance on the environment and how our behaviors drive this.
I assume it is lack of resources to care for the creek and ponds.
I believe that water quality is the result of a complex mix of nature (climate cycles, plant and animal fluctuations) and human interaction (treatment programs, water level mgmt, runoff filtration, recreational use, etc.), and it's all continuously evolving.
I did not select an option- (please a "do not know" to the survey, or change the question to be "what do you perceive the water quality to be?" I am not sure of the quality of Bassett Creek and the lake, so I left it blank.
I have a concern about the spread of invasive weeds in Medicine Lake. It is to the point that we worry about our grand children accidentally falling in the lake off our dock and getting so tangled in the weeds that they drown.
I have been swimming in the lake since 1965, and never had a swimmer's skin problems of any kind.
I have seen a lot of cutting down of beautiful pine trees that were not destroyed by the tornado. While this had some indirect results, the clearing will have more ongoing effects. There is a cement flow control device that would be interesting to review the dynamics of in relation to rainfall.
I smell after swimming in the lakes.
I think people are paying more attention. Concern about property values.
I think the planners did a fair job in providing places for runoff to accumulate from the roads and buildings. The artificial ponds keep salt, grime, and silt out of the natural streams and lakes where I live. I do think people in general respect the bodies of water as they use or visit them. I also believe there are groups who care enough to spend time and treasure to preserve them.
in the summer we see the lake daily and "use" the lake many times each week

Narrative Response - WHY this water quality

It seems to me there has been a lot of progress. But I'd like people to be confident eating fish caught in urban lakes, & would really like to see Basset Creek opened up. Farther out of town, Lake Minnetonka is under fire from pollution and invasive species.

Lakeshore and stream-side residents have been especially resistant to naturalizing shore line. We have done this for half of our shoreline. The difference between the side that we naturalized and that which we didn't is remarkable. The shore and lake directly adjacent to it are much firmer and stable. The un-naturalized portion continues to erode and the shore line is still mucky. Having clear criteria for naturalizing the remaining shore would be very helpful. We had the other portion naturalized through a Plymouth program 6+ years ago.

Low lake levels and weed growth

Low water levels due to dam that feeds basset creek. Mil foil and algae growth have drastically increased in the last few years.

Low water levels I believe is due to the Basset Creek dam having been lowered years ago.

Low water levels, weedy, murky water

Measures taken to prevent or address pollution sources.

Medicine Lake is what it is, as the Indians refereed to the lake as Lake of Medicine

Medicine Lake level is low!! Difficult for me to access the lake without a 200ft dock!!!!

Medicine Lake water quality is improving. Winter activities and runoff are the biggest problem I see holding back the lake. Salt runoff going into the lake and Basset creek is likely a major issue. Storm sewer exits to the lake have salt water influxes onto the lake throughout winter.

more cam be - and should have been done to protect Medicine Lake

Most of our waters have fair to poor water quality but are improving

N/A

Not always the best looking. If we develop right up to the edge some landscaping is going to be in order. Some tree trimming to make them last longer. Some brush clearing maximizing for wildlife habitat.

Not sure if I've ever seen fish in the part of the creek I live near. Should there be more birds and other critters along the creek? Parts of the creek are contained in walls. But I think the Glenwood spring probably supplies some nice clean water and keeps the creek from getting too bad. Wirth Lake - have you seen the goose poop on the boardwalk?? That can't be good for swimming.

Observation of water areas, and knowledge of local efforts to keep the water clean etc.

pollution and runoff, inability to keep the level high as the dam lets so much water out after rains.

Pollution.

Pollution/runoff causes bacteria in our lakes/streams

pollution

Proper management. Rice Lake, however, has been greatly affected by the phosphorous run off and natural high levels in the soil.

Reasonable clarity and (most of the time) modest traffic

recent work around Medicine Lake to create basins to catch ruboff and polutants

road run off and no erosion control

Run off

Run off from yards, highways, etc

Runoff, Lack of Shoreline Buffers and other strategies to filter the water prior to entering the waterbodies. Overall Development

Runoff

Runoff continues to be an issue. Invasive species are a constant threat. As a completely developed lake in a city, it is ultimately going to suffer, but it could be cleaner and clearer.

Runoff from streets and property

Runoff from streets and yards affects water. Trash accumulates, especially in public areas. Some residents maintain grass at the creek's edge instead of providing a margin of water filtering vegetation.

Run-off.

Sometimes they are green and don't look so nice

still recovering from years of abuse. Poor bottom quality. Heavy phosphorus levels

Studies have been done in the lake and have been successful....but due to funding and grant monies we end up with more vegetation and more issues.....like zebra mussels issue

Sweeny, Wirth, Bassett Creek and Medicine lake are all impaired. Sweene is list on the DNR lakefinder as Non-Supported for recreational (swimming) use

the dead fish we see, the amount of algae

Narrative Response - WHY this water quality

the holding pond area that feeds sweeney lake (schaper park) is full of debris and garbage, generally all spring/summer/fall. the filtering cattails that die are never harvested. on the other side of that creek entry to sweeney lake (north of the rr tracks) debris enters and washes up on shorelines. that area really should be dredged.

The holding ponds have been great but like with anything they take years to make changes. However I have seen several, Cleaner water and not fast water level changes after a rains storm.

The life cycle of Medicine Lake and the Bassett Creek dam water level management that reduces the water level on Medicine Lake and stops water movement on Bassett Creek from August through the spring. Bassett Creek typically only has water movement for 4 months of the year from April through July.

The weeds and water clarity issues need more effort.

They are not horribly polluted, and there are many areas near our home where we can go swimming, hiking, and so forth. However, many of the ponds and lakes near my home do not have many native plant species and are clogged with cattails. I have purchased the "Lake Phalen Shoreland Restoration: Walking Tour and Plant Guide, 2nd Edition" by Haley Elvecrog and Bill Bartodziej, 2008. (Ramsey-Washington Metro District; www.rwmwd.org). I wish that more ponds and lakes in our area could have shorelines and prairies restored with native plant life. This would be good for the water quality and for the native animal species (butterflies, birds, etc.) that depend on native plants.

They have been monitored in recent years and improved in some ways but we are still concerned about some weed growth and the need to keep out zebra mussels and milfoil.

They seem fairly clean for being in the city, but can always be improved upon. Also, too many people litter, which really ruins them.

They're fair up from very poor because of the work of AMLAC and the City of Plymouth but there is a long way to go. Prevention of AIS, especially zebra mussels and worse, is of the highest priority. The sand bars that have resulted from runoff from 169 should be dredged out. The water level seems to have dropped and so the height of the dam on Bassett Creek must be raised.

This summer while walking along Bassett Creek, I have seen fish, frogs, turtles, clams, and snails in abundance. Animals like this are sensitive to poor water quality (low oxygen, pollution) and could only flourish in a healthy creek.

Too many non residence launching boats with little care for spreading invasive species

Too many water born plants.

too many weeds sediment/muck in bay areas making them too shallow water level drops too low - need to reinvent the dam on Medicine Lake to keep water in the lake

Too many WEEDS and low water levels

Too much algae growth in summer.

Too much fertilizer use, run-off directly into streams, wetland areas surrounding bodies of water have been drained

...

Too much run off from development in Plymouth.

Too much runoff over the years. Everybody needs the perfect lawn.

Total guess. I'd like more info on what the quality is.... That is, should I be swimming in Wirth Lake?

Toxic runoff from pollutants as rain water falls and runs into the creek, bringing pollutants with it.

Trash in the creek

unfiltered run-off, excess fertility, hardscapes, not spring or groundwater fed

Up until about the last 5-10 yrs, there has been little concern about stormwater runoff.

usable and enjoyable, safe to be in and around

water management activities (e.g. control of point and non-point contaminant sources and reconstruction of key areas along the water bodies)

Water skiing disrupting shoreline, birds, turtles.... All of the wildlife!!!!

We are very concerned about the potential impact of basett creek as the met council wants to put light rail through the near by wet lands. Of course we dont want the lrt in the nature area since it affects the frequency of the life

We do not (yet) have zebra mussels and the water clarity has been improving.

We estimate that at least 1/4 of Medicine Lake is now useless to recreationists because of massive weed issues or low levels.

We have been trying to educate about the importance of clean water in our lakes

We live in a big city with lots of pollutants.

Narrative Response - WHY this water quality

We love the lake, but there is critical work that needs to be done. The water level in Medicine Lake is too low, especially late in the summer and early Fall, and it seems like this is true every year since the new dam was built at the outlet to Bassett Creek. Something is faulty with the design of the dam and it lets out water too quickly and to too low a level. Perhaps a "V" shape in the dam would be better so as the lake level decreases the flow is reduced to let water levels decline gradually after rains. The low level makes boating more dangerous and makes it very difficult to take my boat out at the end of the season as sometimes the water level is so low it is almost impossible to reach the ramps. The second big issue is aquatic invasive species. When they are treated it is great, but the treatment seems inconsistent from year to year. It would also be nice to see the water quality and clarity improve, and sediment be removed from the lake. I really appreciate all the efforts to improve the lake through the building of detention ponds.

We use Medicine Lake primarily. We thoroughly enjoy it but it could be improved by raising/maintaining the water level and better addressing weed infestations.

Weeds and danger of invasive species

Weeds and lack of consistent funding for treatment plus very low water levels in the summer.

Weeds and low water levels

Weeds in the lake(Medicine), are becoming a significant problem/concern.

(blank)

Too many weeds

Fertilizer run off.

Poor clarity and milfoil so thick it mills yje jet skis

The quality is definitely better than some places, but it could still be improved.

The various waters in Basset Creek Park are full of garbage and just generally dirty and gross. The goose feces all over the park does not help.

In the Spring and early Summer, I would choose 'Excellent.' But by early Summer, algae has taken over many bodies of water, lowering their quality and their scenic value.

Run-off and poor water filtration and water-edge planting design.

Medicine Lake is amazing. The lake is under huge pressure though. The lake levels are consistently lower the past few years, the lake needs to be dredged in key areas that are filling in with silt, and the weeds are getting worse every year.

Occasionally you hear of a beach being closed due health issues.

need more buffering capacity and settlement ponding

Medicine Lake is getting cleaner year by year as retention ponds start to work and communities are educated on lawn care and proper disposal of toxic and harmful items. However there are the concerns of invasive species that could seriously impact lake quality on multiple levels.

we have used them for storm water ponds for 60+ years, so all of the pollutant from streets and lawns have gone into the water bodies untreated. Before development agricultural chemicals went into those same waterbodies.

Pollution from run-off, lake is very weedy, water quality is good in spring but progressively gets worse. Something needs to be done about the weeds and low lake level in nearly anytime except spring.

In regards to Medicine Lake the water clarity has improved over the years much to the credit of the holding ponds that have been constructed in the area.

Medicine lake gets very weedy and green by late summer due to phosphorous run-off and low water level.

• shallow depth • invasive weeds • citizen and public run-off (sediment, fertilizers, etc) • low water level creates stagnant water for last couple months of the summer

Good today due to the water level in Medicine Lake; need to raise height of the dam to maintain

I believe that Minneapolis and its watersheds are making several great efforts to maintain water quality and clean and keep them from pollution, but I do think that a: efforts have been inequitably dispersed (Calhoun vs. Bassett vs. Powderhorn), b: there are a lot of stormwater runoff problems, and c: cities are willing to make certain sacrifices regarding pollutants in the name of industry, or if not cities, the agricultural communities surrounding them.

Clean, but if less weeds it would be excellent.

We live on the creek. When we first moved in: fish splashed upstream in spring; dogs could play w/out stinking; water did not get yellow foam; no muck to disturb when you waded in. I think the quality is poor but have been told it is better then it was?????

Weedy/algae chemical buildup

Not enough education to all of us about the watershed and our ability to influence the water quality. I only knew about the watershed by googling Bassett Creek.

A lot of money is being spent for some large bodies of water like Medicine Lake but lakes like Northwood Lake in New Hope gets very little attention.

Narrative Response - WHY this water quality

too much fertilizer flowing into lakes, poor maintenance of Bassett Creek's banks between Fruen Mill and where it has been taken underground.

Ongoing education of lakeshore owners has improved water quality by limiting fertilizers and septic systems. More must be done to delay invasive species.

Minnesota has a strong conservation ethic that has been supported by local government (through regulation and water-improvement work) and citizens' efforts to ensure protection of water resources. That said, water quality could be better.

Murky water, algae growth, 'stinky' at times

no throughflow

City of New Hope is not wheeling to set-up and clean up the lakes, they wait for an commutiy to do something and than attach their problems to the total watershed issues.

Because they have been protected and monitored

Lack of funding, infrequent effort

Lack of oversight by community leaders, etc.as communities developed nearby, sending runoff containing salt, trash, sand etc. into our lake.

Clear, non smell

Lots of runoff in Medicine Lake plus lack of weed control creates a dirty and congested lake.

Through lots if hard work, lobbying and collaboration to make improvements.

Proximity to large population that acts in ways deletrious to waters.

Because of the efforts of the DNR, Lake associations and cities to improve and maintain water standards through education, water and runoff management.

cloudy, silt, weedy, dead fish

Too much sediment from storm sewers; too many chemicals from human actions.

Generally feel there is a commitment to maintaining water quality in this area.

Water clarity is poor, and I am VERY concerned about the invasive species threats, and increasing milfoil. I'm very worried it will destroy Medicine Lake. I'm also VERY worried about the low water levels the past several years. It's not natural (water is being taken from the lake) and it's hurting the ecosystem.

They seem poor and also Medicine lake in particular seems to dry up late in summer and becomes asethically unpleasing[unsightly and less than pleasing aromas] seems like the water disappears in the late summer the swimming beaches look suspect although I don't swim.

I think we could do more to create and maintain a more natural habitat for native plants, fish and other creatures.

runoff from the inlet into Gleason Lake - the inlet stream flows through back yards which are heavily fertilized in Plymouth

5b. Are there one or two water bodies that stand out as having very good or very poor water quality? If so, which ones? - Open-Ended Response

Narrative responses - 1 or 2 water bodies that stand out

Again, I don't know.

Basset Creek see 5a

basset creek as low water quality.

Basset Creek is treated much like a natural storm sewer. Spring time and during rain events it is full and fall and dry times it is dry. Unfortunately it fills up with trash and is not a priority for cleanup. Canoeing down the creek can be very enjoyable, but the amount of trash in the creek is discouraging

Basset Creek very poor

Bassett Creek has very poor water quality in the Theodore Wirth Park area. Extremely reactive body of water . . .

Bassett Creek I think still has relatively poor water quality near where I live. I would very much like to see it improve!

Bassett Creek runs through Golden Valley and is poorly protected

Bassett Creek, Wirth Lake (the water is extremely clean, and cleanest in the chain of lakes)

Bassett Creek: Poor; Medicine Lake: Poor; Lake Minnetonka: Poor to good depending on location.

Bassetts Creek seems like there's trash in it.

Cedar Lake -- Good

Cedar Lake is pretty clean, and we usually have no problems swimming there. On the other hand, Bassett's Creek seems quite polluted, and some of the surrounding lowland areas (e.g. in Wirth Park) are just full of trash. Lake of the Isles seems pretty scummy a lot of the time as well.

Christmas Lake good

Hidden Lake is very good. Sweeney is poor.

hidden valley pond, medicine lake

I am extremely concerned about the condition of Medicine Lake. It has been a recreational lake for my family going back generations, but the weed condition is getting so bad I can see a future where we do not use it except for boating and winter activities. No water skiing or tubing with the children and grandchildren because of the poor water clarity and over abundance of nasty weeds.

I am only intimately familiar with Medicine Lake and Basset Creek. Both these waterways have been used as unlimited storm run off depositories allowing silt to build up. The water levels of both bodies of water are under constant pressure and need to be managed more efficiently. The Basset Creek Dam should be augmented with an adjustable spillway to allow for the retention of water during the rainy season and allow for Basset Creek to be metered out so the waterway does not dry up.

I am really only familiar with the water quality of Medicine Lake. Since it is the largest lake in the watershed with by far the most recreational use it seems that it should be a very high priority.

I cannot rate any.

I only use Medicine Lake

Lake Minnetonka has pockets of horrible algae blooms and now, invasive species.

Lake Minnetonka is choked in some areas with invasive species. Medicine Lake is threatened

Lake Minnetonka=very good Lake Magda = poor

Medicine is getting worse, water disappearing faster than it is being replenished. Is it the next White Bear lake?

Medicine Lake and surrounding wetlands, bassett creek in and out of the lake.

Medicine Lake can be very good to very poor with respect to levels in the summer and weed growth.

Medicine Lake- fair Basset Creek- Good

Medicine Lake has "Fair" water quality when there is water movement through Bassett Creek which is April through July.. Bassett Creek has "Very poor" water quality by having no water movement from August until April most years.

Medicine Lake has at best fair water quality.

Medicine lake has definitely lost the clarity of the water that we had when we moved here 40 years ago. We have interesting photos of our children swimming in the 60's and 70's, big difference!

Medicine Lake is poor.

Medicine Lake is the 2nd largest lake in Hennepin County, however, all attention and monies for R&D are spent on Minnetonka

Medicine Lake is where we live and the basis for these comments.

Narrative responses - 1 or 2 water bodies that stand out

Medicine lake should be looked at alot closer. The spraying of invasives has killed almost all native species of weeds and does not control millfoil at all. You are failing at helping the residents that live around the lake. You won't even look at the water level problems and/or haven't even noticed the problems in this body of water that have been going on over the last 10 years.

Medicine Lake. Water level fluctuation

Mid-summer, the water level is to low...!

my focus is Medicine lake as a lifetime resident

NA

NO

No, I have not seen any that hit the extremes on either side, though I do have some concern that the loss of artificial reservoirs to catch run off will allow pollutants and salts from our roadways get into the larger bodies and ruin them. These artificial reservoirs seem to be filling in with plant material and sand/silt. I do not believe they can accomodate surging storm water of the spring thaw runoff as they once could. I also believe that newer homes built in the lower areas will be xposed to flooding as a secondary result of the loss of resevior capacity.

None good by the standards I was used to in Michigan. Medicine Lake is particularly disappointing for such a large body of water used by so many people

Northwood Lake in New Hope has very poor water quality

Not in the Bassett Creek Watershed. But Lake Charolotte, near Hanover, stands out has having very clear water.

Not one in particular stands out. We spend most of our time on Medicine Lake and sometime on Minnetonka

Of course medicine lake!

Poor- Medicine Lake

Poor Wirth Lake Poor Basset Creek near Wirth Golf Course Medicine Lake Good Exept invasive plants really only familiar with the water quality of Medicine Lake which is where we live.

Rice Lake in the Mary Hill park is getting worse.

Sweeney would be better is it did not have to treat so much storm water

The creek back waters north of Hwy 55 get stagnant and fill with algae.

the nature area on Bassett creek Drive near Dresden. It is so clogged with plant life and dirty.

The pond at Bassett Creek Park in Crystal collects a lot of trash.

The twin to Sweeney

Theodore Wirth is disgusting, so is Lake Calhoun.

Wirth Lake looks pretty clean, but I wouldn't say 'very good' just ok. Bassett Creek I haven't used, but would like to know that it is safe to swim or tube on. Would be a fun adventure.

(blank)

Medicine lake is very bad

Very poor-Medicine Lake

None of them are good. We'll see how things look after the work on the creek is completed.

I haven't spent time on lakes outside of Medicine Lake to be able to comment.

White bear lake has very good water quality. Medicine Lake, the lake I live on, has very poor water quality.

Medicine lake is probably on the poor side, as Parker lake is a little better.

Christmas Lake Not sure of others in our area

Medicine Lake is extremely poor when the water levels are down; need to increase height of the dam to maintain water level

Basset pond and Basset creek from Duluth St. to Hwy 100 are all I know.

Wirth Lake gets weed filled (milfoil and algae) as the summer progresses; it is very heavily used by residents in this region of Minneapolis.

Basset is near me, so I'm most familiar with it, and it seems to be holding steady, though is sometimes full of visible pollution (trash, grass clippings, etc.) after big rains. Wirth Lake is pretty good

Medicine lake? Not sure

Norhtwood Lake

Medicine Lake seems to have good water qualities with the exception of the weeds

Northwood Lake, very poor

Twin Lake in Golden Valley is quite clean I understand. I dont feel qualified to jusdge hence next 2 questions skipped.

Medicine, Sweeney

Right now with all the rain, Northwood lake looks good- but I know the water testing rates it very poor.

Not sure if it is an issue of water quality, but Medicine Lake often smells badly in high heat.

Medicine Lake, see above comment.

Narrative responses - 1 or 2 water bodies that stand out

Medicine is the most noticeable

I like swimming in Twin Lake because it is so clean. I like kayaking on Bassett Creek but I do not think it is in very good natural condition for native habitat.

poor - Gleason Lake, especially north pond

Grand Total

6. What concerns you about the condition of the lakes, streams, ponds and wetlands in your community?
(Choose all that apply) - Other (please specify)

Narrative responses - concerns about conditions

Abundance or diversity of shoreline plants.

AIS is very worrisome, esp. Zebra mussels closing in .

Because of the Dam level, there are a number of times when using a boat is impractical or impossible

Clarity of water and stability of water levels are a priority. The effective use of retention ponds has reduced the water levels from spiking. Prior to retention ponds, the lake spiked two inches for every inch of rain. Currently, the spike is one inch for every inch of rain.

Development plans related to the Bottineau Transitway are my greatest concern.

heavy runoff - sediments, salt, fertilizer, etc

Hopefully they can handle rain run off and hold their levels.

I am very concerned about Asian Carp and their potential impact on water skiing and tubing.

I am very concerned with the LRT impacts to Bassett Creek

I note that you do not list stability of water levels in number 7 below - I think that would get the most hits.

I think it is being handled with the gradual improvements as funds are available to BCWMC

I would like to see the dam level raised about 2 inches.

invasive Buckthorn growth

Lake level is to low Mid-Summer, late Fall

Lake Level on Medicine Lake is about 6" to 12" below where it should be.

loss of some good planning and spending when these parks and reources were constructed = waste

low water level of medicine lake durning late summer months!

my primary desire is to see the wildlife and green areas flourish.

Preventing the water level on Medicine Lake from declining to too low a level

runoff mitigation

The forestation around the water.

water lever too low at time to even get our boat in or keep it at our dock.

Zebra Mussel infestation should be a priority. The DNR has come late to the game and more stringent measures should be adopted to stop the spread of this invasive species.

(blank)

when too many weeds are present- the lake is too dangerous to swim. low water levels in summer inhibit boats from safe boating.

Medicine Lake water level is a concern that can be addressed easier than many of the issues, which require ongoing and widespread effort.

Water levels; need to raise the dam

The old Glenwood plant is an eyesore at the most beautiful point of Bassett Creek, next to the little falls/rapids. The stream bank has eroded here. Why can't this abandoned property be converted to some extraordinary use on this idyllic site?

Inability to swim in the lake due to weeds.

Bassett creek is a wonderful resource that is completely under-used as it goes through MPLS

Odor of the water

Geese Droppings

Weeds are increasing in severity, and water levels are so low that we often can't even use the lake in late summer!

I have heard that the water levels impact boat usage but dont know if this is true

Please do all you can to reduce runoff into the streams and lakes. This will help control flooding and help to keep the water bodies clean.

9. If you had a question or concern about the water bodies in your community, who would you contact? - Open-Ended Response

Narrative responses - who would you contact

?
??
AMLAC
amlac officials, city officials
AMLAC or Basset Creek Watershed committee
AMLAC or DNR
amlac or the City Council
amlac or the parks director
AMLAC representative
Basset Creek Watershed
BCWMC
BCWMC website first
Bruce Larson
City
City Council
City Council member, public works department, BCWMC rep
City Hall or internet
city of crystal
City of Golden Valley
city of Golden Valley or associated watershed group
City of Golden Valley Public Works Dept.
city of medicien lake and AMLAC
City of Medicine Lake or AMLAC
City of Plymouth
city of plymouth, BCWMC, hennipen county
City official
city staff
City staff like Jeff Oliver and Jeannine Clancy
contact our mayor to find out who to call
Current Dam Structure Lowers Lake Level
Derek Asche - City of Plymouth
Derek Ashe
DNR
don't know
Don't know. That is the problem!
Gary holster
GV city council.
Hennepin County Board member
Hennipen Co or DNR
I do not know.. one thing to contact another is to get results
I don't know.
I would search on line "water quality, Bassett Creek" and go from there.
I'm not sure--probably the watershed district or I would search the Plymouth Gov website.
I'm on the AMLAC board, sol'd bring up my concerns to them.
Linda Loomis
LMCD, the City?
Local officials and BCWMC
Mayor
Mayor of New Hope
medicine lake assn
Medicine Lake City Council
Medicine Lake City Council and AMLAC
medicine Lake mayor
Medicine Lake's BCWMC rep

Narrative responses - who would you contact

minneapolis park board
Minneapolis Parks and Recreation
Minneapolis Water Resources
Mpls park board
My Neighbor, who is on the BC watershed committee
My neighborhood association
my public works director and Bassett Creek WMD representatives
neighborhood association
Not really sure. Google.com I suppose.
Not sure
Our Bassett Creek representative (Ted Hoshal)
Our BCWMC rep, Hoshal
Our Major
Our Mayor or Amlac representative
our mayor, city concil members or basset creek rep.
Public Works
Someone on the city council
Start with AMLAC or Ted Hoshal
Ted Hoschal - Basset Creek Watershed Commisioner
Ted Hoschel
Ted Hoshal
Ted Hoshal-
The City or the watershed.
The conditions at Bassett Creek Park have been discussed recently, and we weren't sure who to contact.
The local municipality (who BTW are ignorant of which watershed their constituents belong to...)
The Mayor of Medicine Lake or one of the fine City Council members..!
the town of Plymouth
watershed district
Why bother BCWC does not care about the low lake level - so start to care
(blank)
ted hosel
city of medicine lake
you or Lake Minnetonka watershed
I would look on the city website and find someone in charge of natural resources
I'd have to know more about the specific problem to answer.
City Engineer
park or street department
member of bassett Cr watershed commission
Gary Hoelter
Local government or DNR
I wouldn't know. I would guess the City of Plymouth?
City of New Hope
usually the city council gets the first call
AMLAC; maintaining water levels is not an option on # 7; clearly an indication no one is listening to concerns!
Watershed district?
unknown
I have called the Watershed Mgmnt
Don't know.
Jenny black
The city officials
Michael Welch for Bassett Creek, MPLS parks otherwise
City of Plymouth, AMLAC, DNR
Watershed, MPRB, city.
start with a call to the city
Medicine Lake council and Bassett Creek Watershed
I'd probably search internet (for answer/contact)
Algae--algae---algae---algae--algae

Narrative responses - who would you contact

Bassett Creek or Medicine Lake Association (they would direct me to Bassett Creek)

bob white

Friends of Northwood, Mayor Hemken, Council member Elder and Guy Johnson

depends on issue. Often a friend who is more knowledgeable.

Lake association

AMLAC, BCWSD

this commission, New Hope city manager, John Elder,

I have no idea

Good question - who should I contact?

10. How do you learn about water projects going on in your community? - Open-Ended Response

Narrative responses - how do you learn

?

active look-up on websites

AMLAC

AMLAC and city of medicine lake

AMLAC and Medicine Laker

amlac and plymouth mailer

AMLAC and the cities of Medicine Lake and Plymouth

AMLAC newsletter

AMLAC newsletter and Medicine Lake newspaper

AMLAC Newsletter and Web site

BCWMC

Bryn Mawr Bugle and Southwest Journal

city

City Council

City Council Meetings

City news

City News Letter

City News letter, AMLAC

City newsletter

City newsletter and AMLAC newsletter

city newsletter and public papers

City newsletter.

City of Golden Valley newsletter

city of golden valley, sweeney lake association

city of plymouth, BCWMC, hennipen county newsletters

City Representative

City web site

City, AMLAC

Communication from AMLAC and City of Medicine Lake

Community leaders, local newsletter

community news letter

DNR

don't recall

email / newsletters, council meetings

EPC

Former BCWC commissioner

From active citizens more informed than me

from Derek (I am a Plymouth EQC member) and from the city of Plymouth newsletter

from my mom reading the sun post online. i would gladly subscribe to an e-newsletter

Golden Valley Parks & Rec, our sailing club, minneapolis brochures.

GV city council minutes sent to me via e-mail sign-up

GV Community newsletter

Harrison Neighborhood Assoc, Mpls Park and Rec

Harrison Neighborhood meetings.

HNA

i don't - i have to seek them out - i don't think there are any

I don't - there's not much gong on in this area. I participated in some open houses relating to a study for daylighting the creek east of Cedar Lake Rd, but there hasn't been much else.

I don't ;)

I rarely know about them.

In the Pipeline of the Sun Post Newspaper this website

internet

Internet and mailings

Local newspapers and newsletters

Medicine Lake "The Laker" and "City News" emails sent out by mayor

Narrative responses - how do you learn

medicine lake assn or city of Plymouth

Medicine Lake City Council

Medicine Lake City Newsletter

Medicine lake news, amalac

Medicine Lake newsletter

Medicine Lake village notices, and other notices by mail regarding the water bodies in my area

Medicine Laker

Medicine laker and amlac newsletters and meetings

My neighborhood association

Neighbor

Neighborhood Assoc.

neighborhood monthly newsletter: The Medicine Laker and the Sun Sailor

neighborhood newsletter or online research prior to swimming

Neighborhood newspaper - Bryn Mawr Bugle

news

News letter

No

not sure how to learn about water projects, could be different sources, city websites and watershed

Not sure, can I be put on an emailing list?

Our City keeps us informed

Paper and online

park board

Planning Commission

Plymouth newspaper and Ted

Plymouth Sun and Medicine laker

postcard in the mail

Southwest Journal, BMNA Newsletter The Bugle, news reports.

talk to Nathan Campeau at Barr

Ted hosahl

The City of Medicine has a monthly news letter and E-News

The City of Medicine Lake has 2 forms; 1 the Laker, 2 City News "e-mailed" as needed

the laker

There aren't many so primarily town newspaper.

Thinking of joining our local, Medicine Lake Association

through AMLAC (since most water projects are through City of Plymouth)

usually see them when on my bike or walking

Usually through communication from GV city hall, or Post newspaper

Via Medicine Laker and our city officials.

web

what water projects?

word of mouth If I'm lucky.

word of mouth.

(blank)

Aflac / newspaper

newspaper

Golden Valley newsletter

Crystal Newsletter

"The Crystal Connection" publication

Local newsletter.

don't know

monthly newsletter

City of Med Lk Monthly Newsletter

News paper

Through the AMFLAC newsletter, neighbors, and meetings over the years

City of New Hope

City website

Narrative responses - how do you learn

Haven't much. Do read Bryn Mawr Bugle; SW Journal, Strib. Feel like Minnehaha and other watersheds get more coverage.

Plymouth city newsletter

Not much information is available to the public about water projects.

Next door Bryn Mawr/ Bryn Mawr Bugle
email

thru the lake association emails

City of Medicine Lake

I'd probably search internet (for answer/contact) or ask Bob White who to contact

Northwood Lake Association

unsure

Email from Northwood Lake Assoc generally

Through our Friends of Northwood Lake association.

friends of northwood lake

not sure, erratic

Lake Association and City of Plymouth

Our Friends of Northwood Association and the city Pipeline Newsletter

Activities such as the walkabout

I heard about this website as I was hiking near Medicine lake and AMLAC was having an event

Mas

From Joe Harty for Medicine Lake or from City of Bloomington

Usually just by word of mouth.

12. How would you like to receive information about water projects going on in your community? - Open-Ended Response

Narrative responses - how you would like to receive information

AMLAC and Medicine Laker

AMLAC Newsletter

Both email and printed literature.

by mail

By regular mail.

City News Letter

City newsletter and emails from BCWMD

City newsletter or emails

Could Golden Valley include this information with the water/sewer bills? Since they are mailed and many people prefer printed material, it could be included with no additional mailing costs or impact.

Direction to this website or by emails. New Hope's website

e mail

E mail alerts

e mails

electronic newsletter

email or link to

Email

E-mail

e-mail City E-News

email i would like to host something for our neighborhood

email and local paper. we have a golden valley news.

Email and the "Medicine Laker", our city's newsletter

email and/or online news

e-mail blast

Email or electronic newsletters such as the Golden Valley Common Place and community newsletters (print).

Email or newsletters.

email or newsletter

Email or on line

E-mail or print media

Email would be great!

email, social media

Email.

E-mail.

emails

emails and through direct mail.

emails or website

Emails would be welcome!

Emails, articles in the local paper, or easier access on the website.

How about forgetting about flood plain stuff and take careful wildlife habitats??????

I like E-newsletters or home mailings.

I would like to have more connectivity and more specific GIS, or addressing to various concentrations of hot spots, or sources from commercial business of the state county and city. The smart spreading concepts need to be explained better.

I'd like to know what's going on in Plymouth and in Bassett Creek via email

It's probably easy to get information but sometimes hard to get simple, usable info that we can act on without making a huge commitment. I'm not sure what the remedy is for that--there's a watershed learning curve that's hard to deny.....

mail or email

Medicine Laker

More in the paper

mostly online. postcard is nice on occasion

neighborhood association newsletters, email

Neighborhood newspaper

neighborhood newsletter

Narrative responses - how you would like to receive information

Newsletter

newsletter or email

Newsletters or mailings

on line

One or two simple fliers that clearly tell me how to get online information or updates specifically targeted to my concerns.

our city newspaper, emails

Plymouth newspaer

Post plans in plain English, publish where plans can be found on-line.

postal mailings or email

Postings to the neighborhood list-serve, facebook page, and HNA home page.

regular mail

see #10

Some Email and the well done and informative Golden Valley city newsletteer

Summarized.

The newsletter is excellent; a specific web page on the city web site would be good.

through city council and bassett creek water shed reps

through HNA

Through neighborhood newspapers or neighborhood emails.

U. S. Mail

via the Laker

Website

What water projects are going on?

yes

Yes. Especially how the water level at Bassett Creek Dam can be managed to maintain flow for Bassett Creek and to keep water movement and the lake level up in Medicine Lake.

(blank)

In medicine laker

City

newspaper

Printed info, suggestions of ways to get involved, additional information available online

Newsletter.

Continue publishing in "The Crystal Connection" and on the city web pages. News items in the Sun-Post newspaper.

Create an email list and send our updates to that list

golden valley city website

City newsletter

Vis standard mail or email would be fine

I would like to continue to receive information about water projects through the "In the Pipeline" City of New Hope community newsletter.

e-mails and articles in the Plyouth paper would be sufficient.

email or mail

Medicine Laker is sufficient for me.

as done now...newsletter

Bryn Mawr Bugle. Email

Plymouth city newsletter

emails, local news papers

same way but more info

Plymouth newsletter should have more information on improving water quality and reducing invasive species/prevention.

Email; self-initiated web research

Word of mouth from lake association or e-mail.

E-mail is find , what ever is least cost savings to spend on improvements

Through association meetings or direct mailings.

City Web page

Via web sites and email directing me to them.

Narrative responses - how you would like to receive information

Some good handouts for our Association members. More continuing information in city publishing venues.

In city brochure/newsletters or by email

Please take REAL MEASURES to stop syphoning water out of Medicine Lake! We also need to be more vigilant about milfoil and other invasive species. The future of our lake is at stake.

Bohannon neighborhood news

In City monthly bulletin (with water bill) and city newsletter (quarterly?)

email ---

Maybe by being on an email updating list.

13. Considering the water bodies in your community, what are your major concerns or issues that should be addressed? - Open-Ended Response

Narrative responses - major concerns or issues to be addressed

1. shoreline and trail repair on the west side of Bassett Creek between Glenwood and Penn 2. buckthorn removal in the woods, west side of Bassett Creek between Glenwood and Chestnut

1. Weed control 2. Water clarity

Access to Bassett Creek south of Glenwood though the park.

AIS is my major concern--both plants and animals. Medicine Lake is a very vulnerable lake. It took just two years for Eurasian water milfoil to make its way into Medicine Lake after it was found in Lake Minnetonka. Zebra mussels are now in Lake Minnetonka. We need aggressive action by the cities of Plymouth and Medicine Lake and BCWC and the state to keep zebra mussels from contaminating this lake. I also see what has happened at White Bear Lake could happen in medicine Lake. Lake level must be addressed.

algae

Algae in Medicine Lake Garbage in and on the banks of the Mississippi River

Aquatic weeds

As specified above: 1. Prevent the water level on Medicine Lake from declining too low--figure out a way to modify the dam at the outlet to Bassett Creek using a "V" shape or some other method to variably control how fast water levels decline. 2. Reduce the aquatic invasive species, and do more to prevent and invasion of zebra mussels or other invasive species. 3. Continue to improve water quality through detention ponds and evaluating dredging out some of the silt that has built up around inlets.

Basset Creek- shoreline and water level

Bassett Creek (and Bassett Creek Park) is behind the houses across the street from me (on Vincent Av, south of Glenwood Av). We all love the trails along the shore and through the woods. But the woods are currently overgrown with buckthorn, and the shoreline has eroded (especially across the creek from the old grain mill). These conditions make walking on the trails hazardous. We would love to have this remedied.

Clarity and flooding

clarity, weed control

Concern for the light rail being planned for construction through the wetlands off Bassett Creek and Sochacki Park / Mary Hills.

Consistant lake water levels in Medicine lake. The number of boat allowed on Medicine lake through French Park. The aggrement with Hennipen Parks is a joke... They keep expanding the boat access program.

Contamination Rice Lake Algae

contamination and erosion of bassett creek

control invasive plants improve water levels improve water clarity

covered already - protect Medicine lake water quality and importantly water levels!

Current prevention and interception methods for AIS are not working well enough. I am also concerned about the potentially deadly amoeba, Naegleria fowleri.

Currently the bridge is too low and by the end of July, beginning of August we cannot enjoy the water or boats. The water level gets so low that the boats hit the bottom and make it hard to even get out and enjoy the lake that we pay a small fortune to live at. The fishing has really gone down hill also. Seems as though the fish size and quantity have decreased. Something is very wrong.

Density of homes and streets will continue to add problems. We need to keep watch. City streets are very well engineered so they craack little and stand up well. Thanks to Jeff Oliver's good designs

dredge the artificial reserviors to capture runoff from roads.... they are key as buffers to the greater natural bodies

erosion control and road runoff

fixing the dam! We need to address the ability to regulate the water level. Medicine Lake is the second largest body of water in Hennepin County but we do not get any attention as such. The boat traffic has increased over the years and is almost to a stand still later in the summer because the water level drops. Lake residents cannot even get their boats off the lake at times!

garbage, pollution, continued attentive care of the water bodies.

I am concerned that the urban wetland areas in the vicinity of Bassett Creek will be developed for a light rail project.

I am concerned with the changes to the wetlands and impacts to Bassett Creek from the proposed Bottineau Light Rail line.

I do not have enough information to select the major concerns. E.g. previous question asked, What do I think would make the most impact. I was unable to select two top items.

I guess maintaining current water quality or improving it if there are issues.

Narrative responses - major concerns or issues to be addressed

I know street run off is being addressed. I would like to see more public education and recommendations for landowners on/near the water.

I would like to see the lake level stabilized at a higher level. I would like to see a clearer lake

Increasing / maintaining the water level of Medicine Lake and potentially reducing invasive plant infestations.

ineffective and inequitable programs despite multiple agencies and high taxation

Install a rough fish barrier on the Bassett Creek dam. Control the contaminants entering medicine Lake.

Invasive algae and clarity of water

Invasive plant life

invasive species

Invasive water plants

Keep out invasive species, limit boat traffic on busy days, keep water clean enough for swimming without getting rashes, lifeguards on public beaches

keeping lake free of contaminants and invasive weeds

Lake levels too low and lack of concern by city political leaders of Plymouth and Medicine Lake. As long as it is wet they are happy.

Level and clarity of Medicine Lake needs to be addressed

Look at ways to treat storm water run off before it enters the waterbodies. Not as concerned about the volume of water as long as it is treated to reduce the amount of phosphorus entering the waterbodies.

Low water levels on Medicine Lake must be addressed. Invasive weeds hinder lake use.

Low water levels, invasive plants.

Maintain or increase water levels

Major concerns at present include low water level and invasive species.

Major emphasis must be directed towards the Light Rail D1 line running thru GV and Theo Wirth Park. This is not a benefit to GV and will have a major impact on the environment, mainly the wetlands and Bassett Creek.

Managing the water level at Bassett Creek Dam and protecting against Zebra Mussels.

Medicine Lake gets too low every year. We should dam the flow out so the water stays. I would love to see the whole lake increase at least a foot if we can do it with no damage to homes.

Medicine Lake gets too low for reasonable usage in the summer. we need to raise the dam and preserve the water at a higher level. it affects homeowners and anyone who wants to launch a boat on the lake

Medicine lake low water level

Medicine Lake needs an adjustable dam on the outflow that passes under the bridge on South Shore Drive. We need to be able to maintain a consistent lake level during dry and wet years.

Medicine Lake water level consistency. Keeping Zebra mussels out of the lake. Minimizing sediment entry and stabilizing lakeshore.

Medicine Lake water quality, invasives like Zebra Mussels, water level.

Need filtering ponds for run-off, buffer zones,

Pesticide runoffs from lawns into our local watersheds.

Plants in Medicine Lake - invasive species eliminate usefulness of a large portion of the lake.

Pollution and litter.

pollution and runoff.

Pollution/runoff/contaminants entering the water

Preventing invasive species and maintaining good water quality

preventing zebra mussels. Raising the dam on the south side of the lake to maintain water levels slightly higher.

Raise the level of the Bassett creek dam so the water level remains higher in the fall and late summer.

Raise water level of Medicine Lake - reinvent the dam to keep more water in the lake Low water level limits lake use - can't get boats in or out Harvest/Spray milfoil Bay areas too shallow due to sediment/muck

removal of bordering buckthorn and pet waste

run off into storm drains - people don't realize they need to even get leaves out of gutters

Runoff from yards and streets and contaminants it contains.

Sedimentation and overgrowth of aquatic plants

See answers provided previously - Too many people seem to plant grass right up to the edge of water bodies.

Shoreline restoration, water cleanliness and safety at swimming beaches (no sickness for swimmers), keeping contaminants out of the water, and careful plans for run-off, flooding, and managing waste water.

stop erosion of creek. look at ponds to see if they can be helped. I see where water area in Theodore Wirth Park has islands that were not there 15 years ago. It must get the soil erosion from Bassett Creek upstream.

The control of water levels and weed prevention and clean up

The Current dam structure does not allow control of lake level during low lake cycles.

Narrative responses - major concerns or issues to be addressed

The environmental impact of the Theo Wirth Light Rail D1 project that I do not want in the wet lands and near bassett creek.

The lake level. The level is dangerously low in mid to late summer. Should a major emergency event occur on the lake, with low water levels, Plymouth & Medicine Lake Fire along with Hennepin County Water Patrol would and do have major time consuming issues launching. Many lake residents have major issues launching from lifts in low water.

The proposed Bottineau Transitway light rail poses a tremendous threat to beautiful Bassett Creek & Rice Lake. The addition of 2 rail lines into a wildlife area will have consequences that will reduce wildlife, effect the wetlands and detract from the community. I am most concerned about the run off issues of debris during the construction phase and then the likely water runoff from such a large surface area once the tracks are built. The pristine nature areas of Mary Hills and Sochacki Parks with Bassett Creek as its center piece will no longer provide our community with a valuable natural environment.

The spread of invasive species and the reduced water levels.

Those identified in this survey.

Trash in the creek

Water Clarity and Invasive Species. So many issues on the previous list must be addressed to improve water clarity, it will be an effect of addressing other issues.

Water level stability in Medicine Lake

Water level, and invasive species.

Water Quality

Water quality and lake level in Medicine Lake.

