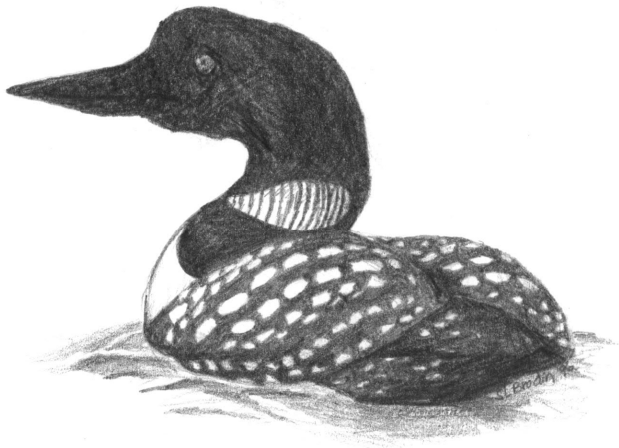
CITY OF HAM LAKE, MINNESOTA



STORM WATER POLLUTION PREVENTION PROGRAM

November 2022

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SECTION I - INTRODUCTION AND PURPOSE

The City of Ham Lake is located in the North-central portion of Anoka County, fifteen miles North of Minneapolis (see Map I - 1, Location). The City is located between the communities of Blaine, Andover, Columbus and East Bethel. The City is square, approximately six miles by six miles for a total area of 35.79 square miles. The close location to the metro area has resulted in recent growth and development. The City will not be as densely populated as some of its neighboring cities due to the presence of numerous wetlands and the lack of availability of metropolitan sanitary sewer.

The purpose of this Program is to meet the requirements for general permit coverage under the National Pollution Discharge Elimination System (NPDES) Phase II Storm Water Permit Program (the Permit), developed and administrated by the United States Environmental Protection Agency (EPA). The Storm Water Pollution Prevention Program (SWPPP) is designed to minimize the discharge of pollutants, protect water quality and to satisfy the appropriate water quality requirements of the Clean Water Act (CWA). The SWPPP is designed and managed to minimize the discharge of pollutants to the maximum extent practicable. The SWPPP is to be managed in compliance with the CWA and the terms and conditions of the Permit. The SWPPP is to manage, operate and maintain the storm sewer system and areas the City controls that discharge to the storm sewer system in a manner to minimize the discharge of pollutants. The SWPPP consists of a combination of Best Management Practices (BMPs), including education, maintenance, control techniques, system design and engineering methods.

The SWPPP is designed and managed to minimize the discharge of pollutants from the municipal storm sewer system to the maximum extent practicable. The City of Ham Lake will manage its storm sewer system in compliance with the CWA and with the terms and conditions of the Permit. The City of Ham Lake will manage, operate, and maintain the storm sewer system and areas it controls that discharge to the storm sewer system in a manner to minimize the discharge of pollutants. The SWPPP consists of a combination of BMPs, including education, maintenance, control techniques, system design and engineering methods, and such other provisions as determined to be appropriate. The BMPs meet the minimum requirements of the Permit.

The primary goal of the SWPPP is to restore and maintain the chemical, physical, and biological integrity of waters within the City of Ham Lake through management and treatment of urban storm water runoff. The purpose is to maintain water quality standards where there is compliance, and help bring waters that do not meet water quality standards into attainment.

The City of Ham Lake shall submit an annual report on the implementation of the SWPPP in accordance with the Minnesota Pollution Control Agency (MPCA) Reporting requirements. The SWPPP includes BMPs that control or reduce pollutants. The City of Ham Lake considered the sources of pollutants, the potentially polluting activities being conducted in the City and the sensitivity of the receiving waters.

The City of Ham Lake has considered the following factors in order to meet the maximum extent practicable standard set forth in the Permit:

● sources of pollutants
● potentially polluting activities being conducted in the watershed
● sensitivity of receiving waters
● uses of receiving waters
● specific local concerns
● the size of our community
● climate
● implementation schedules
● current ability to finance storm water programs
● hydrology
● geology
● capacity to perform operation & maintenance
● local land uses
● rate and type of development
● characteristics of our watershed
● organizational characteristics of the City.

In addition, the City of Ham Lake has also considered the following non-storm water discharges to determine whether they should be identified as significant contributors of pollutants to our storm water system:
● water line flushing
● landscape irrigation
● diverted stream flows
● rising ground waters
● uncontaminated ground water infiltration
● uncontaminated pumped ground water
● discharges from potable water sources
● foundation drains
● air conditioning condensation
● irrigation water
● springs
● water from crawl space pumps
● footing drains
● lawn watering
● individual residential car washing
● flows from riparian habitats and wetlands
● dechlorinated swimming pool discharges
● street wash water
● discharge or flows from fire fighting activities.

The City of Ham Lake did not find any of the additional referenced non-storm water discharges listed above to be significant contributors of pollutants to the storm water system.

The SWPPP shall become an enforceable part of the Permit upon receipt of the complete application for coverage under this permit by the MPCA. Modifications to the SWPPP that are required or allowed by this permit shall also become enforceable provisions.

The six Minimum Control Measures (MCMs) included in the SWPPP are listed below. Appropriate BMPs are defined for these MCMs and measurable goals for each BMP are defined.

The six MCMs of the Phase II Program are:

Public Education and Outreach - Distributing educational materials and performing outreach to inform citizens about the impacts polluted storm water runoff discharges can have on water quality.

Public Participation/Involvement - Providing opportunities for citizens to participate in program development and implementation, including effectively publicizing public hearings and/or encouraging citizen representatives on a storm water management panel.

Illicit Discharge Detection and Elimination - Developing and implementing a plan to detect and eliminate illicit discharges to the storm sewer system (includes developing a system map and informing the community about hazards associated with illegal discharges and improper disposal of waste).

Construction Site Runoff Control - Developing, implementing, and enforcing an erosion and sediment control program for construction activities that disturb one or more acres of land (controls could include silt fences and temporary storm water detention ponds).

Post-Construction Runoff Control - Developing, implementing, and enforcing a program to address discharges of post-construction storm water runoff from new development and redevelopment areas. Applicable controls could include preventative actions such as protecting sensitive areas (e.g., wetlands) or the use of structural BMPs such as grassed swales or porous pavement.

Pollution Prevention/Good Housekeeping - Developing and implementing a program with the goal of preventing or reducing pollutant runoff from municipal operations. The program must include municipal staff training on pollution prevention measures and techniques.

A summary of the BMPs chosen by the City of Ham Lake is shown below. Each BMP is categorized into one or more MCMs to meet the maximum extent practicable standard set in the Permit requirements. Each BMP is attached in Appendix B, which are a compilation of the following League of Minnesota Cities recommended BMPs:

Public Education and Outreach

1a-1	Distribute Educational Materials
1b-1	Implement an Education Program
1c-1	Education Program: Public Education and Outreach
1c-2	Education Program: Public Participation
1c-3	Education Program: Illicit Discharge Detection and Elimination
1c-4	Education Program: Construction Site Run-off Control

1c-5	Education Program: Post-Construction Stormwater Management in New Developments and Redevelopment
1c-6	Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations
1d-1	Coordination of Education Program
1e-1	Annual Public Meeting

Public Involvement/Participation

2a-1	Comply with Public Notice Requirements
2b-1	Solicit Public Input and opinion on the Adequacy of the SWPPP
2c-1	Consider Public Input

Illicit Discharge, Detection and Elimination

3a-1	Storm Sewer System Map
3b-1	Regulatory Control Program
3c-1	Illicit Discharge Detection and Elimination Plan
3d-1	Public and Employee Illicit Discharge Information Program
3e-1	Identification of Non-Stormwater Discharges and Flows

Construction Site Stormwater Runoff Control

4a-1	Ordinance or other Regulatory Mechanism
4b-1	Construction Site Implementation of Erosion and Sediment Control BMPs
4b-2	Individual Building Permit Site Implementation of Erosion and Sediment Control BMP's
4c-1	Waste Controls for Construction Site Operators
4d-1	Procedure for Site Plan Review
4d-2	Impaired Waters Review Process
4e-1	Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance
4f-1	Establishment of Procedures for Site Inspections and Enforcement

Post Construction Stormwater Management in New Development and Redevelopment

5a-1	Development and Implementation of Structural and/or Non-structural BMPs
5b-1	Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment
5c-1	Long-term Operation and Maintenance of BMPs

Pollution Prevention/Good Housekeeping

6a-1	Municipal Operations and Maintenance Program
6a-2	Street Sweeping
6b-1	Annual Inspection of All Structural Pollution Control Devices
6b-2	Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis
6b-3	Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas
6b-4	Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures
6b-5	Record Reporting and Retention of All Inspections and Responses to the Inspections
6b-6	Evaluation of Inspection Frequency

This Program is to be monitored and evaluated each year to ensure compliance with the Phase II Program, appropriateness of the identified BMPs and progress toward achieving the identified measurable goals.

SECTION II - WATER RESOURCES MANAGEMENT RELATED AGREEMENTS

The City of Ham Lake is comprised of one Watershed District and two Watershed Management Organizations (see Map II - 1). The Watershed Management Organizations are the Sunrise River Watershed Management Organization (SRWMO) and the Upper Rum River Watershed Management Organization (URRWMO). The Watershed District is the Coon Creek Watershed District (CCWD).

A. COON CREEK WATERSHED DISTRICT

The CCWD is the major watershed for the City. There are 32.27 square miles of the CCWD located within the City. The City of Ham Lake is 30.2 percent of the CCWD's 107 square mile area. This 32.27 square mile area is 90.2 percent of the City's 35.79 square mile area. The CCWD was established on May 28, 1959, by order of the Minnesota Water Resources Board under authorities given by Minnesota Statute Chapter 112. The City requested CCWD in early 2015 to take over jurisdiction of the portions of the City located within the SRWMO and the URRWMO, which was denied.

B. SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION

The SRWMO is located in the northeastern corner of the City of Ham Lake. There are 1.83 square miles of the SRWMO located within the City. The City of Ham Lake is 2.6 percent of the SRWMO's 70.78 square mile area. This 1.83 square mile area is 5.1 percent of the City's 35.79 square mile area. The City of Ham Lake has joined the Cities of Columbus and East Bethel and the Township of Linwood in a Joint Powers Agreement forming the SRWMO in order to develop and implement a Watershed Management Plan. The City of Ham Lake joined the agreement on February 15, 1995. A further amended Joint Powers Agreement was executed in September 2000. The Joint Powers Agreement was completed under the authority given by Minnesota Statute Sections 103B.201 through 103B.255 and 471.59. The City of Ham Lake is the Local Government Unit (LGU) for that portion of the SRWMO within the City. The City has requested a revision to the JPA in 2015 and 2019 that the administrative costs be based on the non-operating costs formula (50/50 land area and market value).

C. UPPER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION

The URRWMO is located in the northwestern corner of the City of Ham Lake. There are 1.70 square miles of the URRWMO located within the City. The City of Ham Lake is 1.3 percent of the URRWMO's 126.5 square mile area. This 1.70 square mile area is 4.7 percent of the City's 35.79 square mile area. The City of Ham Lake, along with the Cities of Bethel, East Bethel, Oak Grove and St. Francis and the Township of Burns, adopted a Joint Powers Agreement in 1991 forming the URRWMO. The Joint Powers Agreement was formed under the authority given by Minnesota Statute Sections 103B.201 through 103B.251 and 471.59. The City of Ham Lake is the LGU for that portion of the URRWMO within the City. The City has requested a revision to the JPA in 2015 and 2019 that the administrative costs be based on the non-operating costs formula (50/50 land area and market value).

SECTION III - EXECUTIVE SUMMARY

The SWPPP for the City of Ham Lake has been developed to meet the requirements of the Environmental Protection Agency and the Minnesota Pollution Control Agency. The SWPPP incorporates the five mission goals which are:

1. To prevent property damage from erosion or degraded water quality
2. To ensure that water is protected from contamination
3. To provide for a variety of beneficial uses including safety and enjoyment of residents
4. To preserve and enhance wildlife

SECTION IV - ESTABLISHMENT OF GOALS AND POLICIES

The City of Ham Lake has developed a number of goals and policies that conform to the overall purpose that is specified in the Permit and Minnesota Statute Section 103B.201. The Storm Water Pollution Prevention Program purpose is to minimize the discharge of pollutants, protect and improve water quality, satisfy the appropriate water quality requirements of the CWA, preserve and use natural water storage and retention systems in order to reduce, to the greatest practical extent, the public capital expenditures necessary to control excessive volumes and rates of runoff, prevent flooding and erosion from surface flows, promote groundwater recharge, protect and enhance fish and wildlife habitat and water recreational facilities and secure other benefits associated with the proper management of surface water. The City's goals and policies have been developed to compliment the Watershed District, Watershed Management Organizations, County, Regional, State and Federal goals and policies.

Goals are the desired results toward which efforts are directed. A policy is defined as a governing principle that provides the means for achieving established goals. These goals and policies have been developed to preserve and to use natural water storage and retention subsystems in order to:

1. Minimize, to the greatest extent, the public expenditures necessary to control excessive volumes and rates of runoff.
2. Maintain or improve the quality of water in lakes and streams located within or immediately downstream of the City.
3. Prevent erosion and sedimentation.
4. Protect wetlands in conformance with the requirements of the Wetland Conservation Act (WCA), or as amended.
5. Protect and enhance fish and wildlife habitat and water recreation.
6. Promote quality groundwater recharge.
7. Educate and inform the public on pertinent water resource management issues and increase public participation in water management activities.
8. Provide a mechanism through which City public and private ditch systems can be managed.
9. Comply with the Permit requirements.

The above goals are summarized for different subject areas as follows:

A. WATER QUALITY

GOALS

1. Maintain or improve the quality of water in lakes and streams located within or immediately downstream of the City.
2. Reduce pollutants in any storm water runoff from construction activities.
3. Detect and eliminate illicit discharges.
4. Prohibit non-storm water discharges into the storm sewer system.
5. Detect and address non-storm water discharges.

6. Ensure compliance with erosion control standards.

POLICIES

1. Natural vegetation will be preserved to the greatest practical extent.
2. Erosion control plans will be required for all land development disturbance activities. The erosion control plans will be consistent with the criteria established by the MPCA's Best Management Practices Handbook, Protecting Water Quality in Urban Areas, and all subsequent changes, Ham Lake City Codes and the technical criteria in Section VII, of this document.
3. Erosion and sediment control measures on the grading, drainage and erosion control plan must be installed prior to site and utility work.
4. Storm water detention basins will be used to maximize the enhancement of water quality by removing sediment and nutrients from runoff.
5. BMPs are to be applied to the design of new storm water management basins where required per the technical criteria in Section VII, of this document.
6. Outlet control structure will be used to maximize detention time and enhance sediment removal and nutrient assimilation.
7. Storm water facility outlets will be designed to prevent debris from entering the conveyance system, impeding the flow path and to control floatables.
8. All existing storm drain inlets and conveyance systems shall be adequately protected from erosion and sedimentation with methods consistent with the technical criteria in Section VII, of this document.
9. Temporary sediment basins for runoff will be constructed as needed in areas of new development to prevent sediment from leaving the construction area.
10. Establishment of temporary and permanent vegetation will meet the technical criteria in Section VII, of this document.
11. All disturbed areas will be protected from storm water runoff in a manner consistent with the technical criteria in Section VII, of this document.
12. The City shall develop a Field Form for inspection of drainage system, basins and control structures, including a follow up Action Form for recording of maintenance and repairs. A maintenance and improvement program is to be developed within Section VII, of this document.
13. The City shall develop and maintain records of all on-site wastewater systems and wells, active and abandoned.
14. Apply to the MPCA for NPDES Phase II Permit for all construction site activities that result in a land disturbance of equal to or greater than one acre and less than five acres.
15. Incorporate potential water quality impacts in site plan review.

C. WETLANDS

GOALS

1. Protect wetlands in conformance with the requirements of the WCA or as amended.
2. Protect and enhance fish and wildlife habitat and water recreation.

POLICIES

1. Alteration of wetlands is to be minimized. Alteration may be allowed on an individual basis if the alteration meets the requirements of the federal, state and local laws and regulations, the WCA and the technical criteria of Section VII, of this document.
2. The actual boundaries of each wetland must to be delineated by a certified wetland delineator and verified in the field by the LGU prior to any development activities which might affect the wetland. A wetland delineation report will be submitted to the LGU and the City Engineer.
3. Any person proposing or carrying out filling or other development activities in or affecting wetland areas will obtain a City, Watershed District, Watershed Management Organization, DNR and/or a U.S. Army Corps of Engineers (COE) permit(s).
4. Wetlands will be protected whenever possible to preserve the wetlands ability to assimilate nutrients from runoff. All development activities will meet the requirements of the WCA and the technical criteria of Section VII, of this document.
5. When modifying wetlands, existing habitats shall be considered, maintained and enhanced, or new habitats will be developed.
6. The water surface bounce of wetland detention basins will be avoided or minimized to prevent adverse habitat changes.
7. The State, County and City shall work together to enhance water-based recreation by promoting the improvement of public boat access to City lakes.

D. GROUNDWATER RECHARGE

GOALS

1. Promote quality groundwater recharge.

POLICIES

1. Dead storage will be provided in detention basins to promote groundwater recharge per the technical criteria of Section VII, of this document.

E. PUBLIC EDUCATION

GOALS

1. Educate and inform the public on pertinent water resource management issues and increase public participation in water management activities.
2. Inform citizens about the impacts polluted storm water runoff discharges can have on water quality.
3. Inform public of hazards associated with illegal discharges.

POLICIES

1. The City shall actively develop and implement a community education program relating to preserving and improving water quality.
2. The City shall actively develop and implement an awareness program on the proper use of fertilizer.
3. The City shall actively develop and implement an Education Program addressing each MCM.
4. The City shall make available Guidelines for Development.

F. DITCH SYSTEMS

GOALS

1. To provide a mechanism through which City public ditch systems will be managed, for the purpose of protecting local water resources from degradation, including private ditches that serve existing development and multiple owners.

POLICIES

1. Develop a ditch system management policy whereby public ditches and private ditches used by public runoff can be maintained and/or purchased.
2. Anoka County is to maintain County Ditches within the URRWMO and SRWMO located within the City. CCWD took over the County Ditches within the Watershed District.
3. CCWD is to maintain CCWD ditches located within the City. The SRWMO and URRWMO do not have jurisdiction of any ditches.
4. The City is to obtain drainage easements for drainage areas and ditches which service the City, public and multiple owners except for ditches that fall under the jurisdiction of the County or the CCWD.
5. Anoka County shall obtain drainage easements for ditches under their jurisdiction.

SECTION V, ASSESSMENT OF PROBLEMS AND CORRECTIVE ACTION

A. AREAS OF POTENTIAL CONTAMINATION

Some rural residences and commercial properties still make use of outdated and/or poorly maintained subsurface sewage treatment systems. These systems may have failing septic tanks, failing drain fields and/or sludge buildup. Tank deterioration or failure and drain field ponding can cause contamination of the area groundwater, lakes, streams and wetlands. Once failing systems have been reported to the City and to the Anoka County Community Health & Environmental Services, owners of the failing systems are required to bring their system into compliance with State septic system regulations.

Increased residential development will result in an increased number of on-site subsurface sewage treatment systems which in turn may increase the potential for groundwater contamination. An increase in residential development denotes an increase in residential drinking water wells. As with many existing wells, some of these new wells could possibly be located in the same aquifer as the subsurface sewage treatment systems. As long as developments adhere to current state, county and local government regulations regarding on-site water supply and subsurface sewage treatment systems, no problems of this type are expected to be caused by new developments.

To reduce this potential pollutant source, non-conforming on-site subsurface sewage treatment systems shall be upgraded to meet or exceed current state, county and City regulations regarding on-site subsurface sewage treatment systems.

The main environmental hazards in the City of Ham Lake are from non-point sources of pollution such as surface water runoff from agricultural, animal feedlots, urban areas and construction areas. The surface water runoff from these areas can cause a degradation of water quality in City lakes and wetlands due to overloading of sediment, nutrients, toxic chemicals and fecal coliform bacteria.

Groundwater quality is a priority in the City of Ham Lake. There is no municipal sewage or water systems in the City. Residential water and sewer systems are provided by on-site wells and subsurface sewage treatment systems. Many of the residential wells are shallow and located in the glacial drift aquifer which is very susceptible to contamination. The permeable nature of glacial drift allows for downward movement into the aquifer of any contaminants spilled into the drift, allowing for the introduction of pollutants into the aquifer. Unused and abandoned wells are an additional threat to groundwater quality. Improperly capped wells can allow contamination to reach the groundwater. The ACD maintains an inventory of abandoned wells. The Minnesota Department of Health (MDH) requires that all uncapped wells that are unused or abandoned on a property being sold or transferred to be capped prior to the sale or transfer of the property.

Two petroleum pipelines run through the City. These pipelines present the potential for an environmental hazard to groundwater if the pipes should develop a leak. Minnesota Pipeline Company oil line and Northern Natural gas line cross the southerly half of the City.

Old dump sites have the potential to pollute the groundwater. There are nine known dump sites within the City per the MPCA, all of which are considered inactive. For additional information see Map VI - 2, MPCA Pollutant Source Locations and the MPCA Pollutant Source Location Data in Appendix C.

Peterson Farm's (MPCA ID VP13660) is located at 1719 Bunker Lake Boulevard NE. The site was entered into the Voluntary Investigation Cleanup Program on October 31, 2000. The MPCA considers the site inactive, with the Response Action Plan approval on May 16, 2001, Work Plan approval on September 18, 2001 and No Further Action letter issued May 23, 2002. Additional information can be found at https://webapp.pca.state.mn.us/wimn/site/189698.

The Deer Haven dump (MPCA ID VP16610) is located within the Deer Haven Hills Development in the vicinity of 148th Lane and Yancy Street. The site was entered into the Voluntary Investigation Cleanup Program on September 17, 2002. The MPCA approved the Response Action Plan on September 30, 2003, issued the Work Plan Approval letter on April 29, 2003 and issued the No Further Action letter on May 25, 2004. The MCPA considers the site inactive. Additional information can be found at https://webapp.pca.state.mn.us/wimn/site/197217.

The Opal Street Property (MPCA ID VP16220) is located at 17325 Opal Street. The MPCA considers the site inactive, with the Response Action Plan approval on December 12, 2002, and the No Action letter issued November 9, 2009. Additional information can be found at https://webapp.pca.state.mn.us/wimn/site/187403 .

The Robert Anderson parcel (MPCA ID VP19490) is located within the Fox Run 5th Addition north of 155th Avenue (former 4109 155th Avenue). The site's address is 202 3rd Street. The site was entered into the Voluntary Investigation Cleanup Program on August 18, 2004. The Work Plan approval letter and Contingency Action Plan are both dated November 2, 2006. The MPCA considers the site inactive, with a No Association Determination issued December 14, 2004 and a No Further Action letter sent November 6, 2006. Additional information can be found at https://webapp.pca.state.mn.us/wimn/site/222307.

The Anoka County Highway Department located an old farm dump, which is identified as MPCA ID VP26180, when excavating a storm water retention pond at 1745 Bunker Lake Boulevard for the Bunker Lake Boulevard improvement project. The site was entered into the Voluntary Investigation Cleanup Program on May 20, 2010. The MPCA considers the site inactive, with the Response Action Plan approval and Phase II approval both on May 28, 2010. Additional information can be found at https://webapp.pca.state.mn.us/wimn/site/221419.

There are four unpermitted dumps located in the City of Ham Lake. The Erickson dump (https://webapp.pca.state.mn.us/wimn/site/186510) is located south of the intersection of Bunker Lake Boulevard and Naples Street. Flamingo Terrace dump (https://webapp.pca.state.mn.us/wimn/site/199137) is located southwest of the intersection of

169th Avenue and Highway 65. The McKinley School dump (https://webapp.pca.state.mn.us/wimn/site/106682) is located south of Constance Boulevard and west of Hastings Street. The unpermitted dump identified as Peterson Dump-2 (https://webapp.pca.state.mn.us/wimn/site/189069) is located north of 140th Avenue west of Kenyon Street.

The MPCA maintains a list of registered under ground and above ground storage tanks. Leaking storage tanks have the potential to pollute the groundwater. The MPCA maintains a list of leaking underground storage tanks. There are several sites within the City that are being monitored by the MPCA for leaking tanks.

The MPCA maintains a list of spills of petroleum products and/or hazardous substances. Spills of petroleum products and hazardous substances can potentially pollute the groundwater.

B. IMPAIRMENT REDUCTION

The City of Ham Lake has several lakes and waterways that are impaired and exceed the Total Maximum Daily Load (TMDL) allowed by the EPA. Coon Lake and Ham Lake and impaired with mercury. While this is not related to storm water pollution, corrections for this impairment will remain with the Minnesota DNR.

Coon Creek enters Ham Lake at the boundary of Ham Lake and the Carlos Avery State Wildlife Management area and exits the City approximately 1.3 miles north of the southeast corner of the City. Coon Creek is impaired with Total Suspended Solids (TSS), Total Phosphorous (TP) and E.Coli. Due to the multiple jurisdictions this effects, the City of Ham Lake is partnering with Coon Creek Watershed District to tackle this in conjunction with other Cities to reduce the Waste Load Allocation (WLA). Ham Lake will work with the Coon Creek Watershed District to preform testing to find the TSS and TP concentration at certain locations within Coon Creek within the City and locate any point sources that may exist. When enough data is gathered, the Coon Creek Watershed District will provide the City with recommended actions that need to be keep TSS and TP concentration below WLA approved for Coon Creek. Until TSS and TP concentration have been lowered to remove Coon Creek off of the impaired list, the Coon Creek and the City of Ham Lake will continue to gather data and make adjustments as needed.

SECTION VII - FINANCIAL CONSIDERATIONS

The City of Ham Lake has a limited number of resources available for implementing storm water pollution prevention and water resource management practices. The highest management priorities are pollution prevention, storm water runoff and water quality management.

Funding sources for water quantity and water quality improvement projects will be determined for individual projects by the City. Possible funding sources include:

1. Special assessments for local improvements made under the authority granted by

Minnesota Statute Chapter 429. Properties can be assessed annually to fund storm water management plans.

2. Revenue generated by Watershed Management Special Tax Districts provided for under Minnesota Statute Chapter 103B.245.
3. For projects being completed by, or in cooperation with, the CCWD, the URRWMO and/or the SRWMO, funds could be obtained from Watershed District/Watershed Management Organization levies associated with their administrative funds, construction funds, preliminary funds, repair and maintenance funds and/or survey and data acquisition funds, as provided for in Minnesota Statute Section 103D.905, Funds of the Watershed District.
4. General Fund (Maintenance).
5. City funds for budgeted projects.
6. User fees.
7. Special benefit charges.
8. Groups such as sportsman's clubs and nature groups for projects that will enhance wildlife and other preservation objectives.
9. Grant and loan monies that may be secured from various local, regional, County, State or Federal agencies for some elements of the SWPPP, depending on the BMPs selected and the location.
10. Storm Water Utility Fees - Utility service charges are rates billed to customers for providing storm water management services. The service charges could be flat rates, or variable rated based on classes of customers. Utility service charges could represent a dedicated source of funding and an ongoing method of funding some or all storm water management programs.
11. Debt financing – The City could issue debt to finance the SWPPP, including revenue bonds and general obligation bonds.
12. Local Improvement – Under this type of funding system, individual properties benefited by storm water projects are assessed to fund the project.
13. Inspection Fees – plan review and inspection fees would allow the City to recover some or all of the direct cost associated with performing design reviews for pre and post construction BMPs.
14. Developer Fees – The developers construct needed facilities as a condition of development and bear associated costs.

SECTION VII - IMPLEMENTATION PRIORITIES AND IMPLEMENTATION PROGRAM

Based on the information developed in Sections III through VI, the City of Ham Lake has developed a storm water pollution prevention that reflects the needs and concerns of the City Council, City staff and private citizens, as well as the funding capabilities of the City. A listing of the studies, programs and capital improvements that have been identified as necessary to respond to the water resource needs within the City are outlined in this Section. A copy of the CCWD's Rules that were adopted October 2022 is included in Appendix L. The SRWMO Stormwater Standards from the November 7, 2019 adopted Fourth Generation Watershed Management Plan is attached as Appendix M and SRWMO Wetland Standards are attached as Appendix N. The URRWMO Stormwater Infiltration Standards from the Comprehensive Watershed Management Plan dated July 2019 is attached in Appendix O, and the URRWMO Wetland Standards are attached as Appendix P.

A. DRAINAGE

The natural drainage system will be in part used for the storage and flow of runoff. The drainage system will conform to Ham Lake City Code 10-430 and the following:

1. The relationship between flood storage volume and ditch capacity shall be optimized to provide the best balance between volume and capacity, considering not only the specific site, but also the water quality impacts on downstream regional detention basins, lakes and wetlands. The intent is to allow for both live and dead storage within ditches and/or restrict flows to meet specific site, local and regional water quality and quantity criteria.
2. Storm water will be treated per this section prior to discharge into any waters or wetlands.
3. Proposals for ditch repair, abandonment or new construction, as well as ditch crossings will be administered through the appropriate controlling agency. Ditch repairs will be completed in accordance with all applicable Minnesota Statutes, County, CCWD and City requirements.
    a. The City is responsible for ditch easements, repair, abandonment or new construction and administering of ditch crossings for ditches under the jurisdiction of the City.
    b. Anoka County is responsible for ditch easements, repair, abandonment or new construction and administering of ditch crossings for County Ditches under the jurisdiction of the County within SRWMO and URRWMO located within the City. Note that CCWD has jurisdiction over the County ditches.
    c. The CCWD is responsible for ditch easements, repair, abandonment or new construction and administering of ditch crossings for County Ditches under the jurisdiction of the CCWD.
8. Driveway culverts are coordinated with the Ham Lake Public Works Department and/or the Building Department.

C. STORM WATER BASIN

1. To control floating debris, a skimmer device is to be required at the outlet for sedimentation and detention basins. The maximum velocity during a 1-year, 1-hour

rainfall event through the skimmer device shall not exceed 0.5 fps. The materials, plan and installation will be to the approval of the City Engineer. See Typical Baffled Weir Detail and Basin Outlet Structure Details in Appendix D.

2. An emergency spillway or a combination with the outlet pipe and/or control structure will be provided on all basins. The materials, plan and installation will be to the approval of the City Engineer. See Typical Baffled Weir Detail and Basin Outlet Structure Details in Appendix D.
3. Basin design requirements for depth, side-slopes, shelf-dimensions and length to width ratio may be modified with permission of the City Engineer and the LGU in basins with dead storage volume less than 0.10 acre-feet.
4. Basin volumes are to be surveyed as needed by the City. Basins will be dredged by the City if basin volumes fall below 50 percent of design specifications as determined by the City.
5. Storm water basins are not required for one lot single family new residential.
6. Storm water basins are not required for new developments that drain into a regional detention basin, provided that the regional detention basin has the required rate control volume and permanent pool volume and controls for the new development, per this Section. The Developer is to supply supporting calculations.
7. Regional detention basins for new subdivisions are to be considered on a development-by-development basis, to the approval of the City Engineer.
8. Sedimentation control is required for all drainage areas.
    a. The permanent pool (dead storage) volume below the principal spillway (normal outlet) for the storm water runoff from any watershed that discharges into a stream, lake or a type 3, type 4 or type 5 wetland based on the classification system presented in Wetlands of the United States, USFWS Circular No. 39, 1971 edition and subsequent updates will be greater than or equal to the runoff from a 2.5-inch rainstorm over the entire contributing drainage area (this includes a 0.5-inch for sediment storage).
    b. The permanent pool (dead storage) volume below the principal spillway (normal outlet) for the storm water runoff from all other drainage areas will be greater than or equal to the runoff from a 0.5-inch rainstorm over the entire contributing drainage area.
    c. The permanent pool depth will not be less than four feet. The maximum depth of the permanent pool will be no greater than ten feet.
    d. Minimum permanent pool areas will be the greater of two percent of the watershed's impervious area or one percent of the watershed area.
    e. Sedimentation and detention basin side slopes above the normal water level will be no steeper than four feet horizontal to one foot vertical (4:1). A ten-foot-wide basin shelf starting at the normal water level and extending below the normal water level will be no steeper than ten feet horizontal to one foot vertical (10:1). Basin side slopes from the bench to the basin bottom will be no steeper than three feet horizontal to one foot vertical (3:1). Sedimentation basins with volume less than to 0.03 acre-feet are to provide a maximum slope below the normal water level of 4:1 eliminating the 10:1 bench.
    f. Basin design requirements for depth, side-slopes, shelf-dimensions and length to width ratio may be modified with the approval of the City Engineer and the LGU in

basins with dead storage volume less than 0.10 acre-feet.

g. To prevent short-circuiting, the distance between major inlets and the normal outlet will be maximized. The length to width ratio of the permanent pool should be at least 3:1.

9. Modified wet/dry detention basins may be used with approval of the City Engineer.
   a. Modified wet/dry detention basins with outlet filter control will meet the above requirements with the following exceptions:
      1. Provide detention basin with a slotted riser pipe with filter overflow to the top of treatment zone or an outlet control structure and filter meeting same design criteria.
      2. The water quality treatment zone volume should be equal to or greater than the runoff volume from the 1-year, 24-hour event but in no case will be less than the runoff from a 0.5-inch rainfall over the entire watershed draining to the basin. Wetted surface area of the water quality zone should be at least 0.5 percent of the total watershed area draining to the basin.
      3. The basin will manage, through use of controls, the 100-year, 24-hour storm with 100 percent of the flow discharged through the outlet pipe.
      4. The water quality treatment zone volume will be drained from the basin in 3 to 4 days.
      5. Sample structure and outlet details are available from the City Engineer upon request.

11. The City Engineer may, based on site and adjacent site conditions, require greater control and treatment of storm water runoff.
12. For projects located within the CCWD, storm water volume management practices shall be the equivalent of infiltrating the first inch of precipitation over the entire project site, to the maximum extent practicable, with a minimum of infiltrating the first inch over new impervious areas. For projects located within the SRWMO and URRWMO, storm water volume management practices shall be the equivalent of infiltrating the first ½ inch of precipitation over the entire project site, to the maximum extent practicable, with a minimum of infiltrating the first ½ inch over new impervious areas.

D. WETLANDS

1. An on-site field investigation by a certified wetland delineator is required for all proposed development and construction using the most current "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" by the USFWS, SCS, Environmental Protection Agency and the COE to determine the limits of existing and adjacent wetlands. Stakes and other evidence used to delineate the wetlands will be preserved until the LGU has verified the delineation.
2. Wetland classification will be based on the classification system presented in Wetlands of the United States, USFWS Circular No. 39, 1971 edition and subsequent updates. The USFWS published Classification of Wetlands and Deepwater Habitats of the United States which provides the basis for the current National Wetlands Inventory (see Table VIII - 1, Wetland Types and Definitions). Wetlands located within SRWMO and URRWMO will be evaluated for function and value using the Minnesota Routine Assessment Method for Evaluating Wetland Functions (MnRAM).