Water quality of Medicine Lake, including clarity, invasive species, and consistent water levels

Water quality, building water cells and ponds to allow filtering of the runoff before it enters lakes.

Water quality, lake level of Medicine Lake/Bassett Creek dam

WEEDS in the lake!

Wildlife and natural areas are my primary concerns, as well as the beauty of the lake and surrounding wetlands, creeks etc. Too often attempts to make the human population comfortable are detrimental to the wildlife and their habitat.

Wildlife habitats

Winter runoff and recreation. We need to significantly reduce the use of salt on the roads/sidewalks in winter. We need to cleanup recreation on the lake through education and potential additional regulation. For example not allowing cars to drive on the lake. Cars allow too easy of access to the lake which results in more trash being brought out and left on the lake and salt dropping from cars directly onto the lake. Regulations need to be made with education to go along with it. One small example: Medicine Lake considered using less salt on the roads in 2013 but then decided to go back to using more salt because "someone complained." The risk of not using salt on a 20mph roadway is not great at all. The cost of using salt so near the lake is great.

With all the use the lakes get can we keep them clean and flowing?

You always have plans up you sleeve as to where you want to be and I do not like the financial budget proposed. Too much of this spreading and visioning is not healthy. We need to preserve trees, but somehow this did not happen on the corner of Theo Wirth and Glenwood.

Zebra Mussels

Zebra mussels prevention. Do everything that is possible to keep them out of Medicine and other lakes.

(blank)

Too many weeds. And water clarity. And keep lake lever a bit higher.

Lake needs to be dredged.

Clarity Invsive plants. Water levels

Pollution, in the form of run off and trash near the water. I believe that promoting plant, fish, and animal life is also important but it makes more sense to make sure the water is clean first.

Poor citizen behavior

Pollution runoff. Water capture and retention in private and public landscaping design.

Medicine Lake is too shallow. The lake level doesn't stay at a "healthy" level long enough. I am concerned we are not keeping the depth managed properly and it impacts the usability of the lake. This is further enhanced by a concern that sediment is filling in and we should dredge the lake.

I live across from Lion's Park and watch the baseball field dirt run off into the storm sewer.

increase holding capacity of pond bordering Canadian Pacific RR tracks and 36 th ave no runoff from RR tracks enters pond with considerable sediment

Limit the amount of water being let out of Medicine Lake. In other words, rise the outlet dam.

Narrative responses - major concerns or issues to be addressed

Stormwater runoff

Water quality in Medicine lake. it is the largest lake in the 494/694 loop and used by hundreds of people each day. the water quality is poor. The level of the lake is also kept low, especially in August, which leads to the clarity and temp issues affecting the algae blooms.

My biggest concern with Medicine Lake would be the water level. It is often low to very low.

Lead levels in drinking water

I think protecting the lakes from invasive plants and animals(mussels) along with increasing the water levels in the lakes through the summer months to reduce danger for swimming and boating.

• Zebra Mussel invasion • Water level on Medicine Lake is too low during most of the summer. Once the water stops running the lake drops quickly • There's a bridge right by the dam on Medicine Lake, along South Shore Drive... just to the south of the bridge, there was a pile of rocks dumped over some insulation panels (I believe to help protect some underground piping) This has created a pond area under the bridge and up to the dam. Once the water stops running over the dam, hundreds of fish are trapped and die in this area. Last year it was the most awful smell – someone did come clean it up, but I'm assuming the problem will reoccur. Also, some of the insulation panels are uncovered now.

Maintaining water levels by raising the dam!

Water quality and Prevention of Ice fishermen leaving garbage on the lake.

Reduce the runoff from the Highway department on Duluth St. Discuss the clearing of trees and brush from the watershed area with homeowners

Pollution control access and shoreline retention

Improved water quality in order to improve fishery --- big outlet for low income families here. Reimagine old Glenwood plant site.

water quality and garbage in our lakes when we get major rain.

Zebra mussels are not yet in Medicine Lake. However, Plymouth has left the West Medicine Lake Park gate open for uncontrolled/monitored access for more than 4 weeks, 24/7. This is totally unnecessary and poses a severe risk of introducing zebra mussels into the lake. The French Park boat ramp is monitored by the DNR; the WML access is not monitored at all, and fishing boats have been using that ramp for over a month without inspection. Also, boat trailers are parked in the lot day & night.

Mitigation of the impacts of various land use, especially runoff from hard surface, and aquatic invasive species.

storm drain run-off from yards and driveways

Absolutely need to keep more water in Medicine Lake especially in the fall to ensure a longer season of enjoying water activities and prevent damage to watercraft being put away for the winter. Last year was HORRIBLE Algae. - Property Values - Note the bigger the value the more taxes to pay to help the community.

On our lake, Medicine Lake, the water levels seem to get too low too soon resulting in difficulty for everyone. I would like to see the "Dam", or lack thereof, addressed

Water clarity, odor, amount of aquatic plants

If the current condition of the lake continues, we will be able to walk across it. The lake should be dredged again, as it was many years ago. In the alternative, the lake should be temporarily drained so that the invasive weeds and algae die.

Geese, polution

Water level of Medicine Lake.

Water levels in Medicine Lake. Keeping Zebra Mussels out of all lakes they haven't already infected.

It would be beneficial to the Medicine Lake community to have and controlled outlet weir to keep more water in medicine lake late in the season and during dryer times.

elevate dam on Medicine lake to elevate water level to increase use of shallow areas

The amount of pollutants coming from Plymouth into Northwood Lake. Water quality. The amount of sand coming from new Hope city streets. Northwood is a shallow lake as it was a man-made widening of Bassett's Creek- so the sand build-up makes using a canoe very difficult.

Water stability levels apparently need addressing to prevent low levels during high heat or at the end of summer.

1. be more aggressive about getting on top of the milfoil (and other invasive weeds) problem. I think we have been too complacent. 2. STOP the syphoning off of water from Medicine Lake. There is NO good reason this is being done, and it's hurting the lake ecosystem, and rendering the lake unusable when levels get too low.

LOW Water level of Medicine Lake

Businesses need to consider and implement better alternatives to lawn, especially those areas adjacent to drainage sites/ponds. I see a large amounts of lawn that have no use around businesses. I see parking lot drainage sites/ponds, some with VERY steep banks, being mowed to the water's edge (SE corner of Winnetka & 36th).

Narrative responses - major concerns or issues to be addressed

Water level of Medicine Lake

I am concerned mainly about the water quality and maintaining a good natural habitat for native aquatic biota.

14. What actions should be taken to address your issues and who should take those actions? - Open-Ended Response

Narrative response - what actions should be take and who

A dam at the place where the creek exits the lake that can be adjusted to manage lake levels Heightened efforts to educate shoreline owners

Adjacent landowners should know what to do, and the city should use practices (like salt alternatives) that will improve water quality.

All efforts should be put in place to stop the construction of the Bottineau Light railway through wetlands and park land. Community members have voiced concerns at public meetings. The Bassett Creek Watershed Management commission should step in and protect our water. Our community needs your help to stop consideration of the D1 line. Please help us - we need larger, bigger voices to protect nature areas. all who want to protect the beauty of Bassett creek .

Although the residents have long lobbied for further consideration of increasing the water level (modification of the damn structure), this repeatedly seems to fall on deaf ears. This really should be remedied.

Amend the dam structure to allow for water retention during low rain fall.

at least acknowledgement that increased work is needed.

Bassett Creek should partner with the other governing bodies to do an actual study of the dam height and whether putting in either an adjustable dam or an higher dam cut out would cause any increase in the flood plain. The important recreational value of Medicine Lake is not being properly served because of the absolute lack of real knolwedge on this subject.

BCWMC for water level consistency. Three Rivers for Zebra mussel monitoring at boat landing and heavy education component on part of cities. Cities should continue to work on sediment infiltration. Incentives to naturalize shoreline and add rain gardens along roadways might really help.

BCWMC needs to have representation at the upcoming charette being held jointly by the Mpls Park Board and the County to make sure that their interests are considered with station area planning.

BCWMC should take the proactive lead in resolving the dam elevation. Agency stakeholders must cooperate in resolving weed related management.

Better legislation and enforcement of AIS laws is needed. Also, more research is needed for detection, control, and eradication of AIS and Naegleria fowleri. All agencies currently involved should take more action (MN DNR, lawmakers, CDC, etc.).

Buckthorn removal and shoreline repair. Ideally, this would be done by professionals.

cities should take initiative

City of Plymouth and Medicine Lake. They have the most to lose. Plymouth now allows a sail club a French Park eventhough when this agreement was proposed "no boat docks power or sailing was to exist...

City, via public information, should encourage and teach homeowners how to install and maintain rain gardens. The city, itself, should construct rain garrdens on city property where applicable. An organization, such as Metro Blooms, should be brought in to help lead the program. Homeowners should receive credits or sometype of financial incentive to construct rain gardens such as , I believe, Lake Minnetonka Watershed District. .

Collaboration - lake association, watershed, cities, three rivers parks, county, state A natural resource is for everyone - everyone must work together to protect it.

Community/city should work together

consider changing the Basset Creek Dam level to retain more water in lake

Consider options for managing the water level at the Bassett Creek Dam the same as they do with on Lake Minnetonka with Minnehaha Creek. Consider options for inspecting incoming boats at French Park.

Control at access points.

control the loss of water through the dam on Medicine lake

coordinated invasive plant control- chemical or machine. It is so bad our jet ski stalls because the intake gets clogged. Water levels get so so I can not even get my boat off the lift- raise the dam height

Do not know.

Don't know enough

don't know who should take the actions?????

Dredging and contol of weed frowth

Dredging and plant control (whatever the most effective research-based methods currently are) including weed harvesting. Joint cost sharing with government and householders to accomplish this.

Encourage plantings other than grass along shorelines. The City or watershed district should try to educate adjacent land owners and/or try to provide incentives.

Narrative response - what actions should be take and who

French Park should monitor the boats going on as it is the only public launch and the source by which Medicine Lake is being infected.

Have a representative attend meeting on LRT with information on how it will impact the wetlands and Bassett Creek.

Have one (1) government agency be the lead agency for lake issues.

Hennin Co. Park board, City of Plymouth park and Rec, Henn Co sheriff water patrol

I believe the Bassett Creek watershed commission should address the water level, and the other issues should be addressed jointly by the commission in conjunction with the cities of Plymouth and Medicine Lake, with the guidance of AMLAC as I think that organization has a very good understanding of Medicine Lake.

I don't know,

i don't know. education, volunteer efforts, rezoning all come to mind.

I envision that there will be large nordic skiing events around the area, and there will be not enough parking of having tents up for prolonged periods, etc. and other structures and such conditions that go with density fluctuations in events. You need to plan to use the permanent structures and be forward looking with insider info about big events so that everybody can help adapt the landscape better. You need to build a ski/pedestrian bridge around the par 3 golf course like the one near the clubhouse. I used to ski when it was free, so I think that the park board should make an exception to poor people without the disposable income.

I have been a vocal opponent of the proposed route of the Bottineau Transitway and encourage all organizations with an interest in protecting the watershed to be vocal as well.

I think the BCWMC is doing good work.

I will leave that decision to the professionals.

I would like to see a comprehensive weed control plan in place not just for Medicine Lake but for all the recreational lakes in the metropolitan area. I would like educational programs to explain to people the importance of rain gardens, rough strips of lawn between the fertilized yard and the lake shore and picking up dog feces around their yards and streets. All of those can impact lake quality. I would like our elected officials to show they care about preserving this wonderful water heritage we have in Minnesota for our children and grandchildren.

Keep the information at the fore front. If everybody knows they can help in their own small ways.

lawn fertilizer restrictions on lake shore and remove the invasive weeds and/or species

local Cities that border the water bodies, County and State

Make it illegal to use certain chemicals on lawns. If you can't eat it, it shouldn't go on the lawn. Have checks to see if people have dog poop bags - many people don't and shouldn't be allowed to use shared spaces if they won't keep it clean for all.

monitors at boat launch. Raise dam level

More and better organized funding to cover treatment for curly leaf and milfoil. Full time monitors for French Park Launch and supervised special needs launching at West Beach in the spring and fall. Install a water flow system at Bassett Creek outlet.

more education - in neighborhoods and communities - at the city level - i can't even get a curb cut easily for a rain garden. i want more promotion of rain gardens - would love to put one in - can't afford it

More education. Not sure how to get residents' attention. ' Since the watershed spans many communities, it makes sense to have a unifying body, but info from a watershed district is not exactly on the best seller's list. We don't have a terribly active neighborhood association, but we like each other. Maybe if a few neighbors hosted a picnic with a guest who could give short talk on what I do individual homeowners could do and what group projects might be undertaken to help our neighborhood and other popular locations - like neighboring parks. What about National Night Out? We have good turnout for this event.

More projects to capture and treat runoff--

Need to establish a group who is passionate about making a change to drive the tactics through.

Needs to happen at a local level with education on a one to one basis...

Not sure how to address this issue?

Permitting process, awards highlighting actions, create volunteer opportunities.

Prevention of AIS is key. The state, the commissions, and the cities MUST work together to put forward a comprehensive plan for taking care of the lakes and rivers in our state.

Narrative response - what actions should be take and who

Put in a controlable dam at the out flow of medicine lake. Have a 6" gate that closes when the water level is 2" from the bottom of the outflow mouth of the dam. If it crests the 6" level open the dam up totally. Keep the control gate open from Nov 1. to May 1 to prevent any flooding. The outflow was planked up to the top of the dam when plymouth/MET council did the sewer work under the creek and it DID NOT FLOOD ANYONE. I went and looked for flooding in the city of medicine lake and low area on the street by the north arm (mushroom house) and the water wasn't on the street! By mid summer we can't use our boatlifts because the water is too shallow, in times of drought why are we letting water out? I have lived on the lake for 40 plus years. Holding ponds are great and I understand why they were put in and they do help water quality but when they dry out it takes a lot of water to fill them and then flow into medicine lake. Since they have been installed the water level has been slowly dropping every year. Since the new dam was put in the lake level has not been the same. SEE WHAT IS GOING ON IN FRONT OF YOU. You want me to help with water quality issues, I do. I have volunteered my time cleaning up medicine lake long before any of you had anything to do with your organization. You are suppose to lead to change that helps our body of water so do that, put in an adjustable dam on medicine lake, it is an easy fix, other metro lakes with holding pond/water problems are doing the same. Thank you.

raise dam to keep more water in lake during late summer

Raise the dam or have a system that can be raised or lowered at different times of water depths as other lakes have, especially of our size.

raise the dam, or at least notch it to hold more water in the lake longer. City of Plymouth, DNR, Army Corp. of Engrs. Bassett Creek Watershed

Raise the outlet- like Lake Minnetonka

Raising the Basset Creek Dam that runs off of Medicine Lake. Not sure what the options are for invasive plants, harvesting possibly.

reduce amount of fertilizer and other contaminants entering the lake - homeowners control invasive species - ???

Regulation and education

Remove the trash - unknown - perhaps a public cleanup day

Requiemetns for boat inspections should be upgraded with significant fines for spreading invasive species or for attemptin to thwart boat inspections. The timeframes for launching boats should be compressed so that inspections for invasive species can be performed. Upgrade the Basset Creek dam to allow for controlled water runoff.

Restrict outflow of water via outlet dam. BCWMC seems to be the body charged with lake usability issues

Same answer as 13.

SIMPLE..... Change from fixed dam height to "Adjustable" adding one foot.

Someone must take this important issue to the Met Council, GV city council, parks and /rec, State and Federal agencies, such as the FTA, senators and congress people. Let's not pave paradise and invite more commercialization to this wonderful natural area.

Someone should take action! All the rules and sciene are obviously not working. Last year and the year before we were trying to save all the fish that got caught in a death trap at the bridge!! It was not only painful to watch them all die, but the smell was awful!

start a dredging program around important bodies 1 every year... residents could help to fund this if made to care

State and local agencies that have the knowledge to know what is effective. Communicate to home owners and businesses a set of recommendations regarding what they can do individually.

state legislation that would eliminate all current governance and establish a modern unified regulatory system with high accountability, minimal administrative expenditures, and optimal delivery of needed water quality improvement programs.

Stop the flood control and look at the wildlife!,,,,,,,,,,,,,

storm water management reduce road salt poisoning of water bodies

The appropriate taxpayer funded organization should reduce the amount of water released from the lake, especially early in the season, to maintain higher water levels through the summer.

the City drains road runoff into the creek it should all go into detention ponds

The dam should be constructed and paid for by some mix of Plymouth, Medicine Lake, Hennepin County, and the state of Minnesota.

the dam should be raised by a reasonable amount. even 6 inches would make a major difference whoever has authority, probably the DNR or state of Mn

The light rail should be directed through areas which would be best served and where the population is high. The Broadway route was much better suited and would have less environmental and waterway impact.

Narrative response - what actions should be take and who

There should be a bigger push to get neighborhoods (as groups) to invest in shoreline and prairie restoration closer to their homes. The state government and local watersheds/cities should create strong laws and ordinances to protect our natural resources from harmful run-off and pollution.

Those on the list in this survey.

Treatment prior to discharge. Should be a colaborative effort between the City and the Watershed District because both agencies collect funds for this work.

Use of porous pavements. Regulated by the city

we all need to participate through tax dollars to fix these issues

We must all work to guard against invasive species. It only takes 1 careless person. Water clarity must be a community wide effort, I would like to see more regulation of fertilizers and runoff from lawns and farms.

Whoever controls the damn on Basset Creek at the lake outlet needs to consider raising the level so as to level off the fluctuations in lake levels...

Wildlife and natural areas should be a top priority of local gov'ts. I do not approve of slaughtering geese, killing or trapping, or laws restricting the feeding of wildlife. Dead trees should be kept as long as possible to provide cavity nesting areas.

(blank)

Raise dam by 2 or 3 inches.

People need to take more responsibility. I'm not sure how to do that. Maybe a campaign that shows people how much of an effect their actions have?

Apply for public/private funds for a free rain barrel program and rain garden education.

I think we are letting too much water out of the lake at the dam. I also feel that we need to start a multi-year process of dredging the lake to stay ahead of this issue.

there should be some retaining ponds built by the ball fields.

install rip-rap from tracks to pond pond has not been dredged in 40 years build up of sediment has reduced ability of pond to act as a settling basin and flood control function watershed commission should look into this

Use bmp's to reduce/treat runoff

Raise the level of the lake to its spring levels all year.

I believe the dam at basset creek could/should be built up a bit to keep the water level in the lake higher for longer periods of time.

Continue to publish water safety results and how to mitigate excess lead levels. I appreciate the water maintenance organization publications that go out to New Hope residents.

I personally think the dam on Medicine Lake should be higher to let less water flow out of the lake during the summer. There have been deaths due to swimmers getting caught in weeds and numerous boat motors hitting rocks due to the low water levels.

- increase the height of the Medicine Lake Dam a few inches, or install a way to adjust the level of the dam. In my opinion it could be a few inches higher all the time, with the exception of a flood environment where it could be lowered to increase the release of water. In six years, I haven't seen the water ever be too high, but I'm sure it can happen. Unfortunately we seem to be maintaining a low level every year.

Raise the dam

Unknown, actually.

Send out a flyer to homwowners on the creek regarding how they should manage their watershed property. Ask the Highway Dept to put in a drainage pond of some sort.

Shoreline buildup algae removal pollution prevention

Watershed should work w/cities and local community newspapers to create a "from Plymouth to Minneapolis" awareness. Make the website and the focus of the Watershed district about what we love-- the great variety of birds found along the streams and lakes, the wildlife reliant on the watershed, a focus on increasing the fisheries.

Educate the residents of our community regarding water quality and the causes of poor water quality.

Close the gate for all boat launching; French Park can easily accommodate all boats. Use the gate only during ice fishing season.

BCWMC should adopt and implement a more robust set of regulatory controls, in conjunction with the cities in the watershed. The legislature should provide the Department of Natural Resources with the necessary funding to work with local governmental units to implement rigorous inspection and decontamination programs to prevent and manage the spread of invasive species.

freq public service articles addressing each household's responsibility

Have a controlled outlet weir

Narrative response - what actions should be take and who

Get started NOW do not wait for Federal monies The cities are always looking 5-10-20 years down the road. I say stop kicking these improvements into the future. We want better stuff than find a way to take this issue go away now by taxing everyone thats just not lake property owner thru property taxes.. Everyone enjoys the waterways,wetlands,parks and everyone contriubtes to the problems so look at the rainy day funds or general funds a than take action. Do wait, you can not please everyone ,but everyone enjoys the water bodies so make them pay for quailty. .

I would like to see a moveable "Weir" or gate where the present fixed level dam is so that the water could be kept in the lake for wildlife, recreation, etc... It gets very difficult to use the lake the way it was meant to be when the lake levels get too low and I beleive much of that water could be kept in the body of water once a moveable gate or weir is installed

Not a water body specialist, I have no idea. Licensed personnel who understand what they're doing and why, and how it impacts the rest of the community.

See above.

Cleanouts. Treatment. City or watershed

Water level should be raised a few inches to account for the lack of rain which we've had the past few summers. Without rain the lake becomes unusable.

Review on the dam weir. I'm not sure who's responsible - Army Corp of Engineers? DNR?

Put a adjustable weir on the medicine lake outflows

raise dam, BCWMC

I know money is always an issue- but keep working. (Especially for Watershed NB07.) We appreciate the commissions work.

Designate resources to organizations that can take on this work. I'm not sure which organizations would do this.

1. be more aggressive about getting on top of the milfoil (and other invasive weeds) problem. I think we have been too complacent. 2. STOP the syphoning off of water from Medicine Lake. There is NO good reason this is being done, and it's hurting the lake ecosystem, and rendering the lake unusable when levels get too low.

I think maybe BCWMC is the organization that should take action. I dont know how they would address the issues, Maybe they have engineers that could work on the issue?

Cities or whatever appropriate body needs to educate businesses on being good environmental citizens.

Landscape/lawn care companies need to be part of the solution.

Dam inlet to raise the water level of the lake.

I am thinking a lot of rain gardens should be installed all over the watershed to help reduce runoff pollution and siltation of the creeks and lakes. Strong enforcement of permanent runoff control issues with new construction. And strong enforcement and monitoring of temporary runoff issues during construction projects

~ encourage lawn removal, which involves installing native plants ~ discourage use of lawn fertilizers while educating home owners on alternatives

15. Other comments about water resources - Open-Ended Response

Narrative responses - Other comments

.....

BCWMC has been unresponsive to constituent pressure to resolve the low water elevation issue resulting from an inappropriate dam design. It is embarrassing when public agencies funded by taxes conduct public outreach in a manner such as Bassett Creek does business.

Clearing and building always go with development, but the kinds of development that are the worst are the hidden kind that surprises without warning and proper vetting. I missed the visioning exercise, and would like to read the minutes of what was indeed envisioned. The overflow parking and the archery area will not be preserved when the development demands start, and we need to understand the long range plan whether it is olympics or whatever sports commercial interests are at stake. Rebuilding a course for kyacks out of the creek is something that may be possible. All serious future plans need to be public.

Do something.

Educate, EDUCATE,! educate all

Elected/appointed officials that do not live on the water ways making decisions that effect owner of water ways and not them. I've lived on Medicine Lake since 1950's. Much has happen to the lake that should not have happened..! To many directives brought on by non lake residents have grossly affect the impact on/in in the lake. (Hwy 169 run off / French Park / Ryerson Steel and the industrial hard surface run off, Ice fishing and the trash they forget to take with them and so on)

Establish rules/guidelines about removing water from the lake - irrigation systems.

Has the BCWMC been involved in the plans to construct an LRT line through Wirth Park, immediately adjacent to Bassett Creek?

Here today.....hopefully..... not gone tomorrow.

I am against lake residents removing water from the lake to water their lawns. Water like the rest of the residents on odd even days. Ratchet down on irresponsible lawn mowing, intentionally sending their grass out into the street and then right into the storm sewer and then right into the lake.

I don't know if this directly affects us, but the car wash on Hwy 55 and West Medicine Lake Road uses artificial coloring in their wash and it can't be necessary. Also, maybe we could pressure them to be better stewards of water-using less and using non-toxic chemicals. I know there are other car washes that do it.

I have a wet basement, as do many of my neighbors, so every year, I worry about flooding.

I have been interested in diversifying the plant life along the shoreline of Rice Lake near my home. If the BCWMC were interested in such a project, I would happily donate or volunteer.

I know my comments are pretty specific to where I live, and less about water quality (which I know little about) than about enhancing enjoyment of using the trails and space alongside Bassett Creek. I apologize if this is not the right forum for these comments, but I think they are a piece of the overall picture. Thanks for considering,

I support the widest possible public recreational use of Medicine Lake. Given the shape and size of the lake, what are the practical limits to the number of canoes, kayaks, wind surfers, speed (tow) boats, fishing boats, sail boats, pontoons, that can enjoy the lake at any given time? Could the use load be better modulated?

I would like to help.

I would love to attend a rainbarrel workshop or a raingarden workshop.

In addition to MaryHills & Sochacki parks - the construction and disruption to Theodore Wirth Park also needs to be considered as a detriment to our nature areas. Bassett Creek will suffer greatly.

it is unfortunate that the Basset Creek Commission is not responsive to constituent input as a public authority.

Keep the control of BCWMC in local hands and don't merge it into a regional group

Love the new holding ponds at east and west beaches. Need further inforcement on Phosphorous and lawn chemicals.

Love'm!

Maintain lake level higher, if possible and feasible.

MN Highway Department (DOT) should be involved, if they are not currently, to discuss the damage that highway 169 runoff does to lakes like Medicine Lake.

Much opportunity to utilize rainwater storage for residential watering.

People don't realize how important they are to our lives, but only when they are not safe or they can't use them do they. I'm not sure how to educate people.

Provide more access points along the creek for recreation.....Clear to allow navigation.

rain barrel education and promotion

Scary how much we "invest" in our lawns, only to have it run-off into our creeks and lakes.

Take a lesson from Lake Minnetonka!

Narrative responses - Other comments

thank you!

The water is getting so bad the kids do not even want to swim in the lake.

There wasn't any option on the question about results tht would be most beneficial on managing the level of the lake differently or I would have chosen it.

thhnaks for asking

Too many people move into watery areas and then try to destroy species they don't like, and make the land and water conform to their uses .People should be encouraged to adjust their properties , kids, pets, garbage disposal etc to the local land and wildlife, or move to more human-populated areas..

Water is what makes Minnesota a special place to live.

Water resources are one of the things that make our community and Minnesota special, and they are worth investing in, improving and protecting!

We have so very few water resources that they should be protected with vigilance. As a society we tend to treat our water resources as a never ending supply which I fear will end during our lifetime.

Would like to have bassett creek for recreational paddling. At the moment, I have never thought to try. Water seems too low.

(blank)

I understand concerns about flooding and down-stream impacts of different lake levels. No amount of research will properly validate things on either side. I suggest we make a temporary & cost-contained change to the dam for 2 years and then observe any impacts. We need to do something.

Raise the dam and control aquatic growth

Water level of Medicine Lake concerns me also.

I want to thank you for promoting this survey

Water has a mesmerizing quality about it. Everyone is drawn to it. Minnesota is known for its lakes and rivers and should be in the best condition possible for our use and enjoyment. Everyone should be able to canoe safely without getting caught in weeds or subjected to a foul smell.

Less sand down the drains.

Water ressources are important to our city and state lets take care of them to the best of our ability. Maybe if we took better care of our local lakes people wouldnt pollute the air so much driving to cleaner waters uo North.

I do not think we should consider dredging in-stream ponds in the creeks. Let the creek maintain a stable natural habitat for native plants, fish and other critters. Do much to keep silt out of the stream in the first place.

Bassett Creek Watershed Summit

June 13, 2013

Results of Prioritization Exercise

(+ Northwoods Lake Small Group Meeting Ranking June 18, 2013)

Rank (Tally of points)	Broader Topics Ranked	Examples of specific issues identified through public input process related to the topic
		X – indicates specific issue marked as high priority by Summit participant
#2 (42 pts)	Degraded Habitats & Lack of Biodiversity	Too many weeds
		Non-natural shorelines
		XX Aquatic invasive species
		Terrestrial invasive species
		Too many geese
		Lack of wildlife diversity
		Lack of buffers
		Fish consumption advisories
		Loss of thousands of ash trees in watershed
		X Sediment build-up
		XXX Streambank erosion
		Light rail impacts to Bassett Creek, wetlands and natural areas
		Abundance of cattails in ponds resulting in flooding problems
#6 (12 pts)	Lack of Education & Information	Lack of education and knowledge among residents about condition of water and how to improve water quality
		X Need better sources of information
		Disconnection of public from natural resources
		X Lack of volunteer opportunities
#5 (18 pts)	Recreation Needs	X Lack of public access
		Unmaintained public access sites
		No obstructions for kayaking/canoeing
		Too many weeds can be dangerous for swimming and boating
		Need to balance recreation with habitat
#4 (19 pts)	Degraded Water Quality	X Chemical pollutants in water
		Too much algae
		Too much phosphorus
		X Low water clarity
#3 (31 pts)	Effects of Stormwater Runoff and Development	Runoff from yards, streets, highways
		Lack of infiltration or diversion in lawns
		Salt use
		Runoff without filtration or treatment, more treatment needed
		X Concentrated areas of impervious surfaces
		X Chemicals and pollutants in runoff
		Runoff from older commercial/industrial areas
		Construction site erosion
		Effects of developments on waterbodies, wetlands, and water quality
		Leaks and spills from railroads
		Aging infrastructure
		Effects of dredging
		Stormwater ponds filling in, not enough storage to be effective

#7 (8 pts)	Water Quantity, Water Levels, Flooding (aside from Medicine Lake)	XXX Fluctuating water levels
		X Flooding
		Need more land acquisition for flood easements
#1 (87 pts)	Medicine Lake Water Levels	XXXXXX Low water levels on Medicine Lake
		Need to study effects of Medicine Lake's possible water level manipulation on floodplain, water quality, water temperatures, overall lake health
#9 (4 pts)	Actions by Individuals	Too much trash
		Too many motorboats, water skiing, jet skiing
		Too much pet waste
		Too much lawn irrigation using lake water
		Mowing to edge of water, not leaving buffer
		Lack of sense of responsibility
		X Need behavior change, change of habits by individuals and businesses
		Expectations that problems can be solved quickly with silver bullet
#8 (5 pts)	Governance, Management & Funding	Lack of funding
		Requires commitment of all 9 member cities in watershed
		Projects don't benefit enough of the population
		Lack of commitment and leadership from politicians to seek more funding to improve natural resources
		Better prioritization of projects
		Lack of city-implemented projects
		Need more tax incentive for better projects
		Need to balance management of recreational lakes vs. scenic ponds
		Pond management before lake management
		Cities make sacrifices for industry
		X Need incentives or grants for homeowners to install raingardens and restore shorelines
#10 (3 pts)	Groundwater	Groundwater quality and quantity in wells in Medicine Lake
		Lack of structure and collaboration among agencies with groundwater management responsibilities
		Need better data on impacts of groundwater usage on surface water
		Lead levels in drinking water
		Too much groundwater consumption

Bassett Creek Watershed Management Commission Workshop
 Results of Prioritization Exercise with Commissioners, Alternates, TAC and Technical Partners (TRPD,
 BWSR, Met Council) ~ June 24, 2013

Rank (Tally of points)	Broader Topics to be Ranked	Examples of specific issues identified through small group meetings, online survey, Gaps Analysis (GA), and self-assessment
#5 (25)	Degraded Streams and Shorelines	Non-natural shorelines
		Lack of buffers
		Sediment build-up
		Streambank erosion
		Address roles, responsibilities, funding for removing sediment deltas GA9
		Reassess factors for prioritization of stream restoration projects GA10
		Encourage or set standards for natural shoreline restoration methods GA11
		Consider watershed-wide buffer policy for wetlands, lakes, creek GA12
#8 (13)	Lack of Biodiversity	Too many weeds
		Aquatic invasive species – need to define BCWMC role in issue GA11
		Terrestrial invasive species
		Too many geese
		Lack of wildlife diversity
		Loss of thousands of ash trees in watershed
		Define policies aimed at protection of rare and endangered species GA11
		Identify opportunities to maximize cooperative resource protection with agencies GA20
#9 (5)	Wetlands	Light rail impacts to Bassett Creek, wetlands and natural areas
		Abundance of cattails in ponds resulting in flooding problems
		Consider watershed-wide buffer policy for wetlands, lakes, creek GA12
		Evaluate BCWMC role in wetland issues GA12
#6 (21)	Lack of Education & Information; Need for Behavior Change (Actions by Individuals)	Lack of education and knowledge among residents about condition of water and how to improve water quality
		Need better sources of information
		Disconnection of public from natural resources
		Lack of volunteer opportunities
		Too much trash
		Too many motorboats, water skiing, jet skiing
		Too much pet waste
		Too much lawn irrigation using lake water
		Mowing to edge of water, not leaving buffer
		Expectations that problems can be solved quickly with silver bullet
		Implement city staff training programs GA15
		Develop ways to demonstrate BCWMC success (evaluation metrics) GA15
		Develop new ways (using technology) to interact with public GA15
		Take advantage of education opportunities associated w/ projects GA16
		Assess and redefine roles and partnerships in educational efforts GA16
		Identify topics not adequately addressed in current education program GA16

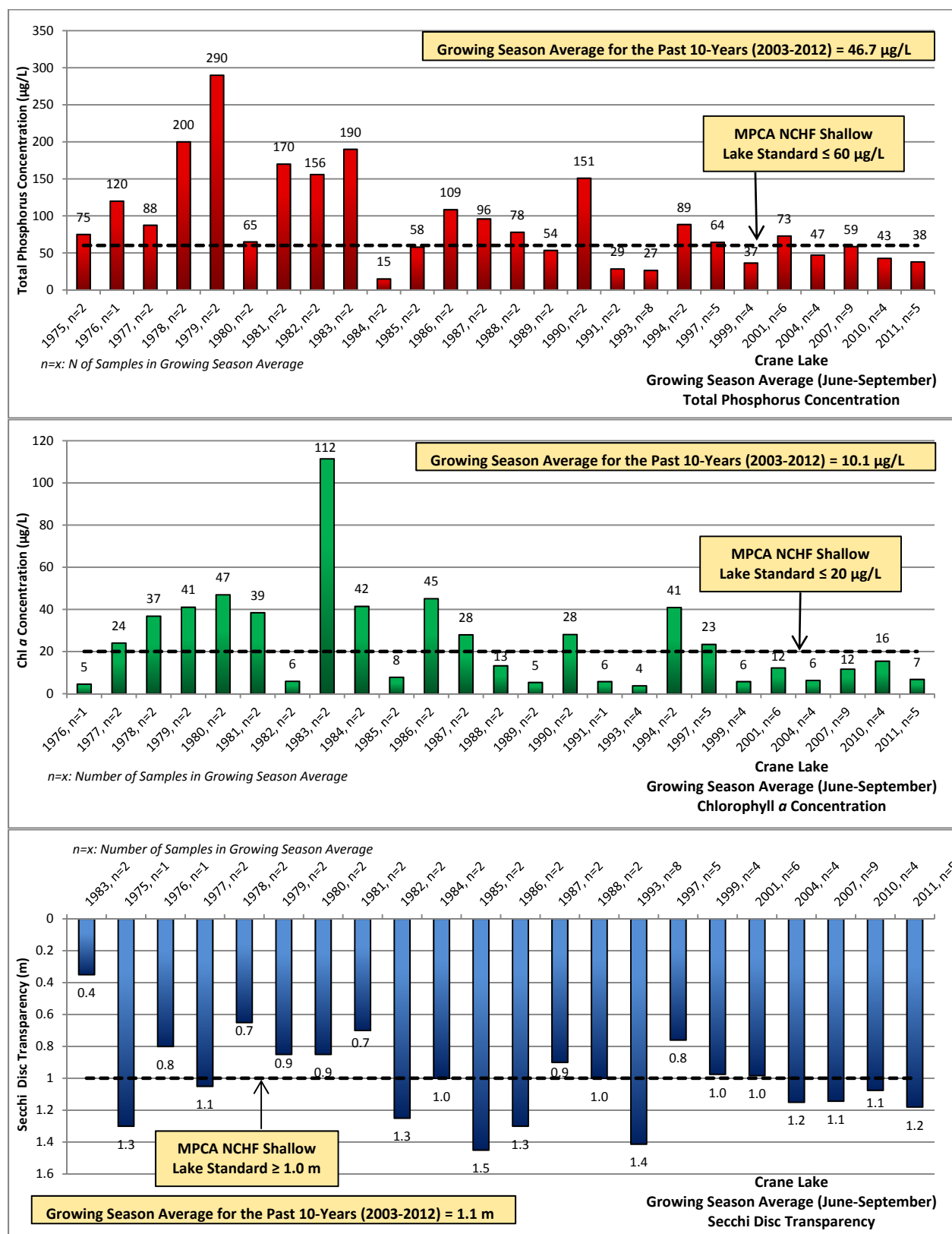
#9 (5)	Recreation Needs	Lack of public access
		Unmaintained public access sites
		No obstructions for kayaking/canoeing
		Too many weeds can be dangerous for swimming and boating
		Need to balance recreation with habitat
#3 (35)	Water Quality	Chemical pollutants in water
		Too much algae; too much phosphorus
		Low water clarity
		Fish consumption advisories
		Need to establish quantifiable water quality standards (Level I standards) GA3
		Expand/revisit list of approved BMPs GA4
		Consider infiltration requirements GA4
		Find ways to take advantage of redevelopment GA5
		Clarify roles in TMDLs GA5
		Address maintenance responsibilities for WQ management facilities GA6
		Revisit water quality monitoring programs and partnerships GA6
		Address impaired waters with CIP projects and other programs – Self Assessment (some projects not implemented)
#1 (42)	Effects of Stormwater Runoff and Development	Runoff from yards, streets, highways
		Lack of infiltration or diversion in lawns
		Salt use
		Runoff without filtration or treatment, more treatment needed
		Concentrated areas of impervious surfaces
		Chemicals and pollutants in runoff
		Runoff from older commercial/industrial areas
		Construction site erosion
		Effects of developments on waterbodies, wetlands, and water quality
		Leaks and spills from railroads
		Aging infrastructure
		Effects of dredging
		Stormwater ponds filling in, not enough storage to be effective
		Revise Plan language to require compliance with NPDES GA9
		Consider revising erosion and sediment control triggers GA9
		Evaluate existing project review triggers GA20
		Review purpose and responsibilities for erosion control inspections GA10
#2 (37)	Water Quantity, Water Levels, Flooding (including Medicine Lake)	Fluctuating water levels
		Flooding
		Need more land acquisition for flood easements
		Low water levels on Medicine Lake
		Need to study effects of Medicine Lake's possible water level manipulation on floodplain, water quality, water temperatures, overall lake health
		Address possible rate control requirements GA8
		Consider flood control objectives in all projects GA8
		Consider policies to handle conflicts betw FEMA & BCWMC flood levels GA8
#8 (13)	Flood Control Project GA18	Flood control project inspection/maintenance – streamline inspections, clarify responsibilities GA18
		Flood control project replacement – consider finances for maintenance and replacement GA18

#7 (18)	Governance, Management & Funding	Lack of funding
		Requires commitment of all 9 member cities in watershed
		Projects don't benefit enough of the population
		Lack of commitment and leadership from politicians to seek more funding to improve natural resources
		Better prioritization of projects
		Lack of city-implemented projects
		Need more tax incentive for better projects
		Need to balance management of recreational lakes vs. scenic ponds
		Pond management before lake management
		Cities make sacrifices for industry
		Need incentives or grants for homeowners to install raingardens and restore shorelines
		Develop process to evaluate cities for compliance and implementation of local water management plans GA19
		Determine if BCWMC is best entity to resolve inter-governmental issues GA19
		Refine procedures for choosing and implementing CIP projects GA20
#4 (32)	Groundwater	Groundwater quality and quantity in wells in Medicine Lake
		Lack of structure and collaboration among agencies with groundwater management responsibilities
		Need better data on impacts of groundwater usage on surface water
		Lead levels in drinking water
		Too much groundwater consumption
		Assess and define a BCWMC role in groundwater management GA13
		Incorporate MIDS site considerations and tools for GW protection GA13
		Evaluate/incorporate Dept. of Health guidance for GW protection GA14

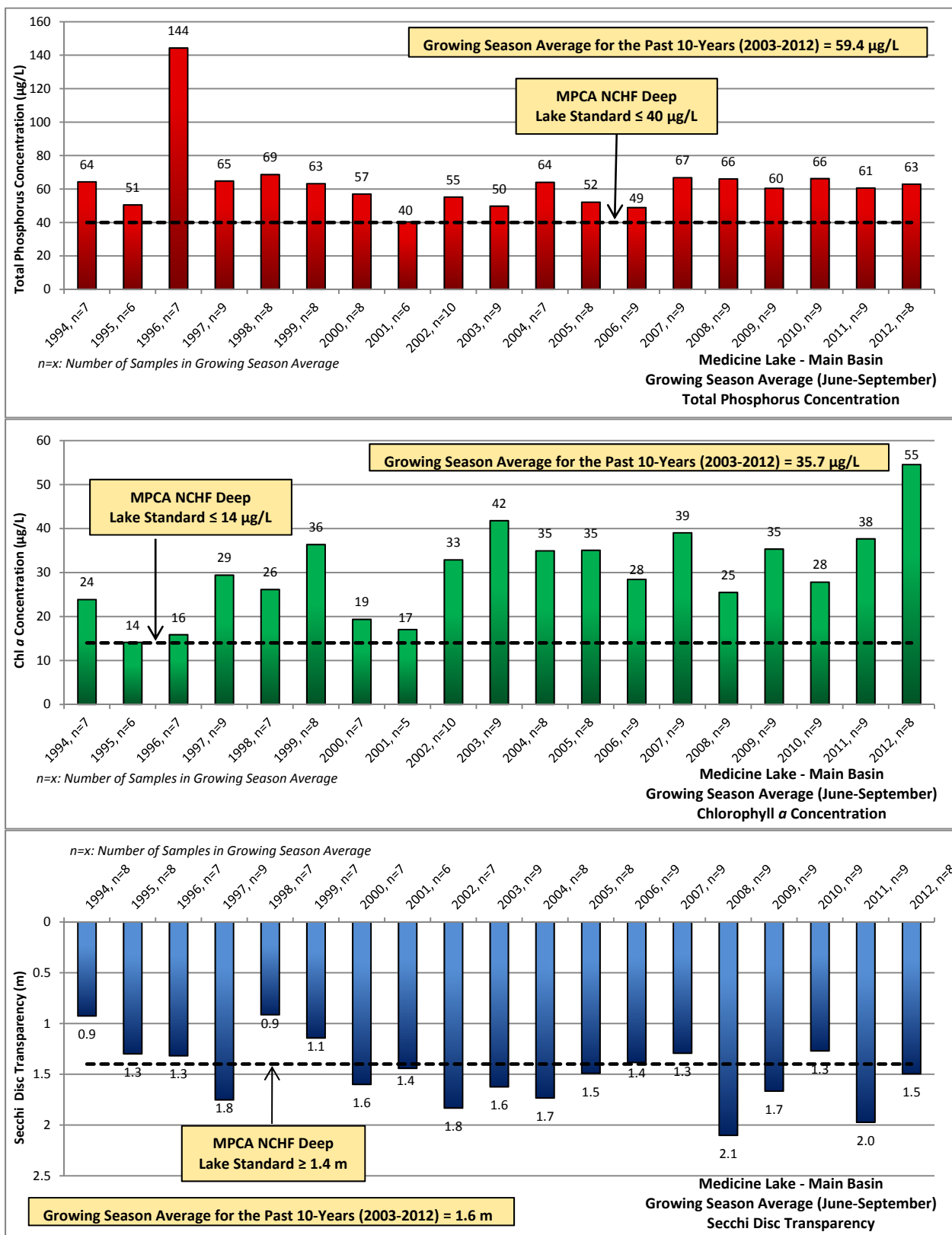
Appendix F

Water Quality Summary

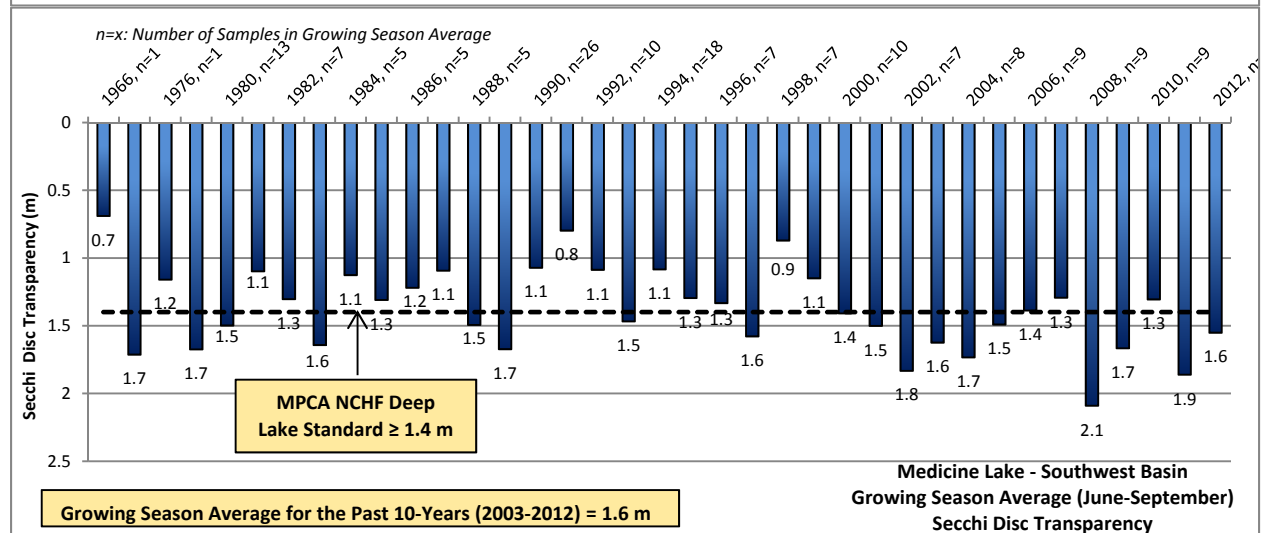
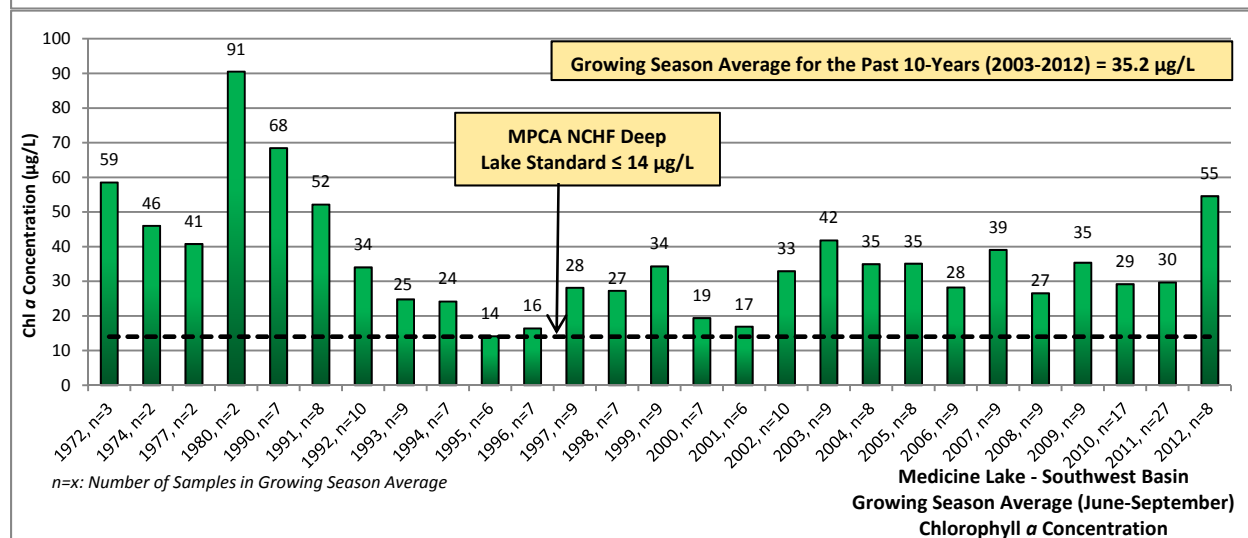
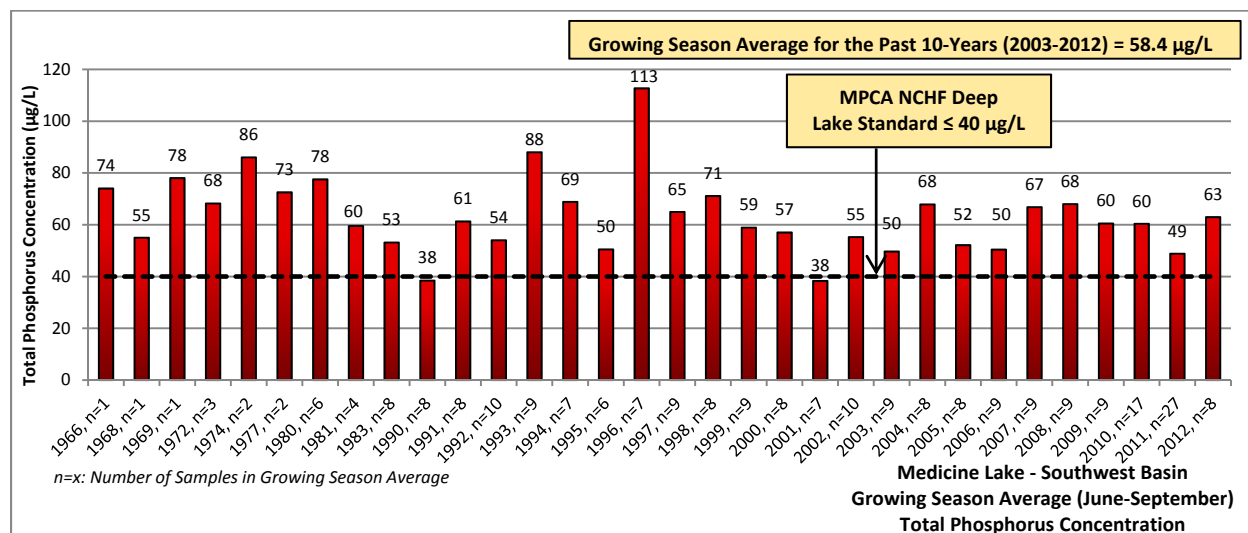
CRANE LAKE



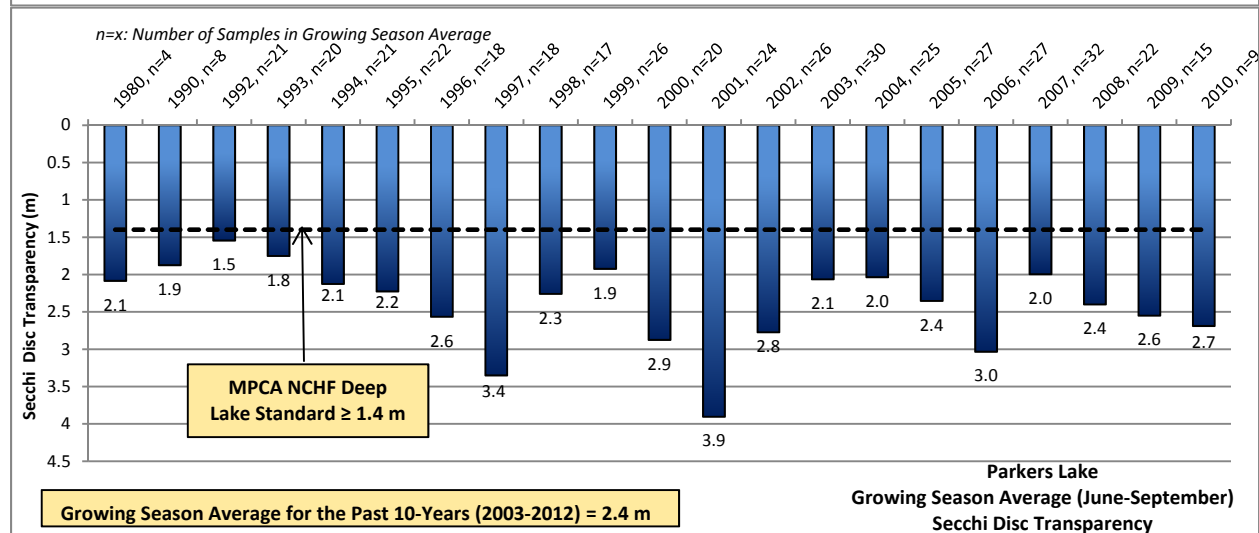
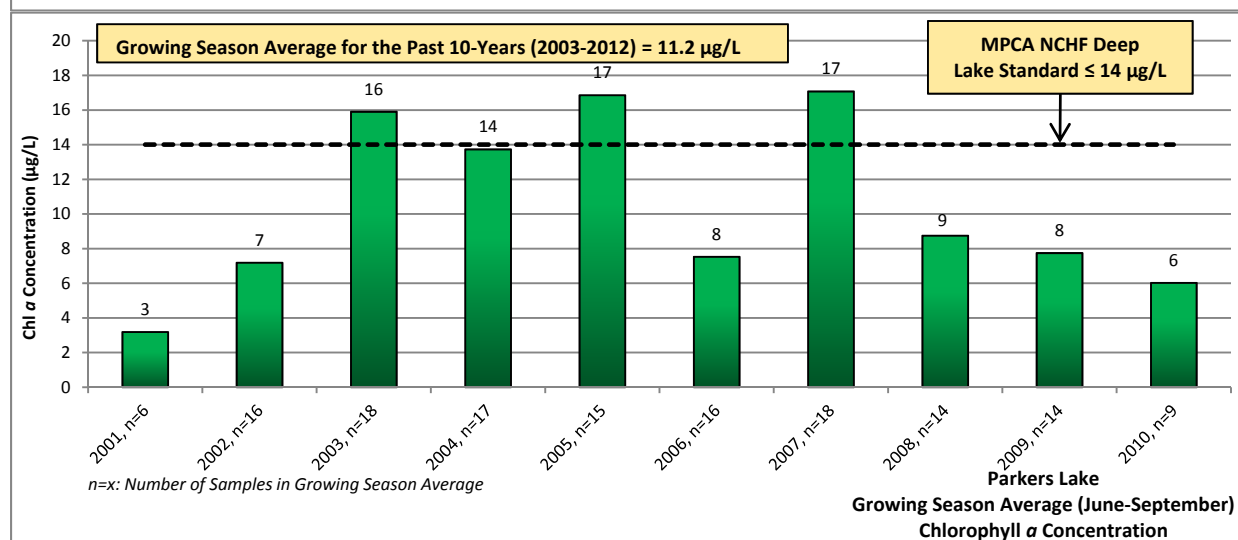
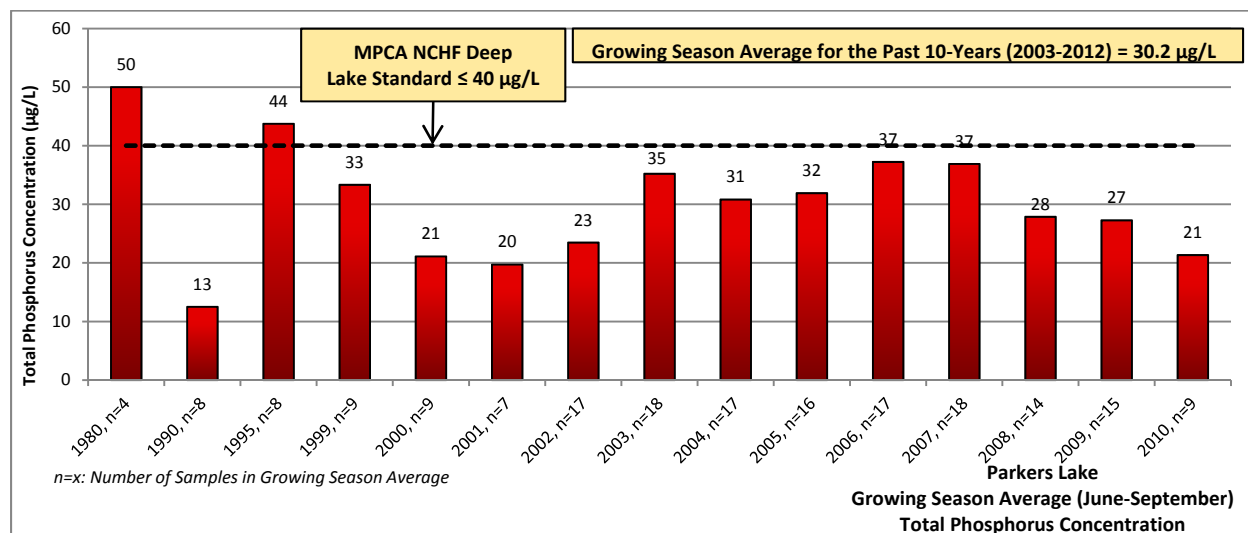
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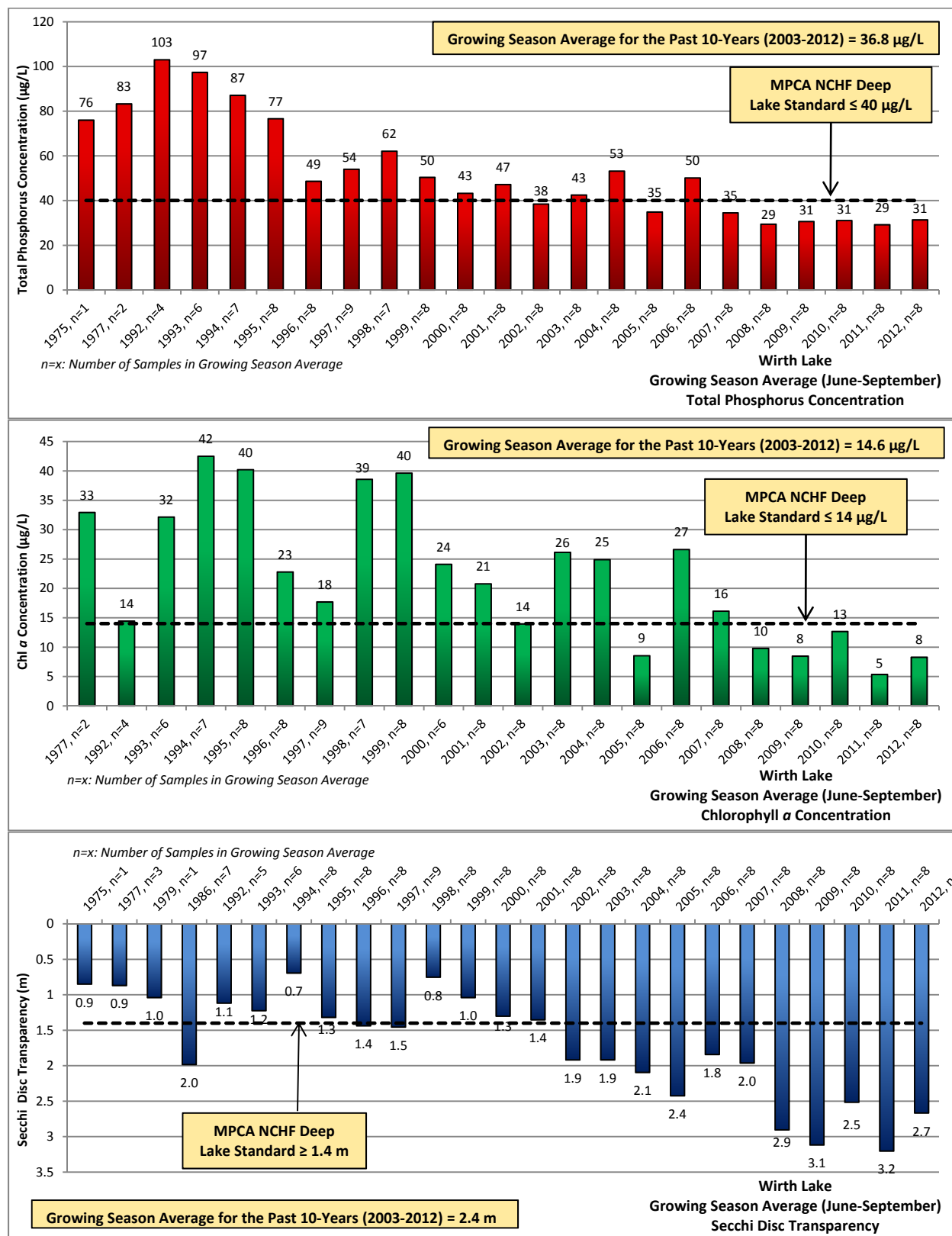
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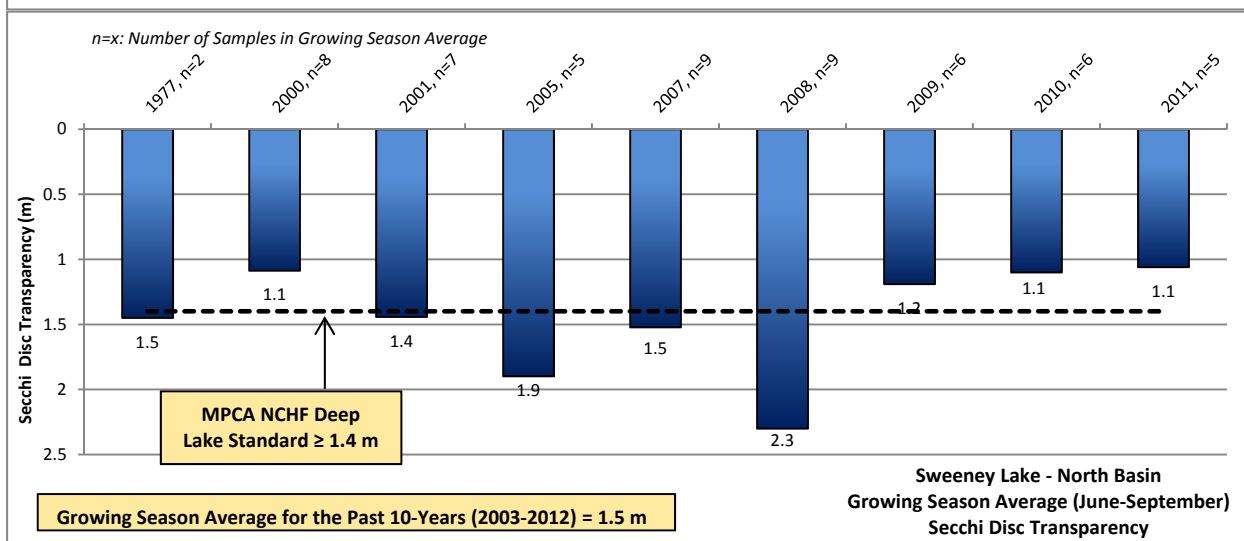
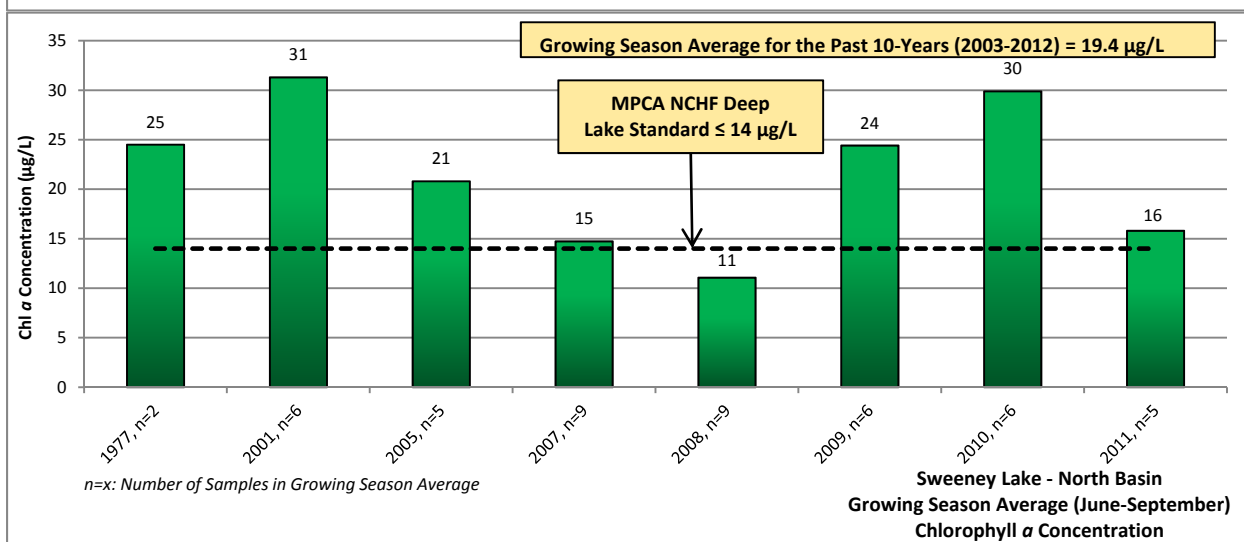
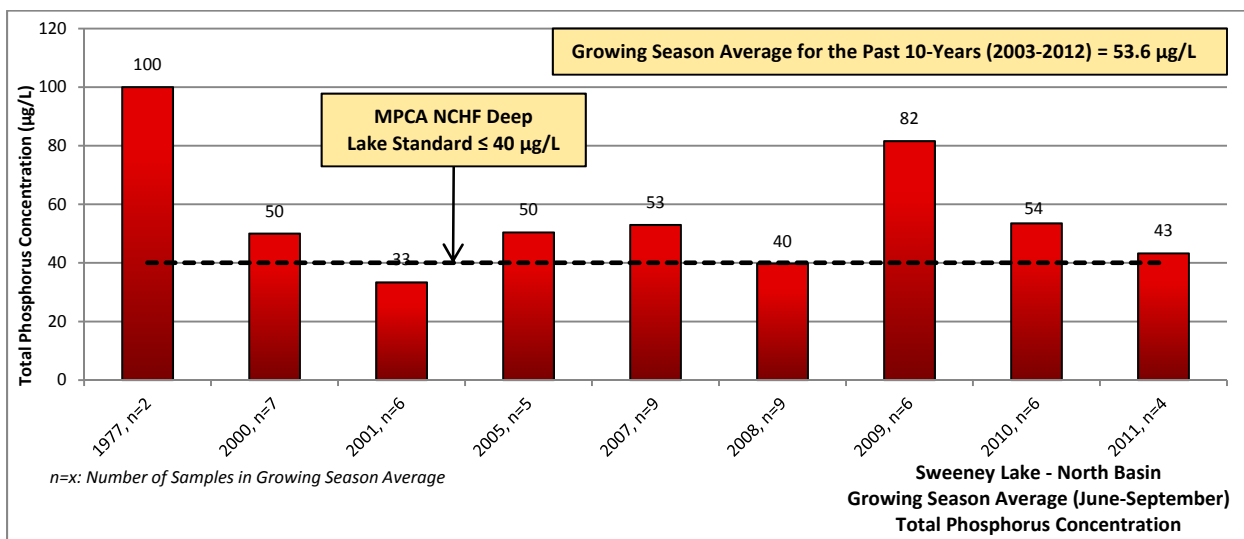
PARKERS LAKE



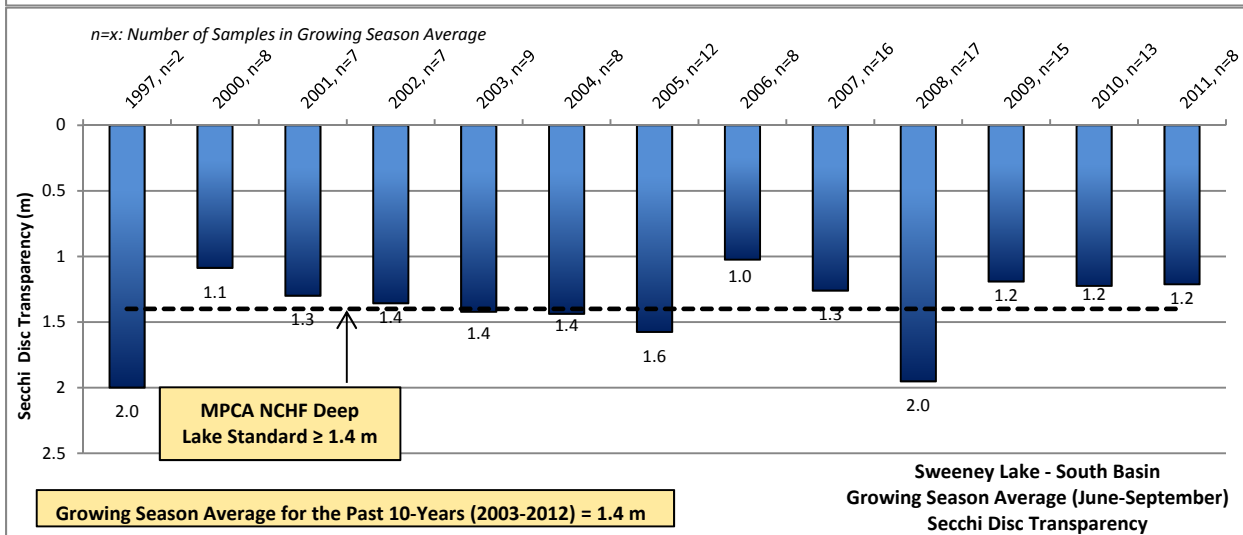
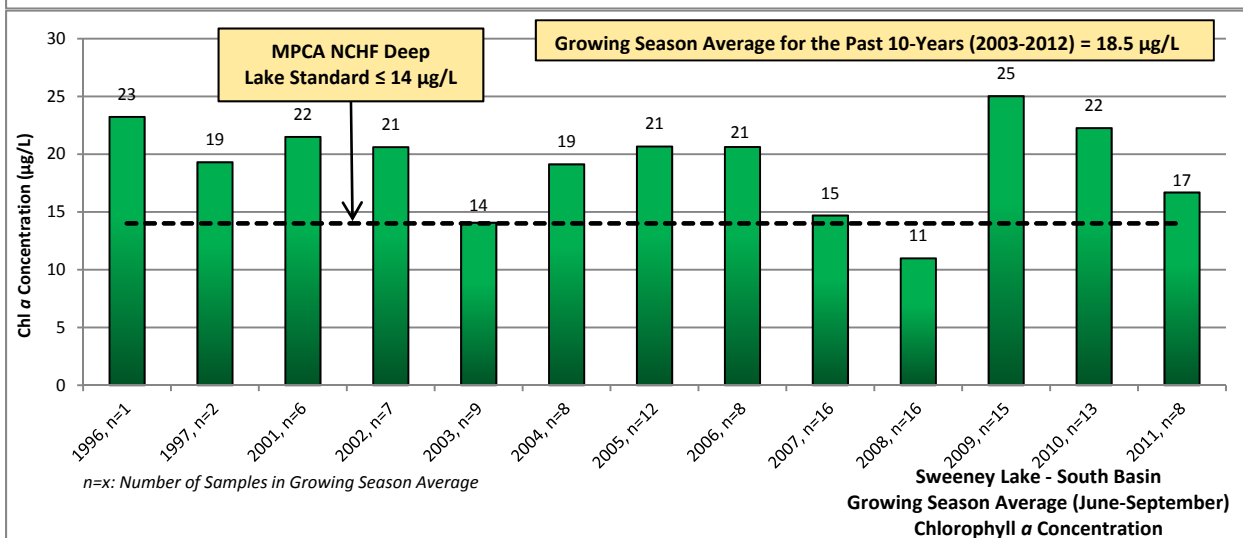
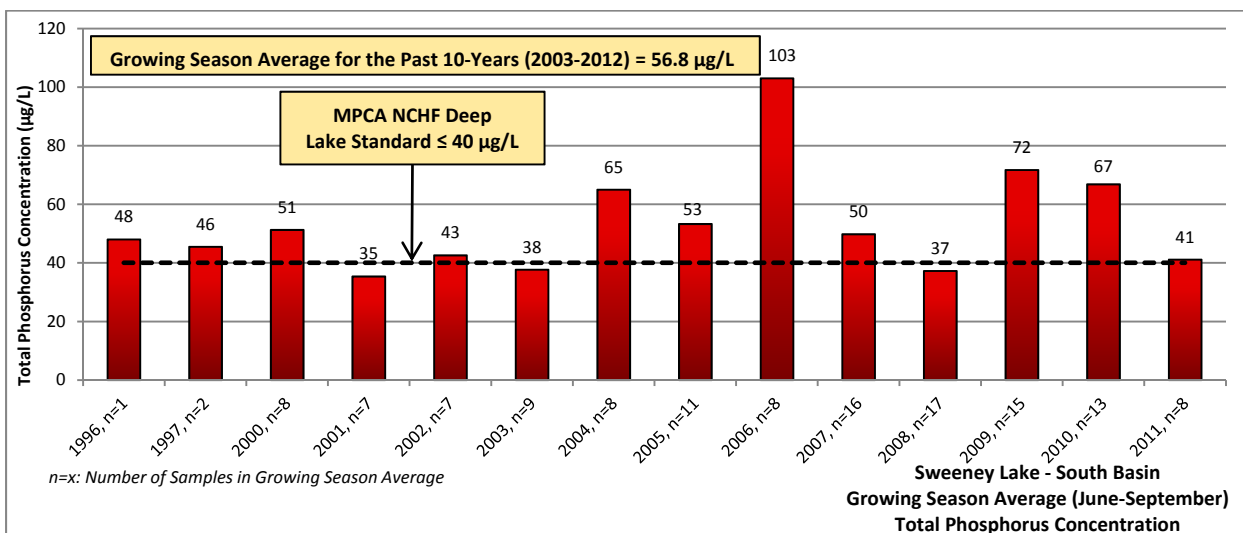
WIRTH LAKE



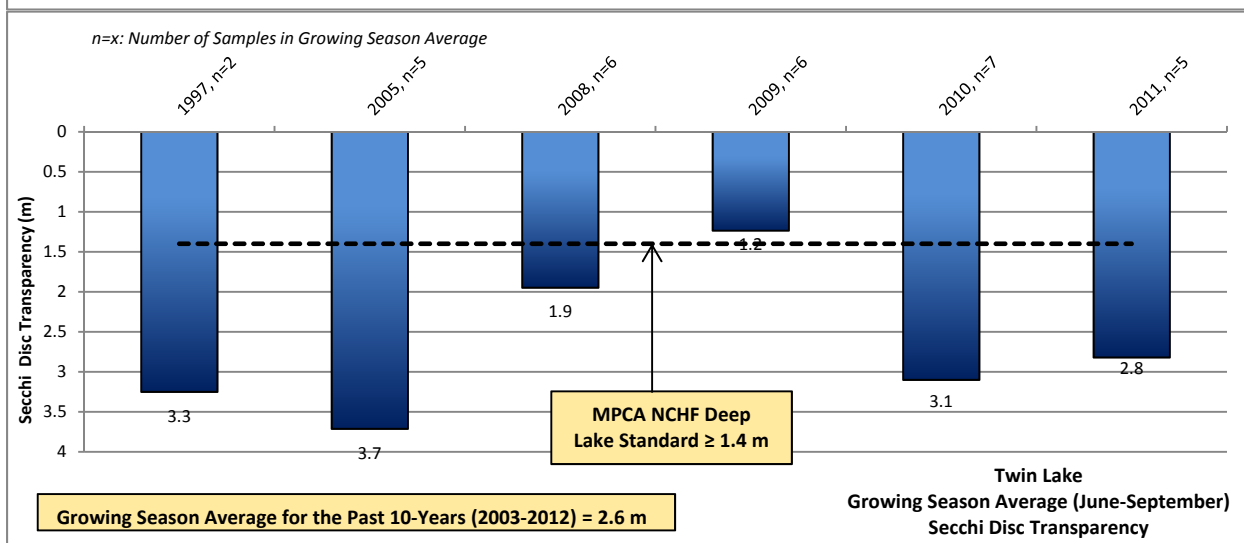
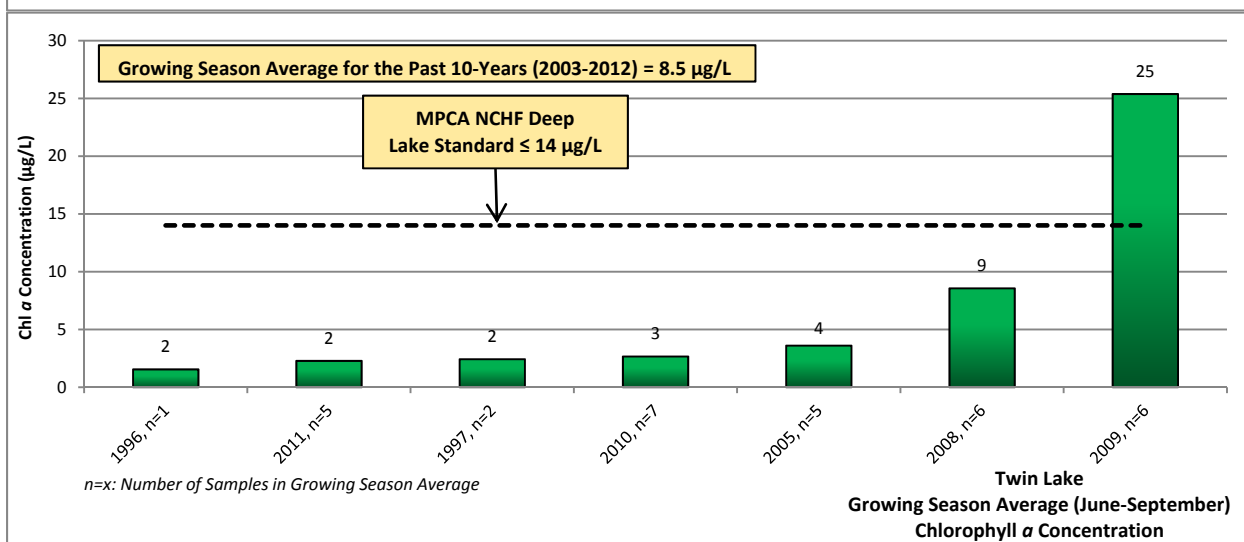
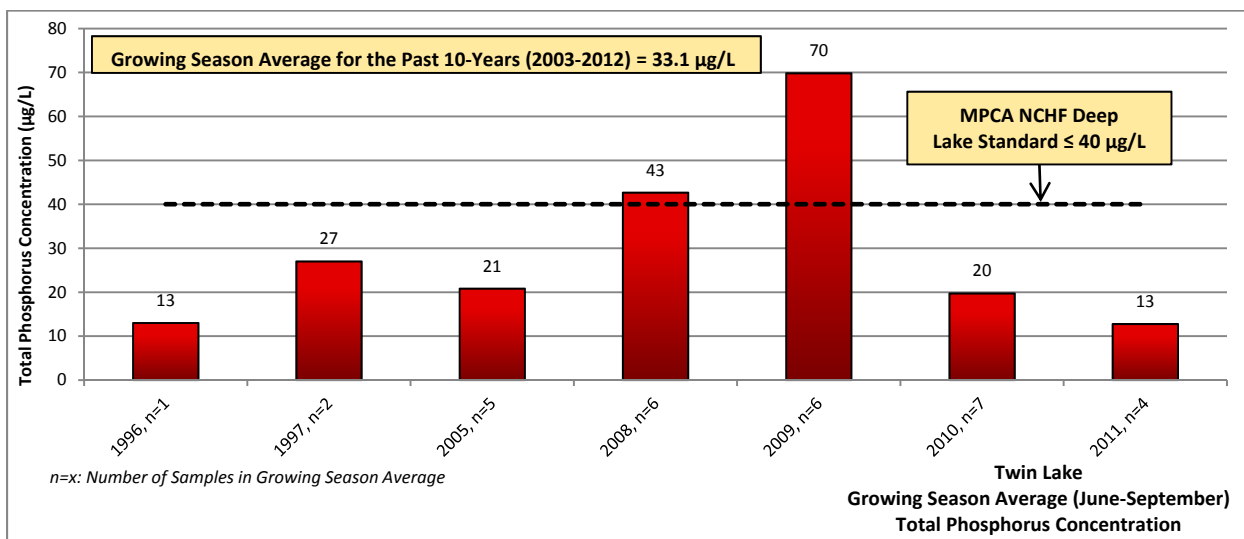
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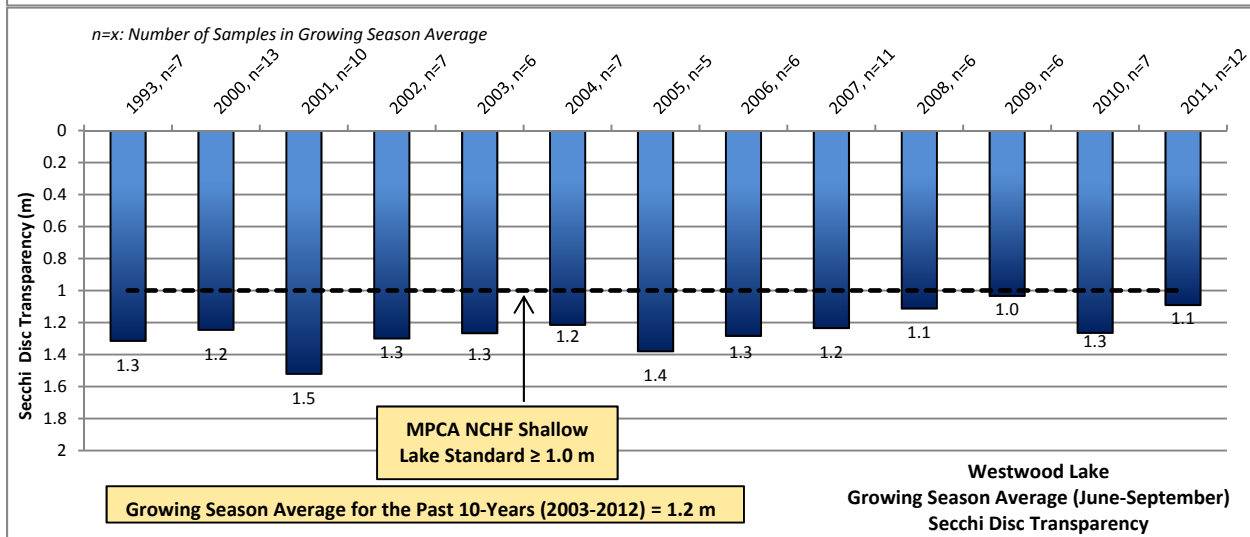
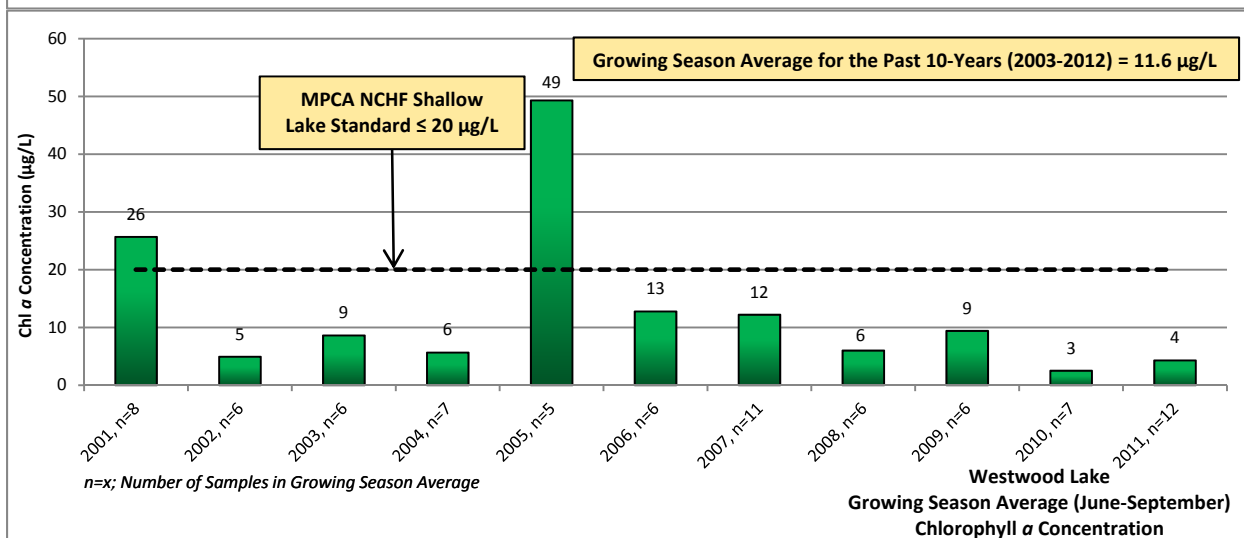
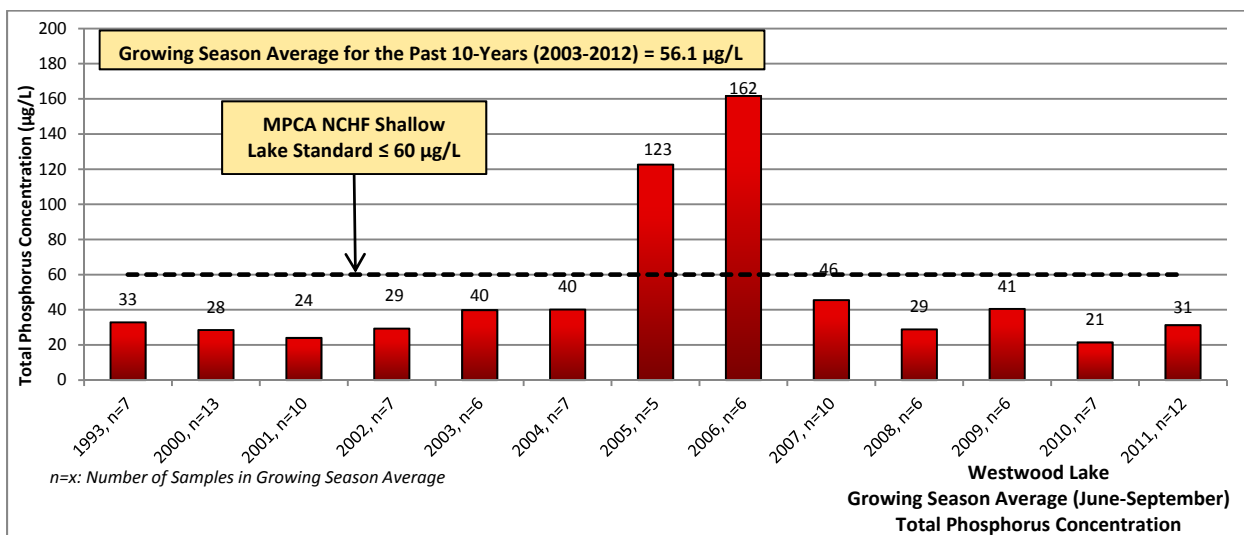
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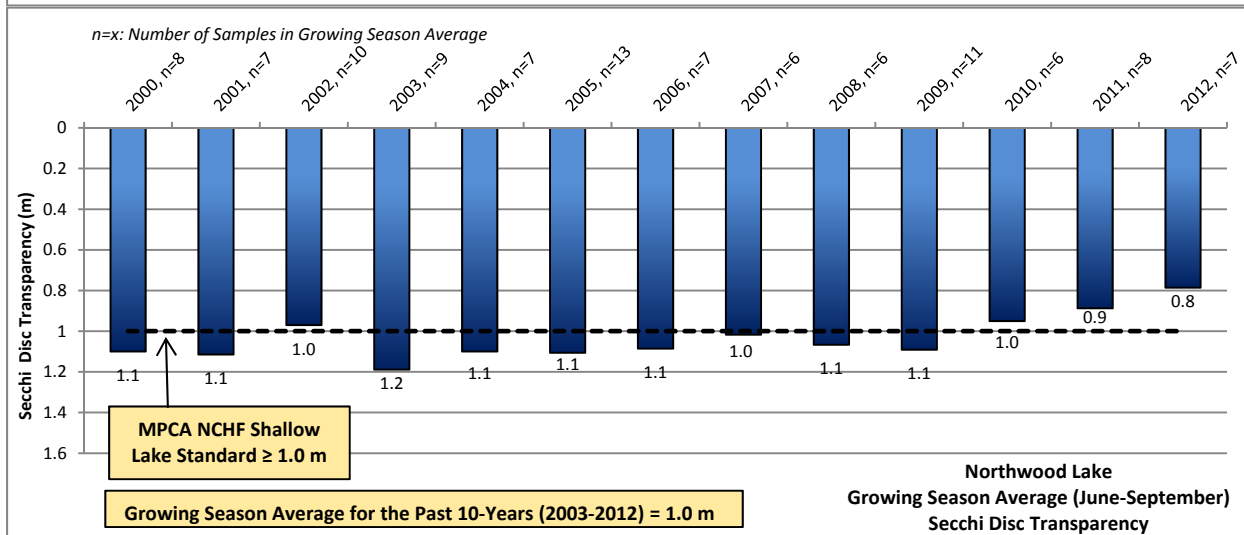
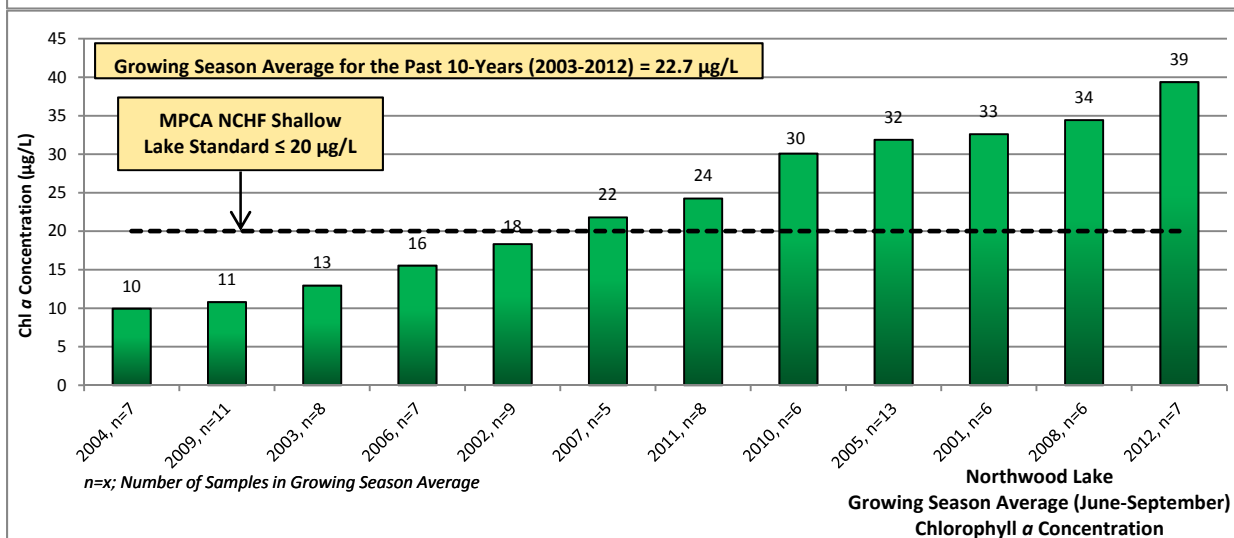
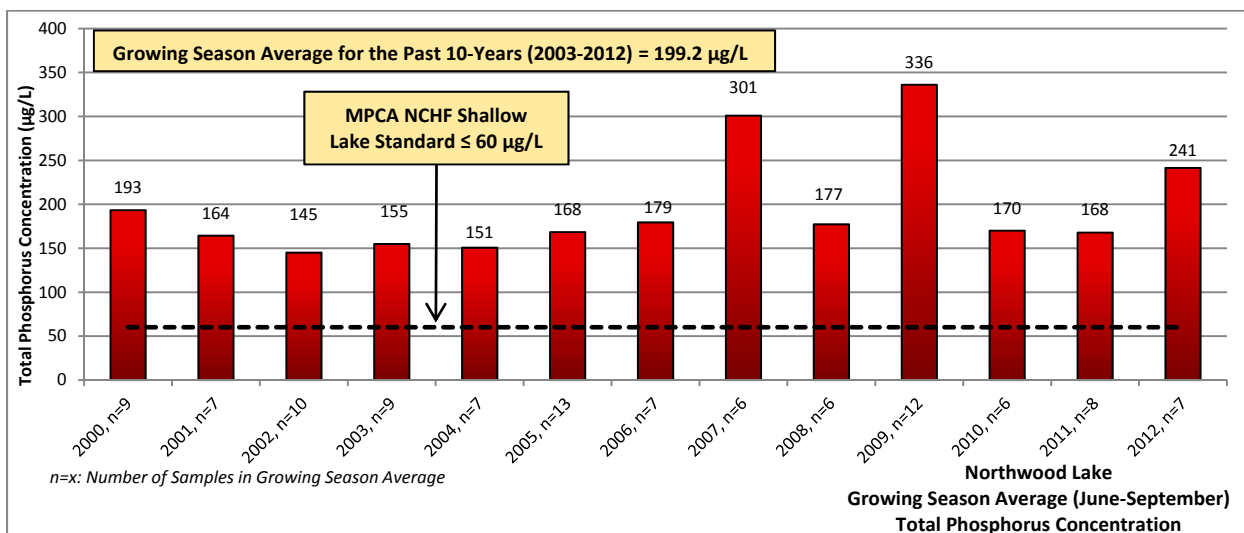
TWIN LAKE