3. Wetlands are to be protected from development as much as possible. Wetland alternations will only be allowed when laws and regulations allow and with the appropriate approvals by the City, Watershed District, Watershed Management Organization, ACD, BWSR, DNR and/or COE.
4. Any area to be disturbed below the OHW of public waters or connections to the public waters must first be authorized by the DNR commissioner per Ham Lake Ordinance 92-35 (Shoreland Zoning Ordinance). Placement of natural rock riprap and filter blanket and associated grading is permitted if the finished slope does not exceed 3:1, the landward extent of the riprap is within ten feet of the OHW and the height of the riprap above the OHW does not exceed three feet, per Ham Lake Ordinance 92-35. See Shoreland Ordinance in Appendix Q. Wetland (and buffer area if required) are to be protected with silt fence.
5. Mitigation may be required for disturbed wetlands. Wetland mitigation approval is required from the Technical Evaluation Panel (watershed district and/or watershed management organization, ACD, BWSR, DNR and/or the COE. Depending on the amount of disturbed wetland and the type of wetland, comments may be solicited for the COE, DNR, Watershed District or Watershed Management Organization, BWSR and ACD. Disturbed wetland exemption requirements are listed in "Wetland Conservation Act Rules" Chapter 8420.0422 Exemption Standards. A wetland exemption (De Minimis) calculation sheet is available from BWSR via the internet. This form is also in Appendix T.
6. Wetland replacement for public transportation projects that meet BWSR and WCA criteria may be done through the WCA road replacement program. Application process is through the watershed district or watershed management organization.
7. Sequencing procedures and mitigation options will be followed for proposed wetland alteration.
    a. Avoidance: The applicant must demonstrate that the proposed wetland impacts result in the least environmentally damaging practical alternative. Evaluating such alternative must consider whether the proposed development activity requires, or is dependent upon, water or wetland proximity. If the development activity does not require water or wetland proximity, it is presumed that other practical alternatives are available. The avoidance determination cannot consider compensatory wetland replacement.
    b. Minimization: Appropriate and practical steps must be taken to decrease to the least possible amount the adverse wetland impacts through project modifications. The minimization process cannot consider compensatory wetland replacement.
    c. Wetland Replacement: Appropriate and practical wetland replacement is required for adverse impacts which remain after all avoidance and minimization actions have been implemented. Except as listed below, wetland replacement will be provided at a minimum ratio of two to one (2:1) for nonagricultural wetland impact and one to one (1:1) for agricultural Type 1 and/or Type 2 wetland impact. Wetland replacement must be performed before or concurrent with development. Wetland replacement will include the following actions in descending order of acceptance:
        i. Restoration of existing previously degraded (filled or drained) wetlands within the same watershed

ii. Creation of on-site, man-made wetlands within the proposed project site or contiguous to the proposed project site.

iii. With the permission of the City Engineer and the LGU, a portion of the man-made wetland may consist of a buffer zone adjacent to the wetland. The buffer zone is not to be mowed or otherwise disturbed. The minimum average width of the buffer zone is 25 feet, with a minimum width of 20 feet. The design of the buffer strip will be per the recommendations of the City Engineer. Wetland replacement credit for the buffer strip is per the WCA.

iv. Enhancement of certain existing wetlands may be allowed by the City Engineer and the LGU. Exchange of an existing common wetland habitat type to a rare wetland habitat type or changing the hydrologic regime are examples of enhancement measures.

v. Use of banked wetland for replacement may be allowed in genuine hardship situations, as to be determined by the LGU and the City Engineer. Banking will be per WCA requirements.

8. Removal of vegetation within a wetland area will be per City of Ham Lake requirements and Ordinances, Watershed District, DNR and WCA requirements, and only when reasonably required for the placement of structures and use of the property as permitted by this Plan.
9. Only fill substantially free of chemical pollutants and organic wastes, as determined by the City Engineer, may be used in wetlands.
10. Disposal of the excavated material shall not result in a significant change in the current flow, or substantial destruction of vegetation, fish spawning areas or water pollution.
11. Work in the wetland will not be performed during the waterfowl breeding season or the fish spawning season and only when authorized by the LGU.
12. The water level bounce of wetland detention basins will be minimized to prevent adverse habitat changes. See Figure IV - 1of Guidance for Evaluating Urban Storm Water and Snowmelt Runoff Impacts to Wetlands by State of Minnesota Storm Water Advisory Group dated May 1995 in Appendix E. There are exceptions to the general categories. Wetland water level bounce must meet the WCA requirements and the approval of the City Engineer and the LGU. Obtain approval of adjacent property owners impacted by any additional water level bounce in the wetland.

E. EROSION AND SEDIMENT CONTROL

The developer will prepare and implement an erosion and sediment control plan per Ham Lake City Code 10-430 and 11-2000. These plans will contain the following:

1. Natural vegetation should be retained wherever possible.
2. A periodic watering plan to keep disturbed soil moist.
3. All disturbed areas will be seeded and mulched within two weeks after rough grading is completed. All seeding and mulch will be per the City of Ham Lake Construction Requirements on file at the office of the City Engineer. Seeding and mulching include hydroseeding and hydromulching.
4. If the disturbed area is not ready for permanent sod or seed, the disturbed area will be temporary seeded and mulched. The rate of seeding will be at 1.5 times the City required rate per acre for permanent seed. If temporary cover is to remain in place beyond the

ii. Creation of on-site, man-made wetlands within the proposed project site or contiguous to the proposed project site.

iii. With the permission of the City Engineer and the LGU, a portion of the man-made wetland may consist of a buffer zone adjacent to the wetland. The buffer zone is not to be mowed or otherwise disturbed. The minimum average width of the buffer zone is 25 feet, with a minimum width of 20 feet. The design of the buffer strip will be per the recommendations of the City Engineer. Wetland replacement credit for the buffer strip is per the WCA.

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v. Use of banked wetland for replacement may be allowed in genuine hardship situations, as to be determined by the LGU and the City Engineer. Banking will be per WCA requirements.

8. Removal of vegetation within a wetland area will be per City of Ham Lake requirements and Ordinances, Watershed District, DNR and WCA requirements, and only when reasonably required for the placement of structures and use of the property as permitted by this Plan.
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4. If the disturbed area is not ready for permanent sod or seed, the disturbed area will be temporary seeded and mulched. The rate of seeding will be at 1.5 times the City required rate per acre for permanent seed. If temporary cover is to remain in place beyond the

SECTION VIII – MODIFICATIONS TO THE SWPPP

The following conditions apply to modifications to the SWPPP.

1. The MPCA Commissioner may require the City of Ham Lake to modify the SWPPP as needed, and may consider the following factors:

    a. Discharges from the storm sewer system are impacting the quality of receiving waters;

    b. More stringent requirements are necessary to comply with new state or federal regulations; or

    c. Additional conditions are deemed necessary to comply with the goals and requirements of the CWA.

2. Modifications required for the SWPPP shall be requested by the Commissioner in writing, setting forth schedules for compliance, offering the City of Ham Lake the opportunity to propose alternative program modifications, and comply with other requirements of law, to meet the objectives of the requested modification.

3. The SWPPP may be modified by the City of Ham Lake without prior approval of the Commissioner, provided it is in accordance with the following:

    a. BMP is added, and none subtracted, from the SWPPP;

    b. A less effective BMP identified in the SWPPP is replaced with an alternate BMP. The alternate BMP shall address the same, or similar, concerns as the ineffective or failed BMP; and

The MPCA Commissioner will be notified of the modification in the annual report for the year the modification is made.

ACRONYMS

ACD ..... Anoka Conservation District
BAT ..... Best Available Technology Economically Achievable (applies to non-conventional and toxic pollutants)
BCT ..... Best Conventional Pollutant Control Technology (applies to conventional pollutants)
BMP ..... Best Management Practice
BWSR ..... Minnesota Board of Water and Soil Resources
CCWD ..... Coon Creek Watershed District
COE ..... US Army Corps of Engineers
CWA ..... Clean Water Act
DNR ..... Minnesota Department of Natural Resources
EPA ..... Environmental Protection Agency
FPS ..... Feet Per Second
GIS ..... Geographic Information Systems
GPD ..... Gallons Per Day
GPM ..... Gallons Per Minute
LGU ..... Local Government Unit
MCM ..... Minimum Control Measure
MDH ..... Minnesota Department of Health
MEP ..... Maximum Extent Practicable
MGY ..... Million Gallons Per Year
MNRAM .. Minnesota Routine Assessment Method for Evaluating Wetland Functions
MPCA ..... Minnesota Pollution Control Agency
MS4 ..... Municipal Separate Storm Sewer System
NOAA ..... National Oceanic and Atmospheric Administration
NOI ..... Notice of Intent
NPDES .... National Pollutant Discharge Elimination System
NPS ..... Non-point Source
OHW ..... Ordinary High Water
SCS ..... Agriculture Soil Conservation Service
SIC ..... Standard Industrial Classification
SSTS..... Subsurface Sewage Treatment System
SRWMO .. Sunrise River Watershed Management Organization
SWPPP .... Storm Water Pollution Prevention Program
TMDL ..... Total Maximum Daily Load
TSI ..... Trophic States Index
TSS ..... Total Suspended Solids
URRWMO Upper Rum River Watershed Management Organization
USFWS .... United States Department of Interior Fish and Wildlife Service
USGS ..... United States Geological Survey
WCA ..... Wetland Conservation Act
WRAPS ... Watershed Restoration and Protection Plan Strategy

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GLOSSARY

Algae: Simple rootless plants that grow in bodies of water in relative proportions to the amount of nutrients available. Algal blooms, or sudden growth spurts, can affect water quality adversely.

Alkalinity: A measure of the capability of water to neutralize acids.

Aquifer: A geologic formation, group of formations or part of a formation composed of rock, sand or gravel capable of storing and yielding groundwater to wells and springs.

Bearing Capacity: Ability of soil to carry a load.

Best Available Treatment (BAT)/Best Control Technology (BCT): A level of technology based on the very best (state of the art) control and treatment measures that have been developed or are capable of being developed and that are economically achievable within the appropriate industrial category.

Best Management Practices (BMPs): Activities or structural improvements that help reduce the quantity and improve the quality of storm water runoff. BMPs include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Bounce: The vertical elevation difference between the peak flood elevation and the pond/wetland elevation.

Buffer Zone: Upland areas immediately adjacent to basins or wetlands as special protection zones.

City Ditch: An open channel to conduct the flow of water. City ditches includes only those ditches which are owned and maintained by the City of Ham Lake.

Clean Water Act (Water Quality Act): (formerly the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972). Public law 92-500; 33 U.S.C. 1251 et seq.; legislation which provides statutory authority for the NPDES program. Also known as the Federal Water Pollution Control Act.

Control Measure: A practice or combination of practices to control erosion and attendant pollution.

Conveyance: The process of water moving from one place to another.

County Ditch: An open channel to conduct the flow of water (Minnesota Statute Section 103E.005 Subdivision 8). County ditch includes only those ditches which are part of the Anoka County public drainage system as identified in the Anoka County Public Ditch Inventory dated January 1992.

Creek: A small stream, often a shallow or intermittent tributary to a river.

Criteria: The measures, principles, models, design levels, or rates which are used to gauge the suitability and accuracy of policies or performance of management strategies.

Design Storm: A rainfall event of specific return frequency and duration that is used to calculate the runoff volume and peak discharge rate.

Detention: The temporary storage of storm runoff, which is used to control the peak discharge rates and which provides gravity settling of pollutants.

Detention Basin: Any lake, pond, basin, storm water storage area, or wetland that temporarily detains storm water runoff for the purpose of storm water management or for the purpose of both storm water and water quality management.

Discharge: The volume of water (and suspended sediment if surface water) that passes a given location within a given period of time.

Discharge Monitoring Report: The required annual report to be submitted by an MS4.

Drainage Easement: A legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

Dry Weather Flow: Water entering storm drains during dry weather conditions which usually indicate illicit connections into the storm sewer system.

Ditch Repair: To restore all or part of a ditch drainage system, as nearly as practicable, to the same condition as when originally constructed and subsequently improved. Resloping of ditches, leveling and reseeding of waste banks, if necessary, to prevent further deterioration. Realignment of original construction, if necessary, and to restore the effectiveness of the system or prevent the drainage of a wetland. Routine operations that may be required to remove obstructions and maintain the efficiency of the drainage system. Restoration or enhancement of wetlands; and Wetland replacement under Minnesota Statute Section 103G.222.

Energy Dissipation: To cause to lose energy irreversibly.

Erosion: When land is diminished or worn away due to wind, water, or glacial ice. Often the eroded debris (silt or sediment) becomes a pollutant via storm water runoff. Erosion occurs naturally but can be intensified by land clearing activities such as farming, development, road building and timber harvesting.

Eutrophic: Pertaining to a lake containing a high concentration of dissolved nutrients; often shallow with periods of oxygen deficiency.

Excavation: The process of removing earth, stone, or other materials from land.

Fecal Coliform Bacteria: Minute living organisms associated with human or animal feces that are used as an indirect indicator of the presence of other disease-causing bacteria.

Filter Fabric: Textile of relatively small mesh or pore size that is used to allow water to pass through while keeping sediment out.

Floodplain: The area of land adjoining a watercourse, water basin or wetland that has been or may be covered by a regional flood.

Floodway: The channel of a watercourse and those portions of the adjoining floodplain, which are reasonably required to carry and discharge the 100-year flood.

Freeboard: The space from the top of an embankment to the highest water elevation expected for the largest design storm stored.

Fully Reconstructed: Areas of impervious surfaces that are being removed down to the underlying soils

Geology: The science, which treats the origin, history and structure of the earth, as recorded in the rocks; together with the forces and processes now operating to modify rocks.

Glacial Drift: Pulverized and other rock material transported by glacial ice and then deposited.

Goals: The objectives which the City will strive to attain in complying with the Metropolitan Surface Water Management Act.

Grading: The cutting and/or filling of the land surface to a desired slope or elevation.

Groundwater: Water underneath the ground surface that is under positive pressure.

Hydraulics: The physical science and technology of the static and dynamic behavior of fluids (water).

Hydrograph: A graphical representation of stage, flow, velocity, or other characteristics of water at a given point as a function of time.

Hydrology: The science that treats the occurrence, circulation, distribution and properties of the waters of the earth, and their reaction with the environment.

Illicit Connection: Any discharge to a municipal separate storm sewer that is not composed entirely of storm water and is not authorized by a separate NPDES permit or included in an approved SWPPP, with some exceptions (e.g., discharges due to fire fighting activities).

Impervious Surface: Impermeable surfaces, such as pavement or rooftops, which prevent the infiltration of water into the soil.

Industrial Activity: Any activity which is directly related to manufacturing, processing, or raw materials storage at an industrial plant.

Infiltration: The downward movement of water from the surface to the subsoil. The infiltration capacity is expressed in terms of inches per hour.

Lake: A large inland body of fresh water of salt water.

Lateral Ditch: Any open channel or storm drain drainage construction by branch or extension, or a system of branches and extensions, or a drain that connects or provides an outlet to property with an established drainage system (Minnesota Statute Section 103E.005, subdivision 15). Lateral includes only those facilities which are connected to the Anoka County ditch system as identified in the Anoka County Public Ditch Inventory dated January 1992.

Linear Project: Construction of new or reconstructed roads, sidewalks, etc. that are not part of a common plan of development.

Management Strategy: The specific physical, legal or administrative actions recommended or implemented based upon the established criteria will achieve the policies and goals.

Maximum extent practicable: A standard for water quality protection that applies to all MS4 operators regulated under the NPDES Storm Water Program. Since no precise definition of MEP exists, it allows for flexibility on the part of MS4 operators as they develop and implement their programs.

Measurable Goals: Goals required for the Permit under each MCM and intended to gauge permit compliance and program effectiveness.

Minimum Control Measure: If coverage is obtained under a general permit or an individual permit under the Phase II regulations, the operator of a regulated small MS4 is required to implement a storm water management program that includes, at a minimum, the six minimum control measures.

Municipal Separate Storm Sewer System (MS4): A publicly-owned conveyance or system of conveyances that discharges to waters of the U.S. or waters of the State, and is designed or used for collecting or conveying storm water, is not a combined sewer, and is not part of a publicly-owned treatment works.

No exposure: All industrial materials or activities that are protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff. Industrial materials or activities include, but are not limited to, material handling equipment or activities, industrial machinery, raw materials, intermediate products, by-products, final products, or waste products. Material handling activities include the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product or waste product.

Non-point Source (NPS) Pollutants: Pollutants from any source other than from any discernible, confined and discrete conveyances. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water.

Normal Water Level: For basins, that water elevation maintained by a natural or man-made outlet.

Nutrient Assimilation: The process by which plants use minerals and organic nutrients, changing nourishment into living tissue.

Oligotrophic: Of a lake, lacking plant nutrients and usually containing plentiful amounts of dissolved oxygen without marked stratification.

One Hundred-Year (100) Storm: Rainstorm of varying duration (e.g., 2, 6 or 24-hour) and intensities (inches per hour) expected to recur on the average of once every one hundred years (1% frequency probability). The 100-year storm is equivalent to 5.9-inches of rainfall in a 24 hour period.

On-Site Detention: A method of storing storm water runoff at a development site in the form of wet or dry basins. While the primary objective is water quality control, significant reduction in outflow conveyor overloading is accomplished for high intensity, short duration storm events. This method is employed on developments when the regional detention basin approach is not available, usually due to site location of either facility.

Ordinary High Water (OHW) Level: That elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape. Generally, it is the point where the natural vegetation changes from predominately aquatic to terrestrial.

Organic Matter: A general term for plant and animal material, in or on the soil, in all stages of decomposition.

Organic Soil: A general term applied to a soil or to a soil horizon that consists primarily of organic matter.

Outfall: The point where storm water discharges from a sewer pipe, ditch, or other conveyance to a receiving body of water.

Peak Discharge Rate: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Permeability: The rate of flow of a liquid or gas through a porous material.

Point Source Pollutant: Pollutants from a single, identifiable source such as a factory or refinery.

Policies: The plans or course of action to be followed by the City in achieving the goals.

Pollutant Loading: The total quantity of pollutants in storm water runoff discharged to receiving waters.

Pond: An artificial water holding area.

Primary Capacity: The volume and/or rate of storm water runoff defined as that level of service provided by a lateral or outflow conveyor system.

Pristine: Show little disturbance from human activity.

Private Ditch: A privately owned and maintained open channel to conduct the flow of water.

Public Ditch: A public owned and maintained open channel to conduct the flow of water. See County Ditch or City Ditch.

Public Waters: Any waters defined in subdivisions 14 and 15 of Minnesota Statutes Section 105.37.

Rainfall Intensity: A measure of the number of inches of rainfall occurring during a given period, usually given in inches per hour.

Rational Method: A technique for estimating peak discharge rates for small developments, based on the rainfall intensity, watershed time of concentration and a runoff coefficient.

Recharge: The process by which waters on the earth's surface infiltrate the soils to replenish the groundwater.

Regional Detention Basin: A natural pond, basin or wetland area, often modified by man, in which a minimum and permanent water level is maintained. During periods of storm water runoff of various durations, the basin receives additional water, stores it temporarily, and releases it at a controlled rate(s). In addition to flow equalization in reducing existing flooding problems, the basin serves to reduce to the greatest practical extent, the suspended solids and associated pollutants in the existing storm flow from existing as well as the planned development projections. Regional detention basin serves more than one subdivision.

Relief: The elevations or inequalities of a land surface, considered collectively.

Retention: The holding of runoff in a basin without release except by means of evaporation, infiltration or emergency bypass.

Retention Basin: Any area that retains all runoff to that area, that is, an area without an outlet. A retention area is referred to as a landlocked area.

Riprap: A combination of large stone, cobbles and boulders used to line channels, stabilize banks, reduce runoff velocities or filter out sediment.

Runoff: Surface water drainage or flood discharge that leaves an area as surface flow or as pipeline flow and can reach a channel or pipeline by either surface or sub-surface routes.

Section: Includes all item numbers of the same whole number

Sediment: Soil, sand, and minerals washed from land into water, usually after rain and snowmelt. Sediment can destroy fish-nesting areas and clog animal habitats. It can also cloud waters so that sunlight does not reach aquatic plants, predators cannot find prey, and water temperatures increase.

Sedimentation Basin: Similar to a detention basin except that it has the purpose of enhancing water quality by allowing a portion of the solids transported in runoff to settle out.

Sensitive Use Areas: Sensitive use areas are farm fields, sod fields, golf courses and ditches that drain into these areas.

Sheet flow: The portion of precipitation that moves initially as diffuse overland flow in very shallow depths before eventually reaching a stream channel.

Shoreland: Land located within the following distances from public water: 1,000 feet from the ordinary high-water level of a lake, pond or flowage; and 300 feet from a river or stream, or the landward extent of a floodplain designated by ordinances on a river or stream, whichever is greater.

Short-Circuiting: The passage of runoff through the basin in less than the theoretical or design treatment time.

Site Runoff: Any surface drainage or flood discharge that is released from a specified area.

Standard Industrial Classification (SIC) Code: A four-digit number, which is used to identify various types of industries.

Storm Drain: A slotted opening leading to an underground pipe or an open ditch for intended to carry surface water runoff, such as a catch basin

Storm Water Management: Functions associated with planning, designing, constructing, maintaining, financing, and regulating the facilities (both constructed and natural) that collect, store, control, and/or convey storm water.

Storm Water Pollution Prevention Program (SWPPP): A program to describe a process whereby an MS4 thoroughly evaluates potential pollutant sources and selects and implements appropriate measures designed to prevent or control the discharge of pollutants in storm water runoff.

Stratification: The arrangement of a body of water, as a lake, into two or more horizontal layers of differing characteristics, especially densities.

Stilling Basin: Basin used to dissipate water energy.

Storm Water Runoff: The flow on the surface of the ground, resulting from precipitation in the form of rainfall or snowmelt.

Stream: A flow of water in a channel or bed, as a brook, rivulet or small river.

Structures: These can be dams, culverts or flow regulating devices, which are at the outlet of a basin or in a conveyance.

Surface Water: Water that remains on the surface of the ground, including rivers, lakes, reservoirs, streams, wetlands, impoundments, seas, estuaries, etc.

Time of Concentration: The time required for surface runoff from the hydraulically remotest point of a watershed to reach the basin outlet.

Total Maximum Daily Load (TMDL): The maximum amount of pollutants which can be released into a water body without adversely affecting the water quality.

Urban Runoff: Storm water from urban areas, which tends to contain heavy concentrations of pollutants from urban activities.

Transmissibility: An index for the rate of groundwater movement equals to the product of the coefficient of permeability and the thickness of the aquifer. Indicates for the aquifer as a whole what the coefficient of permeability indicates for the soil.

Travel Time: The time taken by a particle of water to travel from one location to another.

Treatment Zone: Elevation of water quality treatment below the outlet overflow in the modified wet/dry detention basin.

Trophic: Relating to the nutrient level.

Water Resources: All lakes, ponds, basins, wetlands, outflow conveyors and ditches. The management of a particular water resource in the City may be a watershed, county or municipal responsibility or a cooperative effort between them.

Watershed: That geographical area which drains to a specified point on a watercourse, usually a confluence of streams or rivers (also known as drainage area, catchment, or river basin).

Water Table: The upper surface or top of the saturated portion of the soil or bedrock layer, which indicates the uppermost extent of groundwater.

Wetland: Land areas having a predominance of hydric soils that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that under normal circumstances, support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

Wetland Buffer Zone: Upland areas immediately adjacent to wetlands as special protection zones.

Wet Weather Flows: Water entering storm drains during rainstorms or wet weather events.

APPENDIX A

2021 SWPPP PERMIT

MINNESOTA POLLUTION CONTROL AGENCY

You are currently logged in as:

Ham Lake City MS4

If this is correct, click the 'Next' button. If this information is incorrect, contact Cole Landgraf (651-757-2880, cole.landgraf@state.mn.us).

Before you begin...

A fillable Microsoft Word document with all of the questions is available at https://stormwater.pca.state.mn.us/index.php?title=MS4_Annual_Report (for personal use only, not for submittal).

The MS4 Annual Report for 2021 will automatically save your answers when you hit the 'Next' button at the bottom of each page.

If you wish to leave the MS4 Annual Report for 2021 and complete the document at another time, you may do so by clicking 'Next' at the bottom of your current page to save your progress before exiting the document. Return to the survey by following the previously used web link, and again login using your email and assigned password credentials. Once you successfully log in, your previous answers will appear.

The MPCA will email a formatted version of your MS4 Annual Report for 2021 to you in a confirmation email within three business days after you submit this form.

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MS4 Annual Report for 2021

Reporting period: January 1, 2021 to December 31, 2021

Due: June 30, 2022

Instructions: Complete this annual report to provide a summary of your activities under the 2013 MS4 Permit (Permit) between January 1, 2021 and December 31, 2021. MPCA staff may contact you for additional information.

Note: The annual report questions remain unchanged from the previous annual report because MS4 permittees were covered under the 2013 MS4 Permit for the majority of 2021. In the next annual report (due June 30, 2023), you will be required to report on activities completed to meet requirements under the 2020 MS4 Permit.

Fillable document available at https://stormwater.pca.state.mn.us/index.php?title=MS4_Annual_Report (for personal use only, not for submittal).

Questions: Contact Cole Landgraf (cole.landgraf@state.mn.us, 651-757-2880) or your assigned MPCA staff member listed at https://stormwater.pca.state.mn.us/index.php?title=MS4_staff_contact_information_and_staff_assignments.

MS4 General Contact Information

Full name	Denise Webster
Title	City Administrator
Mailing address	15544 Central Avenue NE
City	Ham Lake
State	Minnesota
Zip code	55304
Phone	763-434-9555
Email	dwebster@ci.ham-lake.mn.us

Preparer Contact Information (if different from the MS4 General Contact)

Full name	Tom Collins
Title	Consulting City Engineer
Organization	RFC Engineering
Mailing address	13635 Johnson Street NE
City	Ham Lake
State	Minnesota
Zip code	55304
Phone	763-862-8000
Email	tcollins@rfcengineering.com

MCM 1: Public Education and Outreach

The following questions refer to Part III.D.1. of the Permit.

Q2 Did you select a stormwater-related issue of high priority to be emphasized during this Permit term? [Part III.D.1.a.(1)]

- (●) Yes
- ( ) No

Q3 What is your stormwater-related issue(s)? Check all that apply.

- [ ] TMDL(s)
- [ ] Local businesses
- [x] Residential BMPs
- [x] Pet waste
- [x] Yard waste
- [ ] Deicing materials
- [ ] Household chemicals
- [x] Construction activities
- [x] Post-construction activities
- [x] Other

Describe:

Septic System Care

Q4 Have you distributed educational materials or equivalent outreach to the public focused on illicit discharge recognition and reporting? [Part III.D.1.a.(2)]

- (●) Yes
- ( ) No

Q5 Do you have an implementation plan as required by the Permit? [Part III.D.1.b.]

- (●) Yes
- ( ) No

Q6 How did you distribute educational materials or equivalent outreach? Check all that apply and provide circulation/audience associated with each item. [Part III.D.1.a.]

- [x] Brochure
- [x] Newsletter
- [ ] Utility bill insert
- [ ] Newspaper ad
- [ ] Radio ad
- [ ] Television ad
- [ ] Cable access channel
- [ ] Stormwater-related event
- [ ] School presentation or project
- [x] Website
- [ ] Other (1)
- [ ] Other (2)
- [ ] Other (3)

Q7 Intended audience? Check all that apply.

	Residents	Local Businesses	Developers	Students	Employees	Other
Brochure	☑	☑	☐	☐	☐	☐
Newsletter	☑	☑	☐	☐	☐	☐
Website	☑	☑	☑	☑	☑	☐

Q8 Enter the total circulation/audience (if unknown, use best estimate):

Brochure	67
Newsletter	6,629
Website	310

Provide a brief description of each activity related to public education and outreach (e.g. rain garden workshop, school presentation, public works open house) held and the date each activity was held from January 1, 2021 to December 31, 2021. [Part III.D.1.c.(4)]

Q9 Date of activity	Q10 Description of activity
Date (mm/dd/yyyy) 01/23/2021	Green Lights Recycling Event
Date (mm/dd/yyyy) 3/27/2021	Green Lights Recycling Event
Date (mm/dd/yyyy) 5/1/2021	City of Ham Lake Spring Recycling Event
Date (mm/dd/yyyy) 6/21/2021	NPDES Public Hearing
Date (mm/dd/yyyy) 7/24/2021	Green Lights Recycling Event
Date (mm/dd/yyyy) 9/11/2021	City of Ham Lake Fall Recycling Event
Date (mm/dd/yyyy) 12/4/2021	Green Lights Recycling Event
Date (mm/dd/yyyy)	

Q11 Between January 1, 2021 and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your public education and outreach program? [Part IV.B.]

- ○ Yes
- ◉ No

MCM 2: Public Participation/Involvement

The following questions refer to Part III.D.2.a. of the Permit.

Q12 You must provide a minimum of one opportunity each year for the public to provide input on the adequacy of your Stormwater Pollution Prevention Program (SWPPP). Did you provide this opportunity between January 1, 2021 and December 31, 2021? [Part III.D.2.a.(1)]

- ◉ Yes
- ○ No

Q13 What was the opportunity that you provided? Check all that apply.

- ☑ Public meeting
- ☐ Public event
- ☐ Other

Q14 Did you hold a stand-alone meeting or combine it with another event?

- ☐ Stand-alone
- ☑ Combined

Enter the date of the public meeting (mm/dd/yyyy): 6/21/2021

Enter the number of citizens that attended and were informed about your SWPPP: 0

Q17 Between January 1, 2021 and December 31, 2021, did you receive any input regarding your SWPPP?

- ○ Yes
- ◉ No

Q19 Between January 1, 2021 and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your public participation/involvement program? [Part IV.B.]

- ○ Yes
- ◉ No

MCM 3: Illicit Discharge Detection and Elimination

The following questions refer to Part III.D.3. of the Permit.

Q20 Do you have a regulatory mechanism which prohibits non-stormwater discharges to your MS4? [Part III.D.3.b.]

- ◉ Yes
- ○ No

Q21 Did you identify any illicit discharges between January 1, 2021 and December 31, 2021? [Part III.D.3.h.(4)]

- ○ Yes
- ◉ No

Q30 Do you have written Enforcement Response Procedures (ERPs) to compel compliance with your illicit discharge regulatory mechanism(s)? [Part III.B.]

- ◉ Yes
- ○ No

Q31 Between January 1, 2021 and December 31, 2021, did you train all field staff in illicit discharge recognition (including conditions which could cause illicit discharges) and reporting illicit discharges for further investigations? [Part III.D.3.e.]

- ◉ Yes
- ○ No

Q32 How did you train your field staff? Check all that apply.

- [ ] Email
- [ ] PowerPoint
- [ ] Presentation
- [ ] Video
- [x] Field Training
- [ ] Other

The following questions refer to Part III.C.1. of the Permit.

Q33 Did you update your storm sewer system map between January 1, 2021 and December 31, 2021? [Part III.C.1.]

- (●) Yes
- ( ) No

Q34 Does your storm sewer map include all pipes 12 inches or greater in diameter and the direction of stormwater flow in those pipes? [Part III.C.1.a.]

- (●) Yes
- ( ) No

Q35 Does your storm sewer map include outfalls, including a unique identification (ID) number and an associated geographic coordinate? [Part III.C.1.b.]

- (●) Yes
- ( ) No

Q36 Does your storm sewer map include all structural stormwater BMPs that are part of your MS4? [Part III.C.1.c.]

- (●) Yes
- ( ) No

Q37 Does your storm sewer map include all receiving waters? [Part III.C.1.d.]

- (●) Yes
- ( ) No

Q38 In what format is your storm sewer map available?

- ( ) Hardcopy only
- ( ) GIS
- (●) CAD
- ( ) Other

Q39 Between January 1, 2021 and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your illicit discharge detection and elimination (IDDE) program? [Part IV.B.]

- ( ) Yes
- (●) No

MCM 4: Construction Site Stormwater Runoff Control

The following questions refer to Part III.D.4. of the Permit.

Q40 Do you have a regulatory mechanism that is at least as stringent as the Agency's general permit to Discharge Stormwater Associated with Construction Activity (CSW Permit) No. MN R100001 (http://www.pca.state.mn.us/index.php/view-document.html?gid=18984) for erosion and sediment controls and waste controls? [Part III.D.4.a.]

- (●) Yes
- ( ) No

Q41 Have you developed written procedures for site plan reviews as required by the Permit? [Part III.D.4.b.]

- (●) Yes
- ( ) No

Q42 Have you documented each site plan review as required by the Permit? [Part III.D.4.f.]

- (●) Yes
- ( ) No

Q43 Enter the number of site plan reviews conducted for sites an acre or greater of soil disturbance between January 1, 2021 and December 31, 2021:

45

Q44 What types of enforcement actions do you have available to compel compliance with your regulatory mechanism? Check all that apply and enter the number of each used from January 1, 2021 to December 31, 2021.

- [x] Verbal warnings
- [ ] Notice of violation
- [ ] Administrative orders
- [ ] Stop-work orders
- [ ] Fines
- [ ] Forfeit of security of bond money
- [ ] Withholding of certificate of occupancy
- [ ] Criminal actions
- [ ] Civil penalties
- [ ] Other

Enter the number of verbal warnings issued: 8

Q45 Do you have written Enforcement Response Procedures (ERPs) to compel compliance with your construction site stormwater runoff control regulatory mechanism(s)? [Part III.B.]

- (●) Yes
- ( ) No

Q46 Enter the number of active construction sites an acre or greater that were in your jurisdiction between January 1, 2021 and December 31, 2021:

20

Q47 Do you have written procedures for identifying priority sites for inspections? [Part III.D.4.d.(1)]

- (●) Yes
- ( ) No

Q48 How are sites prioritized for inspections? Check all that apply.

- [ ] Site topography
- [ ] Soil characteristics
- [ ] Types of receiving water(s)
- [x] Stage of construction
- [x] Compliance history
- [ ] Weather conditions
- [ ] Citizen complaints
- [ ] Project size
- [ ] Other

Q49 Do you have a checklist or other written means to document site inspections when determining compliance? [Part III.D.4.d.(4)]

- (●) Yes
- ( ) No

Q50 Enter the number of site inspections conducted for sites an acre or greater between January 1, 2021 and December 31, 2021:

324

Q51 Enter the frequency at which site inspections are conducted (e.g. daily, weekly, monthly): [Part III.D.4.d.(2)]

daily, weekly, as-needed

Q52 Enter the number of trained inspectors that were available for construction site inspections between January 1, 2021 and December 31, 2021:

3

Q53 Provide the contact information for the inspector(s) and/or organization that conducts construction stormwater inspections for your MS4. List your primary construction stormwater contact first if you have multiple inspectors.

(1) Inspector name	Tom Collins
Organization	RFC Engineering
Phone (Office)	7638628000
Phone (Work Cell)	763-458-5613
Email	tcollins@rfcengineering.com
Preferred contact method	email
(2) Inspector name	John Witkowski
Organization	City of Ham Lake
Phone (Office)	763-235-1662
Phone (Work Cell)	763-238-5342
Email	jwitkowski@ci.ham-lake.mn.us
Preferred contact method	email
(3) Inspector name	Dave Krugler
Organization	RFC Engineering
Phone (Office)	763-862-8000
Phone (Work Cell)	715-240-0422
Email	dkrugler@rfcengineering.com
Preferred contact method	email

Q54 What training did inspectors receive? Check all that apply.

- [x] University of Minnesota Erosion and Stormwater Management Certification Program
- [ ] Qualified Compliance Inspector of Stormwater (QCIS)
- [ ] Minnesota Laborers Training Center Stormwater Pollution Prevention Plan Installer or Supervisor
- [ ] Minnesota Utility Contractors Association Erosion Control Training
- [ ] Certified Professional in Erosion and Sediment Control (CPESC)
- [ ] Certified Professional in Stormwater Quality (CPSWQ)
- [ ] Certified Erosion, Sediment and Storm Water Inspector (CESSWI)
- [ ] Other

Q55 Between January 1, 2021 and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your construction site stormwater runoff control program? [Part IV.B.]

- ○ Yes
- ◉ No

MCM 5: Post-Construction Stormwater Management

The following questions refer to Part III.D.5. of the Permit.