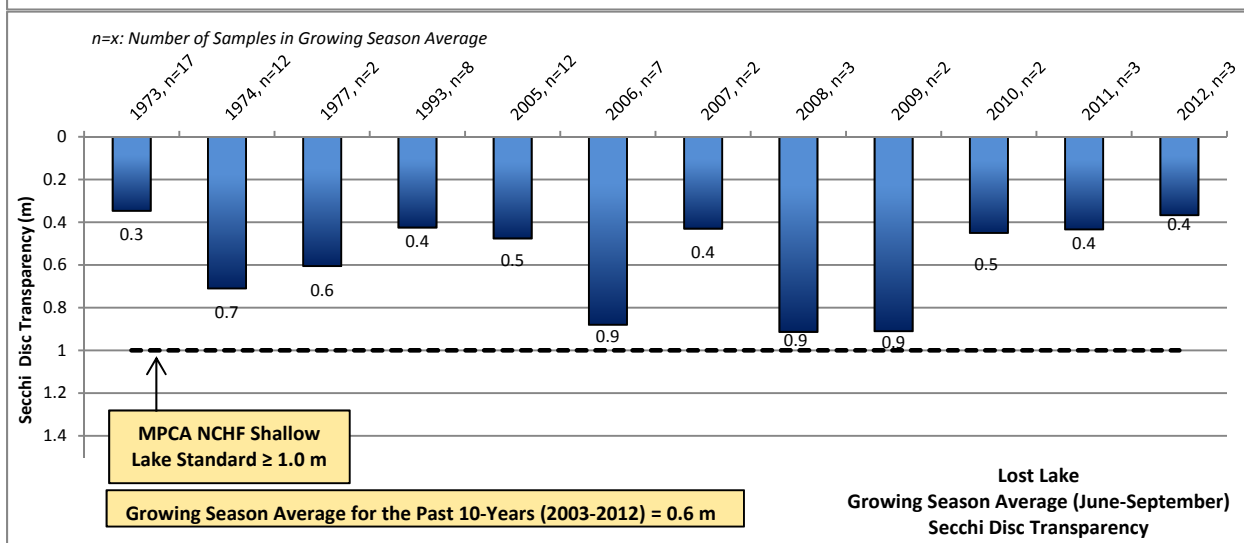
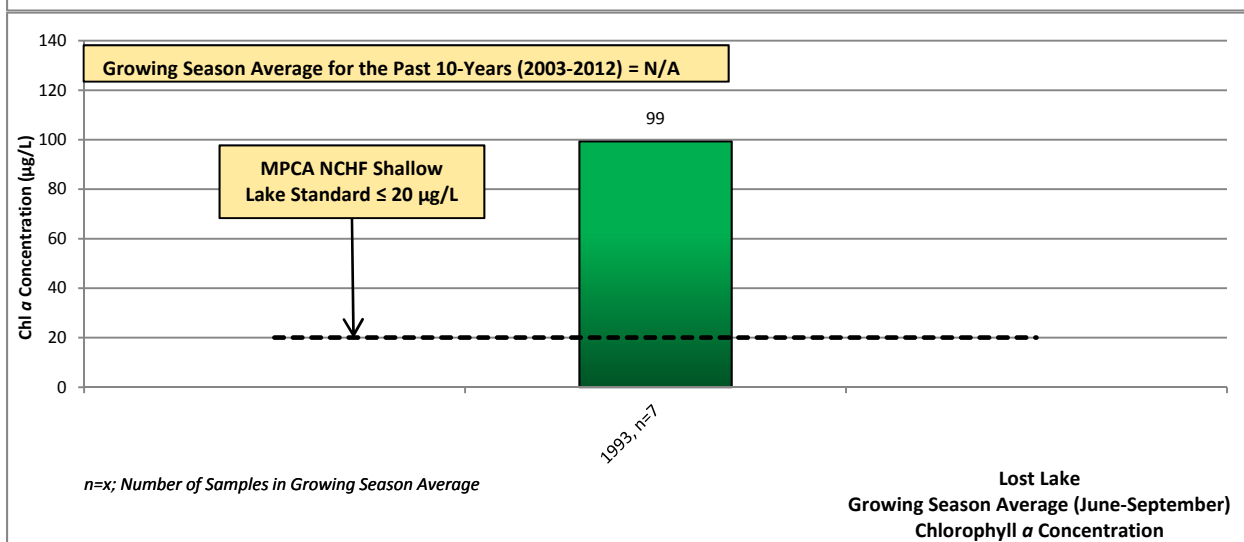
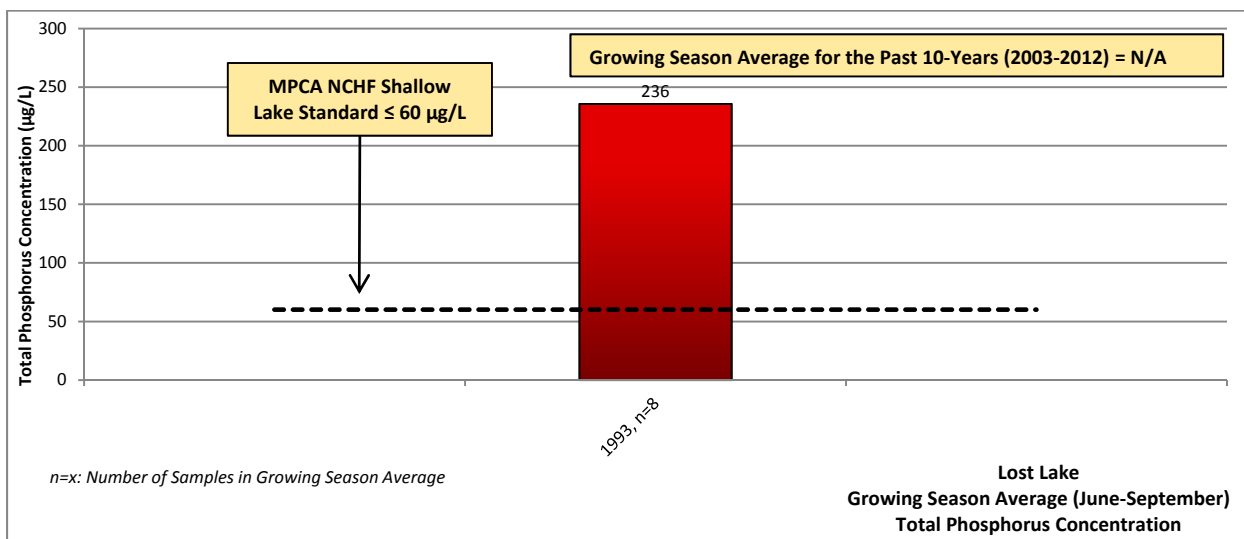
WESTWOOD LAKE



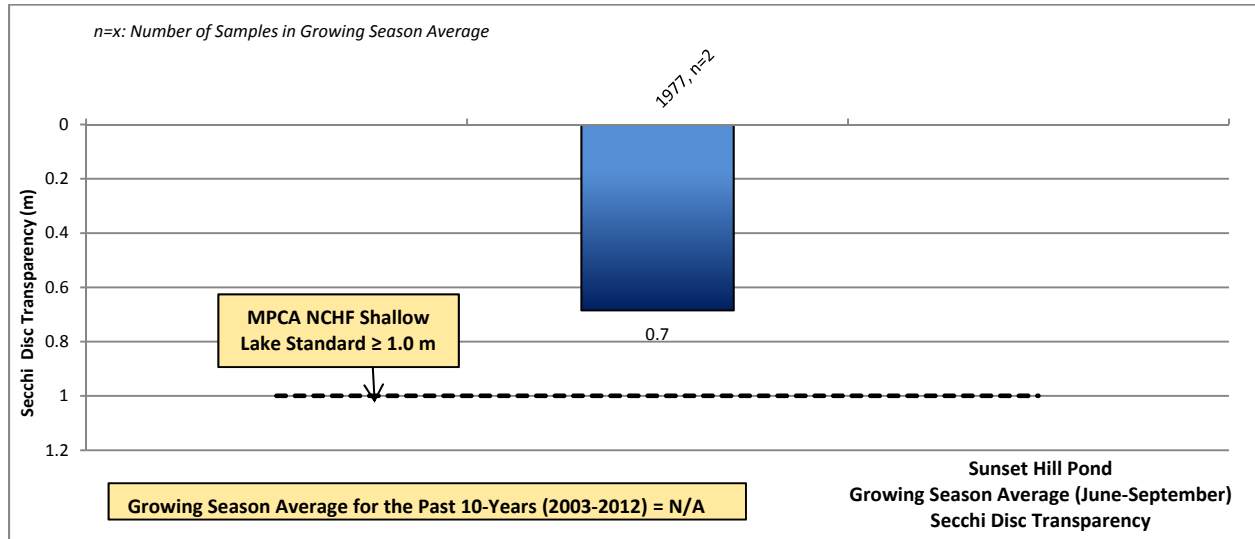
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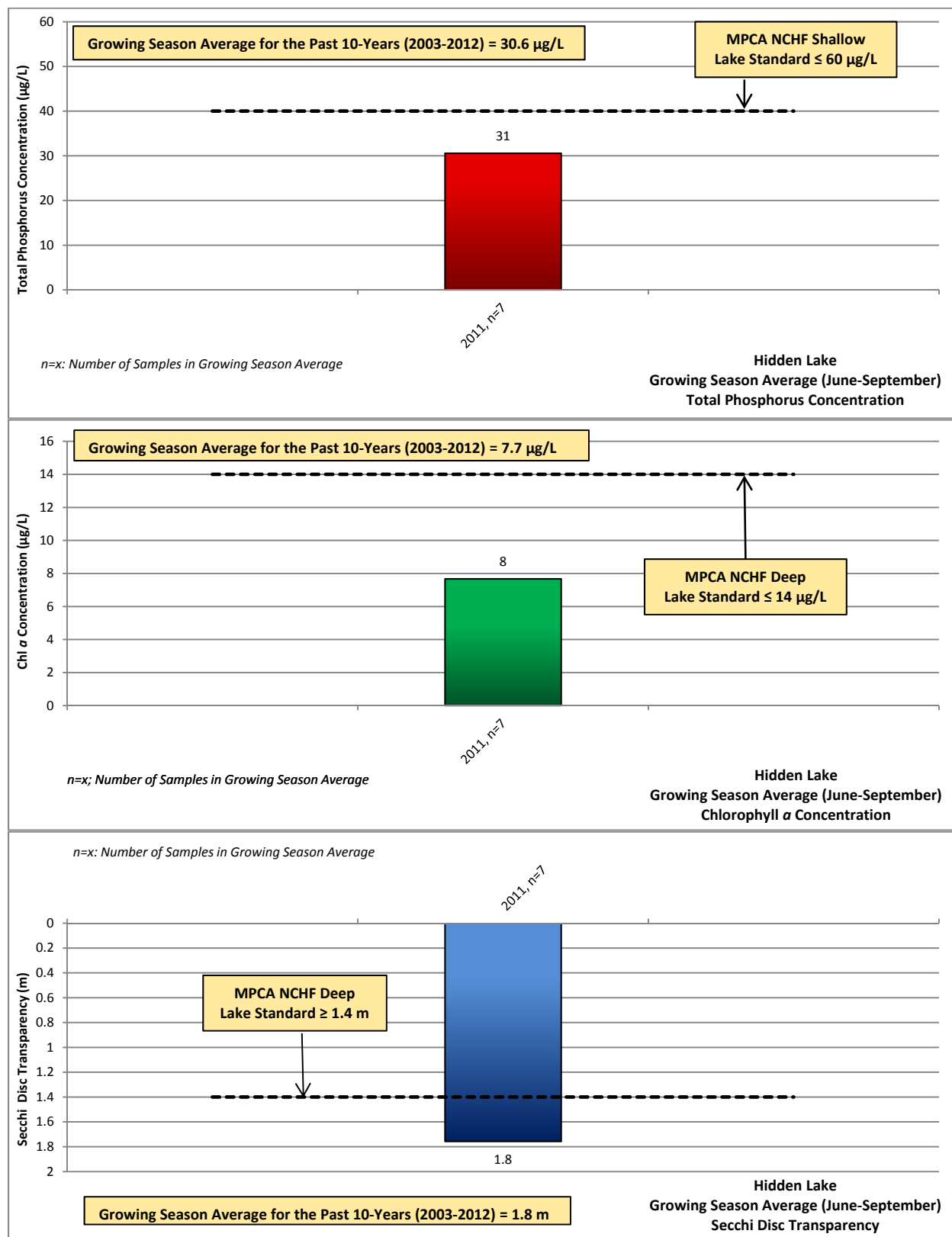
LOST LAKE



SUNSET HILL POND



HIDDEN LAKE



Appendix G

Joint Powers Agreement

**AMENDED JOINT AND COOPERATIVE AGREEMENT FOR THE
ESTABLISHMENT OF A BASSETT CREEK WATERSHED MANAGEMENT
ORGANIZATION TO PLAN, CONTROL AND PROVIDE FOR THE DEVELOPMENT
OF BASSETT CREEK
(Showing Changes Effective August 29, 2014)**

PREFACE

In 1968, the nine cities with land in the Bassett Creek watershed entered into a joint powers agreement which established the Bassett Creek Flood Control Commission. For the past 25 years the Commission, consisting primarily of citizen volunteers and city staff members who have volunteered their time, have worked long and hard to achieve the goals set forth when the commission was established. An overall watershed management plan was prepared and approved after public hearings. The Commission has received technical advice from the United States Army Corps of Engineers in their planning and has obtained the support and aid of all United States Senators and Congressional Representatives representing the member cities. In 1976 the Commission and the Corps of Engineers were successful in having Bassett Creek included in the 1976 Water Resources Development Act (Section 173 Public Law 94-587). The Board of Engineers for Rivers and Harbors submitted a favorable report to the Secretary of the Army on March 30, 1977. The Secretary of the Army has by letter under date of June 19, 1978 notified the U. S. Congress of the approval of the Chief of Engineers.

The Bassett Creek Flood Control Commission has participated with the Minnesota Department of Transportation, the Federal Highway Administration, the City of Minneapolis and the Corps of Engineers in the planning and construction of a deep tunnel in Minneapolis which is designed to carry Bassett Creek under a portion of the City of Minneapolis. The Commission has held hearings and approved and ordered upstream construction in the cities of Golden Valley, Plymouth, Minneapolis, and Crystal. The local share of these costs is being paid by the nine member communities pursuant to an agreement consistent with the funding requirements set forth in Articles VII and VIII of the joint powers agreement which has been in effect from 1968 to 1993. The prior joint powers agreement contained the following "Statement of Intent":

**STATEMENT OF INTENT REGARDING
AGREEMENT**

"Bassett Creek leaves Medicine Lake and flows generally eastward through the Village of Medicine Lake, Plymouth, Golden Valley and into the City of Minneapolis. In Minneapolis, the creek is channeled into a conduit and runs underground to the Mississippi River to its eventual outfall. As the creek runs through the aforementioned communities it collects storm waters and in effect acts as the storm sewer for a large densely populated area and large unpopulated area. It also carries waters channeled to it or naturally flowing to it from the Villages of Minnetonka and New Hope and the Cities of Crystal, Robbinsdale, and St. Louis Park.

For a long time the improvement and development of this creek to carry the increased quantity of storm water has been needed to allow for the orderly planning and development of

the up-stream communities who must rely on the creek as the outfall for storm waters collected or naturally flowing from areas within these communities. As the communities contributing water to the creek have grown, and the lands naturally draining into the creek have been covered with buildings and hard surfaced areas, the ability of the creek and its appurtenant facilities to accommodate the water has diminished. Studies have been conducted by the municipalities both individually and collectively and a study has been made by the United States Army Corps of Engineers. The threat of flood damage increases each year with the increased use of land in the watershed area.

The nine member communities have been meeting over a number of years in an effort to solve the storm water problems in the watershed drained by Bassett Creek. Each year it becomes more apparent that solutions must be sought to allow for a more orderly and efficient planning of the area and to allow the individual communities to plan storm sewer facilities which must be constructed to serve lands within the individual communities. It is also apparent to all nine municipalities that planning and construction to control the Bassett Creek cannot be done on the basis of each community looking at its individual problems. The creek downstream must be improved to accommodate the waters which will eventually be channeled and diverted to the outfall. To determine the downstream improvements it is necessary to know how much water will be contributed by the individual communities upstream and how much storm water will be retained in ponding areas upstream and the area of lands within the watershed which will be controlled by the individual communities as "open lands" and which will not contribute as much storm water as lands which are developed residentially, commercially, or for industrial purposes.

All of the nine communities within the Bassett Creek watershed recognize the aforesaid problems. In seeking solutions to the overall drainage problem it becomes apparent that the only way the problems can be solved is by joint planning, joint cooperation, joint financing and a sincere desire on the part of each community to solve the overall drainage problem within the watershed. This means that some agency, commission, district, corporation, political subdivision, or other vehicle must be found to plan and finance improvements to and to control the development of lands within the watershed. Chapter 112 of the Minnesota Statutes provides for the formation of a watershed district with the powers and duties of conserving and controlling water and watercourses within a watershed. The creation of such a district creates a new political subdivision with the power to sue or be sued, to incur debts, liabilities and obligations, to exercise the powers of eminent domain, to provide for assessments, to borrow money and issue bonds and to do all other acts necessary to carry out the powers vested in the district by said Chapter 112. The managers of the district would be appointed by the Minnesota Water Resources Board and subsequent appointments would be by the Board of County Commissioners of Hennepin County. It is the belief of the parties to this agreement that the creation of such a district would remove control one step further from the electorate and the residents of this watershed area who ultimately would pay the costs of the aforesaid improvements. It would also create another political subdivision which would have to plan and work with the individual parties to this agreement to solve the storm water and drainage problems within the watershed.

The purpose of this statement of intent regarding the agreement is to clarify and establish for any court of review or any arbitrator or for the elected successors to the representatives who have entered into this agreement, the reasons and purposes for this joint and cooperative agreement. The parties to this agreement realize that the success or failure of the Bassett Creek

Flood Control Commission created by this agreement is dependent upon the sincere desire of each member community to cooperate in the exercise of a joint power to solve a joint problem. Each party to this agreement pledges this cooperation."

It is the intent of this amended agreement to carry forward the same purposes as aforesated and to revise the Joint Powers Agreement to meet the mandates of Minnesota Statutes, Sections 103B. 201 through 103B. 251 and Minnesota Rules (Chapter 8410 relating to "Metropolitan Area Local Water Management". This amended agreement shall continue the existence of a Watershed Management Organization in accordance with the provisions of the Metropolitan Surface Water Management Act as set forth in Minnesota Statutes 1992 Sections 103B. 201 to and including 103B. 251. The organization hereby created shall have all of the powers and responsibilities set forth in said statutes for the Bassett Creek Watershed. The purpose of the organization shall be to assist the 9 member communities to preserve and use natural water storage and retention systems to:

1. Protect, preserve, and use natural surface and groundwater storage and retention systems;
2. Minimize public capital expenditures needed to correct flooding and water quality problems;
3. Identify and plan for means to effectively protect and improve surface water and groundwater quality;
4. Establish more uniform local policies and official controls for surface water and groundwater quality;
5. Prevent erosion of soil into surface water systems;
6. Promote groundwater recharge;
7. Protect and enhance fish and wildlife habitat and water recreational facilities;
8. To secure other benefits associated with the proper management of surface water.
9. To promote and encourage cooperation among member cities in coordinating local surface water and groundwater plans and to be aware of their neighbor's problems and to protect the public health, safety, and general welfare.
10. To continue the work of the Bassett Creek Water Management Commission and to carry out the plans, policies and programs developed by said Commission from 1968 to 1993.

JOINT AND COOPERATIVE AGREEMENT

The parties to this Agreement are governmental units of the State of Minnesota, all of which have lands which drain surface water into Bassett Creek and all of which have power to construct, reconstruct, extend and maintain storm water management facilities. This agreement is made pursuant to the authority conferred upon the parties by Minnesota Statutes 1992, Sections 471.59 and 103B. 201 to and including Section 103B. 251.

NAME

I.

The parties hereto create and establish the Bassett Creek Watershed Management Commission.

GENERAL PURPOSE

II.

The general purpose of this agreement is to provide an organization which can investigate, study, plan and control the construction of facilities to drain or pond storm waters, to alleviate damage by flood waters; to improve the creek channel for drainage; to assist in planning for land use; to repair, improve, relocate, modify, consolidate or abandon, in whole or in part, drainage systems within the watershed area; and to do whatever is necessary to assist in water conservation and the abatement of surface water and groundwater contamination and water pollution. In addition to the aforesated purposes, the organization hereby created shall serve as the organization for the Bassett Creek watershed and shall carry out all of the duties and responsibilities outlined in Minnesota Statutes, Section 103B. 201 through 103B. 251, both inclusive.

DEFINITIONS

III.

For the purposes of this agreement, the terms used herein shall have the meanings as defined in this article.

Subdivision 1. "Commission" means the organization created by this agreement, the full name of which is "Bassett Creek Watershed Management Commission." It shall be a public agency of its members.

Subdivision 2. "Board" means the Board of commissioners of the Commission, consisting of one commissioner or one alternate commissioner from each of the governmental units which is a party to this agreement and which shall be the governing body of the Commission.

Subdivision 3. "Council" means the governing body of a governmental unit which is a member of this Commission.

Subdivision 4. "Governmental Unit" means any city, county, or town.

Subdivision 5. "Member" means a governmental unit which enters into this agreement.

Subdivision 6. "Bassett Creek Watershed" means the area contained within a line drawn around the extremities of all terrain whose surface drainage is tributary to Bassett Creek and within the mapped areas delineated on the map filed with the Board of Water and Soil Resources originally filed pursuant to Minnesota Statutes, 473.877, Subd. 2 and as now amended by Minnesota Statutes, Chapter 103B.

MEMBERSHIP

IV.

The membership of the Commission shall consist of all of the following governmental units as shall elect, through resolution or ordinance adopted by their respective Councils, to become members:

City of Crystal

City of Golden Valley

City of Medicine Lake

City of Minneapolis

City of Minnetonka

City of New Hope

City of Plymouth

City of Robbinsdale

City of St. Louis Park

(The foregoing list is intended to include all governmental units which are presently partially or entirely within the Bassett Creek Watershed.)

No change in governmental boundaries , structure or organizational status shall affect the eligibility of any governmental unit listed above to be represented on the Commission, so long as such governmental unit continues to exist as a separate political subdivision.

BOARD OF COMMISSIONERS

V.

Subdivision 1. The governing body of the Commission shall be its Board. Each member shall be entitled to appoint one representative on the Board, and one alternate who may sit when the representative is not in attendance and said representative or alternate representative shall be called a "Commissioner".

Subdivision 2. The council of each member shall determine the eligibility or qualification of its representative on the Commission but the terms of each Commissioner shall be as established by this agreement.

Subdivision 3. The term of each Commissioner and Alternate Commissioner appointed by each member shall be three years and until their successors are selected and qualify and shall

commence on February 1, except that the terms of the Commissioners first appointed shall commence from the date of their appointment and shall terminate as follows:

- a. The Commissioners appointed by the Cities of Crystal, Golden Valley, and Medicine Lake shall terminate on February 1, 1994.
- b. The Commissioners appointed by the Cities of Minneapolis, Minnetonka, and New Hope shall terminate on February 1, 1995.
- c. The Commissioners appointed by the Cities of Plymouth, Robbinsdale, and St. Louis Park shall terminate on February 1, 1996.

Any vacancy shall be filled for the unexpired term of any Commissioner by the council of the governmental unit of the member who appointed said Commissioner. The Commission shall notify the Board of Water and Soil Resources of member appointments and vacancies within 30 days after the Commission is notified by a member. Each member agrees to publish a notice of vacancies resulting from the expiration of a Commissioner's or Alternate Commissioner's term or where a vacancy exists for any reason. Publication and notice shall be in accordance with Minnesota Statutes, Section 103B.227, Subds. 1 and 2, as they now exist or as subsequently amended.

Subdivision 4. The council of each member agrees that its representative commissioner will not be removed from the Board prior to the expiration of the Commissioner's term, unless said Commissioner consents in writing or unless said council has presented the Commissioner with charges in writing and has held a public hearing after reasonable notice to the Commissioner. A member may remove a Commissioner or an Alternate Commissioner for just cause or for violation of a Code of Ethics established by the Commission or by the Member City or for malfeasance, nonfeasance, or misfeasance. Said hearing shall be held by the Member City Council who appointed the Commissioner. A Commissioner or Alternate Commissioner who is an elected officer of a Member City who is not reelected may be removed by the appointing Member City at the appointing Member's discretion. Any decision by a Member to remove a Commissioner or Alternate Commissioner may be appealed to the Board of Water and Soil Resources. A certified copy of the Council's Resolution removing said Commissioner shall be filed with the Secretary of the Board of Commissioners and shall show compliance with the terms of this section.

Subdivision 5. Each member shall within 30 days of appointment file with the Secretary of the Board of Commissioners a record of the appointment of its Commissioner and Alternate Commissioner. The Commission shall notify the Board of Water and Soil Resources of Member appointments and vacancies within 30 days after receiving notice from the Member. Members shall fill all vacancies within 90 days after the vacancy occurs.

Subdivision 6. Commissioners shall serve without compensation from the Commission, but this shall not prevent a governmental unit from providing compensation for its Commissioner for serving on the Board, if such compensation is authorized by such governmental unit and by law. Commission funds may be used to reimburse a Commissioner or Alternate Commissioner for expenses incurred in performing Commission business and if authorized by the Board.

Subdivision 7. At the first meeting of the Board and in February of each year thereafter, the Board shall elect from its Commissioners a Chair, a Vice Chair, a Secretary, a Treasurer, and such other officers as it deems necessary to conduct its meetings and affairs. At the organizational meeting or as soon thereafter as it may be reasonably done, the Commission shall adopt rules and regulations governing its meetings. Such rules and regulations may be amended from time to time at either a regular or a special meeting of the Commission provided that a ten day prior notice of the proposed amendment has been furnished to each person to whom notice of the Board meetings is required to be sent; a majority vote of all eligible votes of the then existing members of the Commission shall be sufficient to adopt any proposed amendment to such rules and regulations.

The Board shall notify each Member City of the location and time of regular and special meetings called by the Board. A meeting shall be held at least annually, and all meetings shall be called and open to the public pursuant to Minnesota Statutes, Section 471.705, or as amended.

POWERS AND DUTIES OF THE BOARD

VI.

Subdivision 1. The Commission, acting by its duly appointed Board of Commissioners, shall as it relates to flood control, water quality, ground water recharge and water conservation or in its construction of facilities and other duties as set forth in Minnesota Laws have the powers and duties set out in this article.

Subdivision 2. It may employ such persons as it deems necessary to accomplish its duties and powers. Any employee may be on a full time, part time or consulting basis as the Board determines.

Subdivision 3. It may contract for space and for material and supplies to carry on its activities either with a member or elsewhere.

Subdivision 4. It may acquire necessary personal property to carry out its powers and its duties.

Subdivision 5. It shall develop an overall plan containing a capital improvement program within a reasonable time after qualifying, and said plan shall meet all of the requirements as established in Minnesota Statutes, Chapter 103B. Said overall plan shall establish a comprehensive goal for the development of Bassett Creek and shall establish a proposed procedure for accomplishing the purposes of the organization as set forth in Article II.

In preparing the overall plan, the Board may consult with the engineering and planning staff of each member governmental unit. It may consult with the Metropolitan Council and other public and private bodies to obtain and consider projections of land use, population growth, and other factors which are relevant to the improvement and development of the Bassett Creek watershed.

Said overall plan shall include the location and adequacy of the outlet or outfall of said Bassett Creek. The plan shall include the quantity of storage facilities and the sizing of an adequate outlet for all branch lateral storm sewers within the Bassett Creek watershed. The plan shall comply with state statutes and regulations promulgated and adopted by the Board of Water and Soil Resources.

Upon completion of the overall plan, or amendments thereto, the Board shall supply each member with a copy of the proposed plan and shall submit the plan for review and comment to Hennepin County, all soil and water conservation districts in Hennepin County and to all statutory and home rule charter cities having territory within the watershed. All governmental units which expect that substantial amendment of its local comprehensive plan will be necessary in order to bring their local water management into conformance with the Commission's watershed plan shall describe as specifically as possible, the amendments to the local plan which it expects will be necessary. The Commission shall hold a public hearing after 60 days mailed notice to the clerk of each member governmental unit. The mailed notice of the hearing shall be sent at the same time the plan is submitted to the members and to other governmental agencies. After such public hearing, the Board shall prescribe the overall plan which shall be the outline for future action by the Commission.

The Commission shall then submit the plan, any comments received and any appropriate amendments to the plan to the Board of Commissioners of Hennepin County. The County shall approve or disapprove projects in the capital improvement program which may require the provision of county funds pursuant to Minnesota Statutes Sections 103B. 251 or 103D. 901. The County shall have 60 days to complete its review. If the County fails to complete its review within 60 days the plan and capital improvement programs shall be deemed approved.

After completion of the review by Hennepin County, the plan and capital improvement program shall be submitted to the Metropolitan Council for its review. After completion of the review by the Metropolitan Council pursuant to Minnesota Statutes, Section 103B. 231, Subd. 8, the Commission shall submit the plan to the Minnesota Commissioner of Natural Resources and the Minnesota Pollution Control Agency for review and comment on the consistency of the plan with state laws and rules relating to water and related land resources and to the Board of Water and Soil Resources for review as provided in Minnesota Statutes, Section 103B. 231, Subd. 9.

After return of the plan, the Commission shall submit to each of its members a copy of the plan and all comments of the reviewing authorities. The Commission shall wait for at least 30 days for comments from the members. The Commission shall adopt the overall plan within 120 days after approval of the plan by the Board of Water and Soil Resources. The Commission shall then implement the approved plan and approved capital improvement program by resolution of the Commission as hereinafter set forth. The adoption of said overall plan shall be only upon a favorable vote of a majority of all eligible votes of the then existing members of the Commission. A copy of the adopted plan shall be filed with the clerk of each member governmental unit. Upon notice and hearing as provided for in adopting the overall plan, said plan may be amended by the Board on its own initiative or on the petition of any member governmental unit.

The review provisions set forth in this section are those required by Minnesota Statutes, Section 103B.231. If the law is amended, approvals shall be as required by law and the provisions contained in this section shall be amended accordingly.

Subdivision 6. It shall make necessary surveys or utilize other reliable surveys and data and develop projects to accomplish the purposes for which the Commission is organized.

Subdivision 7. It may cooperate or contract with the State of Minnesota or any subdivision thereof or federal agency or private or public organization to accomplish the purposes for which it is organized.

Subdivision 8. It may order any member governmental unit or units to construct, clean, repair, alter, abandon, consolidate, reclaim or change the course or terminus of any ditch, drain, storm sewer, or water course, natural or artificial, within the Bassett Creek watershed.

Subdivision 9. It may order any member governmental unit or units to acquire, operate, construct or maintain dams, dikes, reservoirs and appurtenant works or other improvements necessary to implement the overall plan.

Subdivision 10. It shall regulate, conserve and control the use of storm and surface water and groundwater within the Bassett Creek watershed.

Subdivision 11. It may contract for or purchase such insurance as the Board deems necessary for the protection of the Commission.

Subdivision 12. It may establish and maintain devices for acquiring and recording hydrological and water quality data within the Bassett Creek watershed.

Subdivision 13. It may enter upon lands within or without the watershed to make surveys and investigations to accomplish the purposes of the Commission. The Commission shall be liable for actual damages resulting therefrom but every person who claims damages shall serve the Chairman or Secretary of the Board of Commissioners with a Notice of Claim as required by Chapter 466.05 of the Minnesota Statutes.

Subdivision 14. It shall provide any member governmental unit with technical data or any other information of which the Commission has knowledge which will assist the governmental unit in preparing land use classifications or local water management plans within the watershed.

Subdivision 15. It may provide legal and technical assistance in connection with litigation or other proceedings between one or more of its members and any other political subdivision, commission, Board or agency relating to the planning or construction of facilities to drain or pond storm waters or relating to water quality within the Bassett Creek watershed. The use of commission funds for litigation shall be only upon a favorable vote of a majority of the eligible votes of the then existing members of the Commission.

Subdivision 16. It may accumulate reserve funds for the purposes herein mentioned and may invest funds of the Commission not currently needed for its operations, in the manner and subject to the laws of Minnesota applicable to statutory cities.

Subdivision 17. It may collect monies, subject to the provisions of this agreement, from its members, Hennepin County and from any other source approved by a majority of its Board.

Subdivision 18. It may make contracts, incur expenses and make expenditures necessary and incidental to the effectuation of these purposes and powers and may disburse therefor in the manner hereinafter provided.

Subdivision 19. It shall cause to be made an annual audit by a certified public accountant or the state auditor of the books and accounts of the Commission and shall make and file a report to its members at least once each year including the following information:

- a. the approved budget;
- b. a reporting of revenues;
- c. a reporting of expenditures;
- d. a financial audit report or section that includes a balance sheet, a classification of revenues and expenditures, an analysis of changes in final balances, and any additional statements considered necessary for full financial disclosure;
- e. the status of all Commission projects and work within the watershed; and
- f. the business transacted by the commission and other matters which affect the interests of the commission.

Copies of said report shall be transmitted to the clerk of each member governmental unit.

Subdivision 20. Its books, reports and records shall be available for and open to inspection by its members at all reasonable times.

Subdivision 21. It may recommend changes in this agreement to its members.

Subdivision 22. It may exercise all other powers necessary and incidental to the implementation of the purposes and powers set forth herein and as outlined and authorized by Minnesota Statutes, Sections 103B. 201 through 103B. 251.

Subdivision 23. It shall cooperate with the State of Minnesota, the Commissioner of Natural Resources and the Director of the Division of Waters, Soils and Minerals of the Department of Natural Resources in obtaining permits and complying with the requirements of Chapter 103G of the Minnesota Statutes.

Subdivision 24. Each member reserves the right to conduct separate or concurrent studies on any matter under study by the Commission.

Subdivision 25. It shall establish a procedure for establishing citizen or technical advisory committees and to provide other means for public participation.

METHOD OF PROCEEDING

VII.

Subdivision 1. The procedures to be followed by the Board in carrying out the powers and duties set forth in Article VI, Subdivisions 5, 6, 7, 8, 9, and 10, shall be as set forth in this article.

Subdivision 2. The Commissioners shall be the same as those serving as Commissioners and Alternate Commissioners for the predecessor Bassett Creek Water Management Commission. The Board shall immediately proceed to revise the overall plan as set forth in Article VI, Subdivision 5 or as required by state statute. Upon adoption of said overall plan, the Board shall proceed to implement said plan, and this implementation may be ordered by stages.

Subdivision 3. The Bassett Creek Watershed Management Commission shall be the successor to the Bassett Creek Water Management Commission as constituted under the prior Joint Powers Agreement. All personal property, money, bank accounts, records or any other thing of value and on hand with the Bassett Creek Water Management Commission shall be transferred to the Bassett Creek Watershed Management Commission.

Subdivision 4. The location and adequacy of the outlet for Bassett Creek shall be determined and the Commission shall then prepare plans which will provide capacity to outlet the surface waters which will be collected within the Bassett Creek watershed. In determining the necessary capacity for said outlet, the Commission shall take into consideration the quantity of land within the watershed which each member governmental unit has to pond or act as a reservoir for surface waters. It shall consider only lands which are under public ownership or under public control and that will be perpetually dedicated to acting as a reservoir for surface waters. The Commission may require from each member governmental unit a commitment in writing of the lands which shall be so dedicated, including a legal description of the gross area and the capacity in acre feet of water storage. No project which will channel or divert additional waters to Bassett Creek shall be commenced by any member governmental unit prior to approval of the Board of the design of an adequate outlet or of adequate storage facilities. The adequacy of said outlet shall be determined by the Board after consultations with its professional engineers.

Subdivision 5. All construction, reconstruction, extension or maintenance of Bassett Creek including outlets, lift stations, dams, reservoirs, or other appurtenances of a surface water or storm sewer system which involve construction by or assessment against any member governmental unit or against privately or publicly owned land within the watershed shall follow the statutory procedures outlined in Chapter 429 of the Minnesota Statutes except as herein modified. The Board shall secure from its engineers or some other competent persona report advising it in a preliminary way as to whether the proposed improvement is feasible and as to whether it shall best be made as proposed or in connection with some other improvement and the estimated cost of the improvement as recommended and the proposed allocation of costs between members.

The Board shall then hold a public hearing on the proposed improvement after mailed notice to the clerk of each member governmental unit within the watershed. The Commission

shall not be required to mail or publish notice except by said notice to the clerk. Said notice shall be mailed not less than 45 days before the hearing , shall state the time and place of the hearing, the general nature of the improvement, the estimated total cost and the estimated cost to each member governmental unit. The Board may adjourn said hearing to obtain further information, may continue said hearing pending action of the member governmental units or may take such other action as it deems necessary to carry out the purposes of this Commission.

To order the improvement, in accordance with the powers and duties established in Article VI, Subdivisions 7, 8 and 9, a resolution setting forth the order for a capital improvement project shall require a favorable vote by two-thirds of all eligible votes of then existing Board of the Commission. In all cases other than for capital improvement projects, a majority vote of all eligible members of the Board shall be sufficient to order the work. The order shall describe the improvement, shall allocate in percentages the cost allocation between the member governmental units, shall designate the engineers to prepare plans and specifications, and shall designate the member who will contract for the improvement in accordance with Subdivision 7 of this Article.