Q56 Do you have a regulatory mechanism which meets all requirements as specified in Part III.D.5.a. of the Permit?

- ◉ Yes
- ○ No

Q57 What approach are you using to meet the performance standard for Volume, Total Suspended Solids (TSS), and Total Phosphorus (TP) as required by the Permit? [Part III.D.5.a.(2)]
Check all that apply.

Refer to the link http://www.pca.state.mn.us/index.php/view-document.html?gid=17815 for guidance on stormwater management approaches.

- [x] Retain a runoff volume equal to one inch times the area of the proposed increase of impervious surfaces on-site
- [ ] Retain the post-construction runoff volume on site for the 95th percentile storm
- [ ] Match the pre-development runoff conditions
- [ ] Adopt the Minimal Impact Design Standards (MIDS)
- [ ] An approach has not been selected
- [ ] Other method (Must be technically defensible--e.g. based on modeling, research and acceptable engineering practices)

Q58 Do you have written Enforcement Response Procedures (ERPs) to compel compliance with your post-construction stormwater management regulatory mechanism(s)? [Part III.B.]

- ◉ Yes
- ○ No

Q59 Between January 1, 2021 and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your post-construction stormwater management program? [Part IV.B.]

- ○ Yes
- ◉ No

MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations

The following questions refer to Part III.D.6. of the Permit.

Q60 Enter the total number of structural stormwater BMPs, outfalls (excluding underground outfalls), and ponds within your MS4 (exclude privately owned).

Structural stormwater BMPs	218
Outfalls	131
Ponds	430

Q61 Enter the number of structural stormwater BMPs, outfalls (excluding underground outfalls), and ponds that were inspected from January 1, 2021 to December 31, 2021 within your MS4 (exclude privately owned). [Part III.D.6.e.]

Structural stormwater BMPs	210
Outfalls	27
Ponds	86

Q62 Have you developed an alternative inspection frequency for any structural stormwater BMPs, as allowed in Part III.D.6.e.(1) of the Permit?

- ○ Yes
- ☑ No

Q63 Based on inspection findings, did you conduct any maintenance on any structural stormwater BMPs? [Part III.D.6.e.(1)]

- ☑ Yes
- ○ No

Q64 Briefly describe the maintenance that was conducted:

Catch basin grates were cleaned of leaves, sand and debris. Catch basins were inspected and repaired as needed. Sump manholes were pumped and inspected, and repaired as needed. Rain gardens and rain guardians were cleaned of debris and repaired as needed.

Q65 Do you own or operate any stockpiles, and/or storage and material handling areas? [Part III.D.6.e.(3)]

- (●) Yes
- ( ) No

Q66 Did you inspect all stockpiles and storage and material handling areas quarterly? [Part III.D.6.e.(3)]

- (●) Yes
- ( ) No

Q67 Based on inspection findings, did you conduct maintenance at any of the stockpiles and/or storage and material handling areas?

- (●) Yes
- ( ) No

Q68 Briefly describe the maintenance that was conducted:

All stockpiles were shaped and hydroseeded as needed. Primary shaping was the Fox Run 3rd Addition topsoil stockpile.

Q69 Between January 1, 2021 and December 31, 2021, did you modify your BMPs, measurable goals, or future plans for your pollution prevention/good housekeeping for municipal operations program? [Part IV.B.]

- ( ) Yes
- (●) No

Partnerships

Q78 Did you rely on any other regulated MS4s to satisfy one or more Permit requirements?

- (●) Yes
- ( ) No

Q79 Describe the agreements you have with other regulated MS4s and which Permit requirements the other regulated MS4s help satisfy: [Part IV.B.6.]

Joint Powers Agreements with the Sunrise River WMO & Upper Rum River WMO for the purpose of protecting, preserving & using natural surface & groundwater storage & retention systems, minimizing public capital expenditures needed to correct flooding & water quality problems, identifying & planning for means to effectively protect & improve surface & groundwater quality, assist with establishing more uniform local policies & official controls for surface & groundwater management, preventing erosion of soil into surface water systems, promoting groundwater recharge, protecting & enhancing fish and wildlife habitat & water recreational facilities, securing other benefits associated with the proper management of surface and groundwater & assistance with educational material distribution (1 article published in the Ham Laker by the SRWMO). Partnerships without formal agreements: The Anoka Conservation District partners for technical assistance, educational workshops & conservation practices. The Coon Creek Watershed District partners for technical assistance on drainage, floodplain, groundwater, soils & erosion control, hydraulics, water quality & wetlands, educational workshops, assistance with educational material distribution (12 articles published in the Ham Laker). Anoka County has a Water Resource Outreach Collaborative, which creates outreach materials and programs, connect with target audiences, and build efficiency in achieving outreach goals throughout the county and published 2 articles in the Ham Laker.

Additional Information

If you would like to provide any additional files to accompany your annual report, use the space below to upload those files. For each space, you may attach one file. You may provide additional explanation and/or information in an email with the subject *YourMS4NameHere_2021AR* to ms4permitprogram.pca@state.mn.us.

Q80 Click the "up arrow" icon below to upload a file. When it has uploaded successfully, a unique ID will appear in the box. Only files less than 10 MB in size will upload.

Q81 Click the "up arrow" icon below to upload a file. When it has uploaded successfully, a unique ID will appear in the box. Only files less than 10 MB in size will upload.

Q82 Click the "up arrow" icon below to upload a file. When it has uploaded successfully, a unique ID will appear in the box. Only files less than 10 MB in size will upload.

Q83 Optional, describe the file(s) uploaded:

Owner or Operator Certification

The person with overall administrative responsibility for SWPPP implementation and Permit compliance must certify this MS4 Annual Report. This person must be duly authorized and should be either a principal executive (i.e., Director of Public Works, City Administrator) or ranking elected official (i.e., Mayor, Township Supervisor).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete (Minn. R. 7001.0070). I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment (Minn. R. 7001.0540).

☐ Yes

By typing my name in the following box, I certify the above statements to be true and correct, to the best of my knowledge, and that information can be used for the purpose of processing my MS4 Annual Report.

Name:

Title:

Date: (mm/dd/yyyy)

When you are ready to submit, you must click the 'Submit' button at the bottom of this page.

Provide the email(s) of the individual(s) you would like to receive the MS4 Annual Report for 2021 submittal confirmation email from the MPCA. After you click the Submit button below, please allow up to three business days to receive this email.

Email (1)

Email (2)

Email (3)

Print or save a copy of your completed MS4 Annual Report for 2021 for your records. The MPCA will email a formatted version of your MS4 Annual Report for 2021 in a confirmation email within three business days after you submit this form to the email(s) you provided above.

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If you have any questions, contact MPCA staff Cole Landgraf (cole.landgraf@state.mn.us, 651-757-2880).

APPENDIX B

Best Management Practices (BMP'S)

BMP Summary Sheet Instructions

Introduction

The MPCA is required by law to place all Storm Water Pollution Prevention Programs (SWPPP) on public notice. Standardized summary sheets provide an easy mechanism for those wishing to reference comments to specific locations in a SWPPP. Standardized summaries also make SWPPPs easier to understand. The BMP (Best Management Practice) Summary Sheets included in this packet are a required attachment to your application for Permit coverage. Failure to include *all* required BMP Summary Sheets constitutes an incomplete application. All required information must also be included on the sheets for the application to be considered complete.

The MPCA is requiring that the attached BMP Summary Sheets (Sheets) be used. You may however, choose to organize the components of your MS4's SWPPP in any order you feel appropriate. The Sheets may be included as an attachment to your SWPPP, used as a lead-in for each section of the SWPPP, or they may be expanded to contain all of the information related to the BMP and Permit requirements in your SWPPP. The Sheets are designed to aid in the public review process of SWPPPs.

What to put in the BMP Summary Sheets

The Sheets are designed for you to outline the *major* components of each Permit requirement in a required BMP and how you plan to implement the controls associated with it. If the Sheets are only used to summarize what is explained in greater detail elsewhere, then the Sheet may contain a more brief explanation of the BMP's purpose, major milestones and timelines. Additional, more detailed information would then be referenced and provided in the body of your Storm Water Pollution Prevention Program (SWPPP).

The MPCA recognizes that some MS4s have been actively developing and implementing the programs and procedures in the required BMPs. It is important that each MS4 provide a statement on the current status of BMP implementation in the BMP Description section of each Sheet. The Measurable Goals and Timeline/Implementation Schedule for that BMP should also reflect its current status of development and implementation.

Although these Sheets will be included when SWPPPs are placed on public notice, they are not intended to replace or limit what would be necessary to develop a complete SWPPP. For many minimum control measures, effective implementation of the SWPPP will require a more detailed explanation of BMP activities. On the Sheets, provide the specific locations where any additional information relating to each BMP can be found in your SWPPP.

Blank Sheets are provided for additional BMPs. Instructions are provided related to the specific information that must be provided for each part of the Sheet. The intent of these description sheets is to provide a uniform framework for MS4s to summarize activities which have or will take place to fulfill the minimum requirements of a BMP.

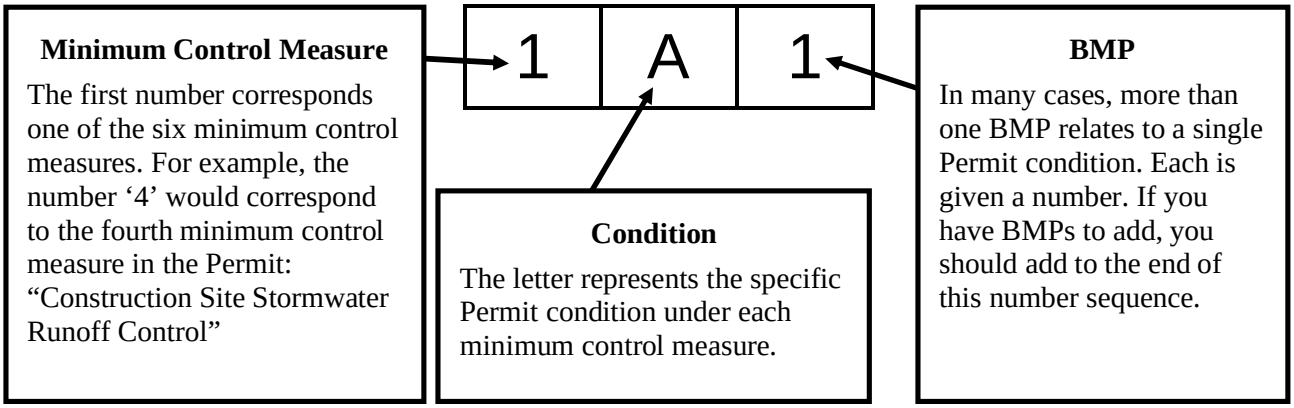
The BMP Numbering System

Your BMP Summary Sheets (Sheets) are a required attachment to use for your Permit Application for Permit coverage. Failure to include *all* required Sheets will constitute an incomplete application. The Sheets are numbered to correspond to each minimum control measure (MCM) identified in the Permit. All required information must be included on the Sheets for the application to be considered complete.

The purpose of these summary sheets is to provide an overview of the information contained in the MS4 SWPPP. These standardized sheets provide a uniform framework for each MS4 to organize and summarize activities which have or will take place to fulfill the Permit requirements (using various BMPs) for each of the six minimum control measures.

For the purpose of efficient public review, you must use the numbering system set forth in the instructions for each minimum control measure. The Permit's 30 required BMP Sheets have each been assigned a unique identification number that corresponds to its location in the Permit. Unique identification numbers consist of a number-letter-number format (Fig. 1). Blank Sheets are provided to be adapted for additional BMPs not specifically identified or required by the Permit. Be sure to follow the numbering sequence (Fig. 1) for each of those additional BMPs.

Figure 1: BMP Unique Identification Numbers



Measurable Goals

Measurable goals, which are required for each minimum control measure and for each BMP, are intended to gauge Permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the geographic and natural resource area served and how the BMPs will be implemented (operated) by the MS4. Measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. Finally, they should allow the MS4 to make improvements to its program over each 5-year Permit term by providing information and feedback to the operators and citizens on program successes and shortfalls.

The MPCA has adopted from EPA the definition of *measurable goals*: "*BMP design objectives or goals that quantify the progress of program implementation* ***and*** *the performance of your BMP."* The use of the term *performance* in this context does not refer to water quality monitoring but rather to progress and effectiveness achieved for implementation of the BMP

Timeline/Implementation Schedule

The Permit requires MS4s to provide an implementation schedule for measurable goals that includes any deadlines or timelines set forth in the Permit. When completing this section for each BMP Summary Sheet you must identify the measurable goals, milestones and elements of the BMP which you intend to accomplish during each year of the MS4 Permit.

Additional Resources for SWPPP Preparation

The MPCA encourages MS4s to use other work products whether voluntarily developed or required by another rule or law to assist in completing a SWPPP. Some examples would be water quality diagnostic or analysis studies, water management plans and stormwater management plans, to name a few, to assist in the development of the MS4 SWPPP and ultimately in the implementation of an integrated water quality and quantity management program for your area.

Many other agencies and organizations have completed guidance documents that may be useful in the development of your SWPPP. Keep in mind that these are simply guidance and do not hold the same legal authority as the Permit. This list is not necessarily inclusive of all materials that are available or may be used:

- **Minnesota Pollution Control Agency**
  - Stormwater Manual: **http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html**
    - Chapter 6: *Introduction to Best Management Practices (BMPs)*
    - Chapter 7: *Choosing Best Management Practices (BMPs)*
    - Chapter 12: *Details of Stormwater Best Management Practices (BMPs)*
  - Guidance Manual for Small Municipal Separate Storm Sewer Systems: **http://www.pca.state.mn.us/publications/wq-strm4-25b.pdf**

- **U.S. Environmental Protection Agency**
  - Menu of BMPs: **http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm**
  - Measurable Goals Guidance: **http://cfpub.epa.gov/npdes/stormwater/measurablegoals/index.cfm**
  - Stormwater Phase II Final Rule Fact Sheet Series: **http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm?program_id=6**

BMP Summary Sheet Instructions

Minimum Control Measure 1: PUBLIC EDUCATION AND OUTREACH

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
1a-1	Distribute Educational Materials	**V.G.1.a.1**
1b-1	Implement an Education Program	**V.G.1.b.1**
1c-1	Education Program: Public Education and Outreach	**V.G.1.c.1**
1c-2	Education Program: Public Participation	**V.G.1.c.2**
1c-3	Education Program: Illicit Discharge Detection and Elimination	**V.G.1.c.3**
1c-4	Education Program: Construction Site Run-off Control	**V.G.1.c.4**
1c-5	Education Program: Post-Construction Stormwater Management in New Development and Redevelopment	**V.G.1.c.5**
1c-6	Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations	**V.G.1.c.6**
1d-1	Coordination of Education Program	**V.G.1.d.1**
1d-2	Education on Salt Impact on Runoff	**V.G.1.d.2**
1d-3	Education on Pet Wastes Impact on Runoff	**V.G.1.d.3**
1d-4	Education to Target Audience within the Community	**V.G.1.d.4**
1e-1	Documentation on Stormwater Related Issues	**V.G.1.e.1**
1f-1	Annual Public Meeting	**V.G.1.f.1**
	Additional BMP Summary Sheet (Copy as Necessary)	

For each of the Best Management Practices (BMPs) associated with Minimum Control Measure 1 (MCM-1), **Public Education and Outreach**, fill out the attached BMP Summary Sheets completely. The completion of all of the associated BMP Summary Sheets for the BMPs listed above are mandatory for a complete application. To aid in review and comment by the public, you must use the numbers listed in the key above and the BMP Titles which are consistent with the MS4 Permit language. This summary is simply an overview of the BMP and does not contain all of the details associated with implementation. Be sure to include a reference to the specific location of detailed information on which the summary sheet is based in your Storm Water Pollution Prevention Program (SWPPP).

1. BMP Description

Summarize the major components of this BMP and how you plan to implement them. Define the following:

- BMP program components
- Plans for program implementation
- Target audience
- Types of materials to be distributed
- Methods of distribution or communication
- Include the exact locations (page numbers) of detailed information in the SWPPP

2. Measurable Goals

Define the milestones that are to be accomplished by the implementation of this BMP. Establish a baseline from which you will measure effectiveness, how the measurements are to be made, and how the success will be defined and quantified.

3. Timeline/Implementation Schedule

Provide specific dates that milestones identified as measurable goals are to be met. Include when materials will be created, printed, and distributed. The schedule should also outline dates when measurable goals will be evaluated to determine program effectiveness.

4. Specific Components and Notes for this MCM
Include any additional notes relevant to the specific purpose of each BMP and how the BMPs for the minimum control measure have been modified from past practice based on experience and monitoring.

5. Responsible Party for this BMP
Indicate who specifically is responsible for the implementation and monitoring of this BMP. This should be the individual who is actively involved with the BMP and not simply a city official who is signing the application for permit coverage.

Additional Instructions for BMPs 1c-1 through 1c-6:
The Minnesota MS4 General Permit requires that "For each minimum control measure, your education program must identify: 1) The audience or audiences involved; 2) Educational goals for each audience in terms of increased awareness, increased understanding, acquired skills, and/or desired changes in behavior; 3) Activities used to reach educational goals for each audience; 4) Activity implementation plans, including responsible department in charge, entities responsible for given activities, and schedules; and 5) Available performance measures that can be used to determine successes in reaching educational goals." [**V.G.1.c**]

1. Audience(s) Involved
Define the specific audience or audiences that will be the target of the education program for the minimum control measured addressed in this BMP.

2. Educational Goals for Each Audience
Define the educational goal of the BMP and how they are associated with each audience.

3. Activities Used to Reach Educational Goals
Outline the specific activities that will be in place to ensure that the educational goals are met.

4. Activity Implementation Plan
Define how you will put each specified activity into place. Also indicate the specific timeline that you will follow. Include major milestones and the dates by which each will be implemented.

5. Performance Measures
Outline how you will measure the success of this BMP. Determine a baseline from which the measurements will be made. Briefly describe how you will quantify the success of an increase in education.

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1a-1(16.2)

***BMP Title:** Distribute Educational Materials

***BMP Description:**

This Best Management Practice includes development and implementation of a public education program to distribute educational materials to the community about the SWPPP, each MCM and the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff. The education program is to address each minimum control measure. Use the monthly city newsletter and the website (www.ci.ham-lake.mn.us) to disseminate all types of information on stormwater issues such as construction projects, erosion and sediment control, etc.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Update website as new information becomes available, but no less than twice per year. Develop website link. Number of website hits reporting illicit discharges. Inform the public of any storm water education programs that are going to be conducted by the City or other entities. Publish at least four stormwater related articles per year in the monthly city newsletter.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is ongoing.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1b-1(16.3)

***BMP Title:** Implement an Education Program

***BMP Description:**

This Best Management Practice involves developing and implementing a public education program to distribute educational materials to the community about the SWPPP, each MCM and the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff. The education program is to address each minimum control measure. Use the monthly city newsletter and the website (www.ci.ham-lake.mn.us) to disseminate all types of information on stormwater issues such as construction projects, erosion and sediment control, etc. Use newsletter and website to inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste. Coordinate the education program with and make effective use of other storm water education programs being conducted in your area by other entities, including community groups, non profit organizations, lake conservation districts, Anoka Conservation District, Coon Creek Watershed District, Sunrise Watershed Management Organization, Upper Rum River Watershed Management Organization, Anoka-Hennepin School District 11, Forest Lake School District 831, U of M Extension, Anoka County, regional, state and federal government.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Update website as new information becomes available, but no less than twice per year. Develop website link. Number of website hits reporting illicit discharges. Inform the public of any storm water education programs that are going to be conducted by the City or other entities.

***Timeline/Implementation Schedule:**

Ongoing now

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-1 (16.4)

***BMP Title:** Education Program: Public Education and Outreach

***Audience(s) Involved:**

Residents of the City of Ham Lake

***Educational Goals for Each Audience:**

The goal is to educate the residents of the City of Ham Lake on the SWPPP, each MCM and the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff.

***Activities Used to Reach Educational Goals:**

The Public Education and Outreach BMP activity is the distribution of educational material through the website and the Ham Laker. Articles have been posted, and are currently posted on the website. Articles have appeared in the Ham Laker. New residents receive literature on the maintenance of individual sewage treatment systems.

***Activity Implementation Plan:**

This activity currently exists and implementation is ongoing.

***Performance Measures:**

Number of website hits and updating educational material on the website.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-2 (16.4)

***BMP Title:** Education Program: Public Participation

***Audience(s) Involved:**

Residents of the City of Ham Lake

***Educational Goals for Each Audience:**

The goal is to educate the residents of the City of Ham Lake on the benefits of public participation in reducing pollutants in storm water runoff.

***Activities Used to Reach Educational Goals:**

The Public Participation BMP activity is the distribution of educational material through the website and the Ham Laker. Articles have been posted, and are currently posted on the website. Encourage residents to participate in the MPCA's Citizen Lake Monitoring Program to monitor physical condition, recreational suitability, depth of visibility, dissolved oxygen, conductivity, pH, phosphorus, nitrogen, chlorophyll and alkalinity of the lakes. Encourage youth groups to adopt parks.

***Activity Implementation Plan:**

This activity currently exists and implementation is ongoing.

***Performance Measures:**

Number of website hits and updating educational material on the website. Coordinate with the Anoka Conservation District for lake monitoring. Record the number of groups and/or individuals participating in volunteer clean-up programs.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-3 (16.4)

***BMP Title:** Education Program: Illicit Discharge Detection and Elimination

***Audience(s) Involved:**

Residents, business owners and public employees of the City of Ham Lake

***Educational Goals for Each Audience:**

The goal is to educate the public employees, business owners and residents of the City of Ham Lake of hazards associated with illegal discharges and improper disposal of waste.

***Activities Used to Reach Educational Goals:**

The Illicit Discharge BMP activity is the distribution of educational material through the website and the Ham Laker. Articles have been posted, and are currently posted on the website. Distribute educational material to illicit discharge generators, such as auto repair shops. Hold training program for public employees on importance of good housekeeping procedures.

***Activity Implementation Plan:**

This activity currently exists and implementation is ongoing.

***Performance Measures:**

Number of website hits and updating educational material on the website. Informational material distributed to business owners and general public. Number of public employees in attendance of training program.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-4

***BMP Title:** Education Program: Construction Site Run-off Control

***Audience(s) Involved:**

Residents, business owners and developers of the City of Ham Lake

***Educational Goals for Each Audience:**

The goal is to educate the residents, business owners and developers of the importance of runoff control from construction sites, whether new residential housing or commercial/industrial development.

***Activities Used to Reach Educational Goals:**

The Construction Site Run-off Control BMP activity is the distribution of educational material through the website and the Ham Laker. Articles have been posted, and are currently posted on the website. Articles have appeared in the Ham Laker. Discussions with individual property owners where construction run-off control is not adequate, and corrective measures required. Contractor for individual lot construction receive the Single Family Residential Construction Erosion/Sediment Control Standards handout (6 pages)

***Activity Implementation Plan:**

This activity currently exists and implementation is ongoing.

***Performance Measures:**

Number of website hits and updating educational material on the website. Keep track of contacts with land owners and developers regarding storm water issues.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

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BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-5

***BMP Title:** Education Program: Post-Construction Stormwater Management in New Development and Redevelopment

***Audience(s) Involved:**

City staff, developers, builders, property owners seeking to sub-divide and develop their property and anyone else seeking to build or develop property in the City of Ham Lake.

***Educational Goals for Each Audience:**

The goal is to educate the residents, business owners and developers of the importance of post-construction stormwater management, the importance of reducing sediment loading off-site through the use of BMPs and the sanctions that will be imposed if not in conformance with the Erosion and Sedimentation Control Ordinance.

***Activities Used to Reach Educational Goals:**

The Post Construction Stormwater Management in New Development and Redevelopment BMP activity is the distribution of educational material through the website and the Ham Laker. Articles have been posted, and are currently posted on the website. Discussions with individual property owners or contractors where construction run-off control is not adequate, and corrective measures required. Inspect new development and redevelopment construction sites and ensure that BMPs are in place.

***Activity Implementation Plan:**

- Cooperate with the MPCA to distribute NPDES materials to builders and developers.
- Revise city's developer agreement to provide better information on what is expected in the way of permanent erosion control and water quality protection.

***Performance Measures:**

Number of website hits and updating educational material on the website. Keep track of contacts with property owners, developers and contractors regarding runoff control and corrective measures.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

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BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-6

***BMP Title:** Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations

***Audience(s) Involved:**

Public Employees of the City of Ham Lake

***Educational Goals for Each Audience:**

The goal is to educate the public employees, including grounds and landscaping staff, fleet and building maintenance staff, street maintenance staff and storm water system staff, and new employees as needed, on pollution prevention/good housekeeping for municipal operations.

***Activities Used to Reach Educational Goals:**

The Pollution Prevention/Good Housekeeping for Municipal Operations BMP activity is the training of public employees to increase awareness on the importance of storm water issues and how staff activities can impact water quality. Training takes place twice a year, once in the spring and again in the fall, with all Public Works employees participating. New employees are trained upon hiring.

***Activity Implementation Plan:**

This activity currently exists and implementation is ongoing.

***Performance Measures:**

Number of public employees trained yearly.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

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BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1d-1

***BMP Title:** Coordination of Education Program

***BMP Description:**

This Best Management Practice involves coordinating the education program with and making effective use of other storm water education programs being conducted by other entities, including community groups, non-profit organizations, lake improvement districts, Anoka Conservation District, Coon Creek Watershed District, Sunrise Watershed Management Organization, Upper Rum River Watershed Management Organization, Anoka-Hennepin School District 11, Forest Lake School District 831, U of M Extension, Anoka County, regional, state and federal government. Education activities are coordinated mainly through use of the monthly city newsletter, where education materials put out by the above listed agencies are published.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Update website as new information becomes available, but no less than twice per year. Inform the public of any storm water education programs that are going to be conducted by the City or other entities.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is ongoing.

Specific Components and Notes:

Number of website hits and updating educational material on the website. Coordinate education program with Coon Creek Watershed District.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

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BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1d-2 (16.5)

***BMP Title:** Education on Salts Impact on Runoff

***BMP Description:**

This Best Management Practice involves educating residents, businesses, commercial facilities, and institutions on the impact of salts on runoff, focused on the following:

a. proper use of deicing salt and the impact on receiving waters
b. methods to reduce deicing salt use
c. proper storage of salt or other deicing materials

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop an educational materials or equivalent outreach to residents, buinesses, commercial facilities, and institutions, at least once a year.

***Timeline/Implementation Schedule:**

Public outreach on this BMP is done at least once every calender year.

Specific Components and Notes:

The City of Ham Lake will distribute educational material to the public via the Ham Laker and made available on the City website.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-4347-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1d-3 (16.6)

***BMP Title:** Education on Pet Wastes Impact on Runoff

***BMP Description:**

This Best Management Practice involves educating residents, businesses, commercial facilities, and institutions on the impact that pet waste has on runoff, focused on the following:

a. impacts of pet waste on receiving waters
b. proper management of pet waste
c. any existing permittee regulatory mechanism for pet waste

Location(s) in SWPPP of detailed information relating to this BMP:

City of Ham Lake website.

***Measurable Goals:**

Develop an educational materials or equivalent outreach to residents, buinesses, commercial facilities, and institutions, at least once a year

***Timeline/Implementation Schedule:**

Public outreach on this BMP is done at least once every calender year

Specific Components and Notes:

The City of Ham Lake will distribute educational material to the public via the Ham Laker

***Responsible Party for this BMP:**

Name: Denise Webster
Department: Administration
Phone: 763-4347-9555
E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1d-4(16.7)

***BMP Title:** Education to Target Audiences within the Community

***BMP Description:**

This Best Management Practice involves development and implement an education and outreach plan that reaches out to the public. This plan must include:

a) target audiences
b) name or position title of responsible persons for overall plan implementation
c) specific activities and schedules to reach each target audience
d) a description of any coordination with and/or use of stormwater education and outreach programs implemented by other entities, if applicable

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop an educational program or equivalent outreach to residents, buinesses, commercial facilities, and institutions within the City.

***Timeline/Implementation Schedule:**

Public outreach on this BMP is done at least once every calender year

Specific Components and Notes:

Consideration should be given to low-income residents, people of color, and non-native English speaking residents.

***Responsible Party for this BMP:**

Name: Denise Webster
Department: Administration
Phone: 763-4347-9555
E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1e-1 (16.8)

***BMP Title:** Documentation on Stormwater Related Issues

***BMP Description:**

This Best Management Practice involves the documentation of stormwater related information. Documents must include:

a) a description of all specific stormwater-related issues identified by the permittee
b) all information required under the permittee's education and outreach plan
c) activities held, including dates, to reach each target audience
d) quantities and descriptions of educational materials distributed, including dates distributed; and
e) estimated audience for each completed education and outreach activity

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop an educational materials or equivalent outreach to residents, buinesses, commercial facilities, and institutions.

***Timeline/Implementation Schedule:**

Public outreach on this BMP is done at least once every calender year

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Denise Webster
Department: Administration
Phone: 763-4347-9555
E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1f-1 (16.9)

***BMP Title:** Annual Public Meeting

***BMP Description:**

This Best Management Practice includes advertising for and holding an annual public meeting to discuss the SWPPP and get public input. The public meeting will be advertised in accordance with the permit requirements. The public comments provided orally or in writing will be considered for adjustments to the SWPPP.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop public meeting format including collection of public input in written form if not available to attend meeting. Hold annual meeting.

***Timeline/Implementation Schedule:**

Yearly, prior to annual report submittal deadline.

Specific Components and Notes:

Publication of public meeting at least 30 days prior to the public meeting in the Star Tribune Record and the Ham Laker. The meeting will be conducted during a regular City Council meeting early in the calendar year to allow for revisions, if necessary, as appropriate to public comment. Make available a copy of the SWPPP for public review prior to the annual meeting. Summarize SWPPP at annual public meeting. Develop means of recording oral and written comments.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet Copy as Necessary

MS4 Name:

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number:

***BMP Title:**
***BMP Description:** Location(s) in SWPPP of detailed information relating to this BMP:
***Measurable Goals:**
***Timeline/Implementation Schedule:**
Specific Components and Notes:
***Responsible Party for this BMP:** Name: Department: Phone: E-mail:

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet Instructions

Introduction

The MPCA is required by law to place all Storm Water Pollution Prevention Programs (SWPPP) on public notice. Standardized summary sheets provide an easy mechanism for those wishing to reference comments to specific locations in a SWPPP. Standardized summaries also make SWPPPs easier to understand. The BMP (Best Management Practice) Summary Sheets included in this packet are a required attachment to your application for Permit coverage. Failure to include *all* required BMP Summary Sheets constitutes an incomplete application. All required information must also be included on the sheets for the application to be considered complete.

The MPCA is requiring that the attached BMP Summary Sheets (Sheets) be used. You may however, choose to organize the components of your MS4's SWPPP in any order you feel appropriate. The Sheets may be included as an attachment to your SWPPP, used as a lead-in for each section of the SWPPP, or they may be expanded to contain all of the information related to the BMP and Permit requirements in your SWPPP. The Sheets are designed to aid in the public review process of SWPPPs.

What to put in the BMP Summary Sheets

The Sheets are designed for you to outline the *major* components of each Permit requirement in a required BMP and how you plan to implement the controls associated with it. If the Sheets are only used to summarize what is explained in greater detail elsewhere, then the Sheet may contain a more brief explanation of the BMP's purpose, major milestones and timelines. Additional, more detailed information would then be referenced and provided in the body of your Storm Water Pollution Prevention Program (SWPPP).

The MPCA recognizes that some MS4s have been actively developing and implementing the programs and procedures in the required BMPs. It is important that each MS4 provide a statement on the current status of BMP implementation in the BMP Description section of each Sheet. The Measurable Goals and Timeline/Implementation Schedule for that BMP should also reflect its current status of development and implementation.

Although these Sheets will be included when SWPPPs are placed on public notice, they are not intended to replace or limit what would be necessary to develop a complete SWPPP. For many minimum control measures, effective implementation of the SWPPP will require a more detailed explanation of BMP activities. On the Sheets, provide the specific locations where any additional information relating to each BMP can be found in your SWPPP.

Blank Sheets are provided for additional BMPs. Instructions are provided related to the specific information that must be provided for each part of the Sheet. The intent of these description sheets is to provide a uniform framework for MS4s to summarize activities which have or will take place to fulfill the minimum requirements of a BMP.

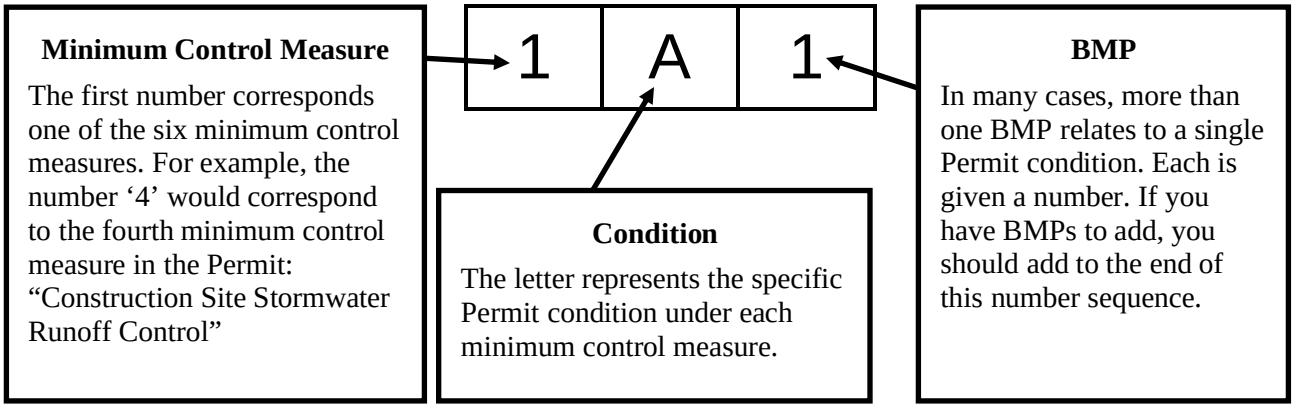
The BMP Numbering System

Your BMP Summary Sheets (Sheets) are a required attachment to use for your Permit Application for Permit coverage. Failure to include *all* required Sheets will constitute an incomplete application. The Sheets are numbered to correspond to each minimum control measure (MCM) identified in the Permit. All required information must be included on the Sheets for the application to be considered complete.

The purpose of these summary sheets is to provide an overview of the information contained in the MS4 SWPPP. These standardized sheets provide a uniform framework for each MS4 to organize and summarize activities which have or will take place to fulfill the Permit requirements (using various BMPs) for each of the six minimum control measures.

For the purpose of efficient public review, you must use the numbering system set forth in the instructions for each minimum control measure. The Permit's 30 required BMP Sheets have each been assigned a unique identification number that corresponds to its location in the Permit. Unique identification numbers consist of a number-letter-number format (Fig. 1). Blank Sheets are provided to be adapted for additional BMPs not specifically identified or required by the Permit. Be sure to follow the numbering sequence (Fig. 1) for each of those additional BMPs.

Figure 1: BMP Unique Identification Numbers



Measurable Goals

Measurable goals, which are required for each minimum control measure and for each BMP, are intended to gauge Permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the geographic and natural resource area served and how the BMPs will be implemented (operated) by the MS4. Measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. Finally, they should allow the MS4 to make improvements to its program over each 5-year Permit term by providing information and feedback to the operators and citizens on program successes and shortfalls.