After the Board has ordered an improvement or if the hearing is continued while the member governmental units act on said proposal, it shall forward said preliminary report to all member governmental units with an estimated time schedule for the construction of said improvement. The Board shall allow an adequate amount of time , and in no event less than 45 days, for each member governmental unit to conduct hearings, in accordance with the provisions of the aforestated Chapter 429 or the charter requirements of any city, or to ascertain the method of financing which said member governmental unit will utilize to pay its proportionate share of the costs of the improvement. Each member governmental unit shall ascertain within a period of 90 days the method it shall use to pay its proportionate share of the costs.

If the Commission proposes to utilize Hennepin County's bonding authority as set forth in Minnesota Statutes, Section 103B. 251, or if the Commission proposes to certify all or any part of a capital improvement to Hennepin County for payment, then and in that event all proceedings shall be carried out in accordance with the provisions set forth in said Section 103B.251.

The Board shall not order and no engineer shall prepare plans and specifications before the Board has adopted a resolution ordering the improvement. The Board may order the advertising for bids upon receipt of notice from each member governmental unit who will be assessed that it has completed its hearing or determined its method of payment or upon expiration of 90 days after the mailing of the preliminary report to the members.

Subdivision 6. Any member governmental unit being aggrieved by the determination of the Board as to the allocation of the costs of said improvement shall have 30 days after the commission resolution ordering the improvement to appeal said determination. Said appeal shall be in writing and shall be addressed to the Board asking for arbitration. The determination of the member's appeal shall be referred to a Board of Arbitration. The Board of Arbitration shall consist of three persons; one to be appointed by the Board of Commissioners, one to be appointed by the appealing member governmental unit, and the third to be appointed by the two so selected. In the event the two persons so selected do not appoint the third person within 15 days after their appointment, then the Chief Judge of the District Court of Hennepin County shall

have jurisdiction to appoint, upon application of either or both of the two earlier selected, the third person to the Board of Arbitration. The third person selected shall not be a resident of any member governmental unit and if appointed by the Chief Judge said person shall be a registered professional engineer. The arbitrators' expenses and fees, together with the other expenses, not including counsel fees, incurred in the conduct of the arbitration shall be divided equally between the Commission and the appealing member.

Arbitration shall be conducted in accordance with the Uniform Arbitration Act, Chapter 572 of the Minnesota Statutes.

Subdivision 7. Contracts for Improvements. All contracts which are to be let as a result of the Board's order to construct, repair, alter, reclaim or change the course or terminus of any ditch, drain, storm sewer, or watercourse, or to acquire, operate, construct or maintain dams, dikes, reservoirs or their appurtenances or to carry out any of the other provisions of the plan as authorized by Minnesota Statutes, and for which two or more member governmental units shall be responsible for the costs, shall be let in accordance with the provisions of Section 429.041 of the Minnesota Statutes. The bidding and contracting of said work shall be let by any one of the member governmental units, as ordered by the Board of Commissioners, after compliance with the statutes. All contracts and bidding procedures shall comply with all the requirements of law applicable to contracts let by a statutory city in the State of Minnesota.

The Commission shall not have the authority to contract in its own name for any improvement work for which a special assessment will be levied against any private or public property under the provisions of Chapter 429 or under the provisions of any City charter. These contracts shall be awarded by action of the council of a member and shall be in the name of a member governmental unit. This section shall not preclude the Commission from proceeding under Minnesota Statutes, Section 103B. 251.

Subdivision 8. Contracts with Other Governmental Bodies. The Commission may exercise the powers set forth in Article V1, Subdivision 7, but said contracts for a capital improvement shall require a favorable vote of two-thirds majority of the eligible votes of the then existing members of the Commission.

Subdivision 9. Supervision. All improvement contracts awarded under the provisions of Subdivision 7 of this Article shall be supervised by the member governmental unit awarding said contract or said member governmental unit may contract or appoint any qualified staff member or members of the Commission to carry out said supervision, but each member agrees that the staff of this Commission shall be authorized to observe and review the work in progress and the members agree to cooperate with the Commission staff in accomplishing the purposes of this Commission.

Representatives of the Commission shall have the right to enter upon the place or places where the improvement work is in progress for the purpose of making reasonable tests and inspections. The staff of this Commission shall report and advise and recommend to the Board on the progress of said work.

Subdivision 10. Land Acquisition. The Commission shall not have the power of eminent domain. The member governmental units agree that any and all easements or interest in land which are necessary will be negotiated or condemned in accordance with Chapter 117 of the Minnesota Statutes by the unit wherein said lands are located, and each member agrees to acquire the necessary easements or right of way or partial or complete interest in land upon order of the Board of Commissioners to accomplish the purposes of this agreement. All reasonable costs of said acquisition shall be considered as a cost of the improvement. If a member governmental unit determines it is in the best interests of that member to acquire additional lands, in conjunction with the taking of lands for storm and surface drainage or storage, for some other purposes, the costs of said acquisition will not be included in the improvement costs of the ordered project. The Board in determining the amount of the improvement costs to be assessed to each member governmental unit may take into consideration the land use for which said additional lands are being acquired and may credit the acquiring municipality for said land acquisition to the extent that it benefits the other members of this agreement. Any credits may be applied to the cost allocation of the improvement project under construction or the Board if feasible and necessary may defer said credits to a future project.

If any member unit refuses to negotiate or condemn lands as ordered by the Board, any other member may negotiate or condemn outside its corporate limits in accordance with the aforesaid Chapter 117. All members agree that they will not condemn or negotiate for land acquisition to pond or drain storm and surface waters within the corporate boundaries of another member within the Bassett Creek watershed except upon order of the Board of this Commission.

The Commission shall have authority to establish land acquisition policies as a part of the overall plan. The policies shall be designed to equalize costs of land throughout the watershed. Said policy is contained in the existing watershed management plan and may be continued in any revised overall plan required by Minnesota Statutes.

Subdivision 11. Pollution Control and Water Quality. The Commission shall have the authority and responsibility to protect and improve water quality in the watershed as this is one of the main purposes set forth in the Surface Water Management Act. All member governmental units agree that they will refuse to allow the drainage of sanitary sewage or industrial wastes onto any land or into any watercourse or storm sewer draining into Bassett Creek. The Board may investigate on its own initiative and shall investigate upon petition of any member all complaints relating to pollution of surface water or groundwater draining into or affecting Bassett Creek or its tributaries. Upon a finding that the creek or surface waters or groundwater are being polluted, the Board shall order the member governmental unit to abate this nuisance and each member agrees that it will take all reasonable action available to it under the law to alleviate the pollution and to assist in protecting and improving the water quality of surface water and groundwater in the watershed.

Subdivision 12. Local Water Management Plans. The Commission shall have power and authority to review the members' local water management plans, capital improvement programs and official controls required by Minnesota Statutes Section 103B. 235 and/or by rules promulgated and adopted by the Board of Water and Soil Resources. The members also understand that the overall plan and capital improvement program required for the entire watershed must consist of the local parts in the plan and therefore every effort shall be made by

the Commission to coordinate the local plans with the watershed's overall plan. The members further understand and agree that upon completion and approval of the overall plan required by Minnesota Statutes 103B. 231, each member will be required to present their local management plan to the Commission as required by Minnesota Statutes, Section 103B. 235. It is therefore important that each member provide the Commission with their best effort to coordinate and plan for the individual member's local plan at the same time the watershed overall plan is being assembled.

FINANCES

VIII.

Subdivision 1. The Commission funds may be expended by the Board in accordance with this agreement and in accordance with the procedures as established by law and in the manner as may be determined by the Board. The Board shall designate one or more national or state bank or trust companies, authorized by Chapters 118 and 427 of the Minnesota Statutes to receive deposits of public moneys and to act as depositories for the Commission funds. In no event shall there be a disbursement of Commission funds without the signature of at least two Board members, one of whom shall be the Treasurer or his Authorized Deputy Treasurer. The Treasurer shall be required to file with the Secretary of the Board a bond in the sum of at least \$10,000 or such higher amount as shall be determined by the Board. The Commission shall pay the premium on said bond.

Subdivision 2. The members agree to contribute all cash, bank deposits, and other assets held by the Bassett Creek Water Management Commission to the new Bassett Creek Watershed Management Commission to carry out the purposes of the Commission. Each member governmental unit has contributed its proportionate share of said funds based on the net tax capacity and area of all taxable property within the Bassett Creek watershed.

Subdivision 3. Each member agrees to contribute each year to a general fund, said fund to be used for general administration purposes including, but not limited to: salaries, rent, supplies, development of an overall plan, insurance, and bonds, and to purchase and maintain devices to measure hydrological and water quality data. Said funds may also be used for normal maintenance of the facilities, but any extraordinary maintenance or repair expense shall be treated as an improvement cost and processed in accordance with Subdivision 4 of this Article. The annual contribution by each member shall be based fifty percent (50%) on the net tax capacity of all property within the watershed and fifty percent (50%) on the basis of the total area of each member within the boundaries of the Watershed each year to the total area in the Bassett Creek watershed. In no event shall any assessment require a contribution to exceed one-half of one percent of the net tax capacity within the watershed.

Subdivision 4.

(a) An improvement fund shall be established for each improvement project instituted under Article VII, Subdivision 3. Each member agrees to contribute to said fund its proportionate share of the engineering, legal and administrative costs as determined by the amount to be assessed against each member as a cost of the improvement. The Board shall submit in writing a

statement to each member, setting forth in detail the expenses incurred by the Commission for each project.

Each member further agrees to pay to or contract with the member governmental unit awarding said contract for the improvement, its proportionate share of the cost of the improvement in accordance with the determination of the Board under Article VII, Subdivision 5. The member awarding the contract shall submit in writing copies of the engineer's certificate authorizing payment during construction and the member being billed agrees to pay its proportionate share of said improvement costs within 30 days after receipt of the statement. The member awarding the contract shall advise other contributing members of the tentative time schedule of the work and the estimated times when the contributions shall be necessary.

(b) Notwithstanding the provisions of paragraph (a) of this subdivision, the Commission may by a vote of 2/3rds of all eligible votes of the then existing members of the Commission decide to proceed to fund all or any part of the cost of a capital improvement contained in the capital improvement program of the plan pursuant to the authority and subject to the provisions set forth in Minnesota Statutes, Section 103B. 251. The Commission and Hennepin County may establish a maintenance fund to be used for normal and routine maintenance of an improvement constructed in whole or in part with money provided by Hennepin County pursuant to Minnesota Statutes, Section 103B. 251. The levy and collection of an ad valorem tax levy for maintenance shall be by Hennepin County based upon a tax levy resolution adopted by a majority vote of all eligible members of the Commission and remitted to the County on or before the date prescribed by law each year. If it is determined to levy for maintenance, the Commission shall be required to follow the hearing process established by Minnesota Statutes, Section 103D. 915 and 103D. 921 and acts amendatory thereof and in addition thereto. Mailed notice shall be sent to the Clerk of each member municipality at least 30 days prior to the hearing.

Subdivision 5. On or before July 1 of each year, the Board shall adopt a detailed budget for the ensuing year and decide upon the total amount necessary for the general fund. Budget approval shall require a favorable vote by a majority of all eligible votes of the then existing members of the Board.

The Secretary of the Board shall certify the budget on or before July 1 to the clerk of each member governmental unit together with a statement of the proportion of the budget to be provided by each member. The Council of each member agrees to review the budget, and the Board shall upon notice from any member received prior to August 1, hear objections to the budget, and may, upon notice to all members and after a hearing, modify or amend the budget, and then give notice to the members of any and all modifications or amendments.

Each member agrees to provide the funds required by the budget and said determination shall be conclusive if no member enters objections in writing on or before August 1. If no objections are submitted to the Board, each member agrees to provide the funds approved by the Board, after the Board has conducted the aforementioned hearing. Modifications or amendments to the original budget require a favorable vote by a majority of all eligible voters of then existing members of the Board.

The budget shall not in any event require any member to contribute in excess of one-half of one percent of the net tax capacity of all taxable property within the watershed and within said members corporate boundaries.

The schedule of payments by the members shall be determined by the Board in such a manner as to provide for an orderly collection of the funds needed.

Upon notice and hearing, the Board by a favorable vote of a majority of all eligible votes of then existing members may adopt a supplemental budget requiring additional payments by the members within 60 days of its adoption but in no event shall the budget require any member to contribute in excess of one-half of one percent of the net tax capacity of all taxable property within the watershed or within any member's corporate boundaries in any one calendar year.

Members' attention is drawn to Minnesota Statutes, Section 103B. 245, which authorizes a Watershed Management Tax District to be created within each member City to pay the costs of planning and for the purpose of paying capital costs and/or normal and routine maintenance of facilities.

Subdivision 5. Cost Allocation. All capital costs incurred by the Commission shall be apportioned to the respective members on either (1), (2), or (3) of the following bases:

- (1) A negotiated amount to be arrived at by the members who have lands in the subdistrict responsible for the capital improvement.
- (2)
 - (a) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the real property valuation net tax capacity of each member within the boundaries of the watershed each year to the total real property valuation net tax capacity in the Bassett Creek watershed area governed by this Agreement.
 - (b) Fifty percent of all capital costs or the financing thereof shall be apportioned to each member on the basis of the total area of each member within the boundaries of the watershed each year to the total area in the Bassett Creek watershed area governed by this Agreement.
 - (c) Capital costs allocated under the 50% area/50% net tax capacity formula herein set forth may be varied by the Commission by a 2/3rds vote if:
 - (1) any member community receives a direct benefit from the capital improvement which benefit can be defined as a lateral as well as a trunk benefit, or
 - (2) the capital improvement provides a direct benefit to one or more members which benefit is so disproportionate as to require in a sense of fairness a modification in the 50/50 formula.
 - (d) Credits to any member for lands acquired by said member to pond or store storm and surface water shall be allowed against costs set forth in Subsections (a), (b), and (c) of this Section.
- (3) If the project is constructed and financed pursuant to Minnesota Statutes, Section 103B. 251, the members understand and agree that said costs will be levied on all taxable property in the watershed as set forth in the statute.

MISCELLANEOUS PROVISIONS

IX.

Subdivision 1. The Commission shall not have the power to issue certificates, warrants or bonds.

Subdivision 2. The Commission shall not have the power of eminent domain and shall not own any interest in real property. All interests in lands shall be held in the name of the corporate member wherein said lands are located.

Subdivision 3. The Commission shall not have the power to levy a special assessment upon any privately or publicly owned land. All such assessments shall be levied by the member wherein said lands are located. It shall have the power to require any member to contribute the costs allocated or assessed according to the other provisions of this agreement.

Subdivision 4. Each member agrees that it will not directly or indirectly collect or divert any additional surface water to the Mississippi River or its tributaries from any subdistrict or subtrunk without a permit from the Board of Commissioners. Permits may be granted by the Board for a member to proceed with the construction or reconstruction of improvements within the individual corporate members' boundaries and at its sole cost upon a finding:

- (a) that there is an adequate outlet; and
- (b) that said construction is in conformance with the overall plan; and
- (c) that the construction will not adversely affect other members of this agreement.

Subdivision 5. Any member who is more than 60 days in default in contributing its share to the general fund shall have the vote of its Board member suspended pending the payment of its proportionate share.

Any member who is more than 60 days in default in contributing its proportionate share of the cost of any improvement to the contracting member shall upon application of the contracting member have the vote of its Board member suspended, pending the payment of its proportionate share.

Any Board member whose vote is under suspension shall not be considered as an eligible member as such membership affects the number of votes required to proceed on any matter under consideration by the Board.

DURATION

X.

Subdivision 1. Each member agrees to be bound by the terms of this agreement until January 1, 2025, and it may be continued thereafter at the option of the parties.

Subdivision 2. This agreement may be terminated prior to January 1, 2025, by the unanimous consent of the parties. If the agreement is to be terminated, a notice of the intent to

dissolve the Commission shall be sent to the Board of Water and Soil Resources and to Hennepin County at least 90 days prior to the date of dissolution.

Subdivision 3. In addition to the manner provided in Subdivision 2 for termination, any member may petition the Board to dissolve the agreement. Upon 90 days notice in writing to the clerk of each member governmental unit and to the Board of Water and Soil Resources and to Hennepin County, the Board shall hold a hearing and upon a favorable vote by a majority of all eligible votes of then existing Board members, the Board may by Resolution recommend that the Commission be dissolved. Said Resolution shall be submitted to each member governmental unit and if ratified by three-fourths of the councils of all eligible members within 60 days, said Board shall dissolve the Commission allowing a reasonable time to complete work in progress and to dispose of personal property owned by the Commission.

DISSOLUTION

XI.

Upon dissolution of the Commission , all property of the Commission shall be sold and the proceeds thereof, together with monies on hand, shall be distributed to the eligible members of the Commission. Such distribution of Commission assets shall be made in proportion to the total contribution to the Commission as required by the last annual budget.

EFFECTIVE DATE

XII.

This agreement shall be in full force and effect upon the filing of a certified copy of the resolution approving said agreement by all nine members. Said resolution shall be filed with the Chair of the existing Bassett Creek Watershed Management Commission (presently W. Peter Enck of the City of New Hope), who shall notify all members in writing of its effective date and shall set the date for the next meeting to be conducted under this amended Joint Powers Agreement.

IN WITNESS WHEREOF, the undersigned governmental units, by action of their governing bodies, have caused this agreement to be executed in accordance with the authority of Minnesota Statutes Sections 103B. 211 and 471.59.

Appendix H

Requirements for Improvements and Development Proposals

Bassett Creek Watershed Management Commission (BCWMC)

Requirements for Improvements and Development Proposals

Revised January 2023



Requirements for Improvements and Development Proposals

Revised January 2023

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1.0 Introduction

This document was prepared to assist developers and consultants in designing and managing projects that conform to the policies of the *Bassett Creek Watershed Management Commission 2015-2025 Watershed Management Plan* (Watershed Management Plan) (September 2015, as amended) and outlines the requirements designed to achieve the **BCWMC**'s goals. The Watershed Management Plan, as adopted by the Bassett Creek Watershed Management Commission (**BCWMC**), may be reviewed or obtained from the **BCWMC** website at <http://www.bassettcreekwmo.org/>.

This document provides the development requirements adopted by the **BCWMC** and includes:

1. *Types of projects to be submitted for review*

2. *Review Process*

- The nature of the review process and procedures
- Required submittals/exhibits
- Variance procedures

3. *Policies, standards and requirements*

- **Floodplain** policies
- **Rate control** policies
- **Water quality** policies
- **Erosion and sediment control** policies
- Other policies

Words and phrases in **bold** text are defined in Section 9.0.

2.0 Types of Projects to be Submitted for Review

All persons, municipalities, public agencies, or other agencies proposing improvements or developments within the Bassett Creek watershed shall submit sufficient information to the **BCWMC** engineer to determine the effect that their proposed project may have on the water resources of the watershed within the following guidelines. At the request of the member cities, the **BCWMC** engineer and/or board of commissioners will review plans for improvements or developments that would not otherwise trigger review. Types of projects to be submitted for review and triggers for BCWMC review include:

2.1 Floodplains

Any proposed project that is located below the 1% (base flood elevation, 100-year flood) **floodplain** elevation or **floodplain** storage sites and would consist of a major alteration of existing **structures**, erection of new **structures**, filling, floodway encroachment, activities considered incompatible with acceptable **floodplain** uses or be subject to damage by the 1% (base flood elevation, 100-year) flood must be submitted to the **BCWMC** for review. **Floodplain** policies shall apply to **structures** such as buildings, bridges, footbridges, culverts, and pipe crossings of any nature, including sanitary sewer, water supply, electrical and telephone lines, and other utilities. Temporary and permanent docks or boardwalks, and work limited to grading or maintenance in the **floodplain** do not require **BCWMC** review. This requirement only applies to the floodplain of the Bassett Creek **trunk system**. Municipalities are responsible for managing other local floodplains. **Floodplain** policies are included in Section 4.0.

2.2 Rate Control

Proposed new, **nonlinear** development projects that create one or more acres of new **impervious surface** or **nonlinear redevelopment projects** that create one or more acres of new and/or fully reconstructed **impervious surface** shall be submitted to the **BCWMC** for **rate control** review. Proposed **linear projects** that create one or more acres of net new **impervious surface** shall be submitted to the **BCWMC** for **rate control** review. Requirements for **rate control** are described in Section 5.0.

2.3 Water Quality

Proposed new, **nonlinear** development projects that create one or more acres of new **impervious surface** or **nonlinear redevelopment projects** that create one or more acres of new and/or fully reconstructed **impervious surface** shall be submitted to the **BCWMC** for water quality review. Proposed **linear projects** that create one or more acres of net new **impervious surface** shall be submitted to the **BCWMC** for water quality review. Requirements for water quality treatment are described in Section 6.0.

2.4 Erosion and Sediment Control

Proposed **nonlinear** projects that will result in 200 cubic yards or more of cut or fill or 10,000 square feet or more of **land disturbance** shall be submitted to the **BCWMC** for **erosion and sediment control** review. Proposed **linear projects** that result in one or more acres of **land disturbance** shall be submitted to the **BCWMC** for **erosion and sediment control** review. **Wetland** mitigation area is not included in the

land disturbance calculation. Individual single family home sites are exempt from **erosion and sediment control** review. **Erosion and sediment control** requirements are included in Section 7.0.

2.5 Lakes, Streams, and Wetlands

Proposed projects that may affect the water surface elevation, outlet storage capability, shoreline or streambank, or be incompatible with existing or proposed land use around the lakes, streams, and **wetlands** in the Bassett Creek watershed shall be submitted to the **BCWMC** for review. The **BCWMC** will defer **wetland** issues in cases where the municipality acts as the local government unit (LGU) for administering the **Wetland** Conservation Act, unless **BCWMC** involvement is requested by the municipality. Lakes, Streams, and **Wetlands** requirements are included in Section 8.0.

The BCWMC does not specifically review buffers for proposed projects, but requires that member cities maintain and enforce **wetland** and streambank buffer requirements at least as stringent as the **BCWMC** requirements laid out in Appendix B. Specific **wetland** and stream buffer requirements and submittal information should be coordinated with the member city in which the project is located. **BCWMC** Buffer Requirements are included in Appendix B.

2.6 Water Resources

Proposed projects that would alter water resources in the watershed, involve the discharge of industrial or other waste to any watercourse or storm sewer, require extensive land alteration, are directly tributary to the waterbodies of the watershed, or may otherwise affect the existing water quality shall be submitted to the **BCWMC** for review. In addition, the **BCWMC** shall be informed of the proposed application of chemicals or other treatments to lakes and ponds in the watershed.

2.7 Diversion of Surface Water Runoff

Proposed projects to provide intra or inter watershed diversion that may affect flood levels, lake levels, or minimum stream flows in the watershed shall be submitted to the **BCWMC** for review. Diversion of Surface Water Runoff requirements are included in Section 8.0.

2.8 Land Use Changes

Proposed changes in land use and zoning that are not consistent with the Watershed Management Plan and affect stormwater management must be submitted to the **BCWMC** for review.

2.9 Appropriations

Ground or surface water appropriations that may temporarily or permanently alter the existing ground and surface water levels in the watershed shall be submitted to the **BCWMC** for review.

2.10 Utility Crossings and Bridges

The construction of utilities through or paralleling the defined **trunk system** that require disturbance of the bed or banks of the creek or the diversion of the creek and all bridges across the **trunk system** shall

be submitted to the **BCWMC** for review. Utility Crossings and Bridges requirements are included in Section 4.0 and 8.0.

2.11 Department of Natural Resources (DNR) Permit Applications

The **BCWMC** will review permit applications submitted to the DNR for work in the Bassett Creek Watershed involving water appropriations, work in public waters, and other application regarding water resources under jurisdiction of the **BCWMC**.

2.12 Modifications or Impacts to the Bassett Creek Tunnels

The City of Minneapolis owns, maintains and operates the old Bassett Creek tunnel. The City of Minneapolis takes the lead on reviewing projects that affect the old Bassett Creek tunnel and the City coordinates with **BCWMC** as needed. Additional information regarding the old Bassett Creek tunnel requirements are included in Section 8.0.

The City of Minneapolis owns the new Bassett Creek tunnel and jointly maintains and operates the new Bassett Creek tunnel with the **BCWMC** and MNDOT. Proposed projects located within the jurisdiction of the **BCWMC** or the Mississippi Watershed Management Organization shall be submitted for **BCWMC** review and approval if the proposed project will increase the area tributary to the new Bassett Creek tunnel, add connections or outlets to the new Bassett Creek tunnel, or change the rate of **runoff** in the new Bassett Creek tunnel for the 10-year, 50-year, or 100-year event. Information regarding the new Bassett Creek tunnel requirements are included in Section 8.0.

2.13 Projects Not Requiring BCWMC Review

The following proposed projects do not require **BCWMC** review:

1. Proposed projects that result in less than 200 cubic yards of cut and fill and less than 10,000 square feet of **land disturbance**
2. Maintenance projects (seal coating and pavement overlays, driveway maintenance that does not result in net fill in **floodplain**, sediment and debris removal from crossings and stormwater ponds, etc.) that do not trigger **land disturbance** criteria
3. Municipal storm sewer maintenance projects that do not trigger **land disturbance** criteria
4. Single family home sites are exempt from **Erosion and Sediment Control** review. Single family home sites must comply with the other requirements and be reviewed by the **BCWMC** if they meet the review triggers.
5. Proposed **linear projects** that result in less than 1.0 acre of **land disturbance**.

3.0 Review Process

As outlined in Section 2.0, all persons, municipalities, public agencies, or other agencies proposing improvements or developments within the Bassett Creek watershed shall submit sufficient information to the **BCWMC** to determine the effect that their proposed project may have on the water resources of the watershed. The **BCWMC** Engineer will review all applications for compliance with the **BCWMC** policies. Some applications will require board approval at a **BCWMC** meeting; as outlined in Section 3.1.3. All other applications may be processed through administrative review by the **BCWMC** Engineer. The process the **BCWMC** will follow in reviewing projects submitted for review and the information that must be submitted by applicants is summarized below.

3.1 Procedure for BCWMC Review

1. The **BCWMC** will review the applicant's submittal only after the project has received preliminary review by the municipality indicating general compliance with existing local watershed management plans prepared pursuant to 103B.235. Questions about the **BCWMC** requirements must first be directed to the municipality in which the project is located. The municipality may choose to direct the applicant to contact the **BCWMC** administrator or engineer.
2. The **BCWMC** engineer has 15 days to determine if an application is complete from the date that the signed application and proposed project documentation is received by the **BCWMC** engineer. The **BCWMC** engineer has 60 days to determine if an application is approved or send a letter with comments to the municipality and to the applicant.
3. Some proposed projects require board approval at a **BCWMC** meeting. Except as noted, all submittals impacting **floodplains** (as defined in Section 2.1), lakes, streams, or wetlands, or involving the Bassett Creek **trunk system**, variances, linear construction or reconstruction projects disturbing 5 acres or more, or alternative **BMPs** not included in the most current version of the Minnesota Stormwater Manual require board approval at a **BCWMC** meeting. Work limited to single-family home shoreline restoration and/or single-family home streambank stabilization projects do not require board approval at a **BCWMC** meeting, but do require administrative approval by the **BCWMC** engineer.
4. The **BCWMC** board meetings are generally held the third Thursday of each month. For a proposed project to be included on the **BCWMC** board meeting agenda, application materials must be submitted to the **BCWMC** engineer by the last Friday of the month prior to the meeting date. **Complex projects** may require additional review time. However, not all proposed projects are presented at the **BCWMC** meeting for review and board approval; as outlined in Section 3.1.3.
5. Upon receipt of a submittal, the **BCWMC** engineer will review the submittal and prepare recommendations to the **BCWMC** board or municipality.

- a. For projects requiring board approval at a **BCWMC** meeting, a memorandum describing each proposed project and the engineer's recommendations will be sent to the **BCWMC** board of commissioners approximately one week before the meeting.
 - b. For projects not requiring board approval at a **BCWMC** meeting, the **BCWMC** engineer will send a letter with comments directly to the municipality and to the applicant.
6. If requiring board approval at a **BCWMC** meeting, the board of commissioners will approve, conditionally approve, table, or reject the submittal. The BCWMC engineer will then send a letter with comments, including a list of deficiencies or required modifications, to the municipality and to the applicant.
7. The applicant must provide a revised submittal addressing each deficiency, required modification, or comment. The BCWMC engineer will send a letter of approval to the municipality and to the applicant after comments have been satisfactorily addressed.
8. Application approvals expire two years from the date of approval. Approved proposed projects that do not begin construction within two years will require a new application and approval. Active applications expire two years from the date of the most recent **BCWMC** comments letter. If a response to **BCWMC** comments or final approval is not received for a proposed project within two years, a new application and approval will be required.
9. Emergency work performed or approved by cities (utility repair, emergency traffic issues, health and safety issues, etc.) is exempt from initial **BCWMC** review. Cities shall inform the **BCWMC** regarding emergency work, as soon as practical, in cases that would have required an application under non-emergency conditions. To document the work, the appropriate application materials and fee shall be provided to the **BCWMC** after construction and a return to non-emergency conditions.

3.2 Required Exhibits

The applicant shall submit an application form and required exhibits. The application form must be signed by City staff. The required exhibits are listed on the application form and further discussed as follows:

1. Completed *Application for Development Proposals* signed by applicant and City staff.
2. Project review fee: submit project review fee in accordance with the fee schedule.
3. Project plans: submit one full size (paper), one 11 x 17-inch (paper) and an electronic (PDF), including at least:
 - a. A scale drawing of the site showing property lines and delineation of lands under ownership of the applicant.
 - b. Proposed and existing **stormwater management facilities** location, alignment, and elevation..

- c. Existing and proposed site contour elevations related to NGVD 29 datum, NAVD 88 datum, or other datum used by municipality.
 - d. Construction plans and specifications of all proposed **stormwater management facilities**.
- 4. Stormwater management plan and computations (if applicable): submit plan signed by a registered professional engineer, and meeting the minimum requirements described in these standards. A stormwater management plan shall include the following items:
 - a. Delineation of the subwatersheds contributing runoff from offsite, and existing and proposed subwatersheds onsite.
 - b. Delineation of existing onsite **wetlands**, marshes, and/or **floodplain** areas.
 - c. Existing and proposed post-development normal, 2-year, 10-year, and 100-year water levels for the site.
 - d. Stormwater runoff volume and rate analyses for existing and proposed conditions for 2-year, 10-year, and 100-year storm events.
 - e. All hydrologic, hydraulic, and other computations necessary to design the proposed **stormwater management facilities**.
- 5. **Erosion and sediment control** plan (if applicable): submit plan meeting the requirements of these standards.
- 6. **MIDS** calculator files (in Excel), P8 model, WINSLAMM model, or other **BCWMC** approved equal (if applicable), demonstrating the project meets the water quality requirements of these standards.
- 7. BMP checklist: Submit checklist provided as part of the application form demonstrating that, to the maximum extent practical, the plan has incorporated the structural and non-structural **BMPs**, as described in the referenced documents.
- 8. Electronic copy of the final approved submittal.
- 9. Other items required to support the proposed project.

3.3 Variance Procedure

The **BCWMC** has established the following variance procedures:

- 1. Applications for variances shall be filed with the City in which the property is being developed, redeveloped, or **retrofitted** and shall state the exceptional conditions of the property and the peculiar and practical difficulties claimed as a basis for a variance. The applicant shall state on the

application the reasons for requesting the variance, in accordance with all of the requirements set forth below.

2. The City shall refer all applications for variances from the **BCWMC** requirements to the **BCWMC** engineer, and such applications shall be reviewed by the **BCWMC** board of commissioners. In reviewing the application, the **BCWMC** shall take into consideration the criteria, standards, and goals for maintaining and improving the quality of the watershed's water resources.

To address the applicant's hardship or special situation, the **BCWMC** may grant the variance, contingent upon conditions specified. Alternatively, the **BCWMC** may deny the request and state reasons for the denial in writing.

3. In granting variances, the **BCWMC** shall make a finding showing that all of the following conditions exist:
 - a. There are special circumstances or conditions affecting the property such that the strict application of the provisions of these standards and criteria would deprive the applicant of the reasonable use of the applicant's land.
 - b. The variance is necessary for the preservation and enjoyment of a substantial property right of the applicant.
 - c. The granting of the variance will not be detrimental to the public welfare or injurious to the other property in the territory in which the property is situated.
 - d. In applications relating to a use in the 1% (base flood elevation, 100-year flood) **floodplain** set forth in Table 2-9 of the Watershed Management Plan, the variance shall not allow a lower degree of flood protection than the current flood protection.
 - e. The granting of the variance will not be contrary to the intent of taking all reasonable and practical steps to improve water quality within the watershed.

4.0 Floodplain Requirements

The **floodplain** of the Bassett Creek **trunk system** is that area lying below the 1% (base flood elevation, 100-year) flood elevations as shown in Table 2-9 of the Watershed Management Plan, or as subsequently revised due to channel improvement, storage site development, revisions to reflect the current **BCWMC**-adopted floodplain elevations, or requirements established by appropriate state or federal governmental agencies. The **BCWMC** adopted the following policies regarding **floodplain** regulation within the Bassett Creek watershed (see policies in Section 4.2.2 of the Watershed Management Plan):

1. **Minimum building elevations** (lowest floor) of new and redeveloped **structures**, including **parking garages/ramps**, must be at least 2.0 feet above the 100-year flood level. *(per Policy 29)*
2. The **BCWMC** encourages property owners to implement best management practices to reduce the volume of stormwater runoff beyond the minimum requirements imposed by the city's MS4 permit, NPDES construction stormwater permit and MIDS performance goal adopted by the **BCWMC**. Examples of stormwater runoff volume reduction methods include:
 - a. Reducing the amount of planned **impervious surface** (as areas develop).
 - b. Reducing the amount of **impervious surface** (during redevelopment).
 - c. Increasing infiltration and/or evapotranspiration.
 - d. Addition of permeable pavement.
 - e. Stormwater reuse. *(Policy 30)*
3. The **BCWMC** will allow only those land uses in the **BCWMC**-established **floodplain** that will not be damaged by floodwaters and will not increase flooding. *(Policy 34)*
4. Allowable types of land use that are consistent with the **floodplain** include recreation areas, playgrounds, surface parking lots, temporary excavation and storage areas, public utility lines, agriculture, and other open spaces. *(Policy 34)*
5. The **BCWMC** prohibits the construction of basements in the **floodplain**; construction of all other infrastructure within the **floodplain** is subject to **BCWMC** review and approval. *(Policy 35)*
6. The **BCWMC** prohibits permanent storage piles, fences and other obstructions in the **floodplain** that would collect debris or restrict flood flows. *(Policy 36)*
7. Where streets, utilities, and **structures** currently exist below the 100-year **floodplain**, the **BCWMC** encourages the member cities to remove these features from the **floodplain** as development or redevelopment allows. *(Policy 37)*

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8. The **BCWMC** requires that projects within the **floodplain** maintain no net loss in **floodplain** storage and no increase in flood level at any point along the **trunk system**. *(Policy 38)* No increase in flood level will be managed to at least a precision of 0.00 feet.
 9. The **BCWMC** prohibits expansion of existing non-conforming land uses within the **floodplain** unless they are fully flood-proofed in accordance with codes and regulations. *(Policy 38)*
 10. The lowest member of all crossings shall be at least 1 foot above the 100-year **floodplain** to prevent debris accumulation unless approved otherwise by the **BCWMC**.

5.0 Rate Control Requirements

Proposed, **nonlinear** projects creating one or more acres of new and/or fully reconstructed **impervious surfaces** must manage stormwater runoff such that peak flow rates leaving the site are equal to or less than the existing rate leaving the site for the 2-, 10-, and 100-year events based on Atlas 14 precipitation amounts and using a nested 24-hour rainfall distribution. Documentation of existing and proposed discharge rates for the 2-, 10-, and 100-year events must be provided to the **BCWMC** for review.

Proposed **linear projects** containing one or more acres of net new **impervious surfaces** must manage stormwater runoff such that peak flow rates leaving the site are equal to or less than the existing rate leaving the site for the 2-, 10-, and 100-year events based on Atlas 14 precipitation amounts and using a nested 24-hour rainfall distribution. Documentation of existing and proposed discharge rates for the 2-, 10-, and 100-year events must be provided to the **BCWMC** for review.

Trails, sidewalks, and miscellaneous disconnected **impervious surfaces** (concrete/bituminous pads, etc.) are exempt from **BCWMC rate control** policies.

6.0 Water Quality Requirements

The **BCWMC** requires all stormwater to be treated in accordance with the **BCWMC** performance goals for new development, redevelopment, and **linear projects**. A performance goal specifies what level of stormwater treatment must be achieved on a site. If the performance goal is not feasible and/or is not allowed for a proposed project, then the project proposer must implement the **BCWMC** flexible treatment options, as shown in the **BCWMC** Design Sequence Flow Chart (Appendix A). Site **restrictions** include those factors listed in the **BCWMC** flexible treatment options, which include, but are not limited to: shallow depth to bedrock, contaminated soils, shallow groundwater, tight clay soils, existing site constraints, or zoning requirements). Section 6.1 of this document outlines the **BCWMC** performance goal. Section 6.2 of this document outlines the flexible treatment options approach.

The **BCWMC** will review projects and developments to evaluate compliance with the **BCWMC** performance goals if the proposed projects are located in member cities that have not adopted the **MIDS** performance goals, triggers, and flexible treatment options or equivalent requirements, or at the request of the member city. For proposed projects located in member cities that have adopted the **MIDS** performance goals, triggers, and flexible treatment options or equivalent requirements, the member cities shall review projects for conformance with **MIDS** water quality treatment standards, unless Commission review is requested by the member cities.

The following surfaces are among those that will be analyzed as **impervious**: swimming pools, compacted ground surfaces such as gravel driveways, and artificially turfed fields. The following surfaces are among those that will be analyzed as pervious (if they are designed in accordance with the Minnesota Stormwater Manual): green roofs and permeable pavement/pavers. Solar panels will be analyzed based on the surface located beneath the panels. Mill and overlay and other resurfacing activities are not considered fully reconstructed **impervious surfaces**. Trails, sidewalks, and miscellaneous disconnected **impervious surfaces** (concrete/bituminous pads, etc.) are exempt from **BCWMC** water quality performance standards. Buffers should be provided for trails and sidewalks where possible.

For projects not requiring the **retention** of on-site runoff in accordance with the **BCWMC** performance goals, the **BCWMC** encourages the use of infiltration, filtration, water reuse approaches, or other abstraction of runoff from **impervious** areas for all development and **redevelopment projects** as a best practice to reduce stormwater **runoff**. (*Policy 32*)

6.1 Performance Goal

6.1.1 Non-Linear Development/Redevelopment

Proposed **nonlinear** development/redevelopment projects that create one or more acres of new and/or fully reconstructed **impervious surfaces** shall capture and retain onsite 1.1 inches of runoff from the new and/or fully reconstructed **impervious surfaces**. If the performance goal is not feasible and/or is not allowed for a proposed project, then the project proposer must implement the flexible treatment options, as shown in the **BCWMC** Design Sequence Flow Chart in Appendix A.

Redevelopment project locations and the amount of new and/or fully reconstructed **impervious surface** will be tracked by the **BCWMC**. If a property has several **redevelopment projects** that individually do not trigger the **BCWMC** performance goal, but would when combined, the applicant will be required to provide treatment in accordance with the **BCWMC** performance goal for all **redevelopment**.

6.1.2 Linear Projects

Linear projects on sites without **restrictions** that create one or more acres of net new **impervious surfaces** shall capture and retain onsite 1.1 inches of runoff from the net new **impervious surfaces**.

If the performance goal is not feasible and/or is not allowed for a proposed project, then the project proposer must implement the flexible treatment options, as shown in the **BCWMC** Design Sequence Flow Chart in Appendix A. Net new **impervious surface** calculations will be based on the street surface from back of curb to back of curb; trails/sidewalks (as noted in Section 6.0) and driveways are not included in the net new **impervious surface** calculations.

6.2 Flexible Treatment Options

If an applicant is unable to achieve the performance goals due to site **restrictions**, flexible treatment options must be implemented following the **BCWMC** design sequence flow chart. The presence of low-infiltrating soils, shallow bedrock, and karst topography are examples of locations that are not conducive to infiltration as a stormwater management approach. Other **restrictions** include but are not limited to sites that have contaminated soil or shallow groundwater, existing building or utility conflicts, or other site constraints such as zoning requirements that create difficulties in providing volume reduction.

Using the flow chart, project proposers are taken through a step-by-step approach to document site **restrictions** and how they have attempted to meet the 1.1 inches performance goal. If the performance goal is shown to be infeasible, a 0.55 inch performance and a 75 percent annual total phosphorus removal goal is explored, followed by a maximum extent practicable volume reduction and a 60 percent annual total phosphorus removal goal, and then a final option to meet the 1.1 inches volume reduction goal at an off-site location.

6.3 Approved Techniques

In order to receive credit toward meeting the **BCWMC** performance goals, **BMPs** must be designed in accordance with the Minnesota Stormwater Manual or as otherwise approved by the **BCWMC**.

6.3.1 Software / Calculators

The **MIDS** calculator, P8, WINSLAMM, or other **BCWMC** approved approaches may be used to demonstrate volume reduction and total phosphorus removals to demonstrate compliance with the performance goals.

The **MIDS** calculator may be downloaded from the Minnesota Stormwater Manual. The applicant must submit the **MIDS** calculator Excel file for review by the **BCWMC**, along with the output summaries generated by the program. If using P8, WINSLAMM, or alternative modeling programs, either the model file or adequate summaries of input and output information must be provided for review by the **BCWMC**.

6.3.2 Minnesota Stormwater Manual

A list of approved **BMPs** and corresponding design guidance can be found in the Minnesota Stormwater Manual. The Minnesota Stormwater Manual should be used to determine the currently approved **BMPs** and design guidance. Some **BMPs** may require pretreatment or other design specifications. At the time of the development of this document, the following **BMPs** were included in the Minnesota Stormwater Manual:

- Bioretention Basin/Bioinfiltration Basin/Biofiltration Basin (Rain Garden)
- Swale/Bioswale
- Sand Filter
- Iron Enhanced Sand Filter (Minnesota Filter)
- Green Roof
- Infiltration Basin/Underground Infiltration
- Infiltration Trench
- Permeable Pavement
- Stormwater Pond
- Stormwater **Wetland**
- Tree Trench System
- Stormwater Reuse
- Hydrodynamic Device (e.g. SAFL Baffle)
- Filtration Device
- Stormwater Manufactured Treatment Devices (MTDs)

The Minnesota Stormwater Manual can be found online at:

http://stormwater.pca.state.mn.us/index.php/Main_Page.