The MPCA has adopted from EPA the definition of *measurable goals*: "*BMP design objectives or goals that quantify the progress of program implementation* ***and*** *the performance of your BMP."* The use of the term *performance* in this context does not refer to water quality monitoring but rather to progress and effectiveness achieved for implementation of the BMP

Timeline/Implementation Schedule

The Permit requires MS4s to provide an implementation schedule for measurable goals that includes any deadlines or timelines set forth in the Permit. When completing this section for each BMP Summary Sheet you must identify the measurable goals, milestones and elements of the BMP which you intend to accomplish during each year of the MS4 Permit.

Additional Resources for SWPPP Preparation

The MPCA encourages MS4s to use other work products whether voluntarily developed or required by another rule or law to assist in completing a SWPPP. Some examples would be water quality diagnostic or analysis studies, water management plans and stormwater management plans, to name a few, to assist in the development of the MS4 SWPPP and ultimately in the implementation of an integrated water quality and quantity management program for your area.

Many other agencies and organizations have completed guidance documents that may be useful in the development of your SWPPP. Keep in mind that these are simply guidance and do not hold the same legal authority as the Permit. This list is not necessarily inclusive of all materials that are available or may be used:

- **Minnesota Pollution Control Agency**
  - Stormwater Manual: **http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html**
    - Chapter 6: *Introduction to Best Management Practices (BMPs)*
    - Chapter 7: *Choosing Best Management Practices (BMPs)*
    - Chapter 12: *Details of Stormwater Best Management Practices (BMPs)*
  - Guidance Manual for Small Municipal Separate Storm Sewer Systems: **http://www.pca.state.mn.us/publications/wq-strm4-25b.pdf**

- **U.S. Environmental Protection Agency**
  - Menu of BMPs: **http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm**
  - Measurable Goals Guidance: **http://cfpub.epa.gov/npdes/stormwater/measurablegoals/index.cfm**
  - Stormwater Phase II Final Rule Fact Sheet Series: **http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm?program_id=6**

BMP Summary Sheet Instructions

Minimum Control Measure 2: PUBLIC PARTICIPATION/INVOLVEMENT

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
2a-1	Comply with Public Notice Requirements	**V.G.2.a.1**
2b-1	Solicit Public Input and opinion on the Adequacy of the SWPPP	**V.G.2.b.1**
2c-1	Consider Public Input	**V.G.2.c.1**
2c-2	Annual Public Involvement Activity	**V.G.2.c.2**
2c-3	Documentation of Revelated Changes	**V.G.2.c.3**
	Additional BMP Summary Sheet (Copy as Necessary)	

For each of the Best Management Practices (BMPs) associated with Minimum Control Measure 2 (MCM-2), **Public Participation/Involvement**, fill out the attached BMP Summary Sheets completely. The completion of all of the associated BMP Summary Sheets for the BMPs listed above are mandatory for a complete application. To aid in review and comment by the public, you must use the numbers listed in the key above and the BMP Titles which are consistent with the MS4 General Permit language. This summary is simply an overview of the BMP and does not contain all of the details associated with implementation. Be sure to include a reference to the specific locations of detailed information on which the summary sheet is based in your Storm Water Pollution Prevention Program (SWPPP).

1. BMP Description
Summarize the major components of this BMP and how you plan to develop and/or implement them. Also identify the following:

- BMP program components
- Plans for program implementation
- Target audience
- Process for collecting input
- Avenues in which comments may be submitted
- Procedure for submitting oral and/or written comments
- Include the exact locations (page numbers) of detailed information in the SWPPP

2. Measurable Goals
Define the milestones that are to be reached through the implementation of this BMP. Establish a baseline from which you will measure effectiveness, how the measurements are to be made, and how the success will be defined and quantified.

3. Timeline/Implementation Schedule
Provide specific dates that milestones identified as measurable goals are to be met. Include specific dates for the following:

- Due date for submitting comments
- Dates review will occur
- Timeframe for response to comments
- Annual time period in which SWPPP adjustments will be made to reflect those comments which were determined appropriate to reflect changes to the SWPPP

The schedule should also outline dates when measurable goals will be evaluated to determine program effectiveness.

4. Specific Components and Notes for this MCM
Include any additional notes relevant to the specific purpose of each BMP and how the BMPs for the minimum control measure have been modified from past practice based on experience and measures.

5. Responsible Party for this BMP
Indicate who specifically is responsible for the implementation and monitoring of this BMP. This should be the individual who is actively involved with the BMP and not simply a city official who is signing the application for permit coverage.

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2a-1 (17.3)

***BMP Title:** Comply with Public Notice Requirements

***BMP Description:**

This Best Management Practice involves complying with public notice requirements. The City will follow applicable public notice requirements and solicit public opinion about the adequacy of the SWPPP. The City will consider both written and oral comments.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

The notice of public meeting will be prepared and posted at least 30 days prior to the meeting. Hold public meeting. Review written and oral comments and revise SWPPP as necessary.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

Public notification will be through the Star Tribune Record and Ham Laker publications, in addition to being posted on the website.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2b-1 (17.5)

***BMP Title:** Solicit Public Input and opinion on the Adequacy of the SWPPP

***BMP Description:**

This Best Management Practice involves solicitation of public input and opinion on the adequacy of the SWPPP

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

The notice of public meeting will be prepared and posted at least 30 days prior to the meeting in the Star Tribune, in the Ham Laker and on the website. Hold public meeting. Review written and oral comments and revise SWPPP as necessary.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

Public notification will be through the Star Tribune Record and Ham Laker publications, in addition to being posted on the website.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2c-1 (17.8)

***BMP Title:** Consider Public Input

***BMP Description:**

This Best Management Practice involves the consideration of public input on the adequacy of the SWPPP.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

The notice of public meeting will be prepared and posted at least 30 days prior to the meeting in the Star Tribune Record, in the Ham Laker and on the website. Hold public meeting. Review written and oral comments and revise SWPPP as necessary.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2c-2 (17.6)

***BMP Title:** Annual Public Involvement Actvity Events

***BMP Description:**

This Best Mangenment Practice involves hosting public involvement actvity that includes a pollution prevention or water quality theme.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

These events will allow the public to be more involved within the community and educate more about the improtience of proper stormwater management.

***Timeline/Implementation Schedule:**

The City of Ham Lake shall host at least one public involvement activity a year.

Specific Components and Notes:

Public involvement activities include: rain barrel distribution event, rain garden workshop, cleanup event, storm drain stenciling, volunteer water quality monitoring, adopt a storm drain program, household hazardous waste collection day, etc.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2c-3

***BMP Title:** Documentation of Revelated Changes

***BMP Description:**

This Best Management Practice involves the documentation of revelated changes recommended by the public.

a) all relevant written input submitted by persons regarding the SWPPP
b) all responses from the permittee to written input received regarding the SWPPP, including any modifications made to the SWPPP as a result of the written input received
c) dates, locations, and estimated number of participants at events held for purposes
d) notices provided to the public of any events scheduled, including any electronic correspondence (e.g., website, e-mail distribution lists, notices, etc.
e) dates, locations, description of activities, and estimated number of participants at events held for the purpose of compliance

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

These events will allow the public to be more involved within the community and implementing more about the improtience of proper stormwater management.

***Timeline/Implementation Schedule:**

Documentations and changes made will be in an annual bases.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Denise Webster
Department: Administration
Phone: 763-434-9555
E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet Copy as Necessary

MS4 Name:

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number:

***BMP Title:**
***BMP Description:** Location(s) in SWPPP of detailed information relating to this BMP:
***Measurable Goals:**
***Timeline/Implementation Schedule:**
Specific Components and Notes:
***Responsible Party for this BMP:** Name: Department: Phone: E-mail:

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BMP Summary Sheet Instructions

Introduction

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What to put in the BMP Summary Sheets

The Sheets are designed for you to outline the *major* components of each Permit requirement in a required BMP and how you plan to implement the controls associated with it. If the Sheets are only used to summarize what is explained in greater detail elsewhere, then the Sheet may contain a more brief explanation of the BMP's purpose, major milestones and timelines. Additional, more detailed information would then be referenced and provided in the body of your Storm Water Pollution Prevention Program (SWPPP).

The MPCA recognizes that some MS4s have been actively developing and implementing the programs and procedures in the required BMPs. It is important that each MS4 provide a statement on the current status of BMP implementation in the BMP Description section of each Sheet. The Measurable Goals and Timeline/Implementation Schedule for that BMP should also reflect its current status of development and implementation.

Although these Sheets will be included when SWPPPs are placed on public notice, they are not intended to replace or limit what would be necessary to develop a complete SWPPP. For many minimum control measures, effective implementation of the SWPPP will require a more detailed explanation of BMP activities. On the Sheets, provide the specific locations where any additional information relating to each BMP can be found in your SWPPP.

Blank Sheets are provided for additional BMPs. Instructions are provided related to the specific information that must be provided for each part of the Sheet. The intent of these description sheets is to provide a uniform framework for MS4s to summarize activities which have or will take place to fulfill the minimum requirements of a BMP.

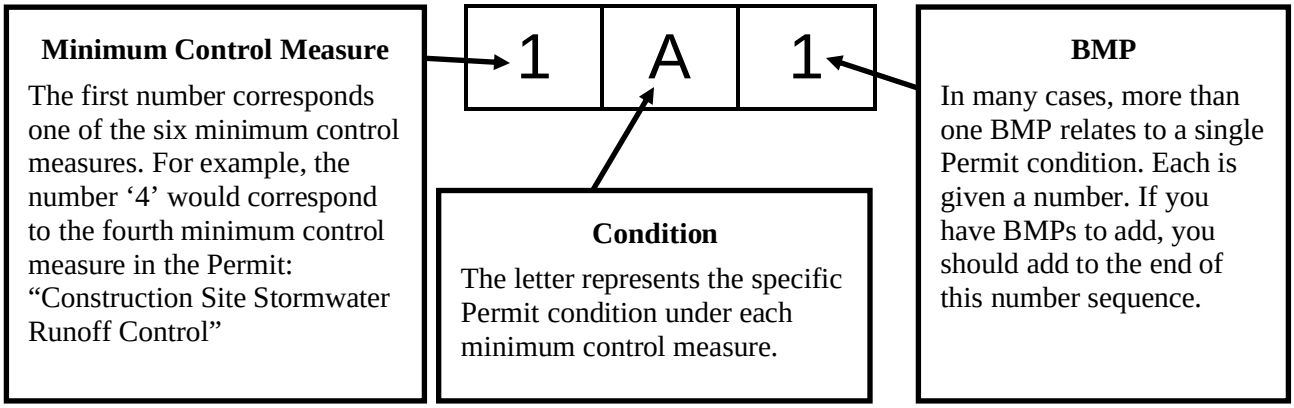
The BMP Numbering System

Your BMP Summary Sheets (Sheets) are a required attachment to use for your Permit Application for Permit coverage. Failure to include *all* required Sheets will constitute an incomplete application. The Sheets are numbered to correspond to each minimum control measure (MCM) identified in the Permit. All required information must be included on the Sheets for the application to be considered complete.

The purpose of these summary sheets is to provide an overview of the information contained in the MS4 SWPPP. These standardized sheets provide a uniform framework for each MS4 to organize and summarize activities which have or will take place to fulfill the Permit requirements (using various BMPs) for each of the six minimum control measures.

For the purpose of efficient public review, you must use the numbering system set forth in the instructions for each minimum control measure. The Permit's 30 required BMP Sheets have each been assigned a unique identification number that corresponds to its location in the Permit. Unique identification numbers consist of a number-letter-number format (Fig. 1). Blank Sheets are provided to be adapted for additional BMPs not specifically identified or required by the Permit. Be sure to follow the numbering sequence (Fig. 1) for each of those additional BMPs.

Figure 1: BMP Unique Identification Numbers



Measurable Goals

Measurable goals, which are required for each minimum control measure and for each BMP, are intended to gauge Permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the geographic and natural resource area served and how the BMPs will be implemented (operated) by the MS4. Measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. Finally, they should allow the MS4 to make improvements to its program over each 5-year Permit term by providing information and feedback to the operators and citizens on program successes and shortfalls.

The MPCA has adopted from EPA the definition of *measurable goals*: "*BMP design objectives or goals that quantify the progress of program implementation* ***and*** *the performance of your BMP."* The use of the term *performance* in this context does not refer to water quality monitoring but rather to progress and effectiveness achieved for implementation of the BMP

Timeline/Implementation Schedule

The Permit requires MS4s to provide an implementation schedule for measurable goals that includes any deadlines or timelines set forth in the Permit. When completing this section for each BMP Summary Sheet you must identify the measurable goals, milestones and elements of the BMP which you intend to accomplish during each year of the MS4 Permit.

Additional Resources for SWPPP Preparation

The MPCA encourages MS4s to use other work products whether voluntarily developed or required by another rule or law to assist in completing a SWPPP. Some examples would be water quality diagnostic or analysis studies, water management plans and stormwater management plans, to name a few, to assist in the development of the MS4 SWPPP and ultimately in the implementation of an integrated water quality and quantity management program for your area.

Many other agencies and organizations have completed guidance documents that may be useful in the development of your SWPPP. Keep in mind that these are simply guidance and do not hold the same legal authority as the Permit. This list is not necessarily inclusive of all materials that are available or may be used:

- **Minnesota Pollution Control Agency**
  - Stormwater Manual: **http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html**
    - Chapter 6: *Introduction to Best Management Practices (BMPs)*
    - Chapter 7: *Choosing Best Management Practices (BMPs)*
    - Chapter 12: *Details of Stormwater Best Management Practices (BMPs)*
  - Guidance Manual for Small Municipal Separate Storm Sewer Systems: **http://www.pca.state.mn.us/publications/wq-strm4-25b.pdf**

- **U.S. Environmental Protection Agency**
  - Menu of BMPs: **http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm**
  - Measurable Goals Guidance: **http://cfpub.epa.gov/npdes/stormwater/measurablegoals/index.cfm**
  - Stormwater Phase II Final Rule Fact Sheet Series: **http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm?program_id=6**

BMP Summary Sheet Instructions

Minimum Control Measure 3: ILLICIT DISCHARGE DETECTION AND ELIMINATION

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
3a-1	Storm Sewer System Map	**V.G.3.a.1**
3b-1	Regulatory Control Program	**V.G.3.b.1**
3c-1	Illicit Discharge Detection and Elimination Plan	**V.G.3.c.1**
3d-1	Public and Employee Illicit Discharge Information Program	**V.G.3.d.1**
3d-2	Implementation on Salts Impact on Illicit Discharge	**V.G.3.d.2**
3d-3	Implementation on Pet Wastes Impact on Illicit Discharge	**V.G.3.d.3**
3e-1	Identification of Non-Stormwater Discharges and Flows	**V.G.3.e.1**
3f-1	Mapping of Identified Illicit Discharges	**V.G.3.f.1**
3g-1	Implementation of Procedures for Investigating, Locating and Eliminating Sources of Illicit Discharges	**V.G.3.g.1**
3h-1	Emergency Response Procedures	**V.G.3.h.1**
3h-2	Enforcement Response Procedures	**V.G.3.h.2**
3i-1	Review of Illicit Discharge Programs	**V.G.3.i.1**
	Additional BMP Summary Sheet (Copy as Necessary)	

For each of the Best Management Practices (BMPs) associated with Minimum Control Measure 3 (MCM-3), **Illicit Discharge Detection and Elimination**, fill out the attached BMP Summary Sheets completely. The completion of all of the associated BMP Summary Sheets for the BMPs listed above are mandatory for a complete application. To aid in review and comment by the public, you must use the numbers listed in the key above and the BMP Titles which are consistent with the MS4 General Permit language. This summary is simply an overview of the BMP and does not contain all of the details associated with implementation. Be sure to include a reference to the specific locations of detailed information on which the summary sheet is based in your Storm Water Pollution Prevention Program (SWPPP).

1. BMP Description
Summarize the major components of this BMP and how you plan to implement them. Also identify the following:

- BMP program components
- Plans for program implementation
- Target audience
- Include the exact locations (page numbers) of detailed information in the SWPPP

2. Measurable Goals
Define the milestones that are to be reached through the implementation of this BMP. Establish a baseline from which you will measure effectiveness, how the measurements are to be made, and how the success will be defined and quantified.

3. Timeline/Implementation Schedule
Provide specific dates that milestones identified as measurable goals are to be met. The scheduled should also outline dates when measurable goals will be evaluated to determine program effectiveness.

4. Specific Components and Notes for this MCM
Include any additional notes relevant to the specific purpose of each BMP and how the BMPs for the minimum control measure have been modified from past practice based on experience and measures. For the Storm Sewer System Map identify the resource materials which were or will be used to create the map. Concerning your

Regulatory Control Program identify who has regulatory authority concerning ordinances or other regulatory instruments.

5. Responsible Party for this BMP

Indicate who specifically is responsible for the implementation and monitoring of this BMP. This should be the individual who is actively involved with the BMP and not simply a city official who is signing the application for permit coverage.

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3a-1 (18.3)

***BMP Title:** Storm Sewer System Map

***BMP Description:**

This Best Management Practice includes updating the existing storm sewer system map. The storm sewer inventory map is in ArcView GIS and AutoCAD format.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Update map as new information becomes available.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is ongoing. The storm sewer system map is continually updated to include new developments, street reconstruction projects and when field crews install or notice pipes that are not in the inventory.

Specific Components and Notes:

Location of all ponds, streams, lakes and wetlands that are part of the City of Ham Lake. Location of all structural pollution control devices. Location of all pipes and conveyances that are 24 inches in diameter and over that are part of the City of Ham Lake. The pipe inventory contains pipe sizes, material, catch basins and pond normal and high-water elevations. Location of all outfalls and other discharge points leaving the City of Ham Lake.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3b-1 (18.2)

***BMP Title:** Regulatory Control Program

***BMP Description:**

This Best Management Practice includes effectively prohibiting, through ordinance, non-storm water discharges into the storm sewer system and implementing appropriate enforcement procedures and actions. Ordinance to provide authority to inspect systems and facilities, prevent illicit connections and discharges and allow for punitive measures.

To develop the ordinance, the City will audit existing related ordinances to determine where gaps exist in the legal authority to inspect systems, prevent illicit connections and discharges and allow for punitive measures. The City will also establish how detected discharges and follow up activities will be tracked.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Documentation of existing related ordinances and programs. Develop non-storm water discharge ordinance and record any corrective actions/measures taken for non-compliance. Review existing ordinance for inspection of possible illicit discharge locations. Review existing ordinance regarding illegal dumping. Documentation of non-compliance occurrences and resolutions.

***Timeline/Implementation Schedule:**

Related ordinances were adopted in 2008. The program will be reviewed annually.

Specific Components and Notes:

Meetings with City Attorney. Regulatory inspection and enforcement mechanisms for septic systems, illicit connections, illegal dumping and recreational sewage. Right of entry provision.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3c-1(18.4, 18.7)

***BMP Title:** Illicit Discharge Detection and Elimination Plan

***BMP Description:**

This Best Management Practice will involve categorizing and prioritizing areas of concern related to illicit connections and illicit discharge based on the likelihood of illicit connections (e.g. older septic systems or industrial sites). Enforce existing code requiring post-construction inspections of septic systems. The current program involves the periodic visual inspection of the stormwater system for the presence of any odors or abnormalities. This program will be developed to include a recording system for tracking non stormwater discharges and responses, including illegal dumping.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Document areas inspected for illicit discharges. Keep records of illicit discharges found and action taken. Document any failed post-construction septic systems and remedy. Develop website link. Update website as new information becomes available. Number of website hits reporting illicit discharges.

***Timeline/Implementation Schedule:**

Implementation of the tracking system will take place early on in the plan timeline and evaluation of the tracking system will be on-going to allow any necessary changes to be made.

Specific Components and Notes:

Routine inspection throughout the City during dry weather to try and locate illicit discharge to the storm drain.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3d-1 (18.8)

***BMP Title:** Public and Employee Illicit Discharge Information Program

***BMP Description:**

This Best Management Practice involves informing employees, businesses and general public of hazards associated with illegal discharges. Use of website to inform. Use of website to have citizens report problems. Education will target neighborhoods and businesses most likely to generate illicit discharge and will focus on public health and safety concerns.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop website link. Number of website hits reporting illicit discharges. Website information posted. Staff training completed.

***Timeline/Implementation Schedule:**

The website link and related information currently exists and implementation is ongoing. Staff training will be on-going.

Specific Components and Notes:

Training in this BMP includes:

a) general subject matter covered
b) names and departments of individuals in attendance
c) date of each event

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 3d-2

***BMP Title:** Implementation on Salts Impact on Illicit Discharge

***BMP Description:**

This Best Management Practice involves implementing the public on the impact of salts on illicit discharge, focused on the following:

a. impact of deicing salt use on receiving waters
b. methods to reduce deicing salt use
c. proper storage of salt or other deicing materials

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop an educational materials or equivalent outreach to residents, buinesses, commercial facilities, and institutions, at least once a year

***Timeline/Implementation Schedule:**

Public outreach on this BMP is done at least once every calender year

Specific Components and Notes:

The City of Ham Lake will distribute educational material to the public via the Ham Laker

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-4347-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 3d-3

***BMP Title:** Implemention on Pet Wastes Impact on Illicit Discharge

***BMP Description:**

This Best Management Practice involves the implementation the public the impact of pet waste on illicit discharge, focused on the following:

a. impacts of pet waste on receiving waters
b. proper management of pet waste
c. any existing permittee regulatory mechanism for pet waste

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop an educational materials or equivalent outreach to residents, buinesses, commercial facilities, and institutions, at least once a year

***Timeline/Implementation Schedule:**

Public outreach on this BMP is done at least once every calender year

Specific Components and Notes:

The City of Ham Lake will distribute educational material to the public via the Ham Laker

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-4347-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3e-1 (18.9)

***BMP Title:** Identification of Non-Stormwater Discharges and Flows

***BMP Description:**

This Best Management Practice involves the identification of non-storm water discharges or illicit discharges entering the storm sewer system through illicit connections, illegal dumping, individual septic treatment system overflows or unauthorized discharging.

The main method for identifying non stormwater discharge is by visual inspection of the stormwater collection system during dry weather for the presence of odors or abnormalities.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Written procedure for responding to illicit discharge complaints and detections. Documentation of illicit discharge complaint responses.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

Training in this BMP includes:

a) general subject matter covered
b) names and departments of individuals in attendance
c) date of each event

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3f-1 (18.10)

***BMP Title:** Mapping of Identified Illicit Discharges

***BMP Description:**

This Best Mangement Practices involves the mapping of priorty areas that have been identified of the likelihood for illicit discharge.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

At a minimum, the following will be evaluated for potential inclusion in the inventory:

a) land uses associated with business/industrial activities
b) arears where illicit discharges have been identified in the past
c) areas with storage of significant materials that could result in an illicit discharge

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

Per state and local laws, additional illicit discharge inspections will be performed in areas already identified

***Responsible Party for this BMP:**

Name: John Witkowski
Department: Public Works
Phone: 763-434-9555
E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3g-1 (18.12)

***BMP Title:** Implementation of Procedures for Investigating, Locating and Eliminating Sources of Illicit Discharges

***BMP Description:**

This Best Management Practice involves the implementation for investigating, locating and elimination sources of illicit discharge sources. At a minimum, procedures must include:

a) a timeframe in which the permittee will investigate a reported illicit discharge
b) use of visual inspections to detect and track the source of an illicit discharge
c) tools available to the permittee to investigate and locate an illicit discharge (e.g., mobile cameras, collecting
d) analyzing water samples, smoke testing, dye testing, etc.)
e) cleanup methods available to the permittee to remove an illicit discharge or spill
f) name or position title of responsible persons for investigating, locating, and eliminating an illicit discharge

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

The goal for this BMP is to eliminate the amount of illicit discharge sources within the MS4.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

Per state and local laws, additional illicit discharge inspections will be performed in areas already identified

***Responsible Party for this BMP:**

Name: John Witkowski
Department: Public Works
Phone: 763-434-9555
E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3h-1 (18.13)

***BMP Title:** Emergency Response Procedures

***BMP Description:**

This Best Management Practice involves the procedures for responding to spills, including emergency response procedures to prevent spills from entering the MS4.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Procedures must also include the immediate notification of the Minnesota Department of Public Safety Duty Officer, if the source of the illicit discharge is a spill or leak as defined in Minn. Stat. 115.061.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

MDPS can be reached at 1-800-422-0798 (toll free) or 651-649-5451 (Metro area)

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3h-2 (18.14)

***BMP Title:** Enforcement Response Procedures

***BMP Description:**

This Best Management Practice involves the enforcement of response procedures to compel compliance with the MS4 regulatory mechanism. At a minimum, the ERP must include

a) a description of enforcement tools available to the permittee and guidelines for the use of each tool
b) timeframes to complete corrective actions
c) name or position title of responsible persons for conducting enforcement

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

This BMP at a minimum, must document the following:

a) dates and locations of the observed violations
b) description of the violations
c) corrective actions (including completion schedule) issued by the permittee

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: John Witkowski
Department: Public Works
Phone: 763-434-9555
E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3i-1 (18.13)

***BMP Title:** Review of Illicit Discharge Programs

***BMP Description:**

This Best Management Practice involves yearly assessment to evaluate the program compliance, the status of achieving the requirements within this MCM and determine with the program can be improved.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Measurable requirements are activities that must be documented or tracked as applicable to the MCM. The MS4 must perform the annual assessment prior to completion of each annual report and document any changes made to the program as a result of the annual assessment.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

MDPS can be reached at 1-800-422-0798 (toll free) or 651-649-5451 (Metro area)

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet Copy as Necessary

MS4 Name:

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number:

***BMP Title:**
***BMP Description:** Location(s) in SWPPP of detailed information relating to this BMP:
***Measurable Goals:**
***Timeline/Implementation Schedule:**
Specific Components and Notes:
***Responsible Party for this BMP:** Name: Department: Phone: E-mail:

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet Instructions

Introduction

The MPCA is required by law to place all Storm Water Pollution Prevention Programs (SWPPP) on public notice. Standardized summary sheets provide an easy mechanism for those wishing to reference comments to specific locations in a SWPPP. Standardized summaries also make SWPPPs easier to understand. The BMP (Best Management Practice) Summary Sheets included in this packet are a required attachment to your application for Permit coverage. Failure to include *all* required BMP Summary Sheets constitutes an incomplete application. All required information must also be included on the sheets for the application to be considered complete.

The MPCA is requiring that the attached BMP Summary Sheets (Sheets) be used. You may however, choose to organize the components of your MS4's SWPPP in any order you feel appropriate. The Sheets may be included as an attachment to your SWPPP, used as a lead-in for each section of the SWPPP, or they may be expanded to contain all of the information related to the BMP and Permit requirements in your SWPPP. The Sheets are designed to aid in the public review process of SWPPPs.

What to put in the BMP Summary Sheets

The Sheets are designed for you to outline the *major* components of each Permit requirement in a required BMP and how you plan to implement the controls associated with it. If the Sheets are only used to summarize what is explained in greater detail elsewhere, then the Sheet may contain a more brief explanation of the BMP's purpose, major milestones and timelines. Additional, more detailed information would then be referenced and provided in the body of your Storm Water Pollution Prevention Program (SWPPP).

The MPCA recognizes that some MS4s have been actively developing and implementing the programs and procedures in the required BMPs. It is important that each MS4 provide a statement on the current status of BMP implementation in the BMP Description section of each Sheet. The Measurable Goals and Timeline/Implementation Schedule for that BMP should also reflect its current status of development and implementation.

Although these Sheets will be included when SWPPPs are placed on public notice, they are not intended to replace or limit what would be necessary to develop a complete SWPPP. For many minimum control measures, effective implementation of the SWPPP will require a more detailed explanation of BMP activities. On the Sheets, provide the specific locations where any additional information relating to each BMP can be found in your SWPPP.

Blank Sheets are provided for additional BMPs. Instructions are provided related to the specific information that must be provided for each part of the Sheet. The intent of these description sheets is to provide a uniform framework for MS4s to summarize activities which have or will take place to fulfill the minimum requirements of a BMP.

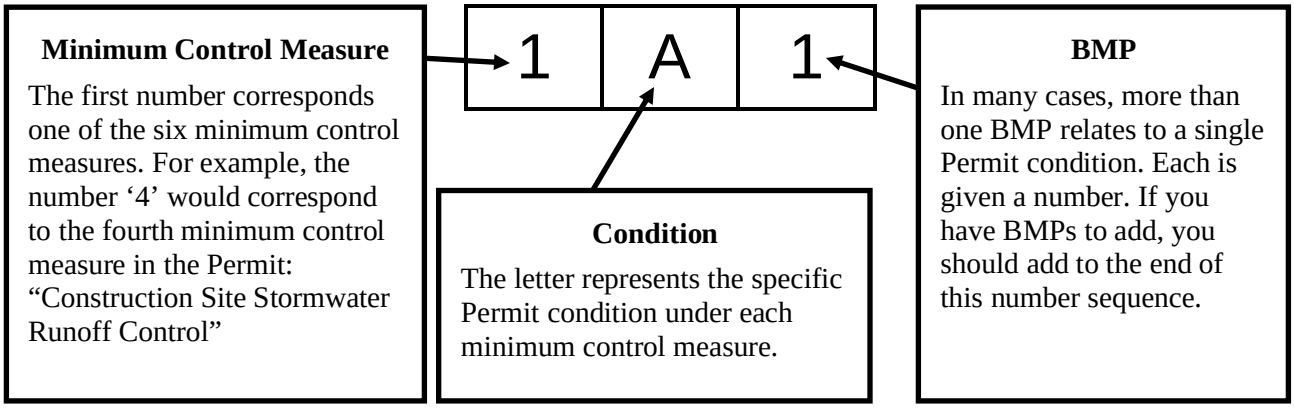
The BMP Numbering System

Your BMP Summary Sheets (Sheets) are a required attachment to use for your Permit Application for Permit coverage. Failure to include *all* required Sheets will constitute an incomplete application. The Sheets are numbered to correspond to each minimum control measure (MCM) identified in the Permit. All required information must be included on the Sheets for the application to be considered complete.

The purpose of these summary sheets is to provide an overview of the information contained in the MS4 SWPPP. These standardized sheets provide a uniform framework for each MS4 to organize and summarize activities which have or will take place to fulfill the Permit requirements (using various BMPs) for each of the six minimum control measures.

For the purpose of efficient public review, you must use the numbering system set forth in the instructions for each minimum control measure. The Permit's 30 required BMP Sheets have each been assigned a unique identification number that corresponds to its location in the Permit. Unique identification numbers consist of a number-letter-number format (Fig. 1). Blank Sheets are provided to be adapted for additional BMPs not specifically identified or required by the Permit. Be sure to follow the numbering sequence (Fig. 1) for each of those additional BMPs.

Figure 1: BMP Unique Identification Numbers



Measurable Goals

Measurable goals, which are required for each minimum control measure and for each BMP, are intended to gauge Permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the geographic and natural resource area served and how the BMPs will be implemented (operated) by the MS4. Measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. Finally, they should allow the MS4 to make improvements to its program over each 5-year Permit term by providing information and feedback to the operators and citizens on program successes and shortfalls.

The MPCA has adopted from EPA the definition of *measurable goals*: "*BMP design objectives or goals that quantify the progress of program implementation* ***and*** *the performance of your BMP."* The use of the term *performance* in this context does not refer to water quality monitoring but rather to progress and effectiveness achieved for implementation of the BMP

Timeline/Implementation Schedule

The Permit requires MS4s to provide an implementation schedule for measurable goals that includes any deadlines or timelines set forth in the Permit. When completing this section for each BMP Summary Sheet you must identify the measurable goals, milestones and elements of the BMP which you intend to accomplish during each year of the MS4 Permit.

Additional Resources for SWPPP Preparation

The MPCA encourages MS4s to use other work products whether voluntarily developed or required by another rule or law to assist in completing a SWPPP. Some examples would be water quality diagnostic or analysis studies, water management plans and stormwater management plans, to name a few, to assist in the development of the MS4 SWPPP and ultimately in the implementation of an integrated water quality and quantity management program for your area.

Many other agencies and organizations have completed guidance documents that may be useful in the development of your SWPPP. Keep in mind that these are simply guidance and do not hold the same legal authority as the Permit. This list is not necessarily inclusive of all materials that are available or may be used:

- **Minnesota Pollution Control Agency**
  - Stormwater Manual: **http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html**
    - Chapter 6: *Introduction to Best Management Practices (BMPs)*
    - Chapter 7: *Choosing Best Management Practices (BMPs)*
    - Chapter 12: *Details of Stormwater Best Management Practices (BMPs)*
  - Guidance Manual for Small Municipal Separate Storm Sewer Systems: **http://www.pca.state.mn.us/publications/wq-strm4-25b.pdf**

- **U.S. Environmental Protection Agency**
  - Menu of BMPs: **http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm**
  - Measurable Goals Guidance: **http://cfpub.epa.gov/npdes/stormwater/measurablegoals/index.cfm**
  - Stormwater Phase II Final Rule Fact Sheet Series: **http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm?program_id=6**

BMP Summary Sheet Instructions

Minimum Control Measure 4: CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
4a-1	Ordinance or other Regulatory Mechanism	**V.G.4.a.1**
4b-1	Construction Site Implementation of Erosion and Sediment Control BMPs	**V.G.4.b.1**
4c-1	Waste Controls for Construction Site Operators	**V.G.4.c.1**
4d-1	Procedure for Site Plan Review	**V.G.4.d.1**
4e-1	Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance	**V.G.4.e.1**
4f-1	Establishment of Procedures for Site Inspections and Enforcement	**V.G.4.f.1**
4g-1	Implementation of Procedures for Receipt and Reports of Stormwater Related Information	**V.G.4.g.1**
4h-1	Training on Construction Site Stormwater Runoff Control Program	**V.G.4.h.1**
4i-1	Site Plan Review	**V.G.4.i.1**
4j-1	Annual Assessment of Construction Site Stormwater Runoff Control Program	**V.G.4.j.1**
	Additional BMP Summary Sheet (Copy as Necessary)	

For each of the Best Management Practices (BMPs) associated with Minimum Control Measure 4 (MCM-4), **Construction Site Stormwater Runoff Control**, fill out the attached BMP Summary Sheets completely. The completion of all of the associated BMP Summary Sheets for the BMPs listed above are mandatory for a complete application. To aid in review and comment by the public, you must use the numbers listed in the key above and the BMP Titles which are consistent with the MS4 General Permit language. This summary is simply an overview of the BMP and does not contain all of the details associated with implementation. Be sure to include a reference to the specific locations of detailed information on which the summary sheet is based in your Storm Water Pollution Prevention Program (SWPPP).

1. BMP Description

Summarize the major components of this BMP and how you plan to implement them. Define the following:

- BMP program components
- Target audience
- Specific information relating to content of local ordinance already in place
- Waste control guidelines
- System(s) in place to receive and respond to complaints related to construction site noncompliance
- Priority areas of inspection and enforcement activities related to construction sites
- Include the exact locations (page numbers) of detailed information in the SWPPP

2. Measurable Goals

Define the milestones that are to be reached through the implementation of this BMP. Establish a baseline from which you will measure effectiveness, how the measurements are to be made, and how the success will be defined and quantified. It is mandatory that the ordinance be at least as strict as those requirements set forth in the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) General Stormwater Permit for Construction Activity.

3. Timeline/Implementation Schedule

Provide specific dates that milestones identified as measurable goals are to be met. The schedule should also outline dates when measurable goals will be evaluated to determine program effectiveness.

4. Specific Components and Notes for this MCM
Include any additional notes relevant to the specific purpose of each BMP and how the BMPs for the minimum control measure have been modified from past practice based on experience and measures.

5. Responsible Party for this BMP
Indicate who specifically is responsible for the implementation and monitoring of this BMP. This should be the individual who is actively involved with the BMP and not simply a city official who is signing the application for permit coverage.

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4a-1 (19.2)

***BMP Title:** Ordinance or other Regulatory Mechanism

***BMP Description:**

This Best Management Practice includes adoption and enforcement of an Erosion and Sediment Control/ Grading Ordinance. The City has an adopted Erosion and Sediment Control/ Grading Ordinance, which address all aspects of the NPDES Construction Stormwater Permit. This existing Ordinance will be reviewed and revised as needed.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Review and update existing Ordinance. Number of plans reviewed. Public comments incorporated into final ordinance, where applicable.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

Financial security and/or letter of credit. Coordination with the Coon Creek Watershed District.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4b-1(19.3)

***BMP Title:** Construction Site Implementation of Erosion and Sediment Control BMPs

***BMP Description:**

The City of Ham Lake has listed minimum erosion and sedimentation control Best Management Practices requirements within the existing Ordinance.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Number of plans reviewed conforming with Ordinance Best Management Practices requirements.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

The City must maintain writtin enforcement response procedures to compliance with the regulatory mechanism given in this BMP. The ERP must include:

a) a description of enforcement tools available to the permittee and guidelines for the use of each tool
b) name or position title of responsible person(s) for conducting enforcement

***Responsible Party for this BMP:**

Name: Tom Collins
Department: Engineering
Phone: 763-862-8000
E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4b-2 (19.4)

***BMP Title:** Building Permit Site Implementation of Erosion and Sediment Control BMPs

***BMP Description:**

The City of Ham Lake has listed minimum erosion and sedimentation control requirements within Ordinance 12-08, located in Appendix R.

Location(s) in SWPPP of detailed information relating to this BMP:

Appendix R

***Measurable Goals:**

Number of plans reviewed and sites inspected conforming to Ordinance, best management practice requirements and building permit requirements.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

Site inspections completed, as required, per Section VII of Ordinance 12-08, shown in Appendix R.

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4c-1 (19.6)

***BMP Title:** Waste Controls for Construction Site Operators

***BMP Description:**

This Best Management Practice includes the development of an ordinance that will address construction site materials storage and waste control, including the handling of discarded building materials, concrete truck washout, chemicals, litter and sanitary waste. Development of this ordinance will include auditing existing related ordinances for gaps in authority involving construction site materials storage and waste control.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Number of enforcement actions taken.

***Timeline/Implementation Schedule:**

Related ordinances was adopted in July 2012. The program will be reviewed annually

Specific Components and Notes:

Define construction site waste control issues, storage requirements and develop inspection and enforcement procedures.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4d-1 (19.5)

***BMP Title:** Procedure for Site Plan Review

***BMP Description:**

This Best Management Practice includes the development of a grading and site plan review process. A plan review process is currently in use by the City. The process will be reviewed and revised as needed.

The current plan review process includes:
-tracking the status of each plan under review by the City
-using a review checklist for required inclusions on plan submittals
-reviewing plans and either approving plans or sending review letters listing deficiencies in the plans
-requiring plan approval before placement on the Planning Commission meeting agenda

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Review and update existing grading and site plan review process. Number of plans reviewed.

***Timeline/Implementation Schedule:**

This activity currently exists and implementation is on-going.

Specific Components and Notes:

Coordinated with the Coon Creek Watershed District. Assess current site plan review procedures.

***Responsible Party for this BMP:**

Name: Tom Collins
Department: Engineering
Phone: 763-862-8000
E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4d-2

***BMP Title:** Impaired Waters Review Process

***BMP Description:**

Coon Lake has been listed on the USEPA 303(d) list as an impaired water. The impairment for Coon Lake is mercury; therefore, the City's stormwater discharge will not contribute to the mercury impairment.

Coon Creek has been listed on the USEPA 303(d) list as an impaired water. The impairment for Coon Creek is aquatic macroinvertebrate bioassessments. A TMDL study is scheduled to start in 2014. It is anticipated that the Coon Creek Watershed District will have an active role in the TMDL study. The City will identify all potential stormwater discharges to Coon Creek, delineate watershed areas and evaluate land use and other characteristics that may impact impaired waters.

Ham Lake has been listed on the USEPA 303(d) list as an impaired water. This impairment for Ham Lake is mercury; therefore, the City's stormwater discharge will not contribute to the mercury impairment.

***Measurable Goals:**

Determine what processes are already in place to help comply with permit conditions.

Create a written inventory of all impaired waters within the City and compile information about any stormwater discharges to impaired waters.

Create a map that includes all impaired waters within the City and any stormwater discharges to impaired waters.

***Timeline/Implementation Schedule:**

Year 1: Identify what processes are already in place to comply with permit conditions. Identify impaired waters receiving stormwater discharges.

Year 2: Develop a map of stormwater discharges to impaired waters. Complete delineations, evaluation of land use, etc…

Year 3: Include an overview of impaired waters and any changes deemed necessary to the SWPPP in the Annual Report the MPCA.

Year 2014: Participate in the TMDL study for Coon Creek.

Specific Components and Notes:

This process is to be reassessed annually over the course of the permit cycle. As the 303(d) list is updated, the City will review changes and review additional waters likely to be impacted by City stormwater discharges.

When an EPA approved TMDL is finalized, the City will comply with all limits and requirements set forth in accordance with the schedule outlined in the TMDL.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4e-1

***BMP Title:** Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance

***BMP Description:**

This Best Management Practice includes the development of a receipt and recording process for public non-compliance complaints and reports. The current complaint procedure involves a Public Works staff member inspecting the site of the complaint and reporting back to the City Engineer. The City Engineer will then work with Public Works on the solution. Development of this program will involve a recording system of complaints logged and action taken.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Number of complaints logged and actions taken.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

Develop a receipt log for receiving complaints or reports. Develop a response procedure.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4f-1

***BMP Title:** Establishment of Procedures for Site Inspections and Enforcement

***BMP Description:**

Erosion and sediment control measures are currently required on all plans before approval. Inspection and enforcement procedures currently exist. Construction sites are inspected periodically throughout the construction season and the findings are tracked using a combination of inspection forms, photographs and written notes. Written letters of inspection are sent accordingly as inspections are completed. Inspection schedules vary depending on the priority of the site.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop construction site inspection and enforcement procedures. Number of sites inspected. Number of enforcement actions.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

Review the needs for inspector training or certification/recertification.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4g-1

***BMP Title:** Implementation of Procedures for Receipt and Reports of Stormwater Related Information

***BMP Description:**

This Best Management Practice involves procedures for receipt and consideration of reports by the public to the City.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Reports are for noncompliance or other stormwater related information on construction activity

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4h-1

***BMP Title:** Training on Construction Site Stormwater Runoff Control Program

***BMP Description:**

This Best Management Practice involves the training of individuals on their responsibilities as they relate to the City's Construction Stormwater Runoff Control program.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Training of individuals includes, but is not limited to: individuals responsibly for conducting site plan reviews, site inspections and enforcement.

***Timeline/Implementation Schedule:**

This is an existing programwith the City and implementation is on-going. Refresher training courses shall be offered every three years following initial training.

Specific Components and Notes:

Training must document the following:

a. general subject matter covered
b. names and departments of individuals in attendance
a. date of each event

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4i-1

***BMP Title:** Site Plan Review

***BMP Description:**

This Best Management Practice involves the documentation required for site plan review by the City. The following is required:

a) project name
b) location
c) total acreage to be disturbed
d) owner and operator of the proposed construction activity
e) proof of notification to obtain coverage under the CSW Permit, or proof of coverage under the CSW Permit
f) any stormwater related comments and supporting completed checklist, used by the permittee to determine project approval or denial

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

The City shall review all civil site plans for projects for the City to review if the requirments in this BMP are being meet.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins
Department: Engineering
Phone: 763-862-8000
E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4j-1

***BMP Title:** Annual Assessment of Construction Site Stormwater Runoff Control Program

***BMP Description:**

This Best Management Practice involves the City conducting annual reviews on this MCM program to evaluate the program compliance, and determine how the program might be improved.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Measurable Requirments are activities that must be documented or tracted as applicable to the MCM. The City must perform the annual assessment prior to completion of each annual report and document any modifications made to the program as a result of the of the annual assessment.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet Copy as Necessary

MS4 Name:

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number:

***BMP Title:**
***BMP Description:** Location(s) in SWPPP of detailed information relating to this BMP:
***Measurable Goals:**
***Timeline/Implementation Schedule:**
Specific Components and Notes:
***Responsible Party for this BMP:** Name: Department: Phone: E-mail:

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet Instructions

Introduction

The MPCA is required by law to place all Storm Water Pollution Prevention Programs (SWPPP) on public notice. Standardized summary sheets provide an easy mechanism for those wishing to reference comments to specific locations in a SWPPP. Standardized summaries also make SWPPPs easier to understand. The BMP (Best Management Practice) Summary Sheets included in this packet are a required attachment to your application for Permit coverage. Failure to include *all* required BMP Summary Sheets constitutes an incomplete application. All required information must also be included on the sheets for the application to be considered complete.

The MPCA is requiring that the attached BMP Summary Sheets (Sheets) be used. You may however, choose to organize the components of your MS4's SWPPP in any order you feel appropriate. The Sheets may be included as an attachment to your SWPPP, used as a lead-in for each section of the SWPPP, or they may be expanded to contain all of the information related to the BMP and Permit requirements in your SWPPP. The Sheets are designed to aid in the public review process of SWPPPs.

What to put in the BMP Summary Sheets

The Sheets are designed for you to outline the *major* components of each Permit requirement in a required BMP and how you plan to implement the controls associated with it. If the Sheets are only used to summarize what is explained in greater detail elsewhere, then the Sheet may contain a more brief explanation of the BMP's purpose, major milestones and timelines. Additional, more detailed information would then be referenced and provided in the body of your Storm Water Pollution Prevention Program (SWPPP).

The MPCA recognizes that some MS4s have been actively developing and implementing the programs and procedures in the required BMPs. It is important that each MS4 provide a statement on the current status of BMP implementation in the BMP Description section of each Sheet. The Measurable Goals and Timeline/Implementation Schedule for that BMP should also reflect its current status of development and implementation.

Although these Sheets will be included when SWPPPs are placed on public notice, they are not intended to replace or limit what would be necessary to develop a complete SWPPP. For many minimum control measures, effective implementation of the SWPPP will require a more detailed explanation of BMP activities. On the Sheets, provide the specific locations where any additional information relating to each BMP can be found in your SWPPP.

Blank Sheets are provided for additional BMPs. Instructions are provided related to the specific information that must be provided for each part of the Sheet. The intent of these description sheets is to provide a uniform framework for MS4s to summarize activities which have or will take place to fulfill the minimum requirements of a BMP.

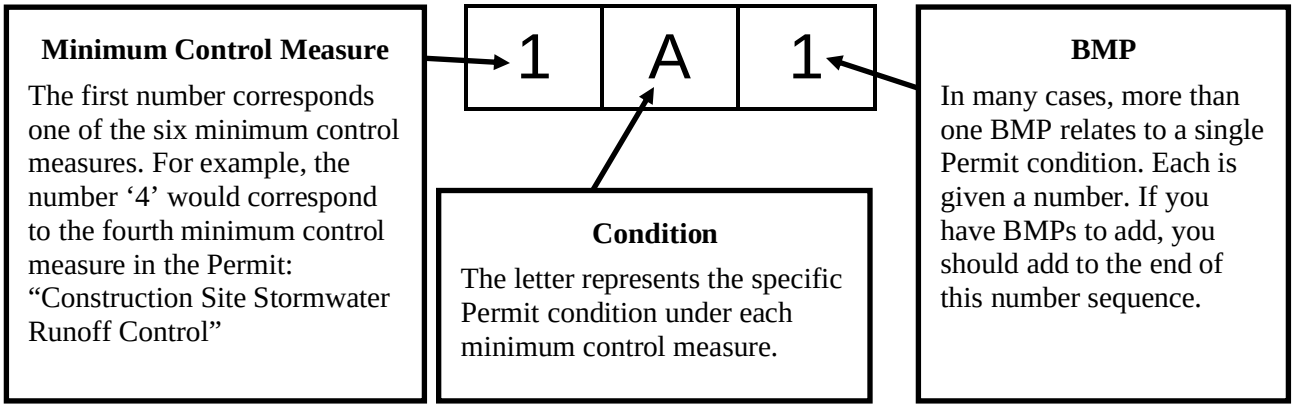
The BMP Numbering System

Your BMP Summary Sheets (Sheets) are a required attachment to use for your Permit Application for Permit coverage. Failure to include *all* required Sheets will constitute an incomplete application. The Sheets are numbered to correspond to each minimum control measure (MCM) identified in the Permit. All required information must be included on the Sheets for the application to be considered complete.

The purpose of these summary sheets is to provide an overview of the information contained in the MS4 SWPPP. These standardized sheets provide a uniform framework for each MS4 to organize and summarize activities which have or will take place to fulfill the Permit requirements (using various BMPs) for each of the six minimum control measures.

For the purpose of efficient public review, you must use the numbering system set forth in the instructions for each minimum control measure. The Permit's 30 required BMP Sheets have each been assigned a unique identification number that corresponds to its location in the Permit. Unique identification numbers consist of a number-letter-number format (Fig. 1). Blank Sheets are provided to be adapted for additional BMPs not specifically identified or required by the Permit. Be sure to follow the numbering sequence (Fig. 1) for each of those additional BMPs.

Figure 1: BMP Unique Identification Numbers



Measurable Goals

Measurable goals, which are required for each minimum control measure and for each BMP, are intended to gauge Permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the geographic and natural resource area served and how the BMPs will be implemented (operated) by the MS4. Measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. Finally, they should allow the MS4 to make improvements to its program over each 5-year Permit term by providing information and feedback to the operators and citizens on program successes and shortfalls.

The MPCA has adopted from EPA the definition of *measurable goals*: "*BMP design objectives or goals that quantify the progress of program implementation* ***and*** *the performance of your BMP."* The use of the term *performance* in this context does not refer to water quality monitoring but rather to progress and effectiveness achieved for implementation of the BMP

Timeline/Implementation Schedule

The Permit requires MS4s to provide an implementation schedule for measurable goals that includes any deadlines or timelines set forth in the Permit. When completing this section for each BMP Summary Sheet you must identify the measurable goals, milestones and elements of the BMP which you intend to accomplish during each year of the MS4 Permit.

Additional Resources for SWPPP Preparation

The MPCA encourages MS4s to use other work products whether voluntarily developed or required by another rule or law to assist in completing a SWPPP. Some examples would be water quality diagnostic or analysis studies, water management plans and stormwater management plans, to name a few, to assist in the development of the MS4 SWPPP and ultimately in the implementation of an integrated water quality and quantity management program for your area.

Many other agencies and organizations have completed guidance documents that may be useful in the development of your SWPPP. Keep in mind that these are simply guidance and do not hold the same legal authority as the Permit. This list is not necessarily inclusive of all materials that are available or may be used:

- **Minnesota Pollution Control Agency**
  - Stormwater Manual: **http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html**
    - Chapter 6: *Introduction to Best Management Practices (BMPs)*
    - Chapter 7: *Choosing Best Management Practices (BMPs)*
    - Chapter 12: *Details of Stormwater Best Management Practices (BMPs)*
  - Guidance Manual for Small Municipal Separate Storm Sewer Systems: **http://www.pca.state.mn.us/publications/wq-strm4-25b.pdf**

- **U.S. Environmental Protection Agency**
  - Menu of BMPs: **http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm**
  - Measurable Goals Guidance: **http://cfpub.epa.gov/npdes/stormwater/measurablegoals/index.cfm**
  - Stormwater Phase II Final Rule Fact Sheet Series: **http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm?program_id=6**

BMP Summary Sheet Instructions

Minimum Control Measure 5: POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
5a-1	Development and Implementation of Structural and/or Non-structural BMPs	**V.G.5.a.1**
5b-1	Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment	**V.G.5.b.1**
5c-1	Water Quality Volume on Construction Projects	**V.G.5.c.1**
5c-2	Volume Reduction Practices	**V.G.5.c.2**
5c-3	Prohibition of Infiltration Systems	**V.G.5.c.3**
5c-4	Non-linear Project Water Quality Volume Cost Effectiveness	**V.G.5.c.4**
5d-1	Long-term Operation and Maintenance of BMPs	**V.G.5.d.1**
5e-1	Procedures for Site Plan Reviews	**V.G.5.e.1**
5e-2	Site Plan Reviews Requirements	**V.G.5.e.2**
5f-1	Training on Post-Construction Stormwater Management Program	**V.G.5.f.1**
5g-1	Enforcement Response Procedures (ERPs)	**V.G.5.g.1**
5g-2	Documentation of Enforcement Conducted Pursuant to the ERPs	**V.G.5.g.2**
5h-1	Annual Assessment of Post-Construction Stormwater Management	**V.G.5.h.1**
	Additional BMP Summary Sheet (Copy as Necessary)	

For each of the Best Management Practices (BMPs) associated with Minimum Control Measure 5 (MCM-5), **Post Construction Stormwater Management in New Development and Redevelopment**, fill out the attached BMP Summary Sheets completely. The completion of all of the associated BMP Summary Sheets for the BMPs listed above are mandatory for a complete application. To aid in review and comment by the public, you must use the numbers listed in the key above and the BMP Titles which are consistent with the MS4 General Permit language. This summary is simply an overview of the BMP and does not contain all of the details associated with implementation. Be sure to include a reference to the specific locations of detailed information on which the summary sheet is based in your Storm Water Pollution Prevention Program (SWPPP).

1. BMP Description

Summarize the major components of this BMP and how you plan to implement them. Identify the following:

- BMP program components
- Plans for program implementation
- Target audience
- Post-Construction BMPs already in place in the MS4 – include information that specifies if the stormwater is treated prior to discharge to receiving waters
- Future plans for the long-term goal of stormwater management
- Include the exact locations (page numbers) of detailed information in the SWPPP

2. Measurable Goals

Define the milestones that are to be reached through the implementation of this BMP. Establish a baseline from which you will measure effectiveness, how the measurements are to be made, and how the success will be defined and quantified. Ensure that the measurable goals include a strategy for reducing pollutants in stormwater discharge as well as control of the rate of discharge to receiving waters. Determine the baseline from which quantifiable

measurements will be taken. Also include information related to sites that disturb less than one acre of land but are part of a larger common plan of development.

3. Timeline/Implementation Schedule
Provide specific dates that milestones identified as measurable goals are to be met. The schedule should also outline dates when measurable goals will be evaluated to determine program effectiveness.

4. Specific Components and Notes for this MCM
Include any additional notes relevant to the specific purpose of each BMP and how the BMPs for the minimum control measure have been modified from past practice based on experience and measures.

5. Responsible Party for this BMP
Indicate who specifically is responsible for the implementation and monitoring of this BMP. This should be the individual who is actively involved with the BMP and not simply a city official who is signing the application for permit coverage.

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5a-1(20.2)

***BMP Title:** Development and Implementation of Structural and/or Non-structural BMPs

***BMP Description:**

This Best Management Practice involves the development and implementation or modifications of strategies which include a combination of structural and/or non-structural BMPs.

The City currently uses non-structural BMP's in the form of both a Comprehensive Plan and zoning ordinances in order to guide development within the City. The City also uses structural BMP's in the form of stormwater collection and detention ponds and grassy swales and promotes the use of rain gardens to manage post-construction stormwater.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Continue implementation of BMPs including projects with greater than or equal to 1 acre in land disturbance.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

Coordination with the BMP requirements of the Coon Creek Watershed District. Utilization of BMPs for dealing with storm water runoff from urban, suburban and developing areas of Minnesota in the Protecting Water Quality in Urban Areas publication by the MPCA.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5b-1(20.04)

***BMP Title:** Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment

***BMP Description:**

The City currently does not allow post-construction runoff to exceed pre-construction conditions as a requirement of the plan reviewing process and subject to the approval of the Watershed District. The City also currently requires a copy of the Stormwater Pollution Prevention Plan that is submitted to the MPCA for NPDES II compliance. These requirements will be put in ordinance form. The City will also complete maintenance agreements with private property owners on whose property a BMP is located.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Develop and approve post-construction site runoff control ordinance. Number of maintenance agreements.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

Development requirements and procedures, enforcement procedures and ramifications for non-compliance. Coordination with the Coon Creek Watershed District.

***Responsible Party for this BMP:**

Name: Denise Webster

Department: Administration

Phone: 763-434-9555

E-mail: dwebster@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5c-1 (20.5, 20.6, 20.7)

***BMP Title:** Water Quality Volume on Construction Projects

***BMP Description:**

This Best Management Practice involves owners of construction projects to treat the water quality volume on any construction project. This BMP is required on any project where the sum of new impervious surface and the fully reconstructed impervious surface is at least one acre is size.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

For non-linear projects, water quality volume is calculated as one-inch times the sum of thew new and the fully reconstructed impervious surface. For linear projects, water quality volume is calculated as one-inch times the new impervious surface or 0.5 inches times the sum of the new and fully reconstructed surface, whichever is greater.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

Water quality volume must be calculated as: one inch times the sum of the new and fully resconstructed impervious surface.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5c-2 (20.7, 20.8)

***BMP Title:** Volume Reduction Practices

***BMP Description:**

This Best Management Practice involves volume reduction practices (infiltration or other) to retain the water quality on-site. This must be considered first when designing the permanent stormwater treatment system. If infiltration is not permitted, other volume reduction practice may be used.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

This BMP requires for the volume reduction to be within the existing right-of-way. If water quality cannot be treated with the right-of-way, a reasonable attempt to obtain additional right-of-way, easement or other permission to treat the stormwater during the project planning process must be made. If additional right-of-way, easements, or other permission cannot be obtained, owners of construction activity must maximize the treatment of the water quality volume prior to discharge from the MS4.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

Volume reduction practices are not required if the practices cannot be provided cost effectively.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5c-3 (20.8)

***BMP Title:** Prohibition of Infiltration Systems

***BMP Description:**

This Best Management Practice lists when infiltration systems are prohibited to use as a volume reduction practice. Infiltration systems is prohibited when the system would be constructed in areas listed in the following:

a) that receive discharges from vehicle fueling and maintenance areas, regardless of the amount of new and fully
b) reconstructed impervious surface
c) where high levels of contaminants in soil or groundwater may be mobilized by the infiltrating stormwater. The assessment must be retained with the site plans
d) where soil infiltration rates are more than 8.3 inches per hour unless soils are amended to slow the infiltration rate below 8.3 inches per hour
e) with less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock
f) of predominately Hydrologic Soil Group D (clay) soils
g) in an Emergency Response Area (ERA) within a Drinking Water Supply Management Area (DWSMA)
h) classified as high or very high vulnerability as defined by the Minnesota Department of Health
i) in an ERA within a DWSMA classified as moderate vulnerability unless the permittee performs or approves a higher level of engineering review sufficient to provide a functioning treatment system and to prevent adverse impacts to groundwater
j) outside of an ERA within a DWSMA classified as high or very high vulnerability unless the permittee performs or approves a higher level of engineering review sufficient to provide a functioning treatment system and to prevent adverse impacts to groundwater
k) within 1,000 feet up-gradient or 100 feet down gradient of active karst features
l) that receive stormwater runoff from these types of entities regulated under NPDES for industrial stormwater: automobile salvage yards; scrap recycling and waste recycling facilities; hazardous waste treatment, storage, or disposal facilities; or air transportation facilities that conduct deicing activities.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Infiltration shall be considered first as a volume reduction practice, however if the General Permit prohibits infiltration as described in this BMP, other volume reduction practices can be used.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins
Department: Engineering
Phone: 763-862-8000
E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5c-4 (20.10)

***BMP Title:** Non-linear Project Water Quality Volume Cost Effectiveness

***BMP Description:**

This Best Management Practice is when the water quality volume on a non-linear project cannot be treated cost effectively on the site of the original construction project location. When this occurs, the City will require the owner of the construction project to identify and locate off-site treatment can be completed.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

If the entire water quality volume is not addressed on the site of the original construction activity, the remaining water quality volume must be addressed through off-site treatment and, at a minimum, ensure the requirements listed below:

a. locations that yield benefits to the same receiving water that receives runoff from the original construction activity
b. locations within the same Department of Natural Resource (DNR) catchment area as the original construction activity
c. locations in the next adjacent DNR catchment area up-stream
d. locations anywhere within the permittee's jurisdiction

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

Volume reduction practices are not required if the practices cannot be provided cost effectively.

***Responsible Party for this BMP:**

Name: Tom Collins
Department: Engineering
Phone: 763-862-8000
E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5d-1 (20.16)

***BMP Title:** Long-term Operation and Maintenance of BMPs

***BMP Description:**

This Best Management Practice involves the long-term operation and maintenance of BMPs

The City will manage resources for long-term operation and maintenance by continuing to inspect BMP's regularly, complete routine and repair maintenance and by determining and monitoring maintenance schedules for BMP's and adjusting them as necessary.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Educate public employees that long term performance of BMPs is ensured with proper operation and regular maintenance. Inspect construction sites for conformance with approved plans/BMPs. Inspect BMPs and document maintenance required.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

Number of BMPs maintained.

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5e-1 (20.17)

***BMP Title:** Procedures for Site Plan Reviews

***BMP Description:**

This Best Management Practice involves produres for site plan reviews being conducted by the City.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

This BMP requires that reviews by the City be conducted prior to the start of construction. This will ensure compliance with requirements of the City's regulatory mechanisms.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5e-1 (20.17)

***BMP Title:** Procedures for Site Plan Reviews

***BMP Description:**

This Best Management Practice involves produres for site plan reviews being conducted by the City.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

This BMP requires that reviews by the City be conducted prior to the start of construction. This will ensure compliance with requirements of the City's regulatory mechanisms.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5e-2 (20.20)

***BMP Title:** Site Plan Reviews Requirements

***BMP Description:**

This Best Management Practice includes requirements that City must document for each site plan review. The documentation must include:
a. supporting documentation used to determine compliance with MSM 4 of the General Permit, including any calculations for the permanent stormwater treatment system
b. the water quality volume that will be treated through volume reduction practices (e.g., infiltration or other) compared to the total water quality volume required to be treated
c. documentation associated with off-site treatment projects authorized by the permittee, including rationale to support
the location of permanent stormwater treatment projects
d. payments received
e. all legal mechanisms drafted, including dates of the agreements and names of all responsible parties involved

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

This BMP requires that reviews by the City be conducted prior to the start of construction. This will ensure compliance with requirements of the City's regulatory mechanisms.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins
Department: Engineering
Phone: 763-862-8000
E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 5f-1 (20.18)

***BMP Title:** Training on Post-Construction Stormwater Management Program

***BMP Description:**

This Best Management Practice involves the training of individuals on their responsibilities as they relate to the City's Post-Construction Stormwater Management program.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Training of individuals includes, but is not limited to: individual responsible for conducting site plan reviews and/or enforcement

***Timeline/Implementation Schedule:**

This is an existing programwith the City and implementation is on-going. Refresher training courses shall be offered every three years following initial training.

Specific Components and Notes:

The City must document the following:

a. general subject matter covered
b. names and departments of individuals in attendance
c. date of each event

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 5g-1 (20.19)

***BMP Title:** Enforcement Response Procedures (ERPs)

***BMP Description:**

This Best Management Practice involves the City maintaining written enforcement response produces to compel compliance with the City's regulatory mechanism, required within MSM 4.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

At a minimum, the written ERPs must include:

a. a description of enforcement tools available to the permittee and guidelines for the use of each tool
b. name or position title of responsible persons for conducting enforcement

***Timeline/Implementation Schedule:**

This is an existing programwith the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins
Department: Engineering
Phone: 763-862-8000
E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 5g-2 (20.21)

***BMP Title:** Documentation of Enforcement Conducted Pursuant to the ERPs

***BMP Description:**

This Best Management Practice involves the City documenting any enforcement conducted pursuant to the ERPs in BMP 5g-1. At a minimum the documentation must include:

a. name of the person responsible for violating the terms and conditions of the permittee's regulatory mechanisms
b. dates and locations of the observed violations
c. description of the violations
d. corrective actions including completion schedule) issued by the permittee
e. referrals to other regulatory organizations (if any)
a. f. dates violations resolved

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

At a minimum, the written ERPs must include:

a. a description of enforcement tools available to the permittee and guidelines for the use of each tool
b. name or position title of responsible persons for conducting enforcement

***Timeline/Implementation Schedule:**

This is an existing programwith the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins
Department: Engineering
Phone: 763-862-8000
E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 5h-1

***BMP Title:** Annual Assessment of Post-Construction Stormwater Management

***BMP Description:**

This Best Management Practice involves the City conducting annual reviews on this MCM program to evaluate the program compliance, and determine how the program might be improved.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Measurable Requirments are activities that must be documented or tracted as applicable to the MCM. The City must perform the annual assessment prior to completion of each annual report and document any modifications made to the program as a result of the of the annual assessment.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Tom Collins

Department: Engineering

Phone: 763-862-8000

E-mail: tcollins@rfcengineering.com

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional BMP Summary Sheet Copy as Necessary

MS4 Name:

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number:

***BMP Title:**
***BMP Description:** Location(s) in SWPPP of detailed information relating to this BMP:
***Measurable Goals:**
***Timeline/Implementation Schedule:**
Specific Components and Notes:
***Responsible Party for this BMP:** Name: Department: Phone: E-mail:

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet Instructions

Introduction

The MPCA is required by law to place all Storm Water Pollution Prevention Programs (SWPPP) on public notice. Standardized summary sheets provide an easy mechanism for those wishing to reference comments to specific locations in a SWPPP. Standardized summaries also make SWPPPs easier to understand. The BMP (Best Management Practice) Summary Sheets included in this packet are a required attachment to your application for Permit coverage. Failure to include *all* required BMP Summary Sheets constitutes an incomplete application. All required information must also be included on the sheets for the application to be considered complete.

The MPCA is requiring that the attached BMP Summary Sheets (Sheets) be used. You may however, choose to organize the components of your MS4's SWPPP in any order you feel appropriate. The Sheets may be included as an attachment to your SWPPP, used as a lead-in for each section of the SWPPP, or they may be expanded to contain all of the information related to the BMP and Permit requirements in your SWPPP. The Sheets are designed to aid in the public review process of SWPPPs.

What to put in the BMP Summary Sheets

The Sheets are designed for you to outline the *major* components of each Permit requirement in a required BMP and how you plan to implement the controls associated with it. If the Sheets are only used to summarize what is explained in greater detail elsewhere, then the Sheet may contain a more brief explanation of the BMP's purpose, major milestones and timelines. Additional, more detailed information would then be referenced and provided in the body of your Storm Water Pollution Prevention Program (SWPPP).

The MPCA recognizes that some MS4s have been actively developing and implementing the programs and procedures in the required BMPs. It is important that each MS4 provide a statement on the current status of BMP implementation in the BMP Description section of each Sheet. The Measurable Goals and Timeline/Implementation Schedule for that BMP should also reflect its current status of development and implementation.

Although these Sheets will be included when SWPPPs are placed on public notice, they are not intended to replace or limit what would be necessary to develop a complete SWPPP. For many minimum control measures, effective implementation of the SWPPP will require a more detailed explanation of BMP activities. On the Sheets, provide the specific locations where any additional information relating to each BMP can be found in your SWPPP.

Blank Sheets are provided for additional BMPs. Instructions are provided related to the specific information that must be provided for each part of the Sheet. The intent of these description sheets is to provide a uniform framework for MS4s to summarize activities which have or will take place to fulfill the minimum requirements of a BMP.

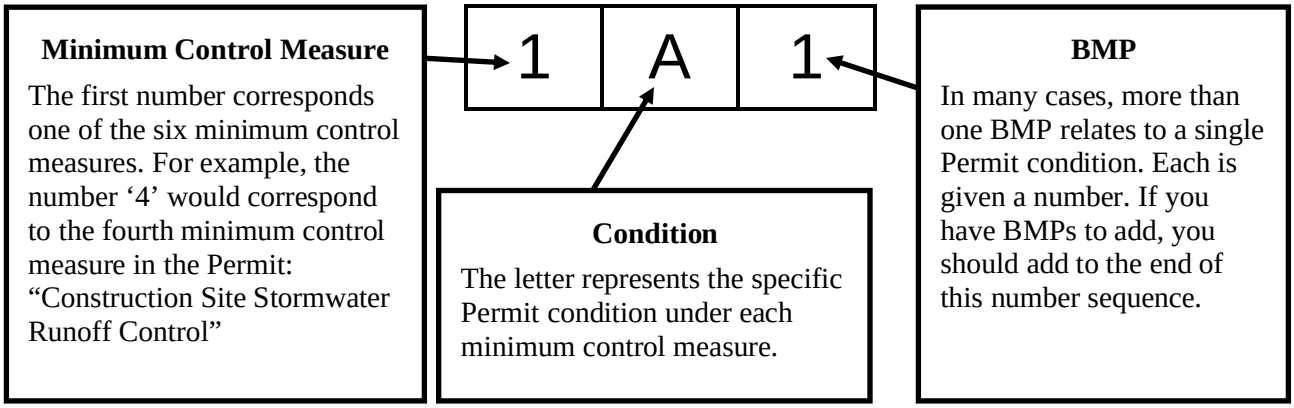
The BMP Numbering System

Your BMP Summary Sheets (Sheets) are a required attachment to use for your Permit Application for Permit coverage. Failure to include *all* required Sheets will constitute an incomplete application. The Sheets are numbered to correspond to each minimum control measure (MCM) identified in the Permit. All required information must be included on the Sheets for the application to be considered complete.

The purpose of these summary sheets is to provide an overview of the information contained in the MS4 SWPPP. These standardized sheets provide a uniform framework for each MS4 to organize and summarize activities which have or will take place to fulfill the Permit requirements (using various BMPs) for each of the six minimum control measures.

For the purpose of efficient public review, you must use the numbering system set forth in the instructions for each minimum control measure. The Permit's 30 required BMP Sheets have each been assigned a unique identification number that corresponds to its location in the Permit. Unique identification numbers consist of a number-letter-number format (Fig. 1). Blank Sheets are provided to be adapted for additional BMPs not specifically identified or required by the Permit. Be sure to follow the numbering sequence (Fig. 1) for each of those additional BMPs.

Figure 1: BMP Unique Identification Numbers



Measurable Goals

Measurable goals, which are required for each minimum control measure and for each BMP, are intended to gauge Permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the geographic and natural resource area served and how the BMPs will be implemented (operated) by the MS4. Measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. Finally, they should allow the MS4 to make improvements to its program over each 5-year Permit term by providing information and feedback to the operators and citizens on program successes and shortfalls.

The MPCA has adopted from EPA the definition of *measurable goals*: "*BMP design objectives or goals that quantify the progress of program implementation* ***and*** *the performance of your BMP."* The use of the term *performance* in this context does not refer to water quality monitoring but rather to progress and effectiveness achieved for implementation of the BMP

Timeline/Implementation Schedule

The Permit requires MS4s to provide an implementation schedule for measurable goals that includes any deadlines or timelines set forth in the Permit. When completing this section for each BMP Summary Sheet you must identify the measurable goals, milestones and elements of the BMP which you intend to accomplish during each year of the MS4 Permit.

Additional Resources for SWPPP Preparation

The MPCA encourages MS4s to use other work products whether voluntarily developed or required by another rule or law to assist in completing a SWPPP. Some examples would be water quality diagnostic or analysis studies, water management plans and stormwater management plans, to name a few, to assist in the development of the MS4 SWPPP and ultimately in the implementation of an integrated water quality and quantity management program for your area.