6.3.3 Stormwater Manufactured Treatment Devices

Stormwater **manufactured treatment** devices (MTDs) may be used toward meeting **BCWMC** flexible treatment options. The project proposer may apply 50% TP and 80% TSS removals for stormwater **MTDs** identified in the Minnesota Stormwater Manual, providing the stormwater **MTDs** are designed in accordance with the manufacturers and Minnesota Stormwater Manual recommendations and guidelines. A project proposer may seek acceptance of a higher pollutant removal efficiency by following guidance from the Minnesota Stormwater Manual. The Minnesota Stormwater Manual has guidance regarding removal efficiencies by device and treatment tiers. If the project proposer pursues a treatment tier higher than Tier 1 (50% TP and 80% TSS), documentation must be submitted to demonstrate that Tier 2 or Tier 3 is met. The Minnesota Stormwater Manual guidance for **MTD** is located at the following link:

[Manufactured treatment devices - Minnesota Stormwater Manual \(state.mn.us\)](http://stormwater.pca.state.mn.us/index.php/Main_Page)

7.0 Erosion and Sediment Control Requirements

1. For proposed **nonlinear** projects that will result in 200 cubic yards or more of cut or fill, or 10,000 square feet or more of **land disturbance**, an **erosion and sediment control** plan shall be prepared that meets the requirements listed below. It is recommended that applicants follow the standards given in the NPDES Permit for Construction Activity (MPCA) and Minnesota Stormwater Manual. Single family home sites are exempt from this requirement.
2. **Erosion and sediment control** plans submitted for **BCWMC** review shall show the proposed methods of retaining waterborne sediments onsite during the period of construction, and shall specify methods and schedules to determine how the site will be restored, covered, or revegetated after construction.
3. In addition, the project proposer shall:
 - a. Provide specific measures to control erosion based on the grade and length of the slopes on the site, as follows:
 - 1) Silt fences shall be placed along the toe of the slopes that have a grade of less than 3 percent and are less than 400 feet long from top to toe. The silt fences shall be supported by sturdy metal or wooden posts at intervals of 6 feet or less.
 - 2) Flow lengths up-slope from each silt fence shall not exceed 400 feet for slopes that have a grade of less than 3 percent.
 - 3) Silt fences or other **sediment control** features shall be placed along the toe of the slopes that have a grade of 3 to 10 percent and are less than 200-feet long from top to toe. These fences shall be supported by sturdy metal or wooden posts at intervals of 6 feet or less.
 - 4) Flow lengths up-slope from each silt fence shall not exceed 200 feet for slopes that have a grade of 3 to 10 percent.
 - 5) Diversion channels or dikes and temporary slope drains shall be provided to intercept all drainage at the top of slopes that have a grade of more than 10 percent and are less than 100 feet long from top to toe. Silt fence shall be placed along the toe of said slopes, and shall be supported by sturdy metal or wooden posts at intervals of 6 feet or less.
 - 6) Diversion channels or dikes and temporary slope drains shall be provided to intercept all drainage at the top of slopes that have grades of more than 10 percent. Also, diversion channels or diked terraces and temporary slope drains shall be provided across said slopes if needed to ensure that the maximum flow length does not exceed 100 feet. Silt fence shall be placed along the toe of said

slopes, and shall be supported by sturdy metal or wooden posts at intervals of 6 feet or less.

- 7) Sediment control logs shall be installed in accordance with the manufacturer's recommendations for effective construction site **sediment control**.
 - 8) Other **erosion control** practices such as compost blankets, compost filter berms, and other practices should also be considered for construction site **erosion control**.
- b. Require that silt fences, silt socks, or approved inlet protection devices be installed at or around each catch basin inlet on the site and that this barrier remain in place until pavement surfaces have been installed and/or final turf establishment has been achieved.
 - c. Ensure that flows from diversion channels or pipes are routed to sedimentation basins or appropriate energy dissipaters in order to prevent transport of sediment to outflow conveyors and to prevent erosion and sedimentation when **runoff** flows into the conveyors.
 - d. Require that site-access roads be graded or otherwise protected with silt fences, diversion channels, or dikes and temporary slope drains to prevent sediment from leaving the site via the access roads. Vehicle tracking of sediment from the construction site (or onto streets within the site) must be minimized by installing rock construction entrances, rumble strips (mud mats), wood chips, wash racks, or equivalent systems at each site access. Rock construction entrances must have a minimum height of 6 inches above the adjacent roadway and a wash-off berm with a minimum height of 2 feet above the adjacent roadway and with maximum side slopes of 4:1. An allowable alternative to the wash-off berm is to install mud mats across the entire width of the rock construction entrance, over at least 50% of the length of the rock construction entrance, and centrally placed within the total length of the rock construction entrance.
 - e. Require that soils tracked from the site be removed from all paved surfaces within 24 hours of discovery throughout the duration of construction.
 - f. Assure that silt fences and diversion channels or dikes and temporary slope drains be deployed and maintained for the duration of site construction. If construction operations interfere with these control measures, the silt fences, diversion channels or dikes and temporary slope drains may be removed or altered as needed but shall be restored to serve their intended function at the end of each day.
 - g. Require that all exposed soil areas must be stabilized as soon as possible, but in no case later than 14 days after the construction activity has temporarily or permanently ceased or within 7 days if the project is within 1 mile of a special or impaired water. A schedule of significant **land disturbance** work will be required as part of the **erosion and sedimentation control** plan.

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- h. Require that temporary or permanent mulch be uniformly applied by mechanical or hydraulic means and stabilized by disc-anchoring or use of hydraulic soil stabilizers.
 - i. Require a temporary vegetative cover consisting of a suitable, fast-growing, dense grass-seed mix spread at a minimum at the MnDOT-specified rate per acre. If temporary cover is to remain in place beyond the present growing season, two-thirds of the seed mix shall be composed of perennial grasses.
 - j. Require a permanent vegetation cover consisting of sod, a suitable grass-seed mixture, or a combination thereof. On slopes greater than or equal to 3 feet horizontal: 1 foot vertical, seeded areas shall be either mulched or covered by fibrous blankets to protect seeds and limit erosion.
 - k. Provide temporary on-site sedimentation basins when 10 or more acres of **land disturbance** drains to a common location. Install temporary sediment basins where appropriate in areas with steep slopes or highly erodible soils drain to one area. On-site detention basins shall be designed to achieve pollutant removal efficiencies equal to or greater than those obtained by implementing the criteria set forth by the NPDES Permit for Construction Activity (MPCA, latest version) and the Minnesota Stormwater Manual.
 - l. Include effective energy dissipation devices or stilling basins to prevent erosion at all stormwater outfalls. Specifically:
 - 1. Outfalls with outlet velocities of less than 4 fps that project flows downstream in a direction of 30 degrees or less from the normal flow direction generally shall not require energy dissipaters or stilling basins.
 - 2. Energy dissipaters shall be sized to provide an average outlet velocity of no more than 6 fps. If riprap is also used, the average outlet velocity may be increased to 8 fps.
 - m. Specify riprap consisting of natural angular stone suitably graded by weight for the anticipated velocities.
 - n. Provide riprap to an adequate depth below the ordinary high water level and to a height above the outfall or channel bottom to ensure that the riprap will not be undermined by scour or rendered ineffective by displacement.
 - o. Specify that riprap be placed over a suitably graded filter material or filter fabric to ensure that soil particles do not migrate through the riprap and reduce its stability.
 - p. Streambank erosion and streambed degradation control measures must be employed whenever the net sediment transport for a reach of stream is greater than zero or whenever the stream's natural tendency to form meanders directly threatens damage to **structures**, utilities, or natural amenities in public areas.

8.0 Other Requirements

8.1 Lakes, Streams, and Wetlands

Multiple waterbodies within the Bassett Creek watershed are on the Minnesota Pollution Control Agency's current impaired waters 303(d) list and Total Maximum Daily Load (TMDL) studies have been completed for the waterbodies. The TMDL studies may have water quality requirements that differ from those outlined in this document. The pollutant waste load allocations specified in MPCA-approved TMDL implementation plans are incorporated into MS4 permits and must be met by municipalities within the waterbodies' watersheds. It is recommended that **BMPs** used to meet TMDL requirements be designed and maintained in accordance with the recommendations in the respective TMDL documents. At the member city's request, the **BCWMC** may review development or redevelopment plans that include **BMPs** that are not otherwise required by **BCWMC** but address TMDL load reduction requirements.

The **BCWMC** will review proposed streambank stabilization projects and streambed degradation control **structures** to evaluate the need for the work, the adequacy of design, unique or special site conditions, energy dissipation, the potential for adverse effects, contributing factors, preservation of natural processes, and aesthetics.

8.2 Diversion of Surface Water Runoff

The **BCWMC** will review diversion plans to determine the effect of the proposal on the Bassett Creek watershed and such plans will be subject to **BCWMC** approval. With respect to diversions, the **BCWMC**:

1. Prohibits any diversions of surface water within, into, or out of the watershed that may have a substantial adverse effect on stream flow or water levels at any point within the watershed.
2. Requires that plans for intra- or inter-watershed diversions must include an analysis of the effects of the diversion on flooding, water quality, and aesthetic quality along the creek.
3. Requires that efforts be made to ensure that there is no fish migration from one watershed to another. (*Policy 42*)

8.3 Utility Crossings and Bridges

1. Utility crossings installed using directional boring shall be at least 4.0 feet below the channel invert.
2. New or reconstructed bridges should be constructed so the cross-sectional area of the channel is not reduced due to the project. Bridge abutments and approaches shall be installed above the 100-year flood elevation and the lowest member of the bridge shall be at least 1 foot above the 100-year flood elevation, as set forth in Section 4.0. If encroachments in the floodplain or channel cross section are proposed, then no-rise to at least a precision of 0.00 feet would need to be demonstrated by modeling the structure and modifying the BCWMC's XPSWMM model.

8.4 Modifications to the Bassett Creek Tunnels

The City of Minneapolis owns, maintains and operates the old Bassett Creek tunnel. The city's responsibility includes maintaining 50 cubic feet per second capacity in the old Bassett Creek tunnel

during the 100-year storm event to accommodate the overflow of stormwater that cannot be accommodated in the new tunnel. Because this affects the function of the **BCWMC** Flood Control Project, the **BCWMC** has a vested interest in ensuring that the 50 cubic feet per second capacity in the old Bassett Creek tunnel is maintained, which includes ensuring that proposed projects do not jeopardize the structural integrity of the old Bassett Creek tunnel. The City of Minneapolis takes the lead on reviewing projects that affect the old Bassett Creek tunnel and the City coordinates with **BCWMC** as needed. The City may require capacity greater than 50 cubic feet per second to accommodate its local runoff.

9.0 Definitions¹

BCWMC: Bassett Creek Watershed Management Commission

Best management practices (BMPs): the structural, non-structural, and institutional controls used to improve the quality of stormwater runoff.

Commercial, industrial, institutional, or public development/redevelopment projects: typically result in larger areas of **impervious surface**, typically in the range of 60 to 80 percent imperviousness. Examples of these developments include shopping malls, stores, schools, hospitals, and warehouses.

Complex projects: include projects that are 40 acres or more, controversial, involve more than one property owner, require detailed hydrologic or hydraulic modeling, require vast changes to infrastructure (such as stormwater systems), include many **wetland** impacts, require extensive environmental review, or involve many different land uses within the same development project

Construction sequencing: a specified work schedule that coordinates the timing of land-disturbing activities and the installation of erosion-protection and sedimentation-control measures

Erosion control: any efforts to prevent the wearing or washing away of the soil or land surface

Floodplain: land adjacent to a water body, which is inundated when the discharge exceeds the conveyance capacity of the normal channel. Often described in the regulatory sense as the extent of the 1% (base flood elevation, 100-year) flood.

Impervious surface: a surface in the landscape that impedes the infiltration of rainfall and results in an increased volume of surface runoff. **Impervious surface** includes but is not limited to building roofs and structures, bituminous and concrete surfaces and compacted ground surfaces such as gravel areas.

Land disturbance: any alteration of the ground surface that could result, through the action of wind and/or water in soil erosion, substantial compaction, or the movement of sediment into waters, **wetlands**, storm sewers, or adjacent property. Land disturbing activity includes but is not limited to soil stripping, clearing, grubbing, grading, excavating, filling, stockpiling soil or earth materials, and the complete removal of an impervious surface down to the underlying soils. Typical, routine farming operations (e.g., plowing, harvesting), mill and overlay projects, and resurfacing projects that do not disturb the underlying soils are not considered to be land disturbing activities for the purpose of these requirements.

Linear project: Construction or reconstruction of a road, rail, trail, or other transportation route, or the construction, repair, or reconstruction of a utility that is not a component of a larger development or redevelopment project. Examples include road and road widening projects, trails, ditch work, road or rail replacement, and utility installation.

Manufactured Treatment Device (MTD): A manufactured treatment device (mtd) is a pre-fabricated stormwater treatment structure utilizing [settling \(sedimentation\)](#), [filtration](#), absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove

pollutants from stormwater runoff ([New Jersey Department of Environmental Protection](#)). MTDs are typically proprietary devices.

MIDS: Minimal Impact Design Standards developed by the Minnesota Pollution Control Agency (MPCA) to minimize stormwater runoff and pollution and preserve natural resources. MIDS includes specific performance goals, flexible treatment options, and the **MIDS** calculator.

Minimum building elevation: the lowest floor of a structure, including the basement.

Nonlinear project: Development, redevelopment and other types of projects that do not meet the definition of a **linear project**.

Priority stream: Main Stem of Bassett Creek, North Branch of Bassett Creek, Sweeney Branch of Bassett Creek, and Plymouth Creek. A map of the priority streams can be found in Figure 2-8 of the Watershed Management Plan.

Rate control: controlling the rate that stormwater is released from localized holding areas into larger conveyance systems

Residential development/redevelopment projects: typically result in smaller areas of **impervious surface**, typically in the range of 25 to 60 percent imperviousness. Examples of these projects include single family home construction, townhome construction, and apartment building construction.

Restriction: as described in the **MIDS** flexible treatment options, one or more of the following factors that prevent full compliance with the **MIDS** volume reduction performance goal:

- i. Karst geology
- ii. Shallow bedrock
- iii. High groundwater
- iv. Hotspots or contaminated soils
- v. Drinking Water Source Management Areas or within 200 feet of drinking water wells
- vi. Zoning, setbacks or other land use requirements
- vii. Excessive cost
- viii. Poor soils (infiltration rates that are too low or too high, problematic urban soils)

Retention: the permanent or temporary storage of stormwater to prevent it from leaving the development site

Retrofit: the introduction of a new or improved stormwater management element where it either never existed or did not operate effectively

Runoff or stormwater runoff: under Minnesota Rule 7077.0105, subpart 41b, stormwater “means precipitation runoff, stormwater runoff, snow melt runoff, and any other surface runoff and drainage.” (According to the Federal Code of Regulations under 40 CFR 122.26 [b][13], “stormwater means stormwater runoff, snow melt runoff and surface runoff and drainage.”). Stormwater does not include construction site dewatering.

Sediment control: The methods employed to prevent sediment from leaving the development site.

Sediment control practices include **silt fences**, sediment traps, earth dikes, drainage swales, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, other appropriate measures, and temporary or permanent sedimentation basins.

Stormwater management facilities: include storm sewer pipes, ditches, ponds, **infiltration basins**, etc.

Structure: Any impervious building or other object that is constructed or placed on the ground and that is, or is intended, to remain in place for longer than a temporary period.

Temporary protection (measure): short-term methods employed to prevent erosion. Examples of such protection include straw, mulch, erosion control blankets, wood chips, and erosion netting.

Trunk system: The trunk creek system is the responsibility of the **BCWMC** and includes the Main Stem of Bassett Creek from Medicine Lake to the box culvert/tunnel; the North Branch from upstream of Co. Rd P to its junction with the Main Stem; the Sweeney Lake Branch from its source in Section 5, T117N, R21W to its junction with the Main Stem downstream of Sweeney Lake; and Plymouth Creek from the point where it intersects with Highway 55 in Section 17, T118N, R33W, to Medicine Lake.

Wetland: defined in Minn. R. 7050.0130, subp. F and includes those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetlands generally include swamps, marshes, bogs, and similar areas. Constructed **wetlands** designed for wastewater treatment are not waters of the state; to be a **wetland** the area must meet **wetland** criteria for soils, vegetation, and hydrology as outlined in the 1987 U.S. Army Corps of Engineers **Wetland Delineation Manual**.

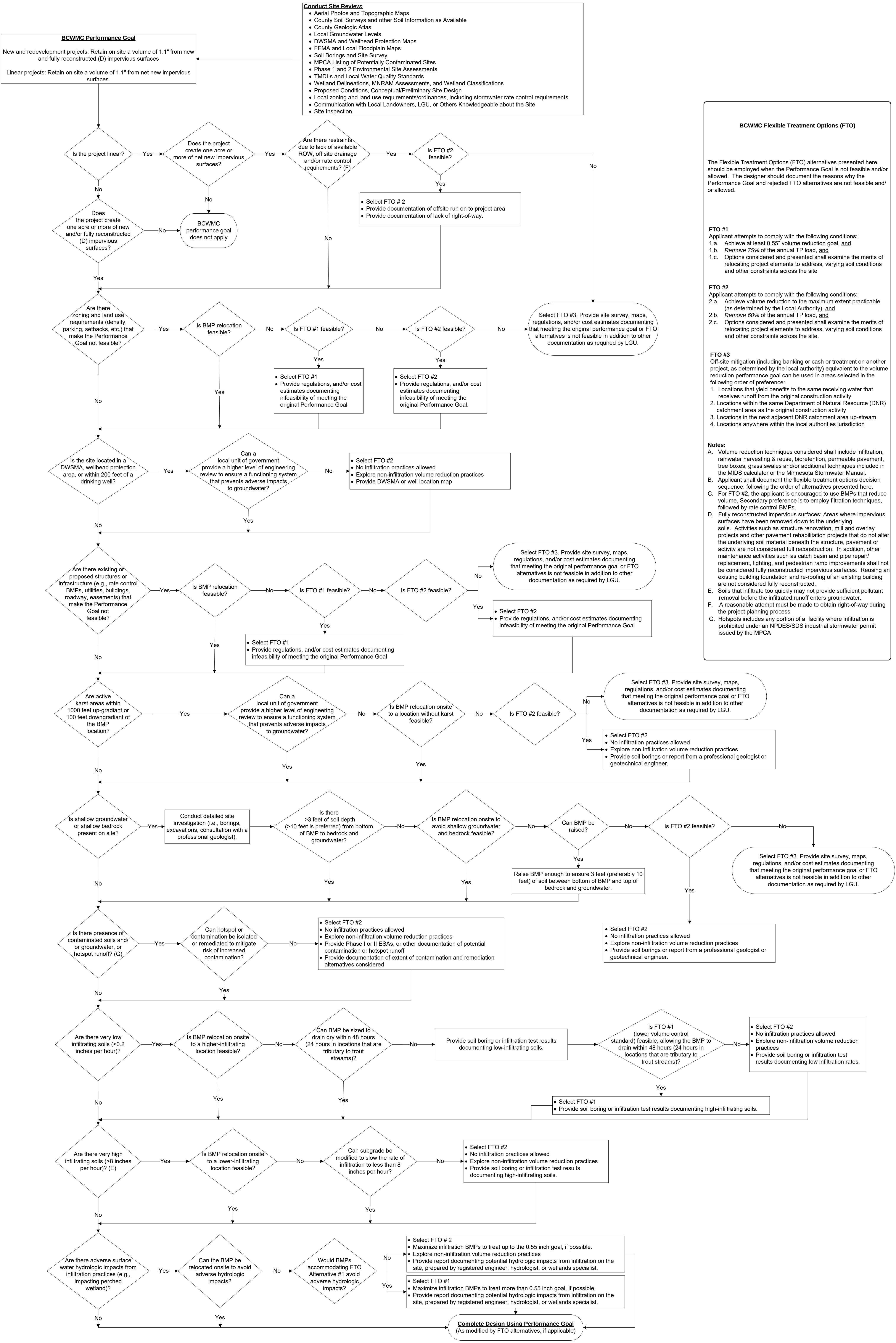
¹ Some definitions taken directly from the *Minnesota Stormwater Manual*

Appendix A

BCWMC Flexible Treatment Options Flow Chart

BCWMC DESIGN SEQUENCE FLOW CHART

version 1.0
last revised: 7/28/17



Appendix B

Buffer Requirements

Buffer Requirements

The **BCWMC** requires that member cities maintain and enforce **wetland** buffer requirements for proposed projects containing more than one acre of new or fully redeveloped impervious area and **priority stream** buffer requirements for proposed projects that will result in more than 200 yards of cut or fill, or more than 10,000 square feet of **land disturbance**. **Priority streams** in the Bassett Creek watershed include the Main Stem of Bassett Creek, the North Branch of Bassett Creek, the Sweeney Branch of Bassett Creek, and Plymouth Creek. A map of the priority streams can be found in Figure 2-8 of the Plan. Buffer requirements will vary depending on the type of water body and classification of the water body. Buffer areas are areas of vegetative cover that are upland of the **wetland** or stream edge, and that occur in a natural condition or through restoration. Buffer areas consist of shrubbery and trees, and native grasses or forbs or both that are not mowed, fertilized or manicured in any manner. These strips of land surrounding water bodies protect their shorelines from erosion, while serving to filter sediment, chemicals and other nutrients before stormwater discharges into the water body. Buffer strips are also beneficial in providing habitat for wildlife.

As noted, the **BCWMC** does not specifically review buffers for proposed projects. The following sections include the minimum buffer requirements that must be included in each member city's local controls. Member city buffer requirements may be more stringent than the minimum requirements specified herein.

B.1. Buffer Width Requirements

B.1.1. Wetland Buffer Width Requirements

Member city local controls must require average minimum buffer widths according to the Minnesota Rapid Assessment Method (MnRAM) classification (or similar classification system approved by the municipality):

- An average of 75 feet and a minimum of 50 feet from the edge of wetlands classified as Preserve.
- An average of 50 feet and a minimum of 30 feet from the edge of wetlands classified as Manage 1.
- An average of 25 feet and a minimum of 15 feet from the edge of wetlands classified as Manage 2 or Manage 3 (Policy 68).

A plan showing the delineated boundary of the **wetland**, proposed buffer area, and MnRAM classification for the **wetland** must be submitted for city review. Maintenance of the buffer area must be included in the maintenance agreement developed between the city and the applicant.

B.1.2. Stream Buffer Width Requirements

Member city local controls must require buffer widths adjacent to **priority streams** of 10 feet or 25 percent of the distance between the ordinary high water level (i.e., the top of the bank of the channel) and the nearest existing **structure**, whichever is less. (Policy 64). A plan showing the ordinary high water

level of the stream (i.e., the top of the bank of the channel), nearest adjacent **structure**, and proposed buffer area must be submitted for city review. Maintenance of the buffer area must be included in the maintenance agreement developed between the city and the applicant.

B.2. Buffer Design Requirements

- Buffer required for all proposed projects shall be limited to property owned or managed by the applicant (i.e. to the extent of a drainage and utility easement owned by a city on a city stormwater project or to the property boundary on a commercial, institutional, or residential project).
- Buffer areas must be left native if not disturbed as part of the project and where acceptable natural vegetation exists. A buffer has acceptable natural vegetation if it:
 - Has a continuous, dense layer of perennial grasses that have been uncultivated or unbroken for at least five consecutive years, or
 - Has an overstory of trees or shrubs with at least 80 percent canopy closure that have been uncultivated or unbroken for at least five consecutive years, or
 - Contains a mixture of the plant communities described above that have been uncultivated or unbroken for at least five consecutive years.
- Buffer areas must be planted with native plants if disturbed as part of the project (plantings must be comprised of at least 75% native species).
- Soil in the buffer areas disturbed as part of the project shall be amended, as necessary, to ensure that the soil has an organic content of not less than 10 percent and not more than 35 percent.
- Buffers must be kept free of all **structures** and features, including fences and play equipment.
- Buffers shall not be used for storage of household and personal items, lawn equipment, furniture, firewood, parts, yard waste, and the like.
- A conservation easement or equivalent to the city for the buffer area is recommended to ensure appropriate maintenance of the buffer.
- Buffer vegetation must not be cultivated, cropped, pastured, mowed, fertilized, subject to the placement of mulch or yard waste, or otherwise disturbed, except for periodic cutting or burning that promotes the health of the buffer, actions to address disease or invasive species, mowing for purposes of public safety, temporary disturbance for placement or repair of buried utilities, or other actions to maintain or improve buffer quality and performance.
- The edge of the buffer must be indicated by permanent, free-standing markers at the buffer's upland edge. A marker will be placed along each lot line, with additional markers at an interval of no more than 200 feet or where needed to indicate the contour of the buffer area.

B.3. Buffer Maintenance Requirements

The affected property owner or homeowner association that is responsible for the maintenance must:

- Maintain and repair damage to buffer areas from such activities as mowing, cutting, grading or other prohibited activities, unless mowing is approved by city staff as a buffer management

strategy. Permission must be obtained from the city before implementing buffer management strategies, which may include mowing, burning, and the use of herbicides.

- Be responsible for maintaining only the permitted vegetation in the buffer area and must remove all noxious weeds and invasive, non-native species such as European buckthorn.
- Ensure that all soil surfaces in the buffer area are planted with the permitted vegetation and that there is no open soil surface that may result in erosion.

B.4. Buffer Exemptions

Exemption areas must be properly designed, maintained, and constructed to prevent erodible conditions. The **BCWMC** will allow the following exemptions from the buffer requirements to be included in member city local controls, at the discretion of the member city:

- Public recreational facilities adjacent to the feature (e.g. trails, stairways, and docks) up to 20 feet in width will be allowed, with that width being added to the required buffer width.
- Minimally improved areas within the buffer for private access to the feature will be allowed (e.g. wood chip trails, stairways, and docks).

A perpendicular access to the feature is allowed up to 20 feet in width or 20 percent of the lot width, whichever is more restrictive.

Appendix C

Application for Development Proposals Form

Appendix C

Application for Development Proposals Form



www.bassettcreekwmo.org

Obtain City staff signature and send application, check for fee, and submittals to:

Bassett Creek Watershed Management Commission
c/o Barr Engineering Co.
Attn: Jim Herbert, P.E.
4300 MarketPointe Drive, Suite 200, Minneapolis, MN 55435-5422

A.F. # _____

Application for Development Proposals

Direct questions about this application to Laura Jester, BCWMC Administrator, at 952-270-1990 or laura.jester@keystonewaters.com.

Complete by City Staff

This application is being submitted to the Bassett Creek Watershed Management Commission for review purposes by the City of _____, by _____

City Staff Signature

Date

The contents of the application are solely the responsibility of the applicant.

Complete by Applicant

General Information:

(Name of development or description of project)

(City/¼ Section)

(Location of work—reference major streets and highways, and attach map)

Name of Applicant (owner): _____

Telephone _____ E-mail _____

Address _____

City, State, Zip _____

Name of Agent (project contact): _____

Telephone _____ E-mail _____

Address _____

City, State, Zip _____

Submittals

Requirements for each submittal are provided in the document *Requirements for Improvements and Development Proposals*. The required fee is shown on the Commission's Fee Schedule attached to this application.

Enclosed is the following required information for review:

- ☐ Project review fee (see fee schedule)
- ☐ Project plans: one full size (paper), one 11x17 inch (paper), electronic (pdf)
- ☐ Stormwater Management Plan and computations
- ☐ Erosion and sediment control plan
- ☐ MIDS calculator file, P8 model, WINSLAMM model, or BCWMC approved equal; or documentation of approved city review of MIDS performance goal requirements
- ☐ Documentation of GULD certification if manufactured treatment device (MTD) is proposed
- ☐ BMP checklist (attached to this application form)
- ☐ Electronic copy of the final approved submittal
- ☐ Other: _____
- ☐ Variance request

Project Information:

Nature of work: _____

Plat/parcel area: _____ Area to be disturbed (graded): _____

Existing impervious area: _____ Proposed impervious area: _____

Net new impervious area: _____ Fully reconstructed impervious area: _____

Total of net new and fully reconstructed impervious area: _____

Land use existing: _____

(Industrial, commercial, multiple residential, single residential, utility, public)

Land use proposed: _____

(Industrial, commercial, multiple residential, single residential, utility, public)

Number and type of units: _____

I understand and agree that I must pay all fees associated with this application, that I am responsible for reimbursing the Commission for all actual costs it incurs for the review in excess of \$5,000, and that any additional applications I may submit will not be deemed complete and no review will occur until the Commission has been fully reimbursed for any outstanding costs.

Authorized Signature (Applicant)

Date

Proposed Best Management Practices (BMPs) to be Implemented on Project for Water Quality Protection

Description of BMP	Was BMP Used?	Location Used or Basis for No Use
STORMWATER INFILTRATION/VOLUME REDUCTION BMPs		
1. Reduce area of impervious surface (pavement, roofs, etc.)		
2. Infiltration basin/rain garden (no underdrain)		
3. Underground infiltration (no underdrain)		
4. Infiltration trench/tree trench (no underdrain)		
5. Tree trench/tree box (no underdrain)		
6. Permeable pavement (no underdrain)		
7. Dry swale/grass swale (no underdrain)		
8. Stormwater reuse		
STORMWATER FILTRATION BMPs		
9. Bioretention basin/rain garden (w/underdrain)		
10. Sand filter		
11. Iron enhanced sand filter (Minnesota Filter)		
12. Permeable pavement (w/underdrain)		
13. Tree trench/tree box (w/underdrain)		
14. Dry swale/grass swale (w/underdrain)		
15. Green roof		
WET SEDIMENTATION BASINS/REGIONAL PONDS BMPs		
16. Stormwater pond		
17. Stormwater wetland		
FLOATABLE/OIL REMOVAL BMPs		
18. Floatable skimmer		
19. Parking lot oil/grease separators		
SEDIMENT CONTROL BMPs		
20. Pretreatment (hydrodynamic devices, forebays, etc.)		
21. Riprap or other storm drain outlet protection		
22. Storm drain inlet protection		
23. Slope stabilization and erosion control measures		
24. Vegetated swale/bioswale		
NONSTRUCTURAL BMPs		
25. Street sweeping		
26. Fertilizer manager		
27. Other (describe):		

Fee Schedule (Effective August 1, 2022)

Bassett Creek Watershed Management Commission Project Reviews

Project Review Fees (check appropriate boxes) ^{1, 7}	
☒ Base Fees	
Single Family Lot (No add-on fees required) ⁷	\$500
Projects Requiring Only Erosion and Sediment Control Review ⁷	\$2,000
Municipal Projects ^{2, 7}	\$1,500
All Other Projects ⁷	\$2,000
☒ Add-On Fees³	
1. Projects requiring Rate Control or Treatment to MIDS Performance Goal	\$2,000
2. Projects involving work within or below the 100-year floodplain (Table 2-9, Watershed Management Plan) - select highest of following add-on fees (a or b)	
a. Work involving filling and compensating storage within or below the 100-year floodplain (identified in Table 2-9)	\$1,000
b. Work along the Bassett Creek trunk system or inundation areas involving review of, or modifying the XP-SWMM model.	\$2,000
3. Work involving creek crossings (bridges, culverts, etc.)	\$1,000
4. Projects involving review of alternative BMPs ⁴	\$1,000
5. Project involving variance request	\$1,000
☒ Wetland Fees ⁵	
Wetland delineation review	Varies
Wetland replacement plan review	Varies
Monitoring and reporting	Varies
Wetland replacement escrow	Varies
Total Project Review Fees ^{6, 7}	
\$ _____	
1 State agencies are exempt from review fees. Other public agencies are required to pay review fees and add-on fees. 2 Including Minneapolis Park & Recreation Board projects 3 Required in addition to base fee (except for single family lots). 4 BMPs not included in <i>Minnesota Stormwater Manual</i>. 5 Wetland fees will be billed at actual cost for projects where BCWMC acts as the LGU for the Wetland Conservation Act or when a member city requests assistance from the BCWMC for wetland-related review tasks (BCWMC is the LGU for the cities of Medicine Lake, Robbinsdale and St. Louis Park). 6 Include check for total project review fees or other fees with application form. Check should be payable to Bassett Creek Watershed Management Commission. 7 If the actual cost to conduct a review reaches \$5,000, the applicant shall be required to reimburse the Commission for all costs it incurs in excess of \$5,000, in addition to base and add on fees. The Commission shall bill the applicant for the additional costs. If an applicant fails to fully reimburse the Commission for the additional costs, any future requests for a review from the applicant shall be deemed incomplete, and the Commission will not conduct a review, until all outstanding amounts have been paid.	

Appendix B

Definitions

Definitions

- **BCWMC:** Bassett Creek Watershed Management Commission
- **Best management practices (BMPs):** the structural, non-structural, and institutional controls used to improve the quality of stormwater runoff.
- **Bioretention:** a soil- and plant-based stormwater management best management practice (BMP) used to filter runoff
- **Commercial, industrial, institutional or public development/redevelopment projects:** typically result in larger areas of **impervious surface**, typically in the range of 60 to 80 percent imperviousness. Examples of these developments include shopping malls, stores, schools, hospitals, and warehouses.
- **Complex projects:** include projects that are 40 acres or more, controversial, involve more than one property owner, require detailed hydrologic or hydraulic modeling, require vast changes to infrastructure (such as stormwater systems), include many **wetland** impacts, require extensive environmental review, or involve many different land uses within the same development project
- **Construction sequencing:** a specified work schedule that coordinates the timing of land-disturbing activities and the installation of erosion-protection and sedimentation-control measures
- **Disturbed area:** total graded area as part of a commercial industrial, institutional, public, residential, or road project
- **Erosion control:** any efforts to prevent the wearing or washing away of the soil or land surface
- **Floodplain:** land adjacent to a water body which is inundated when the discharge exceeds the conveyance capacity of the normal channel. Often described in the regulatory sense as the extent of the 1% (base flood elevation, 100-year) flood.
- **Impervious surface:** a surface in the landscape that impedes the infiltration of rainfall and results in an increased volume of surface runoff. **Impervious surface** includes but is not limited to building roofs and structures, bituminous and concrete surfaces and compacted ground surfaces such as gravel areas.
- **Infiltration basin:** stormwater runoff impoundment designed to capture and hold stormwater runoff and infiltrate it into the ground over a period of days. This impoundment does not retain a permanent pool of water.
- **Land disturbance:** any alteration of the ground surface that could result, through the action of wind and/or water in soil erosion, substantial compaction, or the movement of sediment into waters, **wetlands**, storm sewers, or adjacent property. Land disturbing activity includes but is not limited to soil stripping, clearing, grubbing, grading, excavating, filling, and the storage of soil or

earth materials. Typical, routine farming operations (e.g., plowing, harvesting) are not land disturbing activities for the purpose of these requirements.

- **Linear project:** Construction or reconstruction of a public road or other transportation route, sidewalk or trail, or construction, repair or reconstruction of a utility or utilities right-of-way that is not a component of a larger development or redevelopment project.
- **Minimum building elevation:** the lowest floor of a structure, including the basement.
- **Perimeter control:** activities or practices designed to contain sediments on a project site.
- **Priority stream:** Main Stem of Bassett Creek, North Branch of Bassett Creek, Sweeney Branch of Bassett Creek, and Plymouth Creek. A map of the priority streams can be found in Figure 2-8 of the Plan.
- **Rate control:** controlling the rate that stormwater is released from localized holding areas into larger conveyance systems
- **Residential development/redevelopment projects:** typically result in smaller areas of **impervious surface**, typically in the range of 25 to 60 percent imperviousness. Examples of these projects include single family home construction, townhome construction, and apartment building construction.
- **Restriction:** as described in the MIDS flexible treatment options, one or more of the following factors that prevent full compliance with the MIDS volume reduction performance goal:
 - i. Karst geology
 - ii. Shallow bedrock
 - iii. High groundwater
 - iv. Hotspots or contaminated soils
 - v. Drinking Water Source Management Areas or within 200 feet of drinking water wells
 - vi. Zoning, setbacks or other land use requirements
 - vii. Excessive cost
 - viii. Poor soils (infiltration rates that are too low or too high, problematic urban soils)
- **Retention:** the permanent or temporary storage of stormwater to prevent it from leaving the development site
- **Retrofit:** the introduction of a new or improved stormwater management element where it either never existed or did not operate effectively
- **Road and other linear project construction or reconstruction projects:** include any project which results in the complete removal of the road surface, exposing the base, and/or removal of the vegetated surface within the road right-of-way. Examples include road and trail widening projects, ditch work, road and trail replacement and utility installation. Road and trail overlay

projects and road and trail resurfacing projects which do not disturb the underlying soil will not be covered by the requirements of this policy.

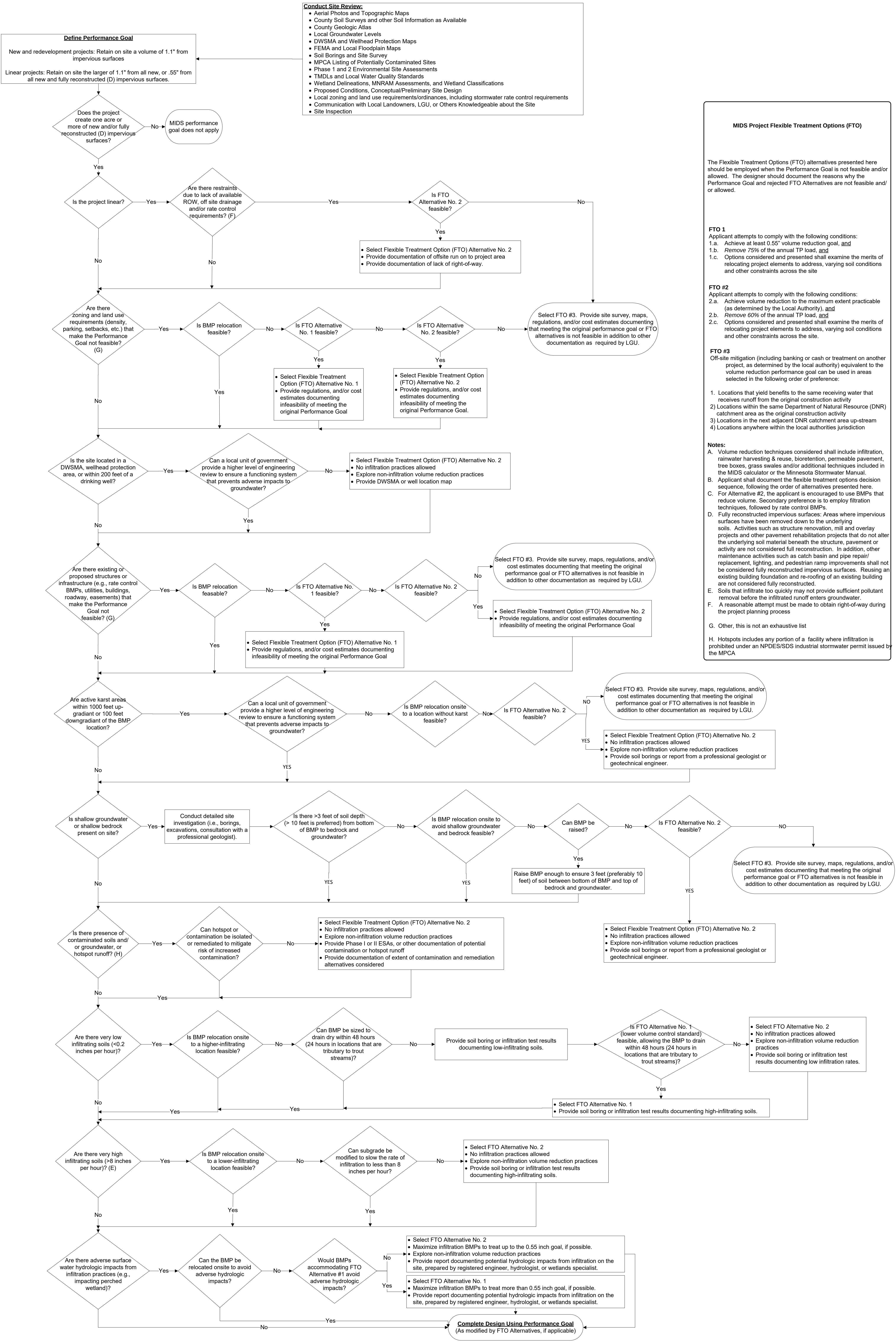
- **Runoff or stormwater runoff:** under Minnesota Rule 7077.0105, subpart 41b, stormwater “means precipitation runoff, stormwater runoff, snow melt runoff, and any other surface runoff and drainage.” (according to the Federal Code of Regulations under 40 CFR 122.26 [b][13], “stormwater means stormwater runoff, snow melt runoff and surface runoff and drainage.”). Stormwater does not include construction site dewatering.
- **Sediment control:** The methods employed to prevent sediment from leaving the development site. **Sediment control** practices include **silt fences**, sediment traps, earth dikes, drainage swales, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, other appropriate measures, and temporary or permanent sedimentation basins.
- **Sediment control log:** Also called wattles or sediment retention fiber rolls, are filtering material in a fabric or netting tube used for slowing water and filtering stormwater runoff or other water encountered on a construction project.
- **Silt fence:** fence constructed of wood or steel supports and either natural or synthetic fabric stretched across an area of non-concentrated flow during site development to trap and retain on-site sediment due to rainfall runoff
- **Stormwater (management) facilities:** include storm sewer pipes, ditches, ponds, **infiltration basins**, etc.
- **Structure:** Any impervious building or other object that is constructed or placed on the ground and that is, or is intended, to remain in place for longer than a temporary period.
- **Sand filter:** consists of a pretreatment basin, a water storage reservoir, a flow spreader, and underdrain piping that treats stormwater runoff via filtration
- **Temporary protection (measure):** short-term methods employed to prevent erosion. Examples of such protection include straw, mulch, erosion control blankets, wood chips, and erosion netting.
- **Trunk system:** The trunk creek system is the responsibility of the **BCWMC** and includes the Main Stem of Bassett Creek from Medicine Lake to the box culvert/tunnel; the North Branch from upstream of Co. Rd P to its junction with the Main Stem; the Sweeney Lake Branch from its source in Section 5, T117N, R21W to its junction with the Main Stem downstream of Sweeney Lake; and Plymouth Creek from the point where it intersects with Highway 55 in Section 17, T118N, R33W, to Medicine Lake.
- **Water quality pond:** a collection area with a permanent pool of water for treating incoming stormwater runoff

- **Wetland:** defined in Minn. R. 7050.0130, subp. F and includes those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. **Wetlands** generally include swamps, marshes, bogs, and similar areas. Constructed **wetlands** designed for wastewater treatment are not waters of the state; to be a **wetland** the area must meet **wetland** criteria for soils, vegetation, and hydrology as outlined in the 1987 U.S. Army Corps of Engineers **Wetland** Delineation Manual.

1– Some definitions taken directory from the *Minnesota Stormwater Manual*

Appendix C

MIDS Flexible Treatment Options Flow Chart



Appendix I

Boundary Change and Related Legal Documentation



470 Pillsbury Center
200 South Sixth Street
Minneapolis MN 55402
(612) 337-9300 telephone
(612) 337-9310 fax
<http://www.kennedy-graven.com>

CHARLES L. LEFEVERE
Attorney at Law
Direct Dial (612) 337-9215
email: clefevere@kennedy-graven.com

September 6, 2000

Mr. Joe Biernat, Chair
Middle Mississippi River Watershed Management Commission
c/o Tom Frame
Room 401
250 South 4th Street
Minneapolis MN 55415

RE: Boundary Change

Dear Mr. Biernat:

I represent the Basset Creek Watershed Management Commission as legal counsel.

As you know, the Basset Creek and Middle Mississippi River commissions have agreed to a change in the boundary between the two organizations. I understand that the agreement between the two commissions and the City of Minneapolis has been executed and that the only remaining step to make the boundary change effective is the filing of an amended map or legal description with the Board of Water and Soil Resources.

Attached is a proposed letter jointly signed by the chairs of the two organizations to the Board of Water and Soil Resources notifying the Board of the boundary change and specifying the new boundary. If the letter is acceptable, please sign it and return a copy of the executed letter to me. The original letter should be forwarded to BWSR in the enclosed envelope.

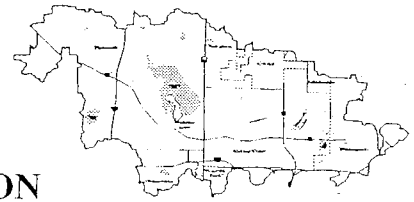
If you have any questions, please give me a call.

Very truly yours,

A handwritten signature in cursive script, reading "Charles L. LeFevere".