Many other agencies and organizations have completed guidance documents that may be useful in the development of your SWPPP. Keep in mind that these are simply guidance and do not hold the same legal authority as the Permit. This list is not necessarily inclusive of all materials that are available or may be used:

- **Minnesota Pollution Control Agency**
  - Stormwater Manual: **http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html**
    - Chapter 6: *Introduction to Best Management Practices (BMPs)*
    - Chapter 7: *Choosing Best Management Practices (BMPs)*
    - Chapter 12: *Details of Stormwater Best Management Practices (BMPs)*
  - Guidance Manual for Small Municipal Separate Storm Sewer Systems: **http://www.pca.state.mn.us/publications/wq-strm4-25b.pdf**

- **U.S. Environmental Protection Agency**
  - Menu of BMPs: **http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm**
  - Measurable Goals Guidance: **http://cfpub.epa.gov/npdes/stormwater/measurablegoals/index.cfm**
  - Stormwater Phase II Final Rule Fact Sheet Series: **http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm?program_id=6**

BMP Summary Sheet Instructions

Minimum Control Measure 6: POLLUTION PREVENTION/GOOD HOUSEKEEPING

Key to Unique BMP ID Numbers	Required BMP Title	Permit Reference
6a-1	Municipal Operations and Maintenance Program	V.G.6.a.1
6a-2	Street Sweeping**	V.G.6.a.2
6a-3	Snow and Ice Management	V.G.6.a.3
6b-1	Annual Inspection of All Structural Pollution Control Devices	V.G.6.b.2
6b-2	Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis	V.G.6.b.3
6b-3	Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas	V.G.6.b.4
6b-4	Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures	V.G.6.b.5
6b-5	Record Reporting and Retention of all Inspections and Responses to the Inspections	V.G.6.b.6
6b-6	Evaluation of Inspection Frequency	V.G.6.b.7
6c-1	Annual Training on Winter Maintenance Activities	V.G.6.c.1
6d-1	Total Suspended Solids (TSS) and Total Phosphorus (TP) Treatment	V.G.6.d.1
	Additional BMP Summary Sheet (Copy as Necessary)	

For each of the Best Management Practices (BMPs) associated with Minimum Control Measure 6 (MCM-6), **Pollution Prevention/Good Housekeeping**, fill out the attached BMP Summary Sheets completely. The completion of all of the associated BMP Summary Sheets for the BMPs listed above are mandatory for a complete application. To aid in review and comment by the public, you must use the numbers listed in the key above and the BMP Titles which are consistent with the MS4 General Permit language. This summary is simply an overview of the BMP and does not contain all of the details associated with implementation. Be sure to include a reference to the specific locations of detailed information on which the summary sheet is based in your Storm Water Pollution Prevention Program (SWPPP).

1. BMP Description

Summarize the major components of the BMP and how you plan to implement them. Define the following:

- BMP program components
- Target audience
- Plans for program implementation
- Include the exact locations (page numbers) of detailed information in the SWPPP

2. Measurable Goals

Define the milestones that are to be reached through the implementation of this BMP. Establish a baseline from which you will measure effectiveness, how the measurements are to be made, and how the success will be defined and quantified.

3. Timeline/Implementation Schedule

Provide specific dates that milestones identified as measurable goals are to be met. Determine a scheduled that outlines dates that effectiveness measurements will be calculated and included in your annual reports. Include specific information related to the frequency that regular tasks will take place (i.e. street sweeping).

4. Specific Components and Notes for this MCM
Include any additional notes relevant to the specific purpose of each BMP and how the BMPs for the minimum control measure have been modified from past practice based on experience and measures.

5. Responsible Party for this BMP
Indicate who specifically is responsible for the implementation and monitoring of this BMP. This should be the individual who is actively involved with the BMP and not simply a city official who is signing the application for permit coverage.

Additional Information Requested for BMP 6a-2: Street Sweeping**
Provide the following information specific to your Street Sweeping BMP in the Specific Components and Notes section:

- Frequency of street sweeping events, including the time(s) of year that it will be conducted
- Type of street sweeping equipment used (brush or vacuum)
- Target areas for more frequent street sweeping, if applicable. Also indicate the reason for selecting the specific target area and how the frequency differs.
- Overview of street sweeping waste management plan

** Although not specifically required by the MS4 permit, street sweeping has been demonstrated to be an effective stormwater management BMP when properly conducted. The MPCA is considering developing a study on street sweeping and your information would be helpful in developing such a study.

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-1

***BMP Title:** Municipal Operations and Maintenance Program

***BMP Description:**

This Best Management Practice involves developing and implementing an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff. Training materials that are available from the USEPA, state and regional agencies, or other organizations may be used as appropriate or modified. Program will include employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances and storm water maintenance. Program to include additional requirements of operation, maintenance and inspection activities. These activities include street sweeping, pond inspection and culvert and catch basin cleaning. Training takes place twice each year. The spring training session addresses mowing and road construction issues. The fall training session addresses snow and ice control and removal.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Record dates, times and attendees of training program. Hold at least twice per year. Use periodic unscheduled inspection of municipal activities to gauge training program.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-3 (21.6)

***BMP Title:** Snow and Ice Management

***BMP Description:**

This Best Management Practice involves the City implementing a snow and ice management policy for individuals that perform winter maintenance activities. The policy must establish practices and procedures for snow and ice control operations (plowing and other snow removal practices, sand use and application of deicing compounds)

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Amount of snow and ice removed.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-1 (21.09)

***BMP Title:** Annual Inspection of All Structural Pollution Control Devices

***BMP Description:**

This Best Management Practice involves inspection of all structural pollution control devices within the City annually. Cleaning procedures will be based on inspection reports.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

100% inspection of all structural pollution control devices. Number of pollution control devices needing maintenance. Keep records of inspection results.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

Pollution control device inspection schedule.

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-2 (21.10)

***BMP Title:** Inspection of a Minimum of 20 percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis

***BMP Description:**

This Best Management Practice involves the annual inspection of a minimum of 20% of ponds, sediment basins and outfalls. Cleaning procedures will be based on inspection reports. The City currently has policy regarding the inspection and maintenance of its storm sewer system outfalls, ponds and sediment basins.

Stormwater collection and sedimentation basins and ponds in the City will be inspected each year on a rotating basis according to the maintenance schedule of each basin. Scheduled and reparative maintenance as well as cleaning will be done as determined by the Public Works Superintendent.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Number of outfalls, ponds and sediment basins inspected.

***Timeline/Implementation Schedule:**

Inspect 20% of current outfalls, ponds and sediment basins annually and document maintenance performed.

Specific Components and Notes:

Develop maintenance schedule for cleaning, rehabilitation and replacement. Keep records of inspection results and maintenance performed.

***Responsible Party for this BMP:**

Name: John Witkowski
Department: Public Works
Phone: 763-434-5555
E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-3

***BMP Title:** Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas

***BMP Description:**

This Best Management Practice involves the inspection of all exposed stockpiles, storage and material handling areas within the City quarterly. Keep records of inspection results. The City conducts inspection on stockpiles weekly to prevent erosion. Salt is stored in an open shed and inspected daily to ensure no salt is left uncovered.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

100% inspection of all exposed stockpiles, storage and material handling areas.

***Timeline/Implementation Schedule:**

Keep records of inspection results and maintenance performed.

Specific Components and Notes:

Exposed stockpile, storage and material handling areas inspection schedule.

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-4

***BMP Title:** Inspection Follow-up Including the Determination of whether Repair, Replacement, or Maintenance Measures are necessary and the implementation of the Corrective Measures

***BMP Description:**

This Best Management Practice involves the follow up to inspection to determine maintenance required. After an inspection has been completed, the staff report back to the Public Works Superintendent, who then determines what action is required.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Number of maintenance activities completed.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-5

***BMP Title:** Record Reporting and Retention of All Inspections and Responses to the Inspections

***BMP Description:**

This Best Management Practice involves the record keeping of all inspections and maintenance performed.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Complete inspections and retain records.

***Timeline/Implementation Schedule:**

This is currently an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-6

***BMP Title:** Evaluation of Inspection Frequency

***BMP Description:**

This Best Management Practice involves the evaluation of the inspection frequency for ponds, sedimentation basins, outfalls, structural pollution control devices, exposed stockpiles, storage and material handling areas. Any adjustments to the frequency of inspections will conform to the permit requirements and conditions.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

Record keeping of inspection results. Adjust inspection frequency based on inspection results.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: John Witkowski
Department: Public Works
Phone: 763-434-9555
E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6c-1 (21.7)

***BMP Title:** Annual Training on Winter Maintenance Activities

***BMP Description:**

This Best Management Practice involves the training of the public, every year, on winter maintenance activities. Training topics must include:

a. the importance of protecting water quality
b. BMPs to minimize the use of deicers (e.g., proper calibration of equipment and benefits of pretreatment, pre-wetting, and anti-icing)
c. tools and resources to assist in winter maintenance (e.g., deicing application rate guidelines, calibration charts, Smart Salting Assessment Tool)

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

This BMP ensures that the general public receieves the proper training on the winter maintence performed by the City on a yearly basis.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going. Training is performed every year.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: John Witkowski
Department: Public Works
Phone: 763-434-9555
E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

BMP Summary Sheet

MS4 Name: Ham Lake

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6d-1 (21.8)

***BMP Title:** Total Suspended Solids (TSS) and Total Phosphorus (TP) Treatment

***BMP Description:**

This Best Management Practice involves the City maintaining procedures for the purpose of determining the TSS and TP treatment effectiveness of all City owned ponds constructed and used for the collection and treatment of stormwater.

Location(s) in SWPPP of detailed information relating to this BMP:

***Measurable Goals:**

This BMP ensures the TSS and TP in ponds constructed within the City are being monitored and maintened to keep concentration levels below maximum allowible concentration.

***Timeline/Implementation Schedule:**

This is an existing program within the City and implementation is on-going.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: John Witkowski

Department: Public Works

Phone: 763-434-9555

E-mail: JWitkowski@ci.ham-lake.mn.us

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

Additional MP Summary Sheet Copy as Necessary

MS4 Name:

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number:

***BMP Title:**
***BMP Description:** Location(s) in SWPPP of detailed information relating to this BMP:
***Measurable Goals:**
***Timeline/Implementation Schedule:**
Specific Components and Notes:
***Responsible Party for this BMP:** Name: Department: Phone: E-mail:

**Indicates a REQUIRED field. Failure to complete any required field will result in rejection of the application due to incompleteness.*

APPENDIX C

MPCA Pollutant Source Location Data

MPCA ID	NAME	ADDRESS	ACTIVITY	SITE URL
140816	S.P. 0208-145 (S.A.P. 002-716-013)	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/140816
113831	Centurylink - Soderville CO	17712 Highway 65 NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/113831
136835	LARSON SYSTEMS INC	13847 Aberdeen St NE	Industrial Stormwater	https://webapp.pca.state.mn.us/wimn/site/136835
197057	Peterson's Farm	1719 Bunker Lake Boulevard NE	Brownfields, Voluntary Investigation and Cleanup	https://webapp.pca.state.mn.us/wimn/site/197057
135958	Mike Little	2067 176th Ave NE	Wastewater	https://webapp.pca.state.mn.us/wimn/site/135958
233893	Coon Creek Commercial Park		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/233893
141317	Radisson Road Baptist Church	13627 Radisson Rd	Underground Tanks	https://webapp.pca.state.mn.us/wimn/site/141317
213767	Ham Lake Professional Building	13352 Aberdeen St NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/213767
191419	Ham Lake Dr Property	2063 S Ham Lake Dr	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/191419
32498	In The Works Auto Body & Paint	16324 Highway 65 NE Unit A	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/32498
225572	Ham Lake Improvement project 1705		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/225572
91162	Hidden Forest West 2nd	2932 134th Ave NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/91162
199236	Soderville, Inc	17616 Highway 65	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/199236
251604	Residential Property	13625 Buchanan St NE	Solid Waste	https://webapp.pca.state.mn.us/wimn/site/251604
42407	Lilhander Auto Sales	17255 Highway 65 NE Ste B	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/42407
217539	Red Fox Hollow 2nd Add		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/217539
224813	Gallagher Shores		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/224813
21228	4 Wheel Parts & Service Inc	15625 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/21228
29836	Beaver Auto & Truck	17856 Highway 65 NW	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/29836
186733	Anoka County Street Reconstruction	See location description	Brownfields, Voluntary Investigation and Cleanup	https://webapp.pca.state.mn.us/wimn/site/186733
20658	Pgm	2415 Constance Blvd NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/20658
29362	Central Garage	17504 Highway 65 NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/29362
149015	London Meadows	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/149015
156636	South Coon Lake Estaes	Crosstown Blvd. NW, east Lk. Netta Dr, 171st Ave Ne	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/156636
19764	Johnson Ready Mix	13507 Jefferson St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/19764
53305	ABB	13720 Lincoln St NE Ste B	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/53305
251526	181st Ave NE Reconstruction Project	181st Ave Se	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/251526
3929	American Woodmark Corp-Ham Lake Facility	16430 Highway 65 NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/3929
38561	Ham Lake Collision	13603 Johnson St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/38561
253434	Larson Systems - Building Additions	13847 Aberdeen St NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/253434
21137	La Machine Shop Inc	15740 Lincoln St NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/21137
136201	North Metro Asphalt	1455 165th Ave NE	Aboveground Tanks	https://webapp.pca.state.mn.us/wimn/site/136201
187227	Ideal Advertising	13460 Highway 65	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/187227
20510	Crosstown Dental Clinic	17565 Central Ave NE Ste 220	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/20510
112564	Mmcp	1260 Bunker Lake Blvd	Underground Tanks	https://webapp.pca.state.mn.us/wimn/site/112564
142577	Bioenergy Life Science Inc	13840 Johnson St NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/142577
142188	Signal Installation at CSAH 17/18	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/142188
39016	Mickman Brothers Inc	14630 Highway 65	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/39016
136689	Woodys Garage	13327 Highway 65 NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/136689
65310	Miniature Circuits Inc	14205 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/65310
81651	NACS Inc	13828 Lincoln St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/81651
89136	Naples Estates	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/89136
89965	Microstructures Inc - Ham Lake	14115 Lincoln St Ste 100	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/89965
197217	Deerhaven	Yancy St & 148th Place	Brownfields, Voluntary Investigation and Cleanup	https://webapp.pca.state.mn.us/wimn/site/197217
215790	Jam Hops	1460 133rd Lane NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/215790
248964	Holiday Stationstore Ham Lake	1442 Crosstown Blvd NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/248964
198477	Harry E. Gulbraa	17125 Lexington Ave NE	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/198477
247567	Growing Generations	13644 radisson road ne	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/247567
77036	Jetson Inc	13414 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/77036
85984	Hamlet Estates 2nd	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/85984
137278	Diamond Metal Products Inc	13815 Lincoln St NE	Industrial Stormwater	https://webapp.pca.state.mn.us/wimn/site/137278
139894	CECO Concrete Construction	15924 Lincoln St	Hazardous Waste, Small quantity generator	https://webapp.pca.state.mn.us/wimn/site/139894
21402	Cylinder Head Exchange	17243 Rockney St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/21402
140158	Ham Lake Hardware	17426 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/140158
216812	ULYSSES STREET RECONSTRUCT		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/216812
248274	Northern Natural Gas - Anoka 1A TBS	14411 7th Avenue NW	Hazardous Waste, One time generator	https://webapp.pca.state.mn.us/wimn/site/248274
20474	Lares Corp - Ham Lake	13517 Highway 65 NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/20474
24115	Letourneau Trucking	1046 Mckay Dr NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/24115
108613	Bluegrass Estates	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/108613
30293	Walsh Auto Repair	1766 Soderville Dr NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/30293
203204	Anoka County	1318 McKay Drive NE, Suite 300	SSTS	https://webapp.pca.state.mn.us/wimn/site/203204
228951	Ham Lake project 1709		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/228951
249773	NACS, Inc.	14640 Buchanan St NE	Hazardous Waste, Small quantity generator	https://webapp.pca.state.mn.us/wimn/site/249773
190983	Anderson Independent Oil/spur	2219 NE Crosstown Blvd	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/190983
21872	Ham Lake Veterinary Hospital	17615 Chisholm St NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/21872
104478	Radisson Plaza - Ham Lake	SW corner of CR 116 and CR 52 intersection	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/104478

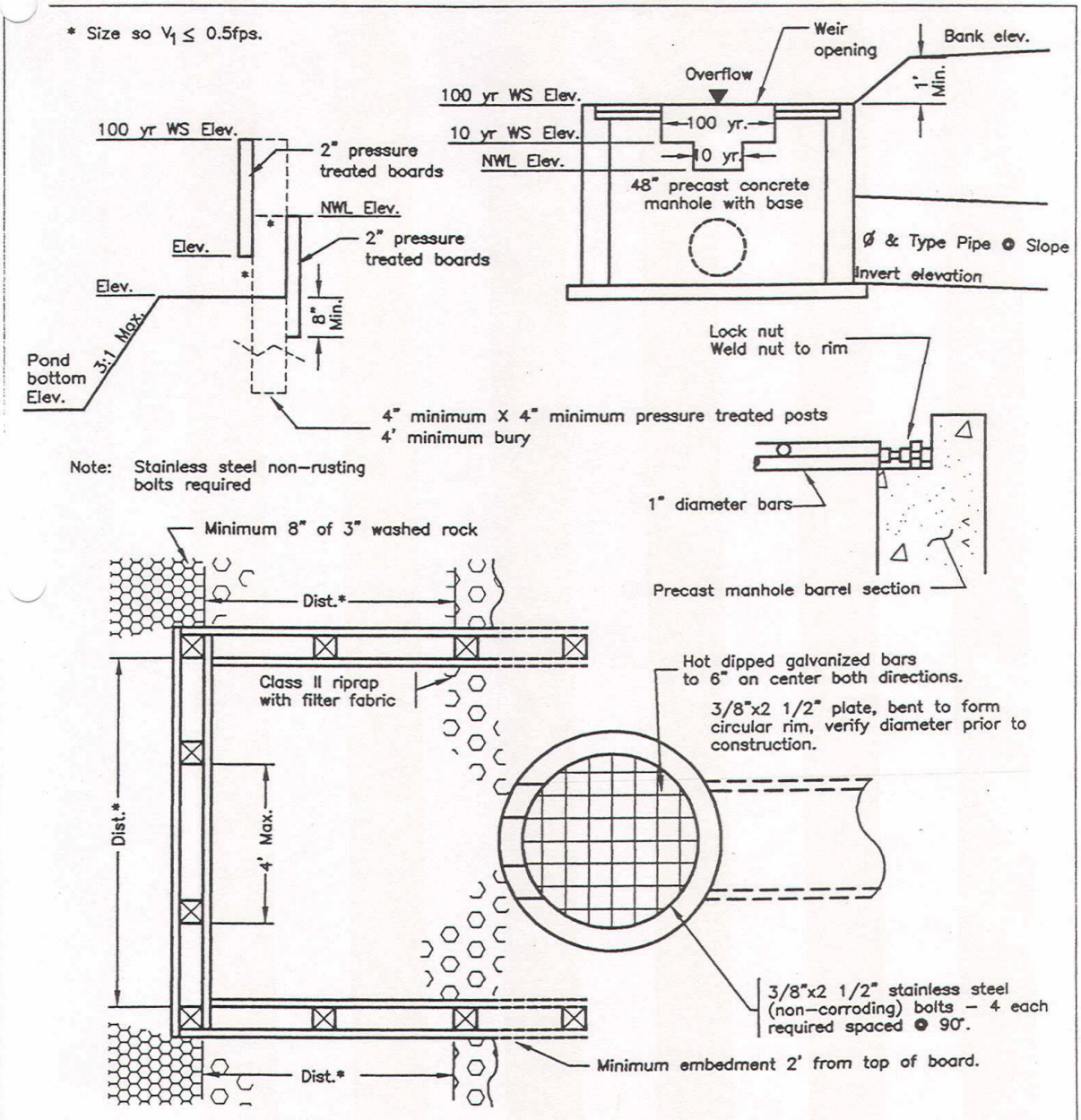
MPCA ID	NAME	ADDRESS	ACTIVITY	SITE URL
139483	Plow World Inc	15811 Lincoln St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/139483
29533	Al-Cast Mold & Pattern Inc	15720 Lincoln St NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/29533
29763	Victory Auto Service	16326 Highway 65 NE	Hazardous Waste	https://webapp.pca.state.mn.us/wimn/site/29763
214936	Crossroad Construction Inc	1232 171st Ln NE Ste 200	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/214936
216021	Hidden Forest East	14251 Lexington Ave NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/216021
229558	Crossroad Construction	17121 Lincoln St NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/229558
233813	155TH AVE RECONSTRUCT	155th ave	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/233813
196105	Mckinley School Absorption Pit/Surf Imp	See location description	Site Assessment	https://webapp.pca.state.mn.us/wimn/site/196105
22157	The Automotive Depot	17159 Highway 65 NE Ste A	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/22157
25611	Magnuson Body Shop	2016 Soderville Dr NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/25611
143817	Caribou Technologies	14148 Lincoln St NE	Hazardous Waste	https://webapp.pca.state.mn.us/wimn/site/143817
199137	Flamingo Terrace Absorption Pit	See location description	Site Assessment	https://webapp.pca.state.mn.us/wimn/site/199137
129811	Kokesh Motorcycles	14745 Aberdeen St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/129811
157428	Ehrnreiter Estates		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/157428
248656	Schoenrock Holdings Commercial Building	13319 Aberdeen Street NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/248656
213002	Harmony Estates		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/213002
4037	AME Inc - Ham Lake Plant	15915 Highway 65 NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/4037
233746	Garvey Residence	17122 Xylite St NE	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/233746
94193	Mickman Brothers Nursery	14630 Hwy 65 NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/94193
85051	Townhomes of Highland Bluffs 5th	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/85051
127628	Formerly Mn Trailer Sales	14525 Highway 65 NE	Underground Tanks	https://webapp.pca.state.mn.us/wimn/site/127628
225883	Comcast Node	Bunker Lake and Raddison	Hazardous Waste	https://webapp.pca.state.mn.us/wimn/site/225883
233573	AutoZone - 3949	15633 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/233573
3046	Auto Part City	329 Bunker Lake Blvd NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/3046
28618	Cassady Richard	435 170th Ave NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/28618
25747	Stans Auto	13621 Johnson St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/25747
97967	Hidden Meadows	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/97967
213964	169th Ave and Xylite Street Street Improvement Project	169th Ave	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/213964
246819	Twin Birch Acres Road Contruction	2436 133rd Ln NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/246819
189580	City Of Ham Lake Senior Housing Parcels	845 Bunker Lake Blvd NE	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/189580
216309	Rose Crest Street Improvment	171 Ave and Kenyon St NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/216309
223181	Whitetail Crossing 2nd Addition		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/223181
91764	Osborn Property	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/91764
221391	Aberdeen Street Properties	16357 & 16421 Aberdeen St. NE	Brownfields, Petroleum Brownfield	https://webapp.pca.state.mn.us/wimn/site/221391
233150	Thul Specialty Contracting, Inc.	14148 Lincoln St NE Ste E	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/233150
25471	Morken Transport Storage Inc	1247 Andover Blvd NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/25471
144448	Halvorson Concrete Building - Ham Lake	1345 157th Ave	Hazardous Waste	https://webapp.pca.state.mn.us/wimn/site/144448
126940	Emily's Waters	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/126940
251954	Storage World	16800 Highway 65 NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/251954
22047	Denny Ds Body Shop	1244 Andover Blvd NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/22047
29812	Smith Brothers Decorating Co	17362 Highway 65 NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/29812
201701	Four Star Digging & Demo	2236 172nd Ln NE	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/201701
249055	Creekside Farms	16800 Highway 65 NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/249055
91187	Caliber Collision - Ham Lake 3319	13819 Johnson St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/91187
102234	Minnesota Equipment, Inc.	14802 Aberdeen St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/102234
150072	JJ's Industrial Painting Inc	15861 Lincoln St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/150072
234103	Aberdeen Street From 144th Ave to 145th Ave		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/234103
20358	Fairchild Equipment	15735 Central Ave NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/20358
26474	Dave Stevens Auto Repair	959 Crosstown Blvd NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/26474
207145	A + Septic Installers	2540 152nd Ln NE	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/207145
248029	Lunds Lakeview Forest Street Recon	2624 160th Ln NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/248029
253372	Natural Systems Utilities, LLC	17818 Highway 65 NE Suite 100	SSTS	https://webapp.pca.state.mn.us/wimn/site/253372
37059	Northwest Dairy Forwarding Co	1305 159th Ave NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/37059
233356	Landmark Finishing	17121 Lincoln St NE Ste 200	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/233356
90789	Rosewood Addition	1348 181rst Ave NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/90789
103740	Ulferts Fournier Acres	NW quad of 154th Ave NE and Central Ave	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/103740
203073	Lashinski Septic	1244 Crosstown Blvd NE	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/203073
189656	Robert Anderson Property	4109 155th Ave NE	Brownfields, Voluntary Investigation and Cleanup	https://webapp.pca.state.mn.us/wimn/site/189656
231951	Hidden Forest 2nd		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/231951
20373	Woody's Garage	13327 Highway 65 NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/20373
28606	Heritage Furniture Restoration	15615 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/28606
22137	Ptl Tire Service Inc	15300 Central Ave NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/22137
19743	Diamond Metal Products	13815 Lincoln St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/19743
20802	Lavoie James	16736 3rd St NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/20802
188168	Rinerson Residence	4105 Wildwood Dr	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/188168
3392	Certified Auto Recyclers	3827 Crosstown Blvd NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/3392

MPCA ID	NAME	ADDRESS	ACTIVITY	SITE URL
28780	AR Honing Inc	16004 Central Ave NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/28780
186510	Erickson Dump	See location description	Site Assessment	https://webapp.pca.state.mn.us/wimn/site/186510
216881	Parent Office	13654 Van Buren Street NW	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/216881
249042	Storage World Expansion	16800 Highway 65 NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/249042
93809	Woodland Preserve	Staples St, N side of CR 18	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/93809
89952	Genco Builders Inc	15745 Lincoln St NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/89952
150413	Master Machine INc.	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/150413
34557	Shofner Auto	1320 133rd Ln NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/34557
137607	Soderquists Market	17525 Central Ave NE	Aboveground Tanks	https://webapp.pca.state.mn.us/wimn/site/137607
223327	Nettas Preserve		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/223327
472	Precision Wood Products Inc - Mill	16030 Central Ave NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/472
157526	Hedgewood		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/157526
247116	Soderville Meats, LLC	17600 Highway 65 NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/247116
29808	SLP Machine Inc	1262 Mckay Dr NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/29808
75252	Andover city of Station Plant	Commercial Blvd	Hazardous Waste, Small quantity generator	https://webapp.pca.state.mn.us/wimn/site/75252
247118	Gary John Anderson Landscaping Inc	13763 Johnson St NE	Aboveground Tanks	https://webapp.pca.state.mn.us/wimn/site/247118
27420	General Engine Repair	15711 Highway 65 NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/27420
141917	Tobin's Auto Parts	17159 Highway 65 NE Ste C	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/141917
202495	Natural Systems Utilities	17818 Highway 65 NE Ste 100	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/202495
225575	147TH AVE/BALTIMORE STR./148TH AVE./149TH AVE		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/225575
3535	Flamingo Terrace Mobile Home Park	17100 Highway 65 NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/3535
189069	Peterson Dump - 2	See location description	Site Assessment	https://webapp.pca.state.mn.us/wimn/site/189069
217640	Peterson Lake Preserve	13839 Goodhue Street NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/217640
22451	Jims Salvage	14205 Highway 65 NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/22451
109261	Superamerica #4537	1442 Constance Blvd	Underground Tanks	https://webapp.pca.state.mn.us/wimn/site/109261
26850	Ss Auto Repair	2219 Crosstown Blvd NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/26850
202489	Professional Grounds Maintenance Inc	1515 Constance Blvd NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/202489
224189	A+ Outdoor Services, Inc.	1551 164th Lane NE	SSTS	https://webapp.pca.state.mn.us/wimn/site/224189
248361	Crosstown Rolling Acres 3rd Addition		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/248361
103473	H & S Transportation	15850 Lincoln St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/103473
213973	Construction of Aberdeen St. Between Constance Blvd and 165th St.		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/213973
220777	Plating Plus, Inc.	14050 Lincoln St NE	Hazardous Waste, Small quantity generator	https://webapp.pca.state.mn.us/wimn/site/220777
229395	JSN Properties Farm	1002 173rd Ave NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/229395
96547	General Pattern Co - Ham Lake	15803 Central Ave NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/96547
231498	MICRON METALWORKS	14203 Lincoln St NE	Hazardous Waste, Small quantity generator	https://webapp.pca.state.mn.us/wimn/site/231498
25163	Maximum Overdrive Inc	1320 133rd Ln NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/25163
21452	Dahlquist Machine Inc	13758 Johnson St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/21452
102495	Pine Run Subdivision	4050 149th Ave NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/102495
137864	Elk River BL at MP 15.8/15.9	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/137864
106922	Ham Lake One Stop	16205 Lexington Ave NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/106922
104266	Doug Osborne Office Building	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/104266
151615	Storage World - Site Improvements	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/151615
216767	North Metro Storage	14205 Highway 65	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/216767
154588	Mielke Transportation Inc - Andover	Address unknown	Underground Tanks	https://webapp.pca.state.mn.us/wimn/site/154588
193548	Perfect Image	1330 133rd Ln NE	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/193548
108015	Former Central Garage	17504 Highway 65	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/108015
188851	Former Transworks Property	17210 Ulysses Street NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/188851
91573	Landborg Industrial Park	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/91573
194484	Former Simonson Property	539 E Saint Germain St	Brownfields, Petroleum Brownfield	https://webapp.pca.state.mn.us/wimn/site/194484
213028	East Frontage Road	134th Ave NE & Aberdeen St NE Bunker Lake Blvd & Eveleth St NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/213028
20509	Crosstown Clinic of Chiropractic	2330 Crosstown Blvd NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/20509
77282	Ham Lake Dental Association PA	16220 Aberdeen St NE Ste A1	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/77282
189147	Perfect Image Auto Body	1320 & 1330 133rd Ln NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/189147
28626	Ceda Inc	15830 Lincoln St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/28626
107968	Whitetail Run	SW corner of CSAH 18 and Vickers St intersection	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/107968
143925	O'Reilly Auto Parts - 1921	15665 Central Ave NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/143925
143994	Twin Cities Broadband	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/143994
225028	Primary Automation Bldg Addition	13361 Aberdeen ST NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/225028
129506	JJs Industrial Painting Inc	15861 Lincoln St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/129506
74788	Crosstown Masonry Inc	1322 159th Ave NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/74788
157146	Highpoint Environmental LLC	15811 Lincoln St NE Ste 1	Hazardous Waste	https://webapp.pca.state.mn.us/wimn/site/157146
24420	Usa 1 4 X 4 Inc	1347 159th Ave NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/24420
144172	Deer Haven Hills 7th Addition	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/144172
82038	Ham Lake city of	15544 Central Ave NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/82038
249399	Braastad Commercial		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/249399
212841	DaVinci Academy	532 Bunker Lake Blvd NE	Wastewater, Municipal SDS Permit	https://webapp.pca.state.mn.us/wimn/site/212841

MPCA ID	NAME	ADDRESS	ACTIVITY	SITE URL
102281	Serenity Meadows	169th Ave NE approximately 1000 ft W of Xylite St NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/102281
249640	Constance Blvd Terrace		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/249640
57865	Crosstown Sign Inc - Aberdeen St	16307 Aberdeen St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/57865
249054	Enchanted Estates Third Addition	161st St NE & Cord Street	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/249054
247344	Radisson Sunset Estates	15203 Raddison Rd NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/247344
28765	Greg Underdahl	17217 Vicker St W	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/28765
248145	Tactical Finishes, LLC	14350 Ural St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/248145
156287	Grant's Excavating and Grading Inc	Address unknown	Solid Waste	https://webapp.pca.state.mn.us/wimn/site/156287
201578	Steve Macglover	14909 University Ave NE	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/201578
233628	DOLLAR GENERAL #21464	16248 Central Ave NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/233628
39292	North Country RV - Ham Lake	14525 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/39292
92634	Deer Haven Hills	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/92634
135207	Elite Automotive Repair	1353 172nd Ln NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/135207
4505	Berggren Steel Fabricating Inc	14835 Aberdeen St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/4505
88161	Cedar Creek Homes Inc	17100 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/88161
142106	Cedar Estates	3826 169th ln	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/142106
225140	MnDOT SP 0208-157		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/225140
85154	Alexa Woods	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/85154
146326	Hidden Forest North	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/146326
38269	Engines by Alan Bohlman - Ham Lake	3011 Hemlock Ln NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/38269
25348	Jellisons Auto	3817 149th Ave NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/25348
30556	Ives Design Inc	1333 Constance Blvd NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/30556
83311	Third Coast Properties	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/83311
57663	Living Word Christian Center	9480 Lima St	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/57663
250026	Diamond Auto Collision	16324 Highway 65 NE	Hazardous Waste, Small quantity generator	https://webapp.pca.state.mn.us/wimn/site/250026
38562	Bendtsen's Transmission Center	13603 Johnson St NE	Hazardous Waste	https://webapp.pca.state.mn.us/wimn/site/38562
107972	Fox Run 5th Addition	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/107972
119524	Meineke Car Care Center	13835 Johnson St NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/119524
224683	Crosstown Rolling Acres	842 Crosstown Blvd NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/224683
226075	Rylies Way	lever st and 176th ave	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/226075
25626	Majestic Oaks Golf Club	701 Bunker Lake Blvd NW	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/25626
148648	Sharper Homes Office	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/148648
26330	Gbs Engineering Inc	15760 Lincoln St NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/26330
209406	Ham Lake, City Of	15544 Central Ave NE	SSTS	https://webapp.pca.state.mn.us/wimn/site/209406
20219	Rapid Marine	1343 Andover Blvd NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/20219
34562	Ham Lake	13635 Johnson St NE	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/34562
21869	Lakeland Motors	13516 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/21869
218278	Northstar Auto Sales LLC	16019 Central Ave NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/218278
225900	Crosstown Rolling Acres Second Addition	17541 Jefferson St NE	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/225900
213908	Davinci Academy	532 Bunker Lake Blvd	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/213908
29728	Hooze 4x4 Trucks	13655 Highway 65 NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/29728
25760	Steinkes Service	17566 Highway 65 NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/25760
198591	A + Outdoor Services	1551 164th Lane NE	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/198591
197002	Deerhaven Development	Yancy St NE & 148th Ln NE Lot 1 Block 1 2nd Addition	Brownfields, Petroleum Brownfield	https://webapp.pca.state.mn.us/wimn/site/197002
204642	Gusse Bros Construction, Inc.	1109 Crosstown Blvd NE	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/204642
214471	Copart Inc	1526 Bunker Lake Blvd	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/214471
23064	RI Automotive	15709 Highway 65 NE	Hazardous Waste, Small quantity generator	https://webapp.pca.state.mn.us/wimn/site/23064
22300	Blatz Automotive	17328 Highway 65 NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/22300
83764	Value Plus Auto	13518 Highway 65 NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/83764
143115	Lake Life Estates	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/143115
77311	Landborg Industrial Park	See location description	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/77311
125443	Landmark Finishing	1232 171st Ln NE Ste 100	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/125443
221383	Casey's General Store #3753	13717 Johnson St NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/221383
110936	Rapid Sport Center, Inc.	1343 Andover Blvd NE	Aboveground Tanks	https://webapp.pca.state.mn.us/wimn/site/110936
209404	R A Macglover Construction LLC	15245 University Ave NE	SSTS, Licensed Organization	https://webapp.pca.state.mn.us/wimn/site/209404
187403	Opal Street Property	17325 Opal St	Brownfields, Voluntary Investigation and Cleanup	https://webapp.pca.state.mn.us/wimn/site/187403
33661	Crosstown Sign Inc - Highway 65	10166 NE Highway 65	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/33661
157484	Red Fox Hollow	136th Ln NE and Lexington Ave	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/157484
193940	Four Seasons Auto	17255 Highway 65	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/193940
22129	Measurement Specialties	15825 Central Ave NE	Multiple Activities	https://webapp.pca.state.mn.us/wimn/site/22129
29492	Peck Construction	1548 164th Ln NE	Hazardous Waste, Very small quantity generator	https://webapp.pca.state.mn.us/wimn/site/29492
151598	Bluegrass Estates 2nd Addition Park	Address Unknown	Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/151598
27055	Cliffs Auto Repair	13546 Highway 65 NE	Hazardous Waste, Minimal quantity generator	https://webapp.pca.state.mn.us/wimn/site/27055
247693	Evergreen Estates		Construction Stormwater	https://webapp.pca.state.mn.us/wimn/site/247693
248237	Ham Lake Resort	2400 Constance Blvd NE	Petroleum Remediation, Leak Site	https://webapp.pca.state.mn.us/wimn/site/248237