Charles L. LeFevere
CLL:lh
Enclosure

cc: Mr. Michael Welch (with enclosure)
Mr. Lee Gustafson (with enclosure)
Mr. Len Kremer (with enclosure)



BASSETT CREEK WATER MANAGEMENT COMMISSION

• Crystal • Golden Valley • Medicine Lake • Minneapolis • Minnetonka • New Hope • Plymouth • Robbinsdale • St. Louis Park

August 30, 2000

Ron Harnack, Executive Director
Minnesota Board of Water and Soil Resources
One West Water Street, Suite 200
St. Paul, MN 55107

**Re: Change in Boundary Between Bassett Creek Watershed Management Commission and
Middle Mississippi River Watershed Management Organization**

Dear Mr. Harnack:

The Bassett Creek Watershed Management Commission and Middle Mississippi River Watershed Management Organization previously requested comments from the Board of Water and Soil Resources (BWSR) on a proposed boundary change in accordance with Minnesota Statutes, §103B.211, subdivision 2. By letter from Mr. Douglas Snyder to Mr. Gustafson, Chair of the Bassett Creek Commission, dated July 28, 2000, BWSR indicated its agreement that the proposed boundary change was appropriate.

Based on this comment from BWSR, the Bassett Creek and Middle Mississippi River organizations have executed a joint powers agreement for the boundary change. Under this agreement, the boundary change will be effective upon filing the revised map or legal description with BWSR.

Accordingly, the Bassett Creek Watershed Management Commission and the Middle Mississippi River Watershed Management Organization hereby jointly submit the amended description of the boundary between the jurisdictions of the two organizations for filing with BWSR.

If you have any questions relating to the legal description, please contact the engineer of the Bassett Creek Watershed Management Commission, Mr. Len Kremer of Barr Engineering at (952) 832-2781. Other questions relating to the boundary change may be directed to the attorney for the Bassett Creek Commission, Mr. Charlie LeFevre (612) 337-9215.

Thank you.

Very truly yours,

Lee Gustafson, Chair
Bassett Creek Watershed Management Commission

Joe Biernat, Chair
Middle Mississippi River Watershed Management Organization

219484

Lee Gustafson, Chairman
City of Minnetonka
14600 Minnetonka Boulevard
Minnetonka, MN 55345
952-939-8239
952-939-8244 (fax)

Charlie LeFevre, Attorney
Kennedy & Graven
470 Pillsbury Center
Minneapolis, MN 55402
612-337-9215
612-337-9310 (fax)

Leonard Kremer, Engineer
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435
952-832-2600
952-832-2601 (fax)

ATTACHMENT C

LEGAL DESCRIPTION OF AREA TO BE TRANSFERRED FROM BASSETT WMO TO MIDDLE MISSISSIPPI WMO

Commencing at the intersection of 4th Av N and Russell Av N; then N on Russell Av N to 8th Av N; then E on 8th Av N to Queen Av N; then N on Queen Av N to 12th Av N; then W on 12th Av N to Russell Av N; then N on Russell Av N to Plymouth Av N; then E on Plymouth Av N to Queen Av N; then N on Queen Av N to 14th Av N; then E on 14th Av N to Girard Av N; then S on Girard Av N to Plymouth Av N; then SWly on Plymouth Av N to Humboldt Av N; then S on Humboldt Av N to 12th Av N; then E on 12th Av N to Fremont Av N; then N on Fremont Av N to Plymouth Av N; then E on Plymouth Av N to Bryant Av N; then S on Bryant Av N to 12th Av N; then E on 12th Av N to the point midway between Bryant Av N and Aldrich Av N; then S from this point to 7th St N; then SEly on 7th St N to Interstate Highway 94; then S along Interstate Highway 94 to the point due W of Holden St; then E along this line to E Lyndale Av N; then N on E Lyndale Av N to 3rd Av N; then E on 3rd Av N to Border Av N; then N on Border Av N to 7th St N; then NWly on 7th St N to E Lyndale Av N; then NEly along E Lyndale Av N to Interstate Highway 94; then NEly along Interstate Highway 94 to Plymouth Av N; then E along Plymouth Av N to the W bank of the Mississippi River; then SEly along the W bank of the Mississippi River to 3rd Av N; then SWly along 3rd Av N to 3rd St N; then NWly along 3rd St N to 4th Av N; then SWly along 4th Av N to 4th St N; then SEly along 4th St N to 3rd Av N; then SWly along 3rd Av N to Holden St; then W along Holden St to 11th St N; then SWly parallel with CNWRR right-of-way to Currie Av N; then S parallel with 12th St N to Chestnut Av; then W along Chestnut Av and the line extending therefrom to Market St; then N on Market St to 2nd Av N; then W on 2nd Av N to Cedar Lake Rd; then SWly on Cedar Lake Rd to 2nd Av N; then NWly/W on 2nd Av N to Gramercy Av; then N/NEly on Gramercy Av to 3rd Av N; then W on 3rd Av N to Logan Av N; then N on Logan Av N to 4th Av N; then W on 4th Av N to the point of beginning and there terminating.

***Joint and Cooperative Agreement
for Boundary Change***

Bassett Creek Watershed Management Commission

***Middle Mississippi River
Watershed Management Organization***

OCT 29 1999

CITY CLERK

JOINT AND COOPERATIVE AGREEMENT FOR BOUNDARY CHANGE

This Agreement is made this 28 day of SEPT, 2000, by and between the City of Minneapolis, a Minnesota municipal corporation; the Bassett Creek Watershed Management Commission, a Minnesota joint powers organization; and the Middle Mississippi River Watershed Management Organization, a Minnesota joint powers organization.

I. BACKGROUND

- 1.1. The Bassett Creek Watershed Management Commission is a Minnesota joint powers organization created pursuant to Minnesota Statutes, Section 471.59 and is the successor in interest to the Bassett Creek Flood Control Commission and the Bassett Creek Water Management Commission by amendments to the joint powers agreement which originally formed the Bassett Creek Flood Control Commission in 1968, as amended in 1984 and 1993.
- 1.2. The Bassett Creek Watershed Management Commission (which, together with its predecessor organizations, is hereinafter referred to as "Bassett Creek WMO") is a watershed management organization pursuant to Minnesota Statutes, Sections 103B.205 to 103B.255 for the Bassett Creek watershed that flows to the Mississippi River. The boundaries established by the joint powers agreement are delineated on a map of the watershed on file and of record with the Minnesota Board of Water and Soil Resources. That part of the Bassett Creek watershed lying within the City of Minneapolis is shown on Attachment One, which is attached to this agreement and hereby made a part hereof.
- 1.3. In the 1900s, an underground conduit was constructed to divert the surface water flowing from the Bassett Creek watershed under the highly developed area of Minneapolis to the Mississippi River. That tunnel (the "Old Tunnel") was, and continues to be, owned and operated by the City of Minneapolis.

1.4. Between 1976 and 1992, a project was undertaken to plan, design, construct and operate, among other things, a new tunnel (the "New Tunnel") under the City of Minneapolis south of and roughly parallel to the Old Tunnel. This major flood control project was a cooperative effort of the member cities of the Bassett Creek WMO, the Minnesota Department of Transportation, and the Department of the Army.

1.5. The relationships and obligations of the parties as they related to the construction of the New Tunnel were defined in the following series of agreements between and among the parties, which agreements are attached to, and hereby made a part of, this agreement:

1. Local Cooperative Agreement between Department of the Army and the City of Minneapolis, Minnesota for Flood Protection on Bassett Creek, Hennepin County, Minnesota; June 27, 1986. (Attachment Two)

2. Agreement entered into pursuant to provisions of the joint powers agreement establishing the Bassett Creek Water Management Organization relating to the construction of an improvement project in cooperation with the U.S. Corps of Army Engineers.

Minneapolis and Minnetonka	June 16, 1986 (Attachment Three)
Minneapolis and Robbinsdale	June 17, 1986 (Attachment Four)
Minneapolis and Plymouth	July 7, 1986 (Attachment Five)
Minneapolis and New Hope	June 9, 1986 (Attachment Six)
Minneapolis and Golden Valley	July 16, 1986 (Attachment Seven)
Minneapolis and Medicine Lake	June 10, 1986 (Attachment Eight)
Minneapolis and Crystal	June 17, 1986 (Attachment Nine)
Minneapolis and St. Louis Park	June 11, 1986 (Attachment Ten)

3. Agreement No. 58881 between the State of Minnesota and the City of Minneapolis, State Project No. 2781-122; December 30, 1977; 2nd Street North Tunnel. (Attachment Eleven)

4. Agreement No. 64742 between the State of Minnesota, Department of Transportation and the City of Minneapolis, State Project No. 2789-51; May 27, 1988; 3rd Avenue North Tunnel. (Attachment Twelve)
- 1.6. Most of the surface water draining from the Bassett Creek watershed was diverted to the New Tunnel, leaving a relatively small area of the watershed continuing to discharge through the Old Tunnel directly to the Mississippi River. The area of the Bassett Creek Watershed that continues to flow through the Old Tunnel is shown on Attachment One as the "Area Tributary to old Bassett Creek tunnel."
- 1.7. In periods of extreme flooding, water from the Bassett Creek watershed which cannot be accommodated by the New Tunnel will flow overland to the Old Tunnel. To accommodate the diversion of a 48-inch storm sewer from the Old Tunnel to the New Tunnel at station 140+81, an overflow must be maintained from Bassett Creek to the Old Tunnel. During a 100-year flood, 50 cubic feet per second will overflow into the Old Tunnel. With this exception and the exception of the area described in Section 1.6, the waters of the Bassett Creek watershed now flow to the Mississippi River through the New Tunnel.
- 1.8. A portion of the Bassett Creek watershed abuts the area under the jurisdiction of the Middle Mississippi River Watershed Management Organization (hereinafter referred to as the "Middle Mississippi River WMO"), a joint powers organization and watershed management organization created and operated pursuant to Minnesota Statutes, Section 471.59 and Sections 103B.205 to 103B.255. The Middle Mississippi River WMO manages the local drainage area adjacent to the Mississippi for nearly its entire length through the City of Minneapolis. Prior to the diversion of waters from the Bassett Creek watershed to the New Tunnel, the upstream reaches of the Bassett Creek watershed were diverted to the Old Tunnel along with Minneapolis local drainage. Therefore, it was appropriate that the entire area tributary to the Old Tunnel should be included within the Bassett Creek watershed. However, now that the waters of the upper Bassett Creek

watershed no longer flow into this tunnel along with the Minneapolis local drainage, it is more appropriate that that part of the Bassett Creek watershed that flows to the Old Tunnel be managed by the Middle Mississippi River WMO along with the other subwatersheds making up the Minneapolis local drainage area.

- 1.9. For this reason, and to facilitate financing of planned local public improvements in the area tributary to the Old Tunnel, the City of Minneapolis has requested that the area tributary to the Old Tunnel currently under the jurisdiction of the Bassett Creek WMO be transferred, by a boundary change, to the jurisdiction of the Middle Mississippi River WMO.
- 1.10. The request of Minneapolis is that the area tributary to the Old Tunnel be transferred to the Middle Mississippi River WMO. The transfer of this area would isolate a small part of the Bassett Creek watershed which is tributary to the New Tunnel and leave it surrounded by area under the jurisdiction of the Middle Mississippi River WMO. The Bassett Creek Commissioners have concluded that this isolated area, consisting of approximately 67 acres, and depicted on Attachment One as the "Area tributary to New Tunnel within Bassett Creek WMO" should also be transferred to the jurisdiction of the Middle Mississippi River WMO. Transfer of this area to the Middle Mississippi River WMO would mean that runoff to the New Tunnel would include runoff coming from land previously in the Bassett Creek watershed over which the Bassett Creek WMO would not have control. There is also currently an area within the Middle Mississippi River WMO boundaries that drains to the New Tunnel but that is not under the jurisdiction of the Bassett Creek WMO. This area, which is approximately 106 acres in size, is labeled on Attachment One as the "Area tributary to New Tunnel within MMRWMO". The parties to this agreement have determined that it is appropriate that an agreement be reached which addresses, among other things, the management of storm water within this area over which the Bassett Creek WMO will not have jurisdiction but which contributes storm water that could affect the adequacy of Bassett Creek systems to manage the volume of storm water or impair water quality for which Bassett Creek WMO could have responsibility or liability.

1.11. The drainage area contributing to the New Tunnel from I-94 and a portion of Minneapolis, west of I-94, is 375 acres. The design assumed the watershed was 42 percent impervious and the calculated peak discharge was 785 cubic feet per second (cfs). This area is tributary to the New Tunnel at the wye at Station 6200. The drainage area contributing to the New Tunnel from I-394 and portions of Minneapolis is 159 acres. The design assumed the watershed was 85 percent impervious and the calculated peak discharge was 284 cfs. This area is tributary to the New Tunnel at Station 860. Minneapolis drains 33-acre watershed with 85 percent impervious surface, and a peak discharge of 82 cfs to the New Tunnel at Station 6365. The Bassett Creek watershed flows into the New Tunnel at Station 6700 and the total tributary watershed is 39.6 square miles. Severe rainfalls on the Bassett Creek watershed cause two peaks to occur at the New Tunnel entrance, one approximately 2 to 6 hours into the storm and the second 20 to 25 hours later. The first peak, 1,030 cfs, occurs at the same time as the peak from I-394, I-94, and Minneapolis drainage areas. The sum of the peak discharges, 2,181 cfs, were used to design the New Tunnel downstream of the wye at Station 6280. The design discharge for the New Tunnel from the wye to Station 860 was 1,314 cfs and the design discharge for the New Tunnel from Station 860 to the entrance was 1,030 cfs. Any changes to the watershed areas, impervious surface area, or inlets to the New Tunnel that add to these design discharges will cause flood damage upstream of the New Tunnel entrance with the design storm.

1.12. The comments of the Minnesota Board of Water and Soil Resources on the proposed boundary change have been solicited pursuant to Minnesota Statutes, Section 103B.211, Subd. 2, received and duly considered by the parties.

1.13. All members of both the Bassett Creek WMO and Middle Mississippi River WMO have authorized the boundary change by duly approved resolutions of their city councils.

1.14. Accordingly, the parties to this agreement wish to effect the change of boundary described in this agreement and to assign duties and responsibilities relating to water

management in areas in which the parties have a common interest and to maintenance of capital facilities, and other duties and responsibilities for administrative matters relating to the change in boundary.

II. BOUNDARY CHANGE

- 2.1. Upon approval of the boundary change by all cities that are members of the Bassett Creek and Middle Mississippi River WMOs, and approval and execution of this agreement by both the Bassett Creek and Middle Mississippi River WMOs, the chairs of both organizations are authorized and directed to file jointly an amended map or other description of the two watersheds in which the areas labeled "Area tributary to old Bassett Creek tunnel" and "Area tributary to New Tunnel within Bassett Creek WMO", which are more particularly described on Attachment One attached hereto and hereby made a part hereof, are removed from the area under the jurisdiction of the Bassett Creek WMO and added to the area under the jurisdiction of the Middle Mississippi River WMO, whereupon the boundary change will be effective.

III. ADMINISTRATIVE EXPENSE REIMBURSEMENT

- 3.1. The City of Minneapolis will reimburse the Bassett Creek WMO for all expenses incurred in connection with, and as a result of, the boundary change including, but not limited to, engineering fees, legal fees, printing costs, postage, and other such expenses incurred in connection with the consideration of, planning for, and effecting the boundary change including attendance at meetings, negotiating contracts, drafting documents, communications with the Minnesota Board of Water and Soil Resources, evaluating and making necessary changes to the Bassett Creek WMO's surface water management plan, and the like.
- 3.2. The City of Minneapolis shall reimburse the Bassett Creek WMO for such expenses incurred within 30 days of receipt of an invoice therefor from the Bassett Creek WMO.

- 3.3. Bassett Creek WMO shall provide such reasonable detail of expenses incurred as may be requested by Minneapolis. Books and records of the Bassett Creek WMO relating to such invoices shall be open to inspection by representatives of the City of Minneapolis at any reasonable time.

IV. MINNEAPOLIS CONTRIBUTION TO BASSETT CREEK WATERSHED MANAGEMENT COMMISSION BUDGET AND EXPENSES

- 4.1. The City of Minneapolis will pay its assessment to the Bassett Creek WMO for all year 2000 assessments, costs and expenses in accordance with the joint powers agreement creating the Bassett Creek WMO in all respects as though the boundary change had not occurred. For all year 2001 assessments, costs and expenses shall be allocated in accordance with the terms of the joint powers agreement based on the amended boundary.

V. OBLIGATIONS RELATING TO OLD TUNNEL

- 5.1. The City of Minneapolis shall continue to own and be responsible for the Old Tunnel and shall continue to maintain and operate its storm drainage systems so as to provide, during a 100 year flood event, a capacity of fifty cubic feet per second for flood overflow of stormwaters which cannot be accommodated in the New Tunnel, as described in paragraph 1.7.

VI. OBLIGATIONS RELATING TO THE NEW TUNNEL

- 6.1. Regulation of public and private projects.

- 6.1.1. Neither Minneapolis nor the Middle Mississippi River WMO will construct public improvements or authorize private projects which will increase the area tributary

to the New Tunnel beyond the area within the adjusted Middle Mississippi River WMO boundaries shown on Attachment One as “Area tributary to New Tunnel within Bassett Creek WMO” and “Area tributary to New Tunnel within MMRWMO” without the written approval of Bassett Creek WMO.

- 6.1.2. Neither Minneapolis nor the Middle Mississippi River WMO will construct public improvements or authorize private projects which will add connections or outlets to the New Tunnel without the written approval of Bassett Creek WMO.
 - 6.1.3. Neither Minneapolis nor the Middle Mississippi River WMO will construct public improvements or projects or authorize private projects which will change the rate of runoff to the New Tunnel for any property affected, in cubic feet per second, for the 10, 50 or 100 year rainfall events without the prior written approval of Bassett Creek WMO.
 - 6.1.4. In determining whether to approve projects or activities described in Sections 6.1.1, 6.1.2, and 6.1.3, the standard which will be applied is that only projects which will not increase either the first or second peak flows to the New Tunnel will be approved.
 - 6.1.5. The Bassett Creek WMO may authorize its engineer to approve projects or activities described in Sections 6.1.1, 6.1.2, and 6.1.3, without formal action by the Bassett Creek WMO Commission, on such terms and conditions as may be specified by the Bassett Creek WMO Commissioners from time to time.
- 6.2. Compliance with future water quality standards. Following the change of boundary, the New Tunnel will carry waters to the Mississippi River from areas within both the Bassett Creek and Middle Mississippi River WMO areas of jurisdiction. The parties recognize that federal, state, or regional authorities may impose storm water quality standards in the future. If this should occur, it will be desirable to have in place a means of allocating

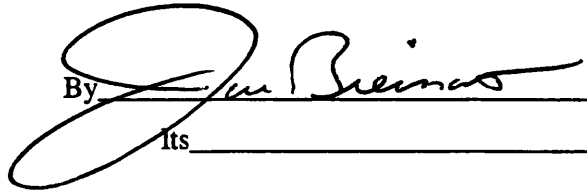
responsibility between the two WMOs for compliance with such standards. Accordingly, the parties agree to follow the following procedure:

- 6.2.1. First, the Bassett Creek and Middle Mississippi River WMOs will work together to attempt to ensure that if target pollution loads, or other standards, are established, they are established at the boundaries of the WMOs so that responsibility for the quality of urban storm water runoff is determined separately for each WMO.
- 6.2.2. If the parties are not successful in having target pollution loads or other standards established at the boundaries of their jurisdictions, the Bassett Creek and Middle Mississippi River WMOs agree to use water quality data or water quality modeling techniques to establish responsibility for load reductions. If adequate water quality data is available for the Bassett Creek WMO and the portions of the Middle Mississippi River WMO tributary to the New Tunnel, the data will be used to represent a representative base condition for the quality of existing runoff. If the water quality loads for a base condition can be determined for both WMOs based on sampling data, the responsibility for load reductions will be determined in the same proportion as their contribution to the total load. If the water quality loads for the representative base condition can be determined for one of the WMOs based on adequate water quality data, then the responsibility for load reductions will be determined by water quality modeling. The model used to establish the "Target Pollution Loads" will be calibrated to the water quality data for the portion of the watershed that data is available for. The model will be used to calculate loads for the portion of the watershed that water quality data is not available for and for the entire watershed. Responsibility for load reductions will be determined in the same portions as the measured loads and calculated loads to the calculated total load.

VII. MISCELLANEOUS PROVISIONS

- 7.1. The parties will attempt in good faith to resolve any controversy or claim arising out of or relating to this agreement promptly by negotiations between representatives of the parties. If the controversy or claim is not resolved within 60 days of the first meeting of the parties' representatives, the parties agree to engage in mediation of the dispute with a mutually acceptable neutral third party before seeking a solution in court. Fees for the services of any neutral third party shall be shared equally between or among the parties involved.

CITY OF MINNEAPOLIS

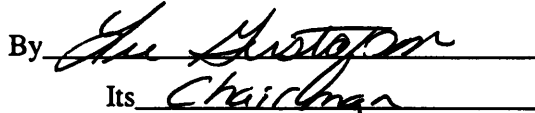
By 
Its _____

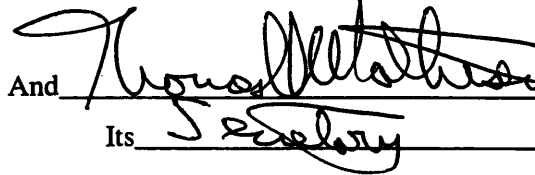
And _____
Its _____

ATTEST:

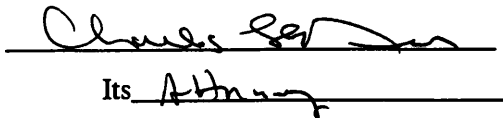
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BASSETT CREEK WATERSHED
MANAGEMENT COMMISSION

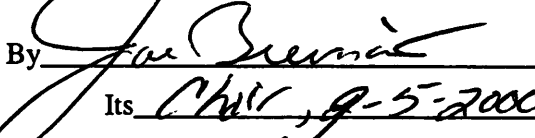
By 
Its Chairman

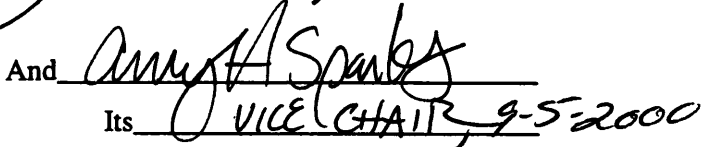
And 
Its Secretary

ATTEST:

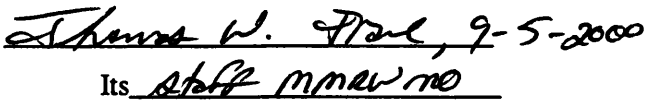

Its Attorney

MIDDLE MISSISSIPPI WATERSHED
MANAGEMENT COMMISSION

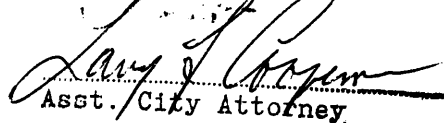
By 
Its Chair, 9-5-2000

And 
Its VICE CHAIR, 9-5-2000

ATTEST:

 9-5-2000
Its att mman no

Approved as to form


Asst. City Attorney

CITY OF MINNEAPOLIS

By
Mayor

Attest
City Clerk

Assistant

Countersigned
Finance Officer

Date

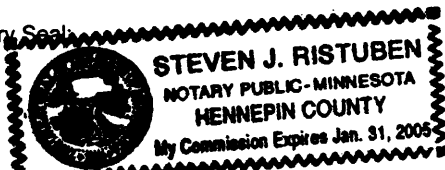
Approved as to form and
execution:

Assistant City Attorney

STATE OF MINNESOTA
COUNTY OF HENNEPIN

The foregoing instrument was acknowledged before me this 21st day of August, 1999, by Sharon Sayles-Belton, the Mayor of the City of Minneapolis, a municipal corporation organized and existing under the laws of Minnesota, on behalf of the corporation.

Notary Seal:



Notary Public Signature

STATE OF MINNESOTA
COUNTY OF HENNEPIN

The foregoing instrument was acknowledged before me this 22 day of August, 2000, by Steve Ristuben, the Assistant City Clerk of the City of Minneapolis, a municipal corporation organized and existing under the laws of Minnesota, on behalf of the corporation.

Notary Seal:



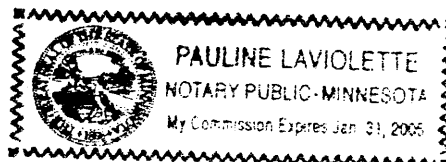
Notary Public Signature

STATE OF MINNESOTA
COUNTY OF HENNEPIN

The foregoing instrument was acknowledged before me this 29th day of September, 2000, by Mary Fox-Stroman, the Assistant Finance Officer, of the City of Minneapolis, a municipal corporation organized and existing under the laws of Minnesota, on behalf of the corporation.

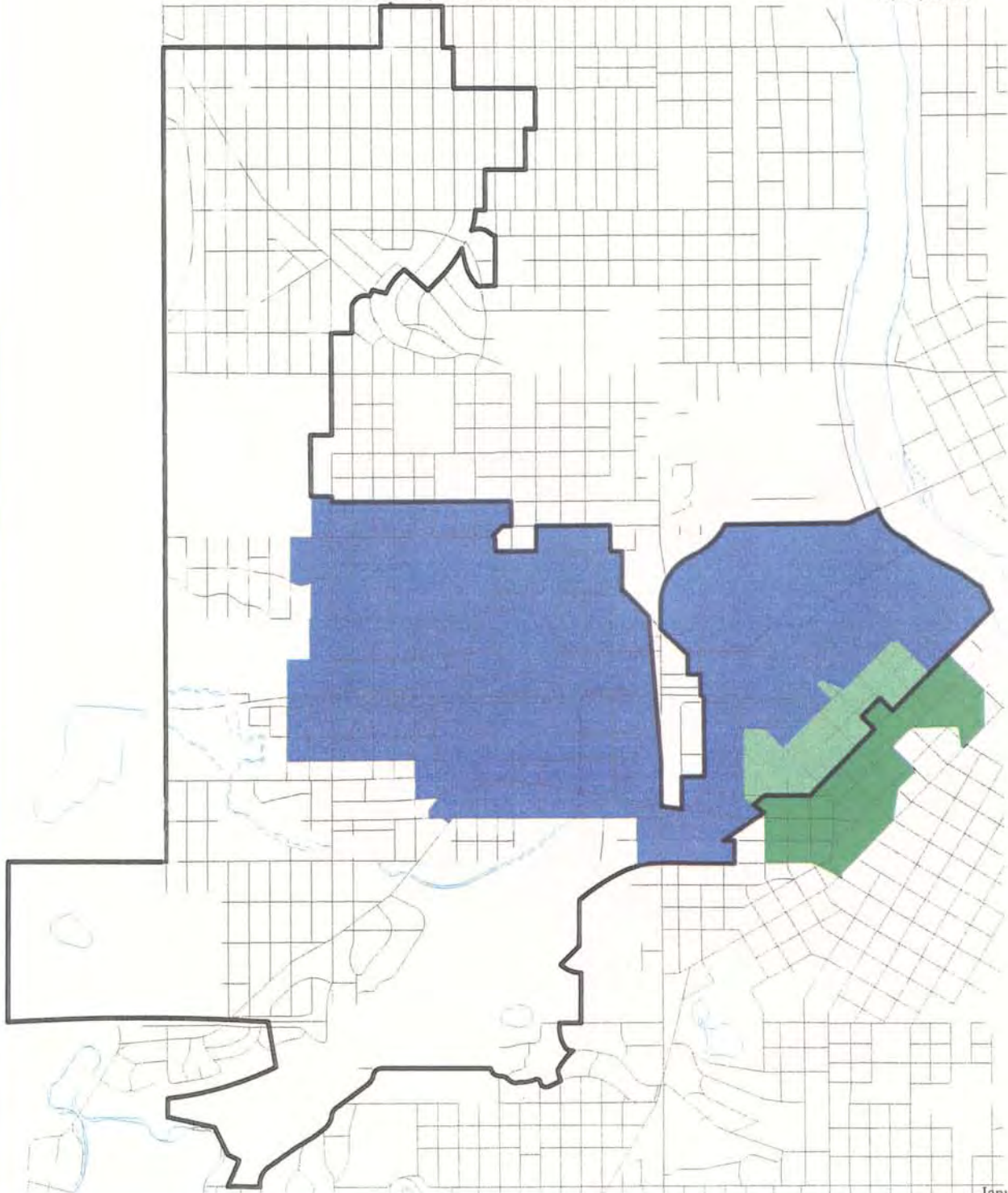
Notary Seal:

Notary Public Signature



Bassett Creek WMO

	Existing Bassett Creek Boundary	1998 pay 1999 Tax Capacity
	Area tributary to Bassett Creek	\$11,128,002.00
	Area tributary to New Tunnel within Bassett Creek WMO	\$5,228,603.00
	Area tributary to New Tunnel within MMRWMO	\$736,370.00
	Area tributary to old Bassett Creek tunnel	\$3,099,431.00
		\$5,159,398.00



January 21, 1999

Appendix J

BCWMC Legal Description

Bassett Creek Watershed Boundary

June 27, 2003

The Bassett Creek boundary is defined by the following legal description^{1 2}.

City of Plymouth

Commencing at the point of intersection along the south line of Sec. 34, T118N, R22W (which is also the border between the City of Plymouth and the City of Minnetonka), and the centerline of Plymouth Road³ thence northerly along the centerline of Plymouth Road to the east extension of the south line of Lot 19, Greer's Orchard Tracts, thence westerly along the south line of said Lot 19 to a point 50 feet east of the west line thereof, thence northerly along a line 50 feet east of and parallel to the west line of said Lot 19 to a point 150 feet north of the south line of said Lot 19, thence easterly along a line 150 feet north of and parallel to the south line of said Lot 19 to the east line thereof, thence northerly along said east line to a point 267 feet north of the south line of said Lot 19, thence westerly along a line 267 feet north of and parallel to the south line of said Lot 19 to a point 59 feet east of the west line of Lot 19, thence northerly along a line 59 feet east of and parallel to the west line of Lot 19 to the centerline of County Road No. 15;

Thence westerly along the centerline of County Road No. 15 in Secs. 34 and 33, T118N, R22W to a point 138.6 feet east of the west line of Lot 16, Block 1, Glen Grove Acres, thence northerly along a line 138.6 feet east of and parallel to the west line of said Lot 16 to the north line of said Lot 16, thence westerly along the north lines of Lots 16 and 17, Block 1, Glen Grove Acres, to the west line of said Lot 17, thence westerly on the north line of Lot 4, Block 1, Juneau Acres, extended, to the west line of said Lot 4, thence southerly along said west line to the north line of Lot 18, Block 2, Glen Grove Acres, thence westerly along said north line and the north line of Lot 19, Block 2, Glen Grove Acres, to the west line of said Lot 19, thence southerly along said west line of Lot 19 to the north line of R.L.S. No. 219, thence southwestly along said north line to the east line of Lot 17,

¹ Common boundary between Bassett Creek watershed and Mississippi Watershed (Formerly Middle Mississippi River Watershed) was obtained from *Middle Mississippi River Watershed Management Organization Legal Description*, May 1985 and *Attachment C Legal Description of area to be transferred from Bassett WMO to Middle Mississippi WMO*, May 2003)

² Common boundary between Bassett Creek watershed and Minnehaha Creek Watershed was from Minnehaha Creek Watershed District boundary (April 28, 1993) obtained from BWSR.

³ Boundary is also the boundary between the Bassett Creek and Minnehaha Creek watersheds.

Block 2, Christiansen's Parker's Lake Second Addition, thence northerly along said east line of Lot 17 and the east line of Lot 18, Block 2, Christiansen's Parker's Lake Second Addition, to a point 35 feet south of the north line of Lot 18, thence generally westerly along a line 35 feet south of and parallel to the north line of said Lot 18 extended, to the centerline of Lakewood Lane, thence southerly along the centerline of Lakewood Lane to the north line of Lot E, R.L.S. No. 219, extended, thence westerly along said north line to the east line of R.L.S. No. 296, thence southerly along said east line, extended, to the centerline of County Road No. 15, thence westerly along said centerline to the centerline of Niagara Lane;

Thence southerly along the centerline of Niagara Lane to the south line of Sec. 33, T118N, R22W, which is also the border between the City of Plymouth and the City of Minnetonka, thence westerly along said south line of Sec. 33 to the most southeasterly corner of Lot 3, Block 1, Cedar View Estates, thence northerly along the east lines of said Lot 3 and Lot 2, Cedar View Estates, to the north line of said Lot 2, thence westerly along said north line to the northwest corner of said Lot 2, thence generally southerly along the west line of said Lots 2 and 3 to the most westerly corner of said Lot 3, thence southeasterly along the southwesterly line of said Lot 3 to the south line of Sec. 33, T118N, R22W, thence westerly along said south line of Sec. 33 to the centerline of Ranchview Lane;

Thence northerly along the centerline of Ranchview Lane to the south line of the NW 1/4 of the SW 1/4 of said Sec. 33, thence 200 feet westerly along said south line of the NW 1/4 of the SW 1/4, thence 220 feet northerly along a line 200 feet west of and parallel to the east line of said NW 1/4 of the SW 1/4, thence 200 feet easterly along a line 220 feet north of and parallel to the south line of said NW 1/4 of the SW 1/4 to the east line of said NW 1/4 of the SW 1/4, thence northerly along said east line to the northeast corner of the South 1/2 of said NW 1/4 of the SW 1/4, thence westerly along the north line of said South 1/2 of the NW 1/4 of the SW 1/4 to the west line of Lot 1, Block 3, Homedale Manor First Addition, thence northerly along said west line to the centerline of Fifth Avenue North, thence easterly along said centerline to the east line of Lot 5, Block 2, Homedale Manor First Addition, extended, thence northerly along said east line to the north line of said Lot 5, thence westerly along said north line and the north line of Lot 4, Block 2, Homedale Manor First Addition to the east line of Lot 6, Block 1, Homedale Manor, thence northerly along said east line, extended, to the north line of Sixth Avenue North;

Thence easterly along the north line of Sixth Avenue North to the west line of Ranchview Lane, thence northerly along said line to the centerline of 7th Avenue North, thence westerly along said

centerline to the centerline of Shenandoah Lane, thence northerly along said centerline, extended, to the south line of Lot 8, Block 1, Vicksburg Forest First Addition, thence westerly along said south line to the west line of said Lot 8, thence northerly along said west line to the north line of Block 1, Vicksburg Forest First Addition, thence westerly along said north line to the centerline of Vicksburg Lane, thence northerly along the centerline of Vicksburg Lane which is also the west line of Sec. 33, Sec. 28 and Sec. 21, T118N, R22W, to the north line of Lot 2, Block 2, Playhouse Industrial Park, extended, thence easterly along said line to the east line of Lot 3, Block 1, Playhouse Industrial Park, extended, thence northerly along said east line to the north line of said Lot 3, thence generally northwesterly along said north line of Lot 3, extended, to the centerline of Vicksburg Lane, thence northerly along said centerline to the north line of said Sec. 21;

Thence westerly along the, south line of Sec. 17, T118N, R22W, to the west line of the SE 1/4 of the SE 1/4 of said Sec. 17, thence northerly on said west line to the north line of said SE 1/4 of the SE 1/4, thence westerly on the north line of the SW 4 of the SE 4 of said Sec. 17 to the east line of the West 1/2 of said SW 1/4 of the SE 1/4, thence southerly 208.7 feet on said east line of the West 1/2, thence westerly 208.7 feet on a line 208.7 feet south of and parallel to the north line of said SW 1/4 of the SE 1/4 of Sec. 17, thence northerly 208.7 feet on a line 208.7 feet west of and parallel to said east line of the West 1/4, thence westerly on the north line of said SW 1/4 of the SE 1/4 to the west line thereof, thence southerly on the west line of the SE 1/4 of said Sec. 17 to a point 247.5 feet north of the south line of said Sec. 17, thence westerly 264 feet on a line 247.5 feet north of and parallel to the south line of said Sec. 17, thence southerly on a line 264 feet west of and parallel to the east line of the SW 1/4 of said Sec. 17 to the north line of State Highway No. 55, thence southeasterly on said north line to the centerline of Dunkirk Lane;

Thence southerly along the centerline of Dunkirk Lane in Sec. 20, T118N, R22W, extended, to the south line of County State Aid Highway No. 24, thence generally southwesterly along said south line to the point of intersection of said south line and the following described line:

commencing at a point in the west line of the east 1030 feet of the NW 1/4 of Sec. 20, T118N, R22W, a distance of 351.58 feet north from the southwest corner thereof, thence south 81 degrees east a distance of 358.36 feet, thence deflect left 97 degrees 46 minutes 18 seconds a distance of 372.85 feet, thence northerly along a curve to the left having a radius of 348.68 feet a distance of 138.16 feet, thence northwesterly tangent to said curve 196.66 feet, thence northerly along a curve to the right having a radius of 433.48 feet a distance of 119.25 feet, thence northwesterly tangent to said curve 124.62 feet, thence northerly along a curve to the left having a radius of

262.35 feet a distance of 80.13 feet, thence northwesterly tangent to said curve to the south line of County State Aid Highway No. 24;

thence southerly along said described line to the north line of Lot 6, Block 1, Seven Ponds East, thence generally southeasterly on said north line and the east line of said Lot 6 and the north line of Lot 7, Block 1, Seven Ponds East to the northeast corner of said Lot 7, thence generally southwesterly on the east line of said Lot 7 and the east line of Lot 8, Block 1, Seven Ponds East to the south line of said Lot 8, thence westerly on said south line of Lot 8 to the west line of Seven Ponds East, thence southerly along said west line to the south line of Lot 10, Block 1, Seven Ponds East, thence deflect right 97 degrees, 46 minutes, 18 seconds a distance of 358.36 feet, northwesterly, to a point on the east line of Seven Ponds;

Thence southerly on the east line of Seven Ponds to the south line of 32nd Avenue North, thence northwesterly along said south line to the southeast line of Holly Lane, thence generally southwesterly on the southeast line of Holly Lane to the northwesterly line of Lot 5, Block 2, Seven Ponds, thence southwesterly on said northwesterly line to the west line of said Lot 5, thence southerly on said west line to the north line of the SW 1/4 of Sec. 20, T118N, R22W;

Thence westerly on said north line of the SW 4 of Sec. 20 to the east line of Lot 14, Block 1, Shiloh, thence southerly on said east line to the south line of said Lot 14, thence westerly on said south line of Lot 14, extended, to the centerline of Jewel Lane, thence southerly on the centerline of Jewel Lane to the south line of Lot 11, Block 1, Shiloh, extended, thence generally westerly on said south line of Lot 11 and on the south line of Lot 8, Block 1, Shiloh, extended, to the centerline of Kimberly Lane, thence southerly on said centerline, extended, to the north line of Lot 3, Block 3, Shiloh, thence westerly on said north line and the north line of Lot 2, Block 3, Shiloh, to the west line of said Lot 2, thence southwesterly on said west line to the north line of Lot 2, Block 1, Fairfield Estates, thence westerly on said north line to the west line of said Lot 2, thence southeasterly on said west line of Lot 2, extended, to the north line of Lot 8, Block 2, Fairfield Estates, thence westerly on said north line of Lot 8 to the west line of said Lot 8, thence generally southerly on said west line of Lot 8 and the east line of Lot 6, Block 2, Fairfield Estates, to the south line of said Lot 6, thence southwesterly on said south line of Lot 6 to the west line of Sec. 20, T118N, R22W;

Thence southerly on the west line of Sec. 20 to the south line of Lot 10, Block 1, Candlelight Terrace, located in Sec. 19, T118N, R22W, thence southwesterly on said south line of Lot 10, extended, to the centerline to 28th Avenue North, thence southerly on said centerline to the north line

of Lot 16, Block 5, Candlelight Terrace, extended, thence westerly on said north line to the west line of said Lot 16, thence southwesterly on said west line of Lot 16, extended, to the south line of 27th Avenue North, thence northwesterly on said south line to the east corner of Lot 22, Block 5, Candlelight Terrace, thence southwesterly on the southeast line of Lot 22 to the south corner of said Lot 22, thence generally northwesterly on the southwest and west lines of said Lot 22 and the west line of Lot 21, Block 5, Candlelight Terrace, to the north line of said Lot 21, thence easterly on said north line of Lot 21 to the east line of Lot 8, Block 5, Candlelight Terrace, thence northwesterly on said east line, extended, to the north line of 28th Avenue North, thence generally southwesterly on said north line of 28th Avenue North to the southwest line of Lot 2, Block 1, Candlelight Terrace, thence northwesterly on said southwest line to the southwest corner of said Lot 2 on the east line of State Highway No. 101, thence northwesterly from said point to the southeasterly corner of Lot 6, Block 1, Meadowood;

Thence northwesterly on the south line of Lot 6, Block 1, Meadowood, extended, to the centerline of Ranier Lane, thence generally westerly along the centerline of Ranier Lane to the intersection of a line bearing S45DEG E from a point in the northeasterly line of Lot 10, Meadowood a distance of 41.36 feet southwesterly of the northerly corner thereof and the centerline of Ranier Lane, thence northwesterly along said line to the northeasterly line of Lot 10 Meadowood, thence northeasterly along said line and the northeasterly line of Lot 9, Meadowood to the north line thereof, thence easterly on said north line to the east line of Lot 4, Block 3, Greentree Addition, thence northerly on said east line of Lot 4 to the south line of 30th Avenue North;

Thence westerly on the south line and northerly on the west line of said 30th Avenue North to the centerline of 30½ Avenue North, thence generally westerly on said centerline to the centerline of Urbandale Lane, thence northwesterly on said centerline to the south line of Lot 2, Block 5, Greentree Forest, extended, thence westerly on said south line of Lot 2 to the west line of said Lot 2, thence northerly on said west line to the south line Lot 11, Block 5, Greentree Forest, thence southwesterly on said south line to the west line of Lot 11, thence northwesterly on said west line, extended, to the centerline Walnut Grove Lane, thence southwesterly on said centerline to the southwest line, extended, of Lot 13, Block 1, Greentree Forest, thence northwesterly on said southwest line and the southwest line of Lot 12, Block 1, Greentree Forest, to the west line of Greentree Forest, thence northerly on said west line to the centerline of Hennepin County State Aid Highway No. 24;

Thence easterly on the centerline of County State Aid Highway No. 24 to the east line, extended, of Lot 4, Block 3, Amber Woods, thence northerly on said east line to the south line of Lot 4, Block 1, Amber Woods, thence westerly on said south line to the west line of said Lot 4, thence northerly on said west line to the north line of said Lot 4, thence easterly on said north line to the west line of Lot 6, Block 1, Amber Woods, thence northerly on said west line of Lot 6 to the south line of 32nd Avenue North, thence generally northeasterly on said south line of 32nd Avenue North to the south line of Lot 17, Block 1, Amber Woods, thence easterly on said south line to the southeast line of said Lot 17, thence northeasterly on said southeast line to the southwest line of Lot 16, Block 1, Amber Woods, thence northwesterly on said southwest line to the west line of said Lot 16, thence northerly on said west line to the south line of 33rd Avenue North, thence generally northerly on said line, being a circle, to the east line of Lot 21, Block 1, Amber Woods, thence northerly on said east line of Lot 21, extended, to the south line of Lot 17, Block 6, Amber Woods, thence easterly on said south line to the east line of said Lot 17, thence northwesterly on said east line of Lot 17 to the south line of Vagabond Place, being a circle, thence generally northwesterly on said south line to the south line of Lot 14, Block 6, Amber Woods, thence westerly on said south line to the west line of said Lot 14, thence northerly on said west line of Lot 14 to the south line of Lot 9, Block 6, Amber Woods, thence westerly on said south line to the southwest corner of said Lot 9, thence westerly to the southeast corner of Lot 17, Block 5, Amber Woods, thence westerly on the south line of said Lot 17 to the west line thereof, thence northerly on said west line to the north line of Lot 16, Block 5, Amber Woods, thence generally northwesterly on said north line of Lot 16 and the north lines of Lots 15 and 14, Block 5, Amber Woods, to the west line of Amber Woods, thence northerly to the centerline of 34th Avenue north, thence westerly at a right angle with said west line of Amber Woods to the west line of said Sec. 19;

Thence northerly on the west line of said Sec. 19 to the south line of Sec. 18, T118N, R22W, thence easterly on said south line to the southeast corner of the SW 1/4 of said Sec. 18, thence northerly along the east line thereof to the centerline of Medina Road⁴;

Thence southeasterly on the centerline of Medina Road to a point 966.8 feet measured northwesterly along the centerline of Medina Road from the intersection of said road and the east line of the SW 1/4 of the SE 1/4 of said Sec. 18, thence southwesterly at right angles to the centerline of Medina Road a distance of 433 feet, thence southeasterly at right angles a distance of 330 feet, thence

⁴ Starting at this point is the boundary between Bassett Creek and Elm Creek watersheds.

northeasterly at right angles a distance of 466 feet to the north line of Medina Road, thence southeasterly on said north line of Medina Road to a line 290 feet west of and parallel to the east line of the West 1/2 of the SE 1/4 of said Sec. 18, thence northerly on said line to a line 632 feet south of the northeast corner of the South 3/4 of said West 1/2, and at right angles to the east line of the West 1/2 of the SE 1/4 of said Sec. 18, thence easterly 290 feet on said line to the east line of the West 1/2 of the SE 1/4 of said Sec. 18, which line is also the centerline of State Highway No. 101;

Thence northerly on the centerline of State Highway No. 101 in Sec. 18, T118N, R22W, to the northeasterly line of State Highway No. 55, thence northwesterly along said northeasterly line to the northwest line of Lot 4, Block 1, Osier Addition, extended, thence northeasterly on said northwest line to the northeast line of Osier Addition, thence southeasterly on said northeast line of Osier Addition to the east line of the West 1/2 of the NW 1/4 of the NE 1/4 of Sec. 18, T118N, R22W, thence northerly along said east line to the centerline of Hennepin County State Aid Highway No. 9, thence southeasterly along said centerline to the centerline of Peony Lane, thence northerly along said centerline to the north line of Sec. 18, T118N, R22W, thence westerly along said north line to the east line of said Sec. 18;

Thence northerly along the west line of Sec. 8, T118N, R22W to the south line of the NW 1/4 of the SW 1/4 of said Sec. 8, thence easterly along said south line to the east line of said NW 1/4 of the SW 1/4, which is also the centerline of Holly Lane, thence northerly on said centerline to the south line of the Soo Line Railroad right of way, thence northeasterly along said south line to the north line of the NE 1/4 of the SW 1/4 of said Sec. 8, thence easterly along said north line and the north line of the NW 1/4 of the SE 1/4 of said Sec. 8 to the east line of said NW 1/4 of the SE 1/4⁵;

Thence southerly a distance of 220 feet on said east line of the NW 1/4 of the SE 1/4 of Sec. 8, thence easterly on a line parallel to and at a distance of 220 feet south from the north line of the NE 1/4 of the SE 1/4 of said Sec. 8 to the east line thereof, thence southerly along said east line, which is also the center line of Vicksburg Lane, to a point 721 feet south of the north line of the NW 1/4 of the SW 1/4 of Sec. 9, T118N, R22W, thence easterly along a line 721 feet south of and parallel to the north line of said NW 1/4 of the SW 1/4 of Sec. 9 to the east line thereof, thence southerly along said east line to the south line of the NE 1/4 of the SW 1/4 of said Sec. 9, thence easterly along said line the southeast corner thereof, thence northerly to the northwest corner of the south 22.74 acres of the NW 1/4 of the SE 1/4 of Sec. 9, thence easterly along the north line of said

⁵ Starting at this point is the boundary between the Bassett Creek and Shingle Creek watersheds.

south 22.74 acres to the east line of said NW 1/4 of the SE 1/4, thence southerly along said east line of the NW 1/4 of the SE 1/4 to the south line thereof, thence easterly along the south line of the NE 1/4 of the SE 1/4 of said Sec. 9 to the east line thereof, which is the west line of Sec. 10, T118N, R22W;

Thence southerly along the west line of said Sec. 10 to the midpoint of the west line of the North 1/2 of the SW 1/4 of the SW 1/4 of said Sec. 10, thence westerly to the midpoint of the west line of the east 10 acres of said North 1/2, thence southerly on said west line of the east 10 acres to the north line of the South 1/2 of the SW 1/4 of the SW 1/4 of said Sec. 10, thence westerly along said north line to the west line of said Sec. 10, thence southerly along said west line to the north line of Sec. 15, T118N, R22W, thence easterly along said north line to the west line of the East 1/2 of the NW 1/4 of the NW 1/4 of said Sec. 15, thence southerly on said west line to a point 336 feet north of the south line of said East 1/2 of the NW 1/4 of the NW 1/4 of Sec. 15, thence easterly along the north line of the south 336 feet of the West 1/2 of the SE 1/4 of the NW 1/4 of the NW 1/4 of said Sec. 15 to the east line of said West 1/2, thence southerly 336 feet on said east line to the south line of the NW 1/4 of the NW 1/4 of said Sec. 15, thence easterly along said south line and the south line of the NE 1/4 of the NW 1/4 of said Sec. 15, to the southeast corner thereof, thence northerly along the east line thereof to a point 652.56 feet southerly from the northeast corner of the NW 1/4 of the NE 1/4 of Sec. 15 thence easterly along the south line of the north 12 rods of the south 26 acres of the NW 1/4 of the NE 1/4 of said Sec. 15, extended, to the east line of West Medicine Lake Road, thence northerly along said east line in said Sec. 15 and Sec. 10, T118N, R22W to the south line of 47th Avenue North, thence generally easterly along said south line to the east line of Tract F, R.L.S. No. 466, thence southeasterly along said east line to the south line of said R.L.S. No. 466, thence easterly along said south line to the east line of said Sec. 10;

Thence northerly along said east line of Sec. 10, 172.80 feet thence easterly along the north line of Schmidt Lake West, Sec. 11, T118N, R22W, to the southeasterly line of Lot 6, thereof, thence southwesterly on said southeasterly line to the southwesterly line of Lot 7, Block 1, Schmidt Lake West, thence generally southeasterly on said southwesterly line to the south line of said Lot 7, thence easterly on said south line to the east line of Lot 5, Block 1, Schmidt Lake West, thence southerly on said east line to the north line of 47th Avenue North, thence easterly on said north line to the east line of Lot 7, Block 2, Schmidt Lake West, extended, thence southerly on said east line to the south line of Schmidt Lake west, thence easterly along said south line extended to the centerline of Larch Lane thence southerly along the centerline of Larch Lane to the south line of Sec. 11, T118N, R22W;

Thence easterly along said south line of Sec. 11 to the west line of Lot 3, Block 3, Deerwood Meadows, thence northerly on said west line to the northwesterly line of said Lot 3, thence generally northeasterly on said northwesterly line to the northeast line of said Lot 3, thence southeasterly along said northeast line to the west line of Lot 6, Block 3, Deerwood Meadows, thence northerly on said west line to the northwest line of said Lot 6, thence northeasterly on said northwest line to the southwest line of Forestview Lane, which is a circle, thence generally southeasterly along said southwesterly line to the northeast line of Lot 8, Block 3, Deerwood Meadows, thence southeasterly on said northeast line to the east line of said Lot 8, thence southerly on said east line to the south line of Lot 23, Block 3, Deerwood Meadows, thence easterly on said south line to the east line of said Lot 23, thence northerly on said east line to the south line of Deerwood Circle, thence generally northerly along said circle to the northeast line of Lot 21, Block 3, Deerwood Meadows, thence northwesterly on said northeast line to the north line of said Lot 21, thence westerly on said north line to the west line of Lot 14, Block 3, Deerwood Meadows, thence northerly on said west line to the south line of 45th Lane, thence easterly along said south line, extended, to the west line of Lot 3, Block 4, Deerwood Meadows, thence northerly along said west line to the north line of said Lot 3, thence easterly on said north line to the west line of the SE 1/4 of the SE 1/4 of Sec. 14, T118N, R22W;

Thence northerly on said west line of the SE 1/4 of the SE 1/4 and the west line of the NE 1/4 of the SE 1/4 of Sec. 11 to the north line of the South 1/2 of said NE 1/4, of the SE 1/4, thence easterly on said north line to the west line of Zachary Lane, thence northerly along said west line to the centerline of 49th Avenue North, extended, thence easterly on said extended centerline in said Sec. 11 and Sec. 12, T118N, R22W to the centerline of Wellington Lane, thence southeasterly along said centerline to the northwest line of Lot 3, Block 3, Sky Line Hills Unit No. 1, extended, thence northeasterly on said northwest line to the northeast line of said Lot 3, thence southeasterly on said northeast line and the northeast line of Lot 4, Block 3, Sky Line Hills Unit No. 1 to the east line of Sky Line Hills Unit No. 1, thence southerly along said east line to the north line of the South 1/2 of the NW 1/4 of the SW 1/4 of said Sec. 12, thence easterly along said north line and the north line of the South 1/2 of the NE 1/4 of the SW 1/4 of said Sec. 12 to the east line of the SW 1/4 of said Sec. 12;

Thence southerly along said east line of the SW 1/4 of Sec. 12 to the south line of Outlot C, Nathan Trails, thence generally easterly along said south line to the easterly line of said Outlot C, thence generally northerly along said easterly line of Outlot C to the centerline of 47th Avenue North, thence easterly along said center line to the west line of Lot 1, Block 4, Nathan Trails, extended,

thence southerly along said west line to the south line of said Lot 1, thence easterly along said south line to the west line of Outlot B, Nathan Trails, thence southerly along said west line to the south line of said Outlot B, thence easterly along the south line of Outlot B to the centerline of Nathan Lane which is the east line of Nathan Trails thence generally northerly to the northeast corner of the NE 1/4 of the SE 1/4 of Sec. 12, thence easterly to the east line of said Sec. 12, which is the east line of the City of Plymouth.

City of New Hope

Thence southerly along the east line of the City of Plymouth which is also the west line of the City of New Hope to a point at the extension of the north line of Lot 11, Block 4, Hillsborough Manor, thence easterly along the extended north line of said Lot 11 to the west line of Lot 9, Block 6, Hillsborough Manor, thence northerly along said west line to the intersection of Independence Avenue and 45th Avenue North, thence southeasterly along the south line of 45th Avenue North to the east line of Lot 5, Block 6, Hillsborough Manor, thence south along said east line of Lot 5 to the southeast corner of said Lot 5, thence southwesterly along an extension of the east line of Lot 13, Block 2, Gettysburg Hills to the centerline of the Independence Avenue North cul-de-sac, thence southerly along the centerline of Independence Avenue North cul-de-sac extended to the south line of Independence Avenue North, thence easterly along the south line of Independence Avenue North to the northeast corner of Lot 6, Block 1, Gettysburg Hills, thence southerly along the east line of said Lot 6 to the southeast corner of said Lot 6, thence easterly along the south line of Block 1, Gettysburg Hills extended, to the east line of Gettysburg Avenue North, thence southerly along the east line of Gettysburg Avenue North to 42nd Avenue North (Rockford Road, Co. Rd. 9).

Thence easterly along the north line of 42nd Avenue North to the southeast corner of Lot 5, Block 1, Flag Addition, thence northerly along the east line of said Lot 5 to the northeast corner of said Lot 5, thence generally easterly along the north line of Lot 13, Block 2, Cooper Herman Addition to the southwest corner of Lot 12, Block 2, Cooper Herman Addition thence southeasterly along south line of said Lot 12 to the southeast corner of said Lot 12, thence northerly along the east Lot of said Lot 12 extended to the northwest corner of Lot A, RLS No. 1267, thence easterly along the north line of Lot A and Lot B, RLS No. 1267 to the northeast corner of Lot B, RLS No. 1267, thence southerly along the east line of said Lot B to the south line of Lot 11 and Lot 10, Block 1, Ridgeview, thence northeasterly along said south line to the east line of said Lot 10, thence north along the east line of Lot 10, Lot 9 and Lot 8 to the northeast corner of Lot 8, Block 1, Ridgeview, thence easterly along the south line of Lot 7, Block 2 and Lot 7, Block 1, Midwestern Properties Addition extended to the east line of Boone Avenue North.

Thence northerly along the east line of Boone Avenue North to the northwest corner of Lot 23, Block 2, Sandra Terrace, thence easterly along the north line of said Lot 23 to the northeast corner of said Lot 23, thence northerly along the east line of Lot 24, Lot 25, Lot 26, Lot 27, Lot 28 and Lot 29, Block 2, Sandra Terrace to the northeast corner of said Lot 29, thence easterly along the north line of said Lot 29 to the northeast corner of Lot 1, Block 2, Sandra Terrace, thence southeasterly along the east and south line of 44th Avenue North to the northeast corner of Lot 1, Block 3, Sandra Terrace, thence southerly along the east line of said Lot 1 to the north line of Lot 25, Block 3, Sandra Terrace, thence easterly along said north line of Lot 25 to the northeast corner of said Lot 25, thence southerly along the east line of Lot 25, Lot 24, Lot 23, Lot 22, Lot 21, Lot 20, Lot 19, Lot 18, Lot 17, Lot 16 and Lot 15 extended to the south line of 42nd Avenue North, thence southeasterly along the south line of 42nd Avenue North to the centerline of Xylon Avenue North extended, which is also the west line of the SE 1/4 of the NE 1/4 of Section 18, T118N R21W.

Thence south along the said west line of the SE 1/4 of the NE 1/4 of Section 18 to the south line of the NE 1/4 of Section 18, T118N R21W, thence east along said south line of the NE 1/4 of Section 18 to the centerline of Winnetka Avenue North, thence southerly along the centerline of Winnetka Avenue South to the south line of the North 1/2 of the SW 1/4 of Section 17, T118W, R21W, which is also the border between New Hope and Crystal, thence easterly along said south line of line of the North 1/2 of the SW 1/4 of Section 17 to the east line of the Soo Line RR Company,

Thence northerly along the east line of the Soo Line Railroad Co. to the northwest corner of Lot 9, Block 1, Gwynnco Addition, thence easterly along the north line of said Lot 9 to the northeast corner of said Lot 9, thence easterly to the northwest corner of Lot 2, Block 4, Gwynnco Second Addition, thence easterly to the northeast corner of said Lot 2, thence easterly and northerly along the rear Lot line of Lot 13, Lot 12, Lot 11, Lot 10, Lot 9, Lot 8, Lot 7, Lot 6, Lot 5, Lot 4, Lot 3, Lot 2, Lot 1, Block 3, Gwynnco Second Addition, thence northerly along the west line of Lot 1, Block 7, Gwynnco Second Addition extended to the centerline of 40th Avenue North, thence easterly along the centerline of 40th Avenue North extended to the east line of the SW 1/4 of Section 17, T118W, R21W, which is also the border between the City of New Hope and the City of Crystal.

City of Crystal

Thence southerly along said east line of the SW 1/4 of Section 17 to the northwest corner of Lot 15, Block 1, Brownwood Manor 2nd Addition, thence easterly along the north line of said Lot 15 extended to the east line of Kentucky Avenue thence southerly along the east line of Kentucky Avenue to the north line of the South 1/2 of the SE 1/4 of Section 17, T118N, R21W, thence easterly

along said north line of the South 1/2 of the SE 1/4 of Section 17 to the southeast corner of Lot 5, Block 3, Gaulke's 5th Addition, thence northerly along the east line of said Lot 5, Lot 6 and Lot 7, Block 3, Gaulke's 5th Addition to the northwest corner of Lot 2, Block 3, Gaulke's 5th Addition, thence easterly along the north line of said Lot 2 to the northeast corner of said Lot 2, thence easterly to the northwest corner Lot 7, Block 2, Gaulke's 5th Addition, thence easterly along the north line of said Lot 7 to the northeast corner of said Lot 7, thence southerly along the east line of said Lot 7, Lot 6 and Lot 5, Block 2, Gaulke's 5th Addition to the north line of the South 1/2 of the SE 1/4 of Section 17, T118N, R21W, thence easterly along said the north line of the South 1/2 of the SE 1/4 of Section 17 to the centerline of Douglas Drive (County Rd. 102).

Thence northerly along the centerline of Douglas Drive (County Road 102) to the extension of the centerline of 39th Avenue North, thence easterly along said centerline of 39th Avenue North to the extension of the east line of Lot 1, Block 1, Beelen Addition, thence southerly along the extended east line of said Lot 1, Lot 4 and Lot 3, Block 1, The Red Barn Addition and Lot 1, Block 1, Douglas Terrace First Addition extended to the centerline of 38th Avenue North, thence easterly along the centerline of 38th Avenue North to the extension of the east line of Lot 12, Block 2, Douglas Terrace Second Addition thence southerly along the said extended east line of Lot 12 to the southeast corner of said Lot 12, thence easterly to the northeast corner of Lot 2, Block 2, Douglas Terrace Second Addition thence easterly to the northwest corner of Lot 2, Block 2, Stromberg Sunnyslopes 3rd Addition, thence easterly along the north line of said Lot 2 to the northeast corner of said Lot 2, thence southerly along the east line of said Lot 2 to the southeast corner of said Lot 2, thence easterly along the north line of Lot 1, Block 2, Sandberg's First Addition, extended to the centerline of Adair Avenue North, thence northerly along the centerline of Adair Avenue North to the extension of the north line of Lot 9, Block 1, Stromberg Sunnyslopes 1st Addition, thence easterly along the north line of said Lot 9 and Lot 8, Block 1, Stromberg Sunnyslopes 1st Addition to the northeast corner of Lot 8, Block 1, Stromberg Sunnyslopes 1st Addition, thence northerly along the east boundary of Lot 10, Lot 11, Lot 12, Lot 13, and Lot 14, Block 1, Stromberg Sunnyslopes 1st Addition to the border between the City of Crystal and the City of Robbinsdale.

City of Robbinsdale

Thence easterly along the border between the City of Crystal and the City of Robbinsdale to the northeast corner of Lot 1, Block 1, Hansen's Beltline Addition, thence easterly along the north line of Lot 27 and Lot 4, Block 5, Seminary Park extended to the north line of Lot 9 and Lot 32, Rearrangement of Blocks 1,2,7,8,9, Seminary Park, thence easterly to the centerline of Regent Avenue North, thence southerly along the centerline of Regent Avenue North to the extension of the

north line of Lot 24, Block 5, Robbinsdale Park, thence easterly along north line of said Lot 24 to the northeast corner of said Lot 24, thence southerly along the east line of said Lot 24, Lot 23, Lot 22 and Lot 21, Block 5, Robbinsdale Park to the southeast corner of said Lot 21, thence easterly along the north line of Lot 11, Block 5, Robbinsdale Park extended to the centerline of Quail Avenue North, thence southerly along the centerline of Quail Avenue North to the centerline of 38th Avenue North.

Thence easterly along the centerline of 38th Avenue North to the centerline between Quail Avenue North and Perry Avenue North, thence southerly along said centerline to the north line of 37th Avenue North, thence easterly along the north line of 37th Avenue North to the west line of Perry Avenue North, thence southerly along the west line of Perry Avenue North to the north line of 36th Avenue North, thence easterly along the north line of 36th Avenue North to the centerline of France Avenue North, thence southerly along the centerline of France Avenue North, to the extension of the south line of Oakdale Avenue North, thence southeasterly along the south line of Oakdale Avenue North to the west line of Victory Memorial Drive (Memorial Parkway), thence southerly along the west line of Victory Memorial Drive to the extension of the centerline of Lowry Avenue North.

City of Minneapolis

Thence easterly along Lowry Avenue North to Newton Avenue North, thence northerly along Newton Avenue North to 33rd Avenue North, thence easterly along 33rd Avenue North to the alley between James Avenue North and Knox Avenue North⁶.

Thence southerly along said alley to Lowry Avenue North; thence easterly along Lowry Avenue North to James Avenue North; thence southerly along James Avenue North to 30th Avenue North; thence easterly along 30th Avenue North to Fremont Avenue North; thence southerly along Fremont Avenue North to 29th Avenue North; thence westerly along 29th Avenue North to the alley between Fremont and Girard Avenues North; thence southerly along said alley to 27th Avenue North; thence westerly along 27th Avenue North to the alley between Humboldt and Irving Avenues North; thence southerly along said alley to 26th Avenue North; thence westerly along 26th Avenue North to Irving Avenue North; thence southerly along Irving Avenue North to 25th Avenue North; thence easterly along 25th Avenue North to Humboldt Avenue North; thence southerly along the southerly extension

⁶ Starting at this point is the boundary between the Bassett Creek and Mississippi watershed.

of Humboldt Avenue North to 23rd Avenue North; thence westerly along 23rd Avenue North to Irving Avenue North; thence northwesterly along Irving Avenue North to Ilion Avenue North; thence southwesterly along Ilion Avenue to Hillside Avenue; thence northwesterly along Hillside Avenue to the alley between James and Logan Avenues North; thence southwesterly along said alley to the easterly alley lying between Lots 72 and 73, Block 19, Forest Heights Addition to Minneapolis; thence westerly along last described alley to Logan Avenue North; thence southerly along Logan Avenue North to West Broadway and Oliver Avenue North; thence westerly and southerly along Oliver Avenue North to 21st Avenue North; thence westerly along 21st Avenue North to Penn Avenue North.

Thence southerly along Penn Avenue North to centerline between 16th and 17th Avenues North that are lying west of Penn Avenue North; thence westerly along said centerline to Queen Avenue North; thence southerly along Queen Avenue North to Plymouth Avenue North, thence westerly along Plymouth Avenue North to Russell Avenue North, thence southerly along Russell Avenue North to 12th Avenue North, thence easterly along 12th Avenue North to Queen Avenue North, thence southerly along Queen Avenue North to 8th Avenue North, thence westerly along 8th Avenue North to Russell Avenue North, thence southerly along Russell Avenue North to 4th Avenue North, thence easterly along 4th Avenue North to Logan Avenue North, thence southerly along Logan Avenue North to 3rd Avenue North, thence easterly along 3rd Avenue North to Gramercy Avenue North, thence southwesterly and southerly along Gramercy Avenue North to 2nd Avenue North, thence southeasterly along 2nd Avenue North to Cedar Lake Road North, thence northeasterly along Cedar Lake Road North to 2nd Avenue North, thence easterly along 2nd Avenue North to Market Street North.

Thence southerly along Market Street North extended to the southerly R/W of the M & St L RR, thence southwesterly along the southerly R/W line of the M & St L RR to the west line of Dupont Avenue South extended, thence southerly along the west line of Dupont Avenue South to the southerly line of Highway No. 12, thence southwesterly along the southerly line of Highway No. 12 to the north line of Wayzata Boulevard, thence southeasterly along the north line of Wayzata Boulevard to the 1/16 line of the South 1/2 of the NE 1/4 of Section 28, T29N, R24W, thence southerly along said 1/16 line of the South 1/2 of the NE 1/4 of Section 28, T29N, R24W to the intersection of Kenwood Parkway and Emerson Avenue South, thence southeasterly along Emerson Avenue South to Groveland Terrace, thence southerly along Groveland Terrace to Mount Curve

Avenue (said point being in Section 28, Township 29 North, Range 24 West of the 4th Principal Meridian in the City of Minneapolis)⁷.

Thence west along the centerline of Mt. Curve Avenue to the intersection of the centerline of Mt. Curve Avenue and the centerline of Kenwood Parkway; thence westerly and southwesterly along the centerline of Kenwood Parkway to the intersection of the centerline of Kenwood Parkway and the centerline of Sheridan Avenue South; thence southwesterly and southerly to the intersection of the centerline of Sheridan Avenue South and the centerline of West Franklin Avenue; thence westerly along the centerline of West Franklin Avenue to the southwest corner of the unplatted Great Northern Railway right of way; thence northeasterly and northwesterly along the boundary of the Great Northern Railway right of way to the intersection of that boundary line and the west line of the SE 1/4, Section 29, Township 29 North, Range 24 West; thence north to the southerly line of Block 3 of Wright's Cedar View Heights; thence easterly along the southerly line of said Block 3 and the southerly line of Block 9, Cedar Lake Townhouses to the southeast corner of said Block 9; thence northerly along the easterly line of said Block 9 to the westerly line of Madeira Avenue; thence northwesterly and northeasterly along the westerly line of Madeira Avenue and its northerly extension to the north line of the South 1/2 of Section 29, Township 29 North, Range 24 West; thence westerly along said north line to the northwest corner of the South 1/2 of Section 29, Township 29 North, Range 24 West.

City of Golden Valley

Thence proceeding westerly along the north line of the SE 1/4 of Section 30, Township 29 North, Range 24 West, to the centerline of June Avenue; thence southerly along the centerline of June Avenue to the intersection of the centerline of June Avenue and the south line of Lots 1 through 4, Block 1 of Kennedy's South Tyrol Hills addition extended; thence westerly along that line to the southwest corner of Lot 4, Block 1 of Kennedy's South Tyrol Hills addition; thence southwesterly and northwesterly along the southerly line of Lot 5, Block 1 of Kennedy's South Tyrol Hills addition, to the intersection of the easterly line of Lot 23, Block 1 of Kennedy's South Tyrol Hills addition; thence northerly along the easterly line of said Lot to the northeast corner of said lot; thence westerly along the northerly line of said Lot to the intersection of the northerly line extended and the easterly line of Lot 2, Block 2, Kennedy's South Tyrol Hills addition;

⁷ Starting at this point is the boundary between the Bassett Creek and Minnehaha Creek watersheds.

thence northerly along the easterly line of said Lot to the northeast corner of said lot; thence westerly along the northerly line of said Lot to the northwest corner of said lot; thence southerly along the westerly line of said Lot to the northeast corner of Lot 26, Block 2, Kennedy's South Tyrol Hills addition; thence westerly along the north line of said Lot to the intersection of the north line extended and the centerline of Natchez Avenue South; thence southerly along the centerline of Natchez Avenue South to the intersection of the centerline of Natchez Avenue South and the centerline of Ottawa Avenue South; thence westerly, southwesterly and southerly along the centerline of Ottawa Avenue South to the intersection of the centerline of Ottawa Avenue South and the extension of the north line of Block 2, Kavlis Cedardale addition; thence westerly along the north line of Block 2 to the northeast corner of Lot 12, Block 2, Kavlis Cedardale addition; thence southerly along the east line of said Lot to the southeast corner of said lot;

thence westerly along the south line of said Lot to the intersection of the south line of said Lot extended and the centerline of Princeton Avenue South; thence southerly along the centerline of Princeton Avenue South to the intersection of the centerline of Princeton Avenue South and the south line of Lot 4, Block 3, Kavlis Cedardale addition extended; thence westerly along said line to the southwest corner of Lot 4, Block 3, Kavlis Cedardale addition; thence southerly along the westerly line of Lots 5 and 6 of Block 3, Kavlis Cedardale Addition to the intersection of the westerly line of Lots 5 and 6 extended and the northerly line of Lot 35, Block 1, Kavlis Cedarhurst addition; thence easterly along the north line of said Lot to the northeast corner of said lot.

Cities of St. Louis Park and Golden Valley

Thence southerly along the east line of Lots 32 through 35, Block 1, Kavlis Cedarhurst addition to the southeast corner of Lot 32; thence westerly along the south line of Lot 32 to the intersection of the south line of Lot 32 extended and the centerline of Quentin Avenue South; thence southerly along the centerline of Quentin Avenue to the centerline of Old Cedar Lake Road; thence westerly along the centerline of old Cedar Lake Road to the easterly line of State Highway 100; thence southerly along said easterly line to the south line of Section 30, Township 29 North, Range 24 West; thence west along the south line of Section 30 to the westerly line of State Highway 100; thence northerly along said westerly line of State Highway 100 to the southerly line of U.S. Highway 12;

City of St. Louis Park

Thence westerly along the southerly line of U.S. Highway 12 to the westerly right of way line of Zarthan Avenue; thence southerly along the westerly right of way line of Zarthan Avenue to a point 126 feet north of the northerly right of way line of West 16th Street; thence westerly to the easterly

right of way line of the Minneapolis Northfield and Southern Railway; thence southwesterly along the right of way line to the centerline of West 18th Street; thence westerly along the centerline of West 18th Street to the westerly right of way line of Dakota Avenue; thence southerly along that line to the northeast corner of Lot 10, Block 1, Westwood Park; thence westerly along that line to the northwest corner of said lot; thence southerly along the west line of Lots 10 through 16 extended to the, southerly right of way line of West Franklin Avenue;

thence northwesterly along the north line of Lot 1, Block 3, Westwood Park to the northwest corner of said lot; thence southerly along the westerly line of Lot 1 to the southeast corner of Lot 2, Block 3, Westwood Park; thence westerly along the north line of Lot 4, Block 3, Westwood Park and its westerly extension to its intersection with the northerly extension of the east line of Lot 7, Block 2, Supreme Park First Division; thence southerly to the southeast corner of said Lot 7; thence southwesterly along the southerly line of said Lot 7 and its westerly extension to the westerly right of way line of Florida Avenue; thence southerly along that line to the northeast corner of Lot 4, Block 3, Supreme Park First Division; thence southwesterly along the rear Lot line of Lots 4 through 9, Block 3, Supreme Park First Division extended to the westerly right of way line of Georgia Avenue;

thence southerly along that line to the northeast corner of Lot 7, Block 4, Spring Park First Division; thence southwesterly along the rear Lot lines of Lots 7 through 12, Block 4, Supreme Park First Division extended to the intersection of that line and the centerline of Hampshire Avenue; thence northerly along the centerline of Hampshire Avenue to the intersection of the centerline of Hampshire Avenue and the extension of the south line of Lot 11, Richmond Third Addition; thence westerly along that line to the southwest corner of Lot 20, Richmond Third Addition; thence westerly to the southeast corner of Lot 41, Richmond Third Addition; thence westerly to the southwest corner of said lot; thence northerly along the west line of Lots 39, 40 and 41, Richmond third Addition, to the southeast corner of Lot 69, Richmond Third Addition; thence westerly to the southwest corner of said lot;

thence westerly to the southeast corner of Lot 86, Richmond Third Addition; thence northerly to the northeast corner of Lot 85; thence westerly to the northwest corner of Lot 85; thence north to the northeast corner of Lot 135, Richmond Third Addition; thence westerly to the northwest corner of said Lot 135; thence westerly to the northwest corner of Lot 136, Richmond Third Addition; thence northerly to the southwest corner of Lot 407, Richmond Addition; thence northerly along the west line of Lots 397 through 407, Richmond Addition, to the northwest corner of Lot 397, Richmond Addition; thence northerly to the southwest corner of Lot 396, Richmond Addition; thence northerly

along the west line of Lots 384 through 396, Richmond Addition, to the northwest corner of Lot 384, Richmond Addition; thence northerly to the southwest corner of Lot 383, Richmond Third Addition; thence northerly along the west line of Lots 374 through 383, Richmond Addition, to the southeast corner of Lot 441, Richard Addition;

thence westerly to the southwest corner of said lot; thence westerly to the northeast corner of Lot 11, Richmond Addition; thence southerly to the southeast corner of Lot 12, Richmond Addition; thence west to the southwest corner of said Lot 12; thence northerly along the west lines of Lots 1 through 12 and its northerly extension to the centerline of 14th Street; thence westerly along the centerline of 14th Street to the southeast corner of Lot 1, Block 1, Bar Ett Addition; thence northerly 90 degrees, 7 minutes to a point 209.7 feet north of the centerline of 14th Street; thence westerly to the centerline of Pennsylvania Avenue; thence southerly along the centerline of Pennsylvania Avenue to the intersection of the southerly line of Lot 8, Block 1, Penn-Zayta Second Addition extended; thence westerly along that line to the southwest corner of said lot; thence northerly along the westerly line of Lot 8 to the northwest corner of Lot 8; thence westerly along the south line of Lots 4 through 9, Block 2, Penn-Zayta Addition, to the southwest corner of Lot 4;

thence northerly along the west line of said Lot to the intersection of that line extended and the north right of way line of 13th Lane; thence westerly along the north right of way line of 13th Lane to the southwest corner of Lot 1, Block 1, Penn Zayta; thence northerly along the west line of Lot 1 to the northerly line of the South 1/2 of Section 5, Township 117 North, Range 21 West; thence westerly along that line and the north line of the South 1/2 of Section 6, Township 117 North, Range 21 West, to its intersection with the westerly line of Skyehill Townhomes; thence southerly along said westerly line to the southwest corner of said Skyehill Townhomes; thence east along the south line of Skyehill Townhomes to the east line of the SE 1/4 of said Section 6; thence south along said east line to the north line of the Second Country Club Addition of Westwood Hills; thence west along said north line to the northwest corner of Lot 1, Block 1, of said Addition; thence south along the west line of said Lot 1 to the north line of West 16th Street;

thence west along said north line to the west line of Virginia Avenue South; thence south along said west line to its intersection with the westerly line of Westwood Hills Drive; thence southwesterly and southeasterly along said westerly line to the northeast corner of Lot 2, Block 1, Westwood Estates; thence westerly to the northwesterly corner of said Lot 2; thence southerly, southeasterly, and southwesterly along the west lines of Lots 2 and 3, Westwood Estates to the southwest corner of said Lot 3; thence southerly along the extension of Lot 3, to the intersection of that line and the south

right of way of Franklin Avenue; thence northwesterly along the northerly line of Lot 4, Block 2, Westwood Estates Fourth Addition, to the northwest corner of Lot 4; thence southwesterly to the southwest corner of said Lot 4; thence northwesterly along the northerly line of Block 1, Westwood Hills Grove Addition to the northwest corner thereof; thence southerly along the westerly line of Block 1, Westwood Hills Grove Addition, to the southwest corner of Lot 11, Block 1, Westwood Hills Grove;

thence westerly along the south line of the NW 1/4 of the NE 1/4 of Section 7, Township 117 North, Range 21 West to the southwest corner thereof; thence southerly along the west line of the SW 1/4 of the NE 1/4 of Section 7 to the intersection of that line and the north right of way line of West 24th Street extended; thence westerly along that line to the westerly line of the replat of part of Block 1, Golf View Terrace, extended; thence southerly along that line to the north right of way line of Club Road; thence westerly along that line to the southeast corner of Lot 7, Block 5, Flag Terrace Addition; thence northerly along the east line of Blocks 1 through 5, Flag Terrace Addition, to the northeast corner of Lot 1, Block 1, Flag Terrace Addition; thence westerly along the north line of Block 1, Flag Terrace Addition, to the intersection of that line extended and the centerline of Flag Avenue; thence northerly along the centerline of Flag Avenue to the intersection of that line and the north line of Lot 43, Crestview Addition extended;

thence westerly along the north line of Block 43 to the northwest corner of said lot; thence southerly along the west line of said Lot to the northeast corner of Lot 40, Crestview Addition, thence westerly along the north line of said Lot to the intersection of that line and the west right of way line of Hillsborough Avenue; thence northerly along the west right of way of Hillsborough Avenue to the northeast corner of Lot 28, Crestview Addition; thence westerly along the north line of said Lot to the northwest corner of said lot; thence southerly along the west line of said Lot to the northeast corner of Lot 23, Crestview Addition; thence westerly along the north line of said Lot to the west right of way line of Independence Avenue; thence southerly along the west right of way line of Independence Avenue to the northeast corner of Lot 11, Crestview Addition; thence westerly along that line to the centerline of County Road 18; thence southerly along the centerline of County Road 18 to the southeast corner of Section 1, Township 117 North, Range 22 West; thence west along the south line of said Section 1 to the east line of Ford Road; thence north along said east line to its intersection with the easterly extension of the north line of Block 1, Windsor Highlands.

City of Minnetonka

Thence west along said north line and its easterly extension to the easterly line of Lot 10, Block 2, Windsor Hills; thence northerly along said easterly line to the northeasterly corner of said Lot 10; thence westerly to the most easterly corner of Lot 9, Block 2, Windsor Hills; thence northwesterly along the northeasterly line of said Lot 9 and its northwesterly extension to the southeasterly line of Lot 11, Block 3, Windsor Hills; thence northeasterly along said southeasterly line to the southeasterly corner of said Lot 11; thence northerly to the northeasterly corner of Lot 13 of said Block 3, thence westerly to the northwesterly corner of said Lot 13; thence northerly along the westerly line of said Block 3 and its northerly extension to the southerly line of Lot 8, Block 6, Windsor Hills;

thence northeasterly to the southeasterly corner of said Lot 8; thence northerly to the southwesterly corner of Lot 5 of said Block 6; thence northeasterly to the southeasterly corner of said Lot 5; thence northerly along the easterly line of Lots 5 and 4 of said Block 6 to the northeast corner of said Lot 4; thence west to the northwest corner of said Lot 4; thence north to the northeast corner of Tract B Registered Land Survey No. 927; thence west along the north line of said Tract B and its westerly extension to the centerline of Traymore Avenue extended; thence south along said centerline to the centerline of Crestridge Drive extended; thence southwesterly along the centerline of Crestridge Drive to its intersection with northerly extension of east line of Lot 5, Block 2, Green Acres; thence south to the southeast corner of said Lot 5; thence west to the northeast corner of Lot 11 of said Block 2;

thence south along the east line of said Lot 11 and its southerly extension to the centerline of Belmont Road; thence west along said centerline to the east line of Block 1 Allentown; thence south to the southeast corner of said Block 1; thence west to the southwest corner of said Block 1; thence north to the most easterly corner of Lot 11, Block 1, Oak Knoll Terrace; thence west to the northwest corner of said Lot 11; thence south to the northeast corner of Lot 10, Block 2, Oak Knoll Terrace;

thence west to the northwest corner of said Lot 10; thence south to the southwest corner of said Lot 10; thence west to the northwest corner of Lot 14 of said Block 2; thence south to the southwest corner of Lot 18, Block 1, Oak Knoll Terrace; thence east to the northeast corner of the North 125 feet of the West 983 feet of the South 1/2 of the SW 1/4 of the SW 1/4 of Section 1, Township 117 North, Range 22 West; thence south to the southeast corner thereof; thence west along the south line thereof to the easterly line of Vernon Drive South; thence southerly along said easterly line and its southerly extension to the north line of Section 12, Township 117 North, Range 22 West; thence east along said north line to its intersection with northerly extension of east line of Lot 1,

Block 1, Cape Cod Estates First; thence south to the southeast corner of said Lot 1; thence west to the southwest corner of said Lot 1; thence south to the northeast corner of Lot 3, Block 1, Knoll Ridge; thence west along the north line of said Lot 3 and its westerly extension to the east line of Block 2, Knoll Ridge;

thence south to the southeast corner of Lot 6 of said Block 2; thence west along the south line of Lots 6 and 21 of said Block 2 and its westerly extension to the west line of County Road No. 73; thence south along said west line to the northeast corner of Lot 5, Block 2, Replat of Oak Knoll Third Addition; thence west to the northwest corner of said Lot 5; thence south to the northeast corner of Lot 9 of said Block 2; thence west to the northwest corner of said Lot 9; thence southerly and westerly along the easterly and southerly lines of Park Ridge Drive West to the northeast corner of Lot 13, Block 2, Replat of Oak Knoll Third Addition; thence southerly to the southeast corner of said Lot 13; thence westerly to the northeast corner of Lot 2, Block 1, Fetterly Woods; thence south to the southeast corner of said Lot 2; thence westerly along the southerly line of Lots 2 and 1 of said Block 1 to the southwest corner of said Lot 1; thence north along the west line of said Lot 1 to a point 122 feet south from the northwest corner of said Lot 1;

thence westerly to a point on the east line of Lot 2, Block 2, Sherwood Hills Distant 211.12 feet north from the southeast corner thereof; thence north to the northeast corner of said Lot 2; thence east to the southeasterly corner of Lot 8, Block 6, Replat of Oak Knoll Third Addition; thence northerly to the southeasterly corner of Lot 7 of said Block 6; thence westerly to the southwesterly corner of said Lot 7; thence westerly along the southerly line of Lot 10 of said Block 6 and its westerly extension to the easterly line of Block 7 Replat of Oak Knoll Third Addition; thence northerly along said easterly line to the northeasterly corner of Lot 7 of said Block 7; thence west to the northwest corner of said Lot 7; thence south to the northwest corner of the south 100 feet of the west 160 feet of the North 1/4 of the SW 1/4 of the NE 1/4 of Section 11, Township 117 North, Range 22 West; thence east to the northeast corner thereof; thence south to the southeast corner thereof; thence east to the northeast corner of Lot 1, Block 1, Sherwood Hills;

thence southerly along the easterly line of said Lot 1 to the most northerly corner of Lot 1, Block 1, Sherwood Oaks; thence southwesterly to the most westerly corner of said Lot 1; thence southeasterly to the most southerly corner of said Lot 1; thence southwesterly to the most westerly corner of Lot 2 of said Block 1; thence south to the southwest corner of Lot 4 of said Block 1; thence west to the southwest corner of Lot 1, Block 1, Byrnes Woods Second Addition; thence north to the northwesterly corner of said Lot 1; thence northwesterly along the southwesterly line of Byrnes Road

to the south line of Tract H Registered Land Survey go. 1444; thence west to the southwest corner of said Tract H; thence north to the northwesterly corner of Tract E Registered Land Survey No. 1444; thence westerly along the centerline of Hilloway Road to its intersection with the southerly extension of the west line of Block 2, Hilloway Glen; thence north to the northwest corner of Lot 3 of said Block 2; thence west to the southwesterly corner of Lot 3, Block 1, Sherwood Gardens 1st Addition;

thence northerly along the westerly line of Lots 3 and 4 of said Block 1 to the northwesterly corner of Lot 4; thence west along the north line of sections 11 and 10, Township 117 North, Range 22 West, to the easterly line of Plymouth Road; thence southerly along said easterly line to its intersection with a line bearing N 88 degrees, 43 minutes, 25 seconds East from a point 310 feet south as measured at right angles from a point on the north line of said section 10 distant 711.31 feet west from the northeast corner thereof; said north line having an assumed bearing of S 88 degrees, 47 minutes, 45 seconds West; thence west to said point being 310 feet south from the north line of section 10; thence north to said point on north line of section 10 being 711.31 feet west from the northeast corner thereof; thence east along said north line to the centerline of Plymouth Road; thence northerly along said centerline to the north line of the South 1/2 of Section 3, Township 117 North, Range 22 West;

thence east along the north line of the South 1/2 of Sections 3 and 2, Township 117 North, Range 22 West to its intersection with the southerly extension of the east line of Lot 13, Block 5, Sunset Hill; thence north along said east line and its northerly extension to the south line of Lot 15 of said Block 5; thence west along the south line of said Lot 15 and its westerly extension to the east line of Tract H Registered Land Survey No. 451; thence north to the southeast corner of Tract B Registered Land Survey No. 451; thence west to the southwest corner thereof; thence north to the northwest corner thereof; thence west along the north line of Tract O and its westerly extension to the west line of Corens Drive; thence north along said west line and its northerly extension to the north line of Fairfield Road; thence west along said north line to the east line of the SW 1/4 of the NE 1/4 of the NE 1/4 of Section 3, Township 117 North, Range 22 West; thence north to the northeast corner thereof; thence west along the north line thereof to the east line of Milbert Road;

thence north along said east line and its northerly extension to the north line of Section 3, Township 117 North, Range 22 West (which is also the border between the City of Minnetonka and the City of Plymouth); thence westerly along said north line to the centerline of Plymouth Road; which is the point of beginning.