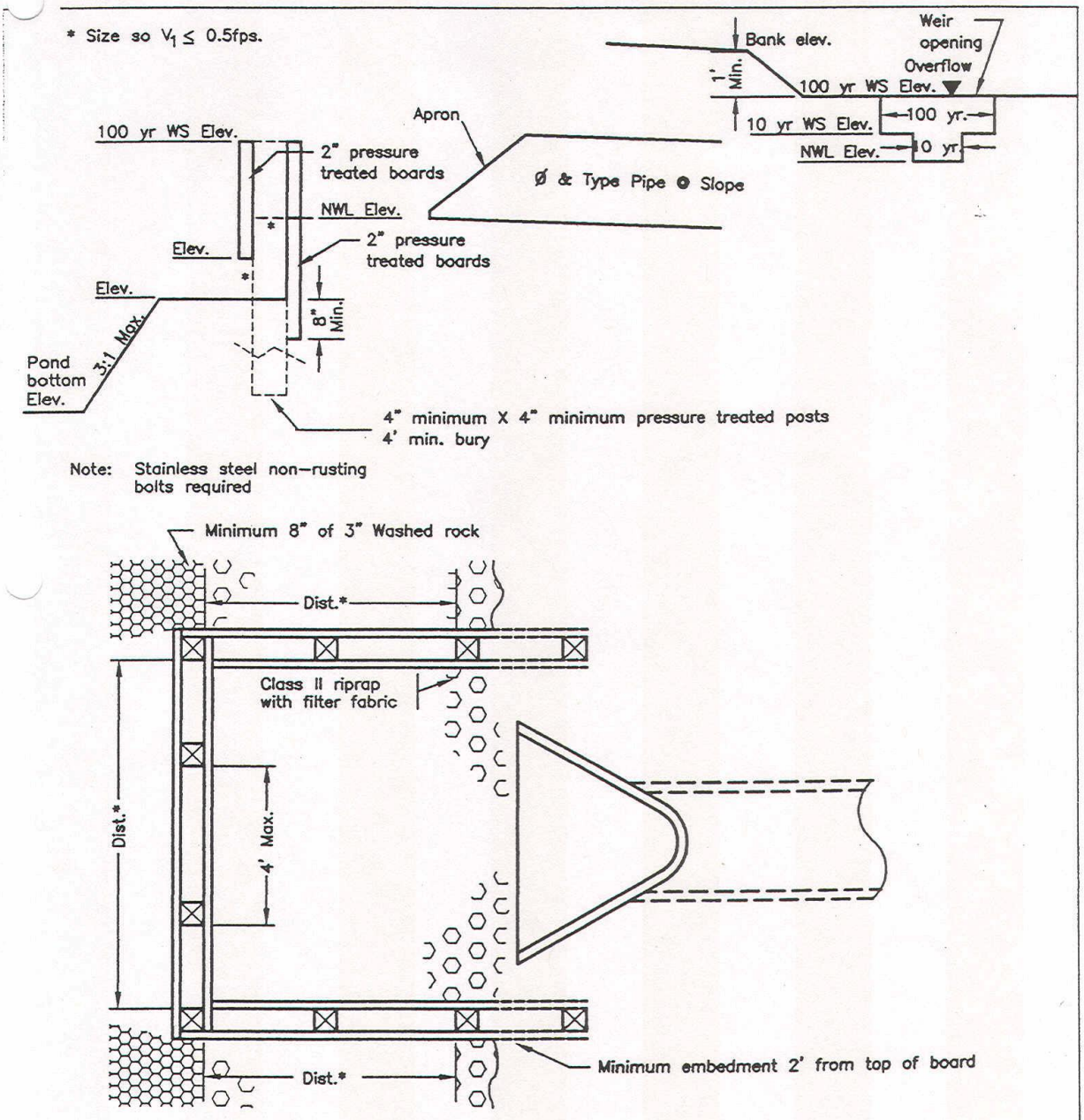
APPENDIX D

Typical Baffled Weir and Basin Outlet Structure Details



POND OUTLET BAFFLE HL-800

NOT TO SCALE



POND OUTLET BAFFLE HL-800A

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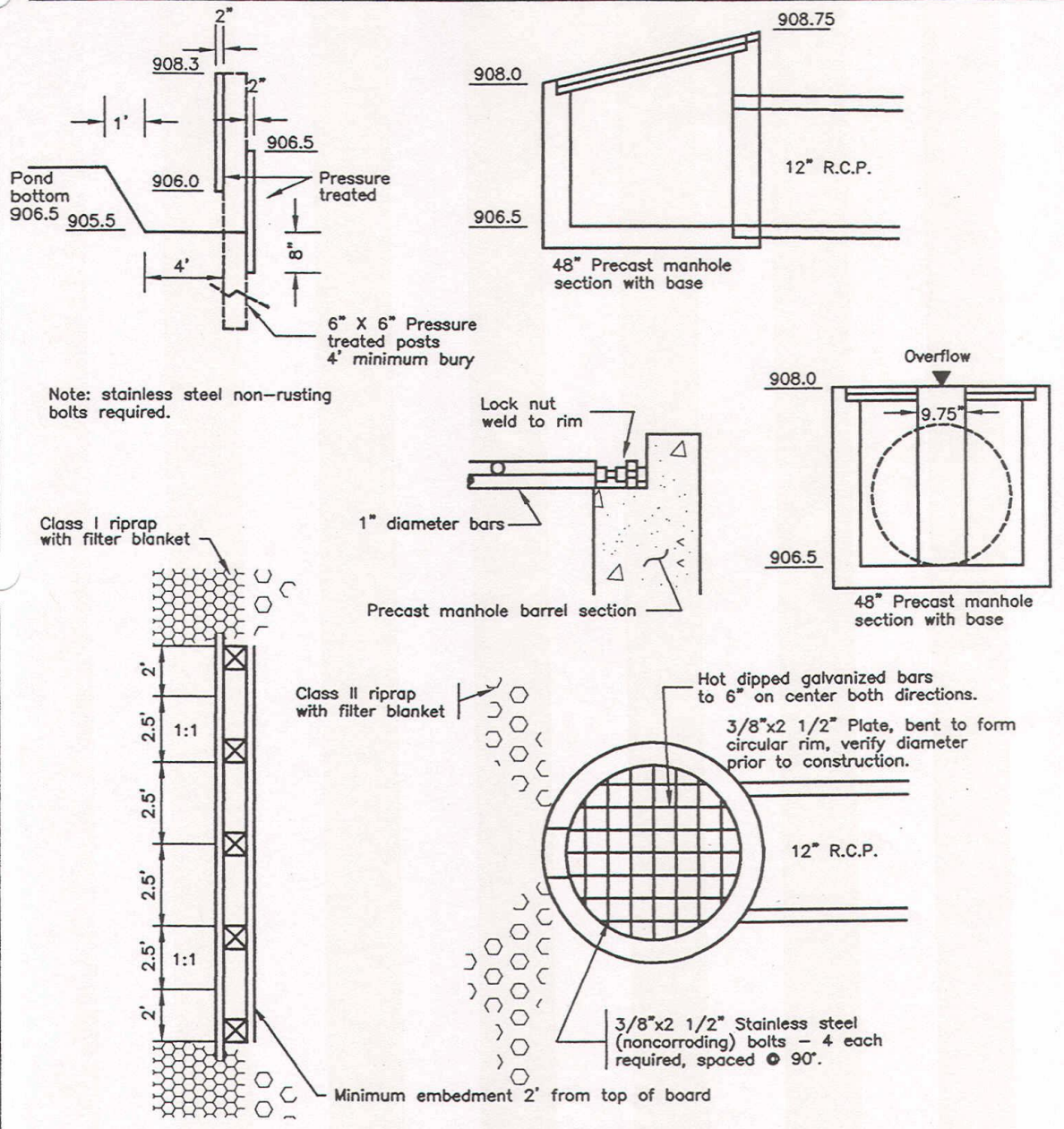

POND OUTLET BAFFLE RFC-800K

NOT TO SCALE

APPENDIX E

Process for Evaluating Urban Stormwater and Snow Melt Runoff to Wetlands and other Waters

APPENDIX F

Pollutants into the Storm Water Drainage System
City Code 11-1900

Prepared by the State of Minnesota
Storm-Water Advisory Group

Storm-Water And Wetlands:

Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Storm-Water and Snow-Melt Runoff on Wetlands

June 1997

Other publications in the
Storm-Water Guidance Series
of the
Minnesota Wetlands Advisory Group

- Storm-Water and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Storm-Water and Snow-Melt Runoff on Wetlands
- Soil Bio-Engineering: The Science and Art of Using Biological Components in Slope Protection and Erosion Control
- Buffer Zone Guidance and Model Ordinance
- Storm-Water Pond Design

For copies of these publications contact the Minnesota Pollution Control Agency. For information about the content of these documents, contact any of the agencies listed in the acknowledgments section of the document.

March, 04

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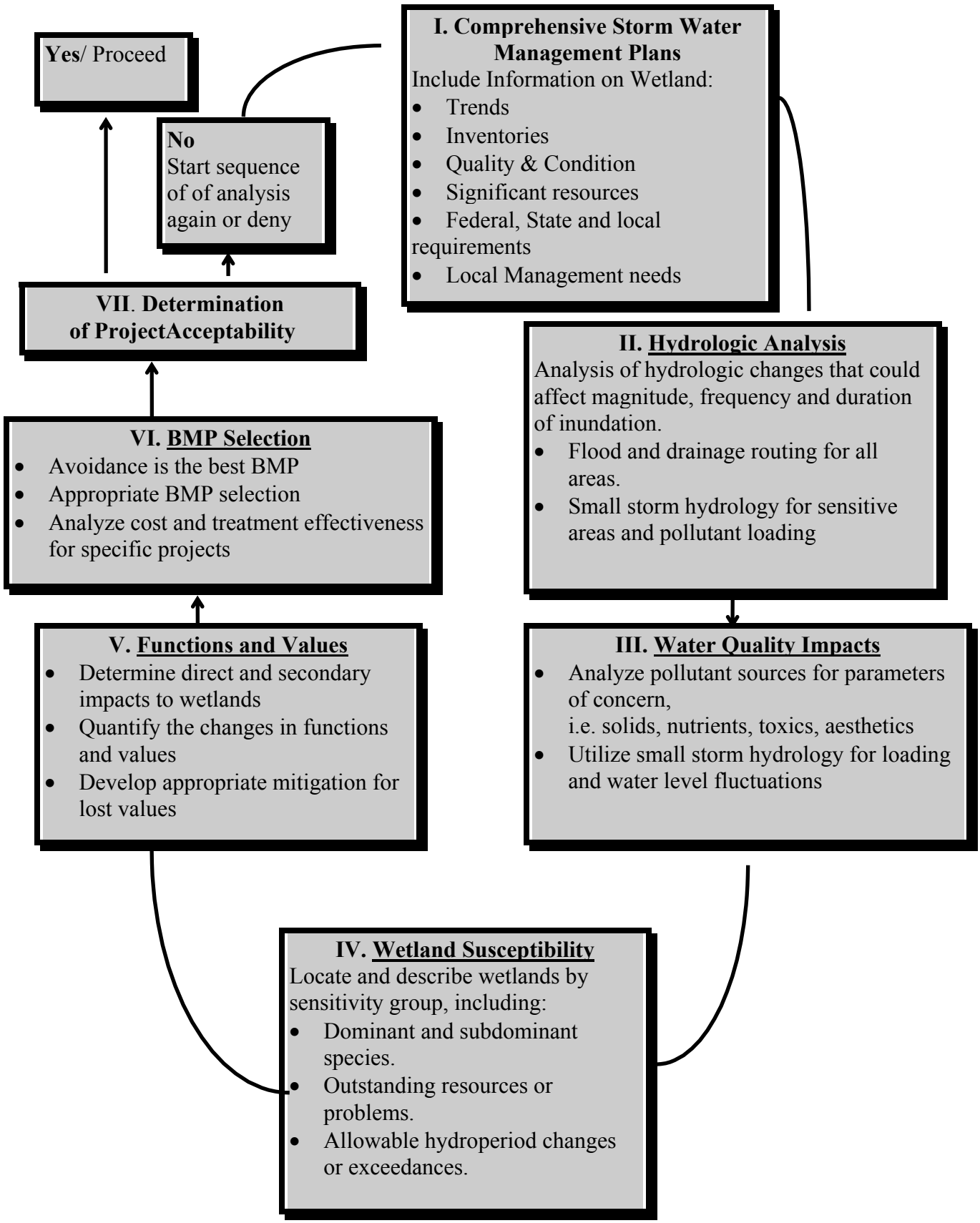
Table of Contents

PROCESS FOR EVALUATING URBAN STORM-WATER AND SNOW-MELT RUNOFF TO WETLANDS AND OTHER WATERS



Preface

This publication presents recommended guidelines of current concepts for managing storm-water and snow-melt runoff when it is necessary to use wetland areas. The Urban Storm Water Advisory Group acknowledges that wetlands are often affected by storm-water management; decisions and wetland responses to changes in storm-water flows can be highly complex and can affect other waters, such as lakes and streams. Though this document focuses on avoiding impacts to wetlands from storm water and snow melt, keep in mind that wetlands are part of a larger hydrologic system. Poor storm-water management can readily damage not only wetlands, but lakes, streams and ground-water resources as well. This guidance seeks to balance storm-water and flood-flow management with ecological protection.

Comprehensive plans for local government units, including cities, counties, and watershed management organizations, should address the management of the effects of urban storm-water and snow-melt runoff on wetlands and associated water courses and basins. These guidelines should be considered whenever there are storm-water discharges to natural water courses and basins, including wetlands, so as to minimize any adverse impacts to the diverse biological systems. The aim of these guidelines is to reduce chemical and physical degradation to water uses, aquatic habitats, and the level of water quality necessary to sustain such uses.

These guidelines are intended to assist managers in designing a process that minimizes wetland impacts. The guidance does not take the place of any criteria administered by local, state, and federal agencies. The project must meet any requirements of the state Environmental Policy Act (M.S. 116D) and the state Environmental Rights Act (M.S. 116B), and comply with all permits issued by any unit of government. The permits include, but are not limited to, those issued by local governments under the state Wetland Conservation Act of 1991 (M.S. 103G), Protected Waters permits (M.S. 103G.245) issued by the Minnesota Department of Natural Resources, permits issued by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act, and certifications by the Minnesota Pollution Control Agency under Section 401 of Clean Water Act.

This guidance was developed to summarize the existing knowledge about impacts of runoff to wetlands. Recommendations are included that attempt to standardize how various units of government can implement the guidance in existing planning and regulatory processes. New regulatory programs based on the guidelines may need to be developed, but this should be done if current programs cannot effectively incorporate the guidance concepts, and only after significant public and governmental input. The advisory group that developed the guidance intends that it become a source of common understanding so that current required programs can be made more effective in controlling environmental impacts at the same time they can be made less burdensome through procedural simplification and clear statements of regulatory expectations.

Introduction

The purpose of this document is to provide guidance to local governmental units (LGUs) on what they must do if they wish to protect wetlands from storm-water and snow-melt discharges to wetlands. It is not a rule, it provides technical guidance for implementation at the local level. It is the intention of the work groups that the concepts contained in this document be incorporated in planning and regulatory processes.

LGUs often have asked the question, "Will the discharge of storm water to wetlands be prohibited?" The answer is clearly no; wetlands require storm water for their existence. However, changes in the quantity or quality of storm-water discharges can affect or even destroy the ability of wetlands to support aquatic life and other sensitive functions.

So what is the impact of our storm-water discharges to wetlands? The agencies involved in the development of this guidance have reached a general consensus that the type of wetland determines its sensitivity. A plan and process that adequately addresses wetland sensitivity will not allow storm-water discharges that destroy the existing nature of the wetland, including its functions and values. As was stated in the preface (and is worth repeating), keep in mind that wetlands are part of a larger hydrologic system. Poor storm-water management can readily damage not only wetlands, but lakes, streams and ground-water resources as well. This guidance seeks to balance storm-water and flood-flow management with ecological protection.

The implementation of urban storm-water management plans that minimize adverse impacts to wetlands and other waters can be achieved through the use of a comprehensive management approach. All elements of a storm-water plan must consider a watershed or other large-scale areas as opposed to piecemeal, project-by-project approaches.

The complexity of the storm-water runoff and wetlands issue is due to the numerous factors involved when storm water is discharged to wetlands. Those factors include: (1) the nature of the proposed change such as urbanization of a natural watershed; (2) changes in the quantity of storm-water input to each wetland; (3) changes in the frequency and duration of storm-water input; (4) changes in the quality (pollutant concentration and load) of the runoff; (5) the sensitivity of the particular wetland (e.g., a tamarack swamp is more sensitive to storm water input than a reed canary grass or cattail marsh); (6) changes in functions and values of a particular wetland from its current state; (7) need for management practices to minimize the potential losses; and (8) selection of appropriate mitigation to compensate for lost wetland functions, values and uses.

The Metropolitan Watershed Management Act and the enabling rules (MR 8410.0000) require, after January 1, 1995, that watershed and local plans address wetlands in the plans. Because of the new round of plan revisions that are currently being implemented, it is clear that LGUs have a major role to play in the protection of wetlands.

The key element of these recommendations involves developing an inventory of wetlands by vegetation type which then can be placed in a sensitivity group. The purpose of this

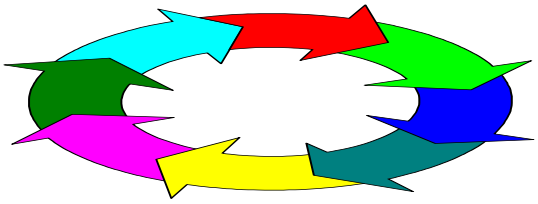
grouping is to indicate what level of protection is needed and, therefore, indicate the detail of planning needed. A guide to acceptable levels of hydrologic change is presented in this document. For some wetlands this means no change and for others there could be a range of acceptable levels. The more sensitive the wetlands, the more we need to identify existing and proposed land use in the watershed. Land-use changes can create corresponding effects on hydrology and on pollutants.

For most LGUs, this guidance recommends some concepts in hydrologic analysis to determine the effect of the present and proposed development. Most local metropolitan governments analyze flood and drainage events. A great number of LGUs currently analyze only rainfalls of 2 inches or greater for pollutant treatment. This guidance recommends that LGUs analyze small-storm hydrology to understand the hydrologic impacts to sensitive wetlands, stream-bank erosion, and pollutant treatment. Storms of less than 1.25 inches of rainfall depth contribute a large portion of annual runoff and pollutant loads. There are also differences in the runoff characteristics and sources that the LGUs should be aware of when analyzing flood routing.

Through State Executive Order 91-3, Minnesota state agencies were instructed to strictly apply the principles of no-net-loss of wetlands in the conduct of all their activities which affect wetlands. This policy was essentially codified in statute with the passage of the Wetland Conservation Act of 1991. With passage of that Act and subsequent rules, the no-net-loss sequencing process of avoidance, minimize, and compensate for wetland losses was focused on wetland draining and filling activities. This document expands on guidance for avoiding and minimizing wetland losses resulting from storm water so as to meet wetland protection goals. The guidance provides a sequence for decisions made by the developer or governmental agency in order to avoid, minimize, and/or mitigate the impacts of a project. The recommended sequence avoids impacts by design, layout, and site specific action that do not change the basic hydrologic cycle or pollutant loading, a constant theme of all regulatory agencies. The guidance stresses specific measures that help to avoid discharges which will destroy sensitive wetlands, and to bypass or fingerprint the especially sensitive or protected areas. Ponding is often not enough. Special measures may be needed to reach the recommended criteria of "no change" in ambient conditions. Ponds and other measures should be analyzed for their impacts and adjustments made until acceptable protection can be attained. The guidance should also convey the message that mitigation of unavoidable impacts does not occur if you adopt the process of simply replacing wetlands acre per acre. An analysis of values and functions must be made on a site specific basis. The replacement of values and functions should be analyzed "value for value" and "function for function."

The guidance points out that when approached as an opportunity and not only as a requirement, mitigation provides the opportunity to enhance or benefit the community as you mitigate losses.

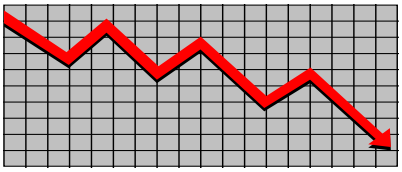
Sec. I. - COMPREHENSIVE STORM-WATER MANAGEMENT



Storm-water discharges to wetlands may be a significant portion of the comprehensive storm-water and surface-water runoff management plan developed by local units of government. Requirements of the Metropolitan Area Surface Water Management Act and other applicable planning requirements should form the basis for comprehensive review of storm-water and wetlands plans. These issues are discussed in detail in some of the appendices to this chapter. As with all plans, the first step should be a survey of existing information. Good wetland management would include a mapping of all the wetlands in the watershed, and associated normal flow paths.

The following five steps are proposed as a method for planning and prioritizing local wetland protection and management needs.

Wetland Trends



Until recent years, wetlands were viewed as wastelands that were best drained or filled. It is estimated the state of Minnesota has lost nearly 42 percent of its original wetland acres (Dahl, 1990). Since wetlands are now recognized as contributing significant functions and values, their historic loss might be viewed as a deficit. It will be useful to quantify on a local level what types and acreage of wetlands historically have been prone to drainage, filling or other impacts. By quantifying this information the local trend of wetland loss can be better understood. It is recommended that existing information such as soil surveys and land-office records be used to determine the historical wetland base within the area of concern or jurisdiction (Galatowitsch, 1994). The county soil and water conservation district office may be able to assist with providing or interpreting this data.

It is recommended that the relative historic acreage and frequency of occurrence of various wetland sensitivity classes be developed. This information will be useful in determining the need and potential for wetland restoration within the watershed when confronted with specific wetland mitigation requirements and other wetland prioritizing needs.

Wetland Inventory

It is recommended that inventories of existing wetland resources be completed by the local unit of government. Existing information such as the National Wetland Inventory (NWI) can be used as a starting point for these inventories. Because very little of the NWI information has been field verified and much of the original aerial photography was made over 10 years ago, it is recommended to use the NWI only as a guide to field activities. Field visits will be

necessary to carry out other parts of this process and verification of NWI information can be done at that time. Wetlands should be identified in the inventory and classified according to their appropriate wetland sensitivity group. The size should be estimated and the surface hydrologic connections should be recorded for each wetland identified on the inventory.

A wetland site visit should be conducted to determine each wetland's sensitivity group. The appendix for Section IV, Wetland Sensitivity, contains a fairly comprehensive listing of wetlands types, including a description of their sensitivity type. This classification is key to the plan. Figure I-1 (p. 5) gives a wetlands management process for storm-water-related activities. Once the wetland sensitivity has been categorized, for each individual wetland type, you can enter the chart on the left and be led through the chart by conducting a variety of assessments. The following describes these steps.

Wetland Quality and Condition

An assessment of wetland quality and condition is probably best conducted using a methodology which evaluates the condition of the biological community. The functioning of many wetland uses is directly related to the biological integrity since the biota will reflect the health of the system overall. Therefore an assessment of the wetland condition would best be based on an evaluation of the relative biotic impoverishment (such as provided by Karr, 1993).

There are two strategies which it is generally agreed are best for assessing wetland quality and condition:

a) Quantitative research-type method that is resource-intensive. This may be necessary to assess identified high-priority wetlands and continue to monitor their relative condition.

b) Rapid/practical assessment that is more qualitative and based on best professional judgment. This is an appropriate method for local government staff to conduct or contract out for evaluating each wetland basin or complex occurring within the watershed. A useful example that can be adapted for this kind of assessment is the Minnesota Assessment Methodology.

These two methods vary greatly in the precision of the data collected. To reduce assessor bias, both methods should include least-disturbed reference wetlands. Once identified, these wetlands should be used as standards in making judgments about the condition of the assessed wetlands. It is recommended that three reference wetlands be identified for each of the various hydrogeomorphic wetland classes found within the watershed, for example depressional wetlands, riparian wetlands, lake fringe wetlands, and peatlands (Brinson, 1993).

Wetland quality can be assessed as excellent, moderate, or highly impacted, depending on the extent to which human activities have affected the wetland. The wetland should be evaluated using the following criteria:

1. Excellent-Quality Wetlands. These wetlands remain in a least-impacted condition and, as such, typically possess very diverse vegetative assemblages. Strata are well developed and composed of native species. Non-native species, if

present, are infrequent and do not comprise significant relative cover percentiles. Wetlands which support rare, threatened, or endangered species are likely to be included as high-quality wetlands.

2. Moderate-Quality Wetlands. Areas that have been subjected to varying degrees of human disturbance, but still provide important ecological wetland functions and values, are considered to be of moderate quality. An example would be a partially drained wetland complex composed of 60 percent cover of reed canary grass and 40 percent cover of native species such as sedges. These wetlands often provide important wildlife habitat and water-quality benefits.

3. Highly-Impacted Wetlands. Areas that have been severely degraded such that they have little vegetation, or the vegetation is dominated by non-native species or by monotypic stands of species such as cattails, are considered highly impacted. Hydrologic and/or biological processes have been greatly altered and inputs of urban storm water will have minimal impacts. Example wetlands include abandoned gravel pits, nutrient-loaded wetlands, storm-water detention basins, and dredged areas within wetlands that result in extreme hydrologic modifications.

Significant Resources

Wetlands that have been designated by local, state or federal action as providing unique qualities such as recreational, scientific, educational or aesthetic uses would be considered as significant resources. Other significant wetlands would include those which have been restored for specific purposes such as water-quality improvement, wildlife, industrial, or agricultural uses. Wetlands known to be important to local recreation activities such as hunting, fishing or bird watching, wetlands occurring within parks, shoreland areas, and conservation corridors would also be considered to be significant resources.

Resource-significance "red flags" warn of recognized special uses or unique features such that a wetland's integrity should be preserved. Examples of such "red flags" include if the wetland:

a. is on the Minnesota Department of Natural Resources protected waters inventory (MS 1036.245);
b. has a direct hydrologic association with a designated trout stream;
c. borders the Mississippi or Minnesota Rivers or Lake Superior;
d. borders a state or federal wild and scenic river;
e. has been restored or created for mitigation purposes;
f. is within an environmentally sensitive area or environmental corridor identified in a local water management plan, special area management plan, special wetland inventory study, or an advanced identification study;
g. is recognized as an Outstanding Resource Value Water (Minn. Rules Ch. 7050);
h. is within a local, state or federal park, forest, trail or recreation area;
i. is within a state or federal fish and wildlife management refuge and/or area;
j. is part of an archeological or historic site as designated by the State Historic Preservation Office;

k. is part of a sole-source aquifer recharge area;
l. provides endangered species habitat;
m. has biological communities or species that are listed in the Natural Heritage inventory database;
n. is recognized as an important local recreation resource.

Notes:

1. The red flags listed above indicate that there are certain concerns that are local, regional, or statewide which must be addressed in the evaluation.

2. The flow chart I-1 indicates that excellent-quality wetlands and those that involve red flags are of special concern and every attempt should be made to apply these guidelines.

3. Excellent-quality wetlands of all types are very rare and becoming more rare as time and development goes on. They are therefore given red flags.

4. It should be noted that highly sensitive wetlands, even of moderate quality, are red flagged because of the care that must be taken in order to preserve them. Also, these types of wetlands are not easily mitigated by providing off-site compensation. They often cannot be reproduced through artificial means.

5. Most moderately and slightly sensitive wetlands should be protected; but importantly, they can more easily be mitigated, preferably through restoration but also through creation.

Management Needs

It is the intent of these guidelines that local option wetlands will, at some point in the future, require less state and federal regulatory review such as general permits. Projects that affect excellent-quality wetlands and "red flag" wetlands still would go through normal regulatory processes.

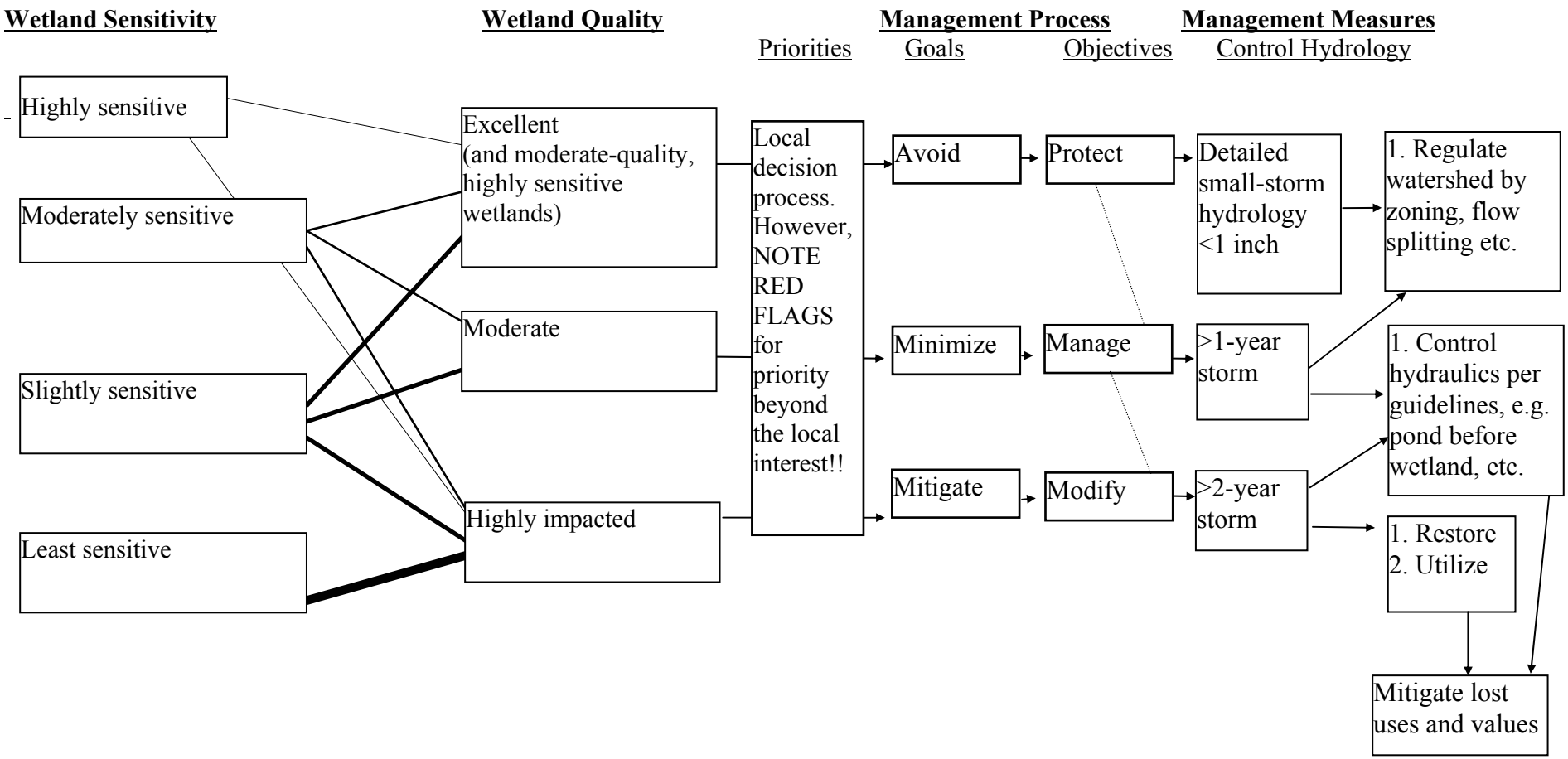
While there probably will not be a complete cessation of state/federal regulatory activity for wetlands of less concern, there may be a great deal more latitude allowed in decisions relating to hydraulic modification or the mitigation sequencing required for these types of projects. It is intended that general permits or other types of regulatory measures be taken to expedite permit issuance procedures. However, even under an expedited regulatory process, compensation should be required for losses of uses and values. Maintaining public uses and values is a very important component of maintaining the entire function of a watershed. Piecemeal destruction of minor wetlands or changes in the hydraulic regime can significantly damage the entire system through changes in erosion, nutrients, or other pollutant loading on the system.

SECTION I

Figure I-1

Wetland Inventory and Management Process

This table provides a decision chart for storm-water-related activities. It is not intended for determining fill or drainage for development, rather for hydraulic utilization and excavation activity related to storm-water conveyance.



1 Low-flow augmentation 2. Maintaining biological diversity 3. Preserving wildlife habitat 4. Providing recreational opportunity 5. Erosion control 6. Providing for floodwater retention 7. Reducing stream sedimentation which maintains water quality 8. Enhancing the natural beauty of the landscape

Often certain wetlands, because of their position in the watershed, morphometry, surface-flow connections or other physical attributes. are especially well-suited to be part of a storm-water management system. Identification of such basins does not necessarily mean they will be targeted only for receipt of storm water, though they should be highlighted in the inventory when this function is believed to be most important.

Considerations for the Local-Option Decision Path

Information layers on wetland trends, sensitivity and condition, as well as resource significance and management needs, can be incorporated into a geographic information system (GIS) to provide easy updating and viewing. Viewing these information items as overlays will help the decision-making process.

Following compilation of the data, a process for making decisions should be developed. This should be coordinated with respective local, state and federal permitting and regulatory agencies in order to ensure that ecologically and socially acceptable decisions are the result. Public participation should be an integral part of the process, and should be included early and throughout planning.

Once local wetland management decisions are made, the local unit of government should make a commitment to initiate a wetland monitoring and maintenance effort. Local citizens or schools may be recruited to carry out a wetlands monitoring effort. If the local government is unable to commit to sponsoring a wetlands citizen-monitoring effort, then at a minimum they should support monitoring of wetlands afforded long-term preservation. As much as possible, these monitoring efforts should include a review of individual and landscape wetland functions.

Wetlands which are of lower sensitivity to storm-water discharge, or are impaired, present opportunities for improving wetland integrity. In the storm-water-related activities decision chart (Figure I-1), these wetlands would be classed as "local option" wetlands. These may be good candidates for applying guidelines for control of "storm bounce" and pollutant loading, or to modify the wetland basin for improved storm treatment. In a planning context, this is not an easy decision to make, and there's no prescriptive means of further defining how these wetlands should be viewed. However, where possible, the following should be considered in making these decisions:

1) Relative rarity of wetland habitat types remaining in the wetlands in comparison with historical ratios of wetland types. Even if they are impaired, a diversity of wetland types is preferred.

2) Amount of fragmentation and isolation of a wetland that would result.

3) The possibility of avoiding, through zoning or other means, development or other pressures which would influence the integrity of the wetland basin.

4) Ability to minimize the impact of storm-water flows on the wetland through consideration of alternatives.

5) The relative position of the wetland within the watershed in relation to other surface waters.

6) Greater recognition of seasonal features of wetland importance, such as ephemeral wetlands which provide important forage value to migrating aquatic birds. Often these are the first waters to open up in the spring and this triggers complex cycles of certain freshwater crustaceans such as various species of fairly shrimp.

Mitigation of Functions and Values

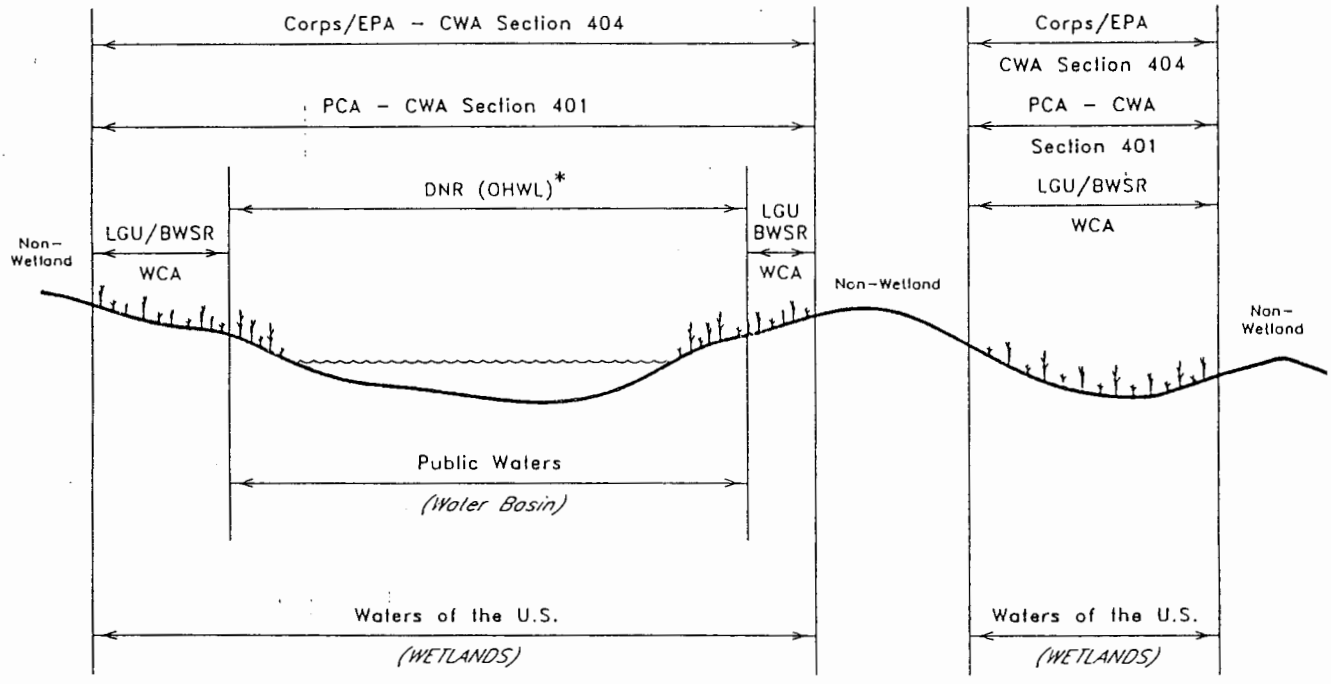
If a wetland must be used, mitigation should be considered, especially in cases where a wetland is targeted for expanded hydrologic utilization that will not comply with the guidelines presented in this document. If utilization will change the wetland character and these conversions result in changes in the uses that a particular wetland can provide, compensation must be provided. Ideally, this compensation must replace the affected wetland's uses and function. At a minimum, compensation is intended to maintain the no-net-loss wetlands policy enacted at the local, state and federal levels of government. One of the prime questions in replacement is whether wetland values can be replaced on-site in the watershed or at remote locations. Section V gives some guidance on the importance of each wetland value and the location in which it must be compensated. Mitigation for all lost functions and values should be provided, even if less-strict regulatory and management options are allowed under these guidelines.

For further information, we recommend the following:

1. EPA, September 1993. "Urban Runoff Pollution Prevention and Control Planning."
2. Minnesota Pollution Control Agency, October 1989. "Protecting Water Quality in Urban Areas."
3. Board of Water and Soil Resources, August 1, 1992. Minn. Rules Ch. 8410, "Metropolitan Area Local Water Management."
4. Minnesota Department of Natural Resources. July 3, 1989. Minn. Rules Ch. 6120, Shoreland Ordinances.
5. Minnesota Department of Natural Resources. _____ 19___. "A Guide to Land and Water Resource Management Programs in Minnesota."
6. Minnesota Board of Water and Soil Resources _____ 19___. "Handbook for Comprehensive Local Water Planning."
7. Minnesota Assessment Methodology. 1995. Board of Water and Soil Resources. Guidelines For Assessment of Wetland Functions and Values In Minnesota.

State and Federal Jurisdiction over "WATERS"

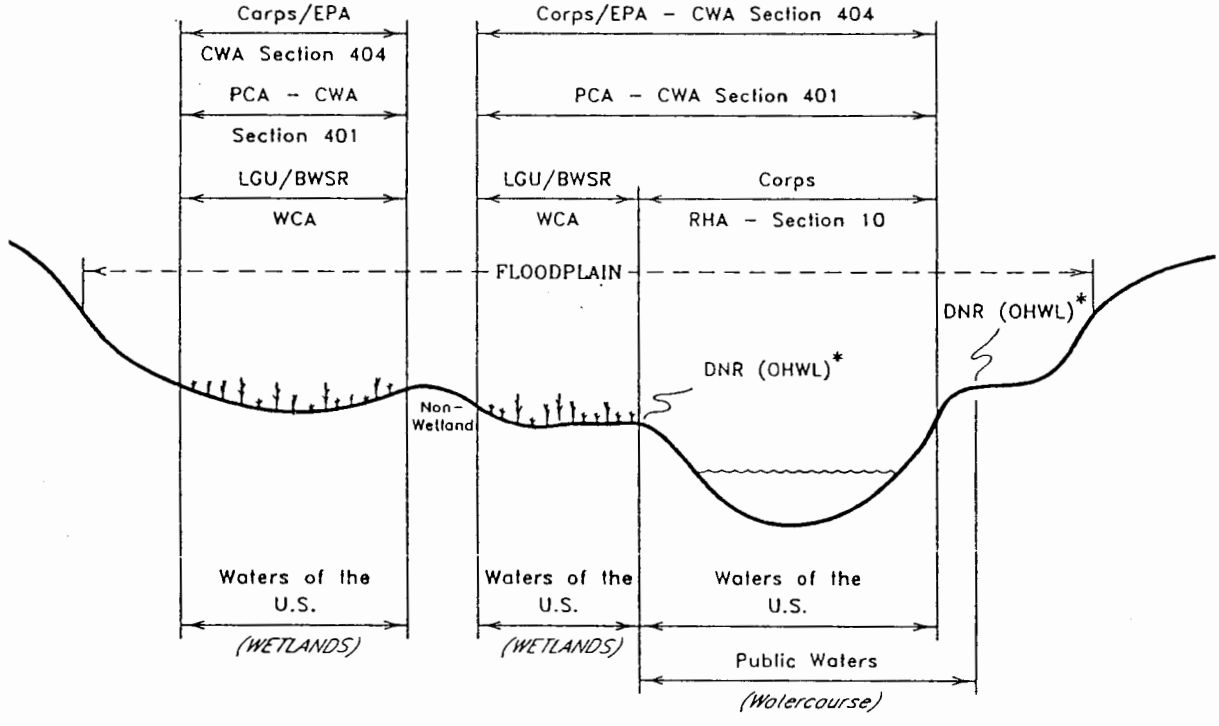
Public Waters: Water Basin



* Ordinary High Water Level
The OHWL is an elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial.

Note:
Most local government units (LGUS) have adopted state shoreland and floodplain zoning requirements into their zoning ordinances. Check with your local zoning office for requirements related to building sites, sewage treatment, grading and filling and vegetative removal.

Public Waters: Water Course



* Ordinary High Water Level
The OHWL (for water courses) is the elevation of the top of the bank of the channel.

Note:
Most local government units (LGUS) have adopted state shoreland and floodplain zoning requirements into their zoning ordinances. Check with your local zoning office for requirements related to building sites, sewage treatment, grading and filling and vegetative removal.

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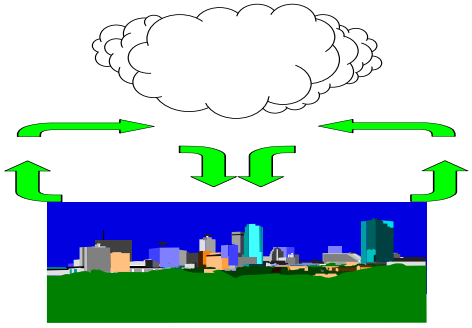
SECTION II

SEC. II - HYDROLOGIC ANALYSIS



Urbanization Changes Hydraulics

When an undeveloped area changes to support urban land uses, drastic changes in the local hydrologic conditions often result. As land is covered with roads, buildings, and parking lots, the amount of rainfall that can infiltrate into the soil is reduced. This increases the volume and changes the timing of runoff from the watershed. Figure II-1 shows the relationship of runoff, infiltration, and evaporation for watersheds with varying degrees of impervious cover. Typical impervious cover percentages are also shown.

Hydrologic Changes in Wetlands and Waterways

Water is the driving force in wetlands. A naturally fluctuating hydrologic cycle over hundreds or thousands of years has helped shape the plant and animal communities present in wetlands. Many of the organisms and plants have become adapted to fluctuating water levels, saturated soils, and anaerobic conditions. Wetlands have adopted to natural cycles of wet and drought. These are important factors in natural wetland hydrology that maintain the functions and values that wetlands provide.

In the pre-settlement landscape of the Midwest, entire watersheds were in vegetative cover (e.g., prairie, oak savanna) with maximum infiltration and minimum runoff. With the massive conversion of this landscape to agricultural and urban uses came substantial changes in runoff to wetlands as well as lakes and streams.

Removal of perennial vegetation led to a decrease in infiltration and an increase in the volume of runoff. Soils exposed to wind and water erosion led to increased sediment loads carried by runoff, and artificial drainage systems accelerated removal of water from the landscape. Fertilizers, pesticides, automobile exhaust residues, animal waste and other sources greatly increase nutrient loading and contaminants carried by runoff. All of these factors had prominent roles in altering and degrading wetlands.

Impact of Development

When an urban area is developed, natural drainage patterns are modified as runoff is channeled into road gutters, storm sewers, and paved channels. These modifications can increase the velocity of runoff, which decreases the time required to convey it to

FIGURE II-1

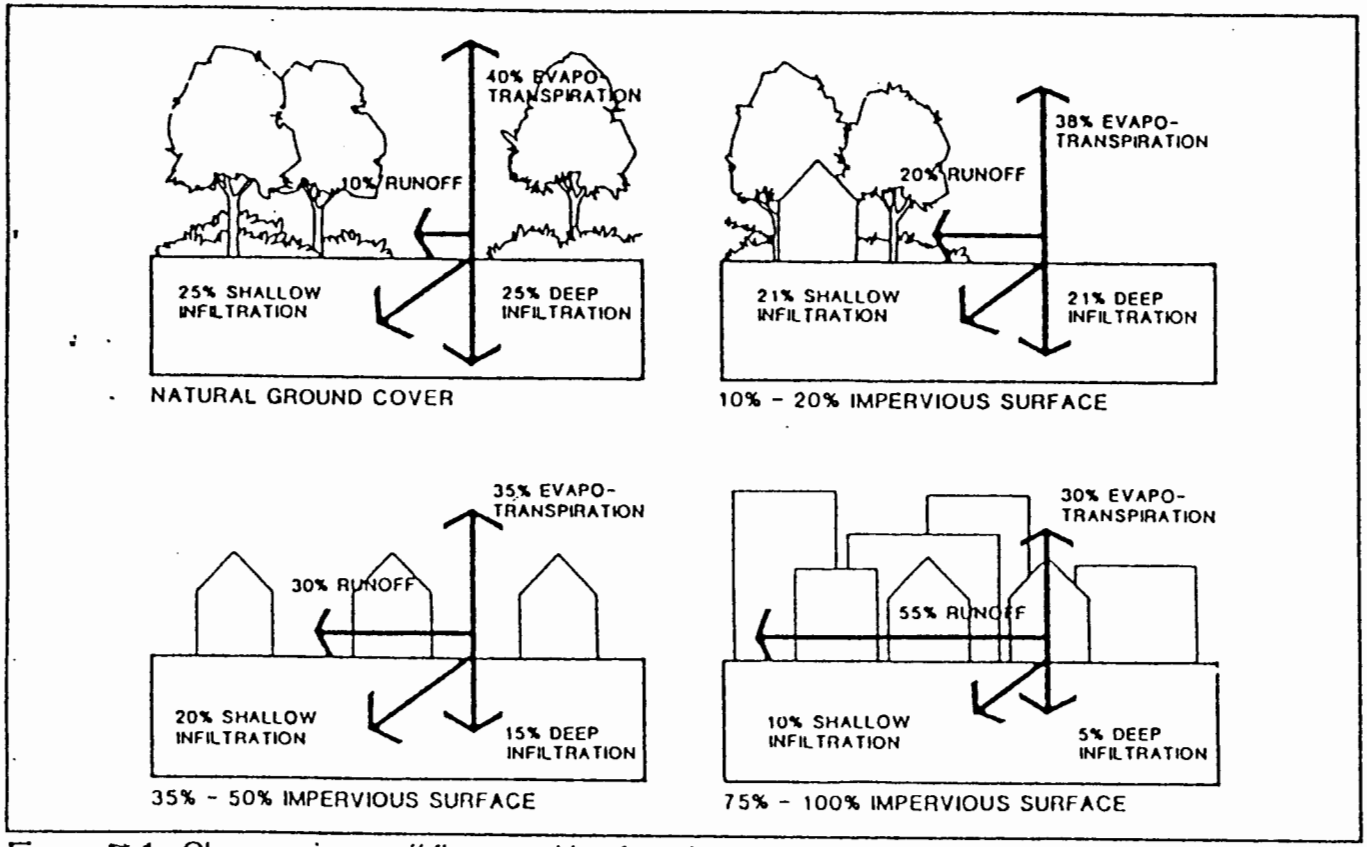


Figure II-1. Changes in runoff flow resulting from increased impervious area (NC Dept. of Nat. Res. and Community Dev., in Livingston and McCarron, 1992).

the mouth of the watershed. This results in higher peak discharges and shorter times to reach peak discharge. Figure II-2 shows typical pre-development and post-development hydrographs for a watershed that is being developed for urban land uses. The area below the hydrographs represents the volume of runoff. The increased volume of runoff after development is significant because of the increased pollutant loading it can deliver as well as potential flooding and channel erosion problems.

Base flow (low flow) in streams is also affected by changes in hydrology from urbanization because a large part of base flow is supplied by shallow infiltration. As shallow infiltration is reduced by increased impervious cover, the volume of water available for base flow in streams is reduced. These changes in hydrology, combined with increased pollutant loading, can have a dramatic effect on the aquatic ecosystems of urban streams. Studies of streams affected by urbanization have shown that fish populations either disappear or are dominated by rough fish that can tolerate a lower level of water quality (Klein, 1979).

One-hundred-year storms can cause flooding and have adverse effects on natural waterways. This is a fairly well understood but infrequent phenomena. What seems to be less well understood is that less severe but more frequent storm events can also have significant impacts. Studies have shown that most "natural" streams have a bank-full flow approximately equal to the two-year frequency peak discharge (Anderson, 1970; Leopold et al, 1964). After urbanization, increased flows may cause bank-full flow to be exceeded several times each year. In addition to flood damage, this condition causes previously stable channels to erode and widen. Much of the material that erodes becomes bed load and can smother benthic organisms. Sediment from stream bank erosion eventually settles and silts in wetlands, streams, rivers, and lakes.

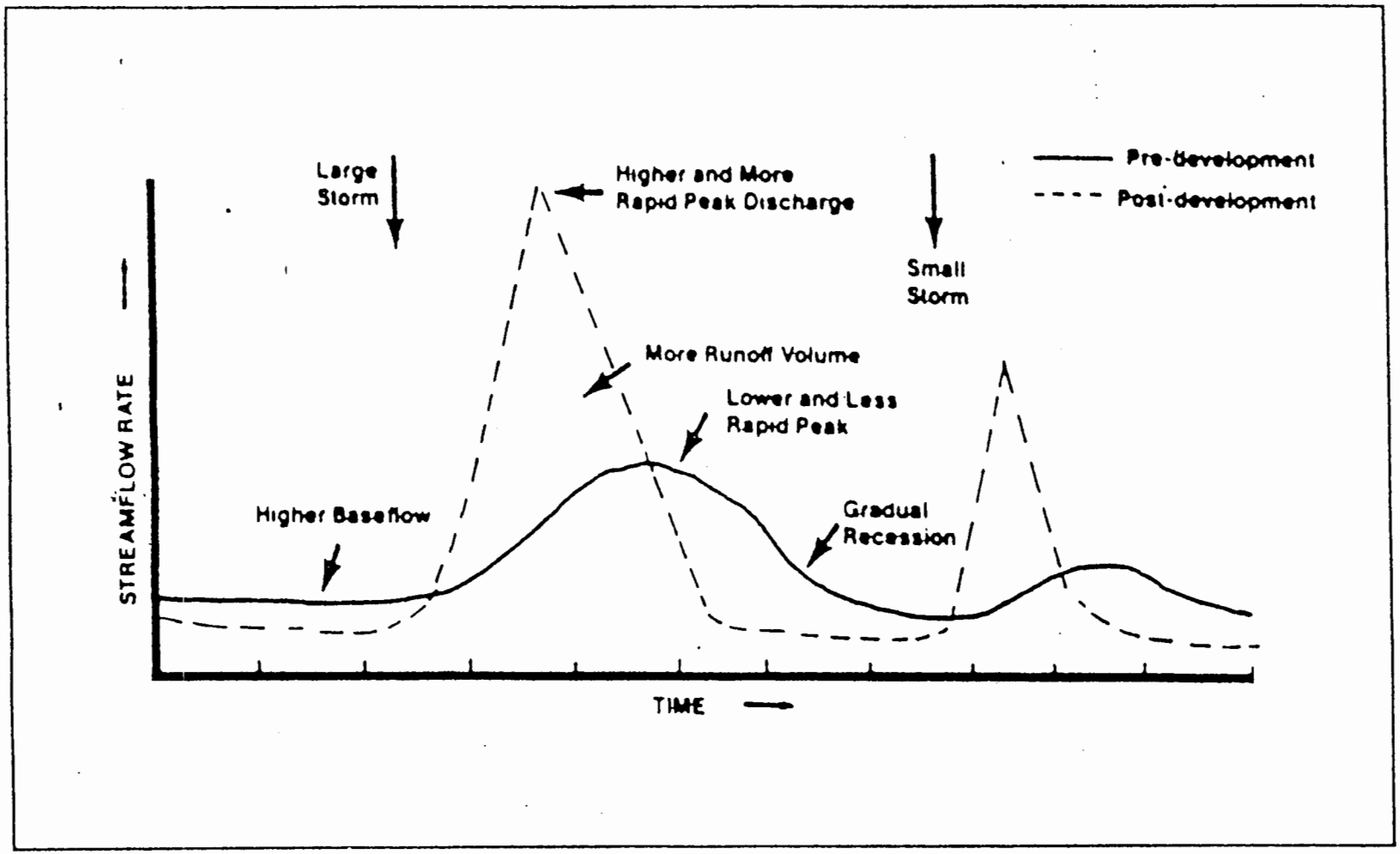
Hydrologic Modeling Concepts

Computer hydrologic models are used extensively for hydrologic predictions. A hydrologic model can be defined as a mathematical model representing one or more of the hydrologic processes resulting from precipitation and culminating in watershed runoff. Hydrologic models aid in answering questions about the effect of land management practices on quantity and quality of runoff, infiltration, lateral flow, subsurface flow (both unsaturated and saturated) and deep percolation. The models should be used with caution and within their span of applicability. Each model is developed for a specific purpose with certain underlying assumptions. Precautions should be taken that the assumptions of the model are not violated. (For further discussion of these issues see MPCA, 1988.)

Pitt has observed that there are limitations with the commonly accepted hydrologic runoff modeling methods currently used on a widespread basis (Pitt, 1987 & 1994). The methods Pitt discussed are the Rational Method, SCS TR-20 method, SCS TR-55 tabular method, SCS TR-55 graphical method, and the Corps of Engineers HEC-1 method.

The traditional urban hydrology models often depend on information gained from studies of flood and drainage conditions or

FIGURE II-2



Changes in stream hydrology as a result of urbanization (Schueler, 1992).

rural areas. Appropriate assumptions used for large storms may create problems when used for small storms. The runoff values for small storms do not approach conventional runoff predictions until several inches of rain have fallen. More infiltration occurs through typical street pavement than is generally accepted, and there are highly irregular infiltration rates through disturbed urban soils. These disturbed areas can have much less infiltration than pavement under certain conditions. For example, turf playing fields and unpaved parking lots can have less infiltration than a paved area such as a roadway. However, large paved areas including freeways have less infiltration because of longer drainage paths and sealing overcoats (Pitt, 1987).

Figure II-4 (Pitt, 1994) shows measured rain and runoff distributions for Milwaukee during 1983. Rains between 0.05 and 5 inches were monitored during this period. Two very large events (greater than 3 inches) occurred during this monitoring period which greatly bias these curves, compared to typical rain years. It was found that the median rain depth was about 0.3 inches and 66 percent of all Milwaukee rains were less than 0.5 inch in depth. In addition, 50 percent of the runoff was associated with rains less than 0.75 inches in depth for medium-density residential areas. In contrast, a 100-year, 24-hour rain of 5.6 inches for Milwaukee could produce about 15 percent of the average annual runoff volume, but only contribute about 0.15 percent of the average annual runoff volume when amortized over 100 years. Similarly, typical 25-year-drainage-design storms (4.4 inches in Milwaukee) produce about 12.5 percent of the typical annual runoff volume but only about 0.5 percent of the average runoff volume.

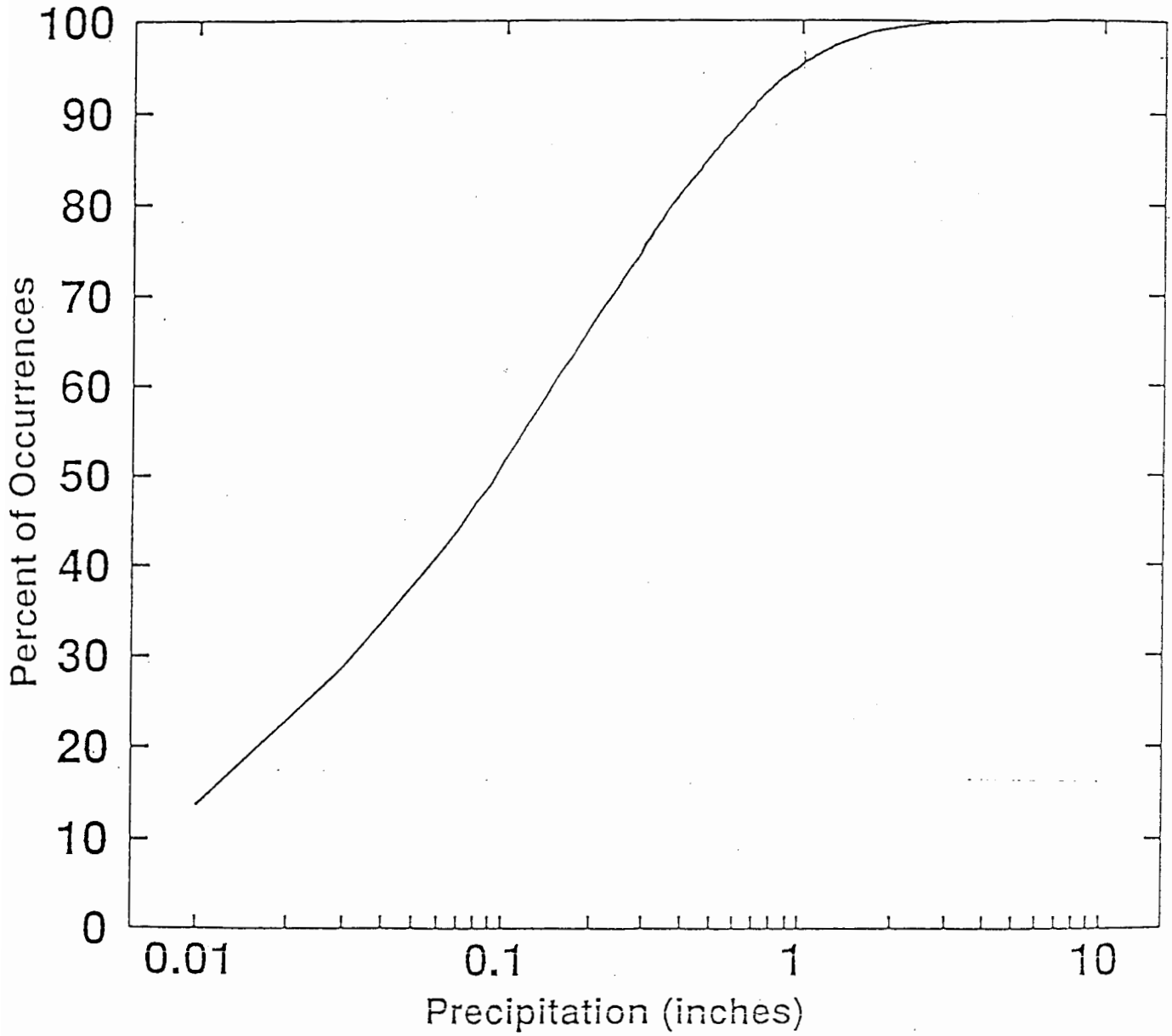
Figure II-5 (Pitt, 1994) shows actual measured Milwaukee pollutant discharges associated with different rain depths for a medium density residential area. Monitored discharges of suspended solids, COD, lead, and phosphates are seen to closely follow the runoff distribution shown in Figure II-4. These figures substantiate typical statistical analysis results that show that concentrations of most runoff pollutants do not significantly vary for runoff events associated with different rain depths. Therefore, being able to accurately predict runoff volume is very important in order to reasonably predict runoff pollutant discharges.

These figures show three distinct rainfall categories:

- Common rains less than about 0.5 inches in depth have relatively low pollutant discharges (<25 percent of the annual pollutant mass discharges from residential areas), but occur very frequently (on about 95 days a year in Minneapolis/St. Paul). These are key rains when evaluating runoff-associated water-quality violations, especially for bacteria and heavy metals. These pollutants in the storm water exceed water-quality standards for almost all rains.
- Rains between 0.5 and 1.5 inches are responsible for about 75 percent of the annual runoff-pollutant mass discharges from residential areas and are the key rains that need to be addressed when concerned with mass discharges of pollutants.
- Rains greater than 1.5 inches occur rarely (on only about two days a year in Minneapolis/St. Paul) and are needed for designs and evaluations of storm drainage systems. However, these rains

FIGURE II-3

Daily Precipitation - Cumulative Frequency Distribution
Minneapolis/St. Paul
(1891 to 1992)



State Climatology Office
D.N.R. - Division of Waters

are only responsible for relatively small portions of the annual pollutant mass discharges.

The bottom line is that you must understand the areas that you are attempting to model, spending time to get to know the area that is involved in discharging to your watershed. While understanding the low-frequency, larger storm events is critical to flood control, it is probably as important to understand small-storm hydrology to predict the runoff volumes, pollutant loading, impacts to vegetation, and water-quality impacts. For discharges with sensitive or moderately sensitive wetland vegetation, the key to this protection will be understanding the low-flow hydrology.

The best way to be certain of how well a model and the included assumptions perform is to compare the results with independent data from that used for calibration, whether it be collected on-site or considered adequately representative of the site. This verification of model results is often overlooked. Encouraging or requiring verification is the only way to have confidence in the results. More on-site data collection should be encouraged.

Implications of Wetland and Pollutant Sensitivity for Hydrologic Studies

A large percentage of cumulative runoff events occur from rainfall of one inch or less. Urbanization will increase the runoff volume that occurs from each storm event, thereby overloading the natural drainage systems that have adapted themselves to the pre-existing conditions. The frequency of bank-full events increases with urbanization, and the stream attempts to enlarge its cross-section to reach a new equilibrium with the increased approximate two-year flows. Increased flow volumes therefore increase the erosive force of the channel flows and can significantly upset the sediment load equilibrium that has established itself over centuries or thousands of years.

In Minnesota, over 96 percent of the daily precipitation events are under one inch in depth (Figure II-3). These rainfall events also account for the majority (approximately 65 percent) of the cumulative runoff quantity and proportionately large amounts of the pollutant loading associated with these rainfall events, Figure II-4, II-5 (Pitt, 1987 & 1994). The pollutant loading is more closely associated with total runoff volume than with peak runoff rates. For wetlands that are highly sensitive and moderately sensitive, the significance of hydrologic changes and pollutant loads is clear: For water quality and for wetland protection, small-storm hydrology is a critical component of the hydrologic investigation.

While the significance of the large flood events should not be underestimated, the smaller but cumulatively very erosive flows have not usually been given significant consideration. Several states have developed policies regarding erosive flow controls. A copy of the state of Washington's policy is attached as Appendix II-A. The implication with regard to hydrologic studies is clear: While we continue to look at flood and peak flow conditions and total flow, small-storm hydrology is a critical component for protection of property, water quality, and habitat.

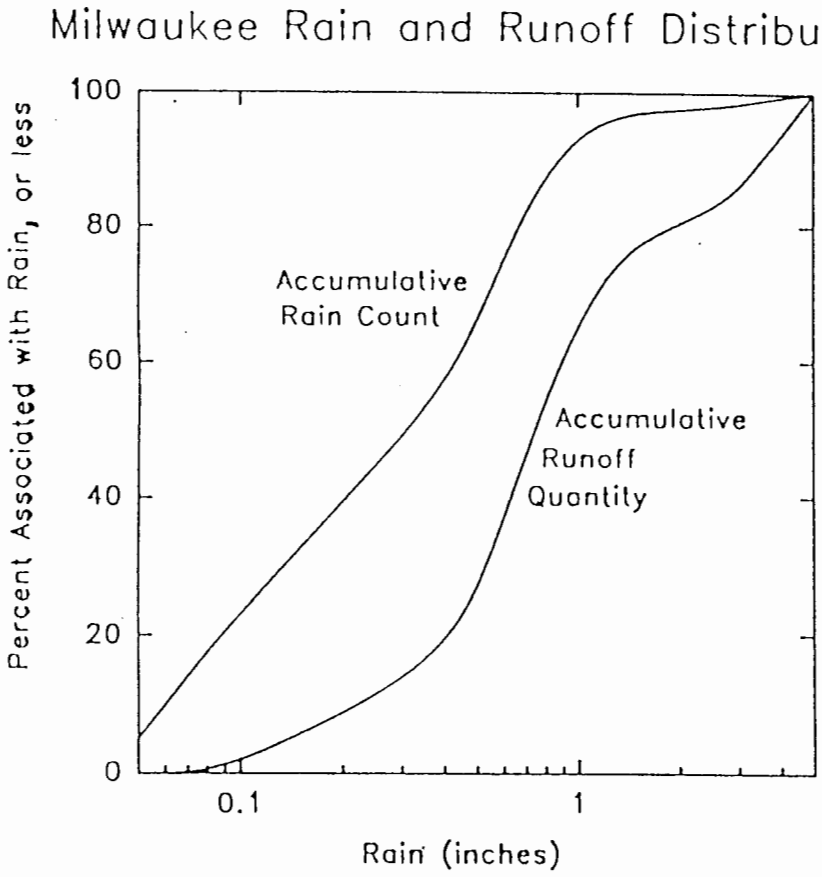


FIGURE II-4

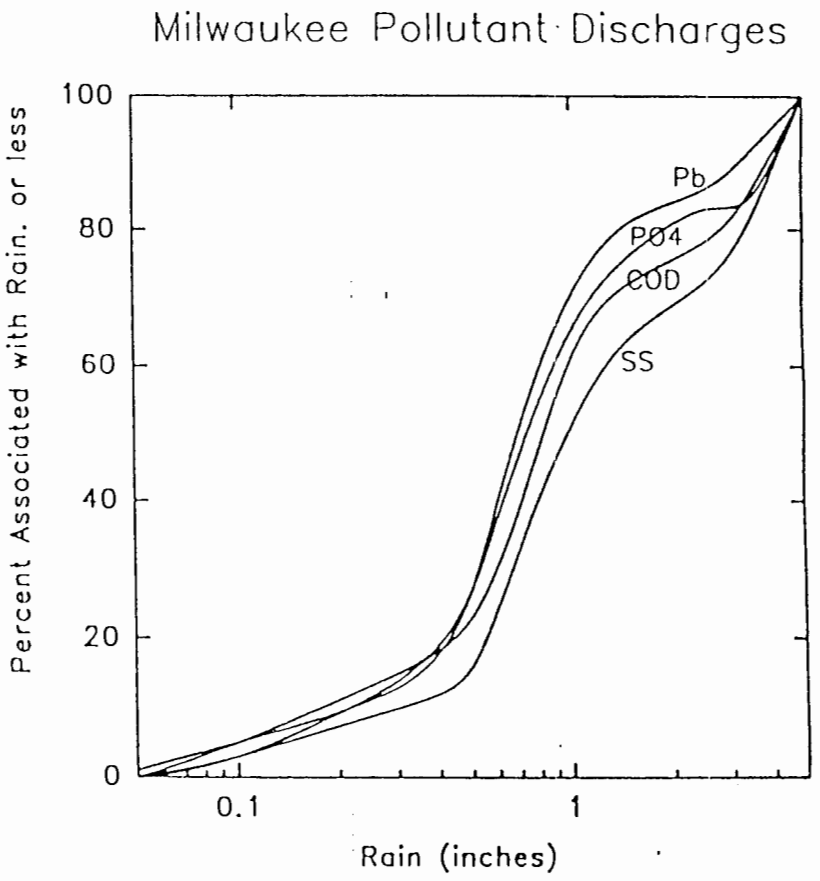


FIGURE II-5

SECTION II

Conclusions

Predicting the magnitude of adverse impacts to wetlands when natural watersheds are converted to urban development is a complex task. The assumption must be made that any change directing more or less water into wetlands beyond what would naturally occur as a result of any given rainfall event, is not necessarily good. Also, do not assume that, when urban development surrounds a wetland basin but does not actually encroach upon it, that the wetland will be preserved. Most urban flows are diverted by pipes or flow through channels and therefore they are unaffected by grassed areas or buffer zones that could modify the influences of development. If the supply of water is increased or reduced beyond the limits that the wetland's sensitivity allows, or if it carries excess pollutants, the wetland may not persist. Maintaining the pre-existing hydrologic conditions should be stressed in all cases, but especially in those wetlands that are highly or moderately susceptible to storm-water impacts. The relationship between any storm event, no matter how small or large, and runoff volumes must be thoroughly understood. BMPs which address the full range of hydrologic conditions should be employed in the process of minimizing impacts.

For further information, we recommend the following:

1. Minnesota Pollution Control Agency, October 1989. "Protecting Water Quality in Urban Areas."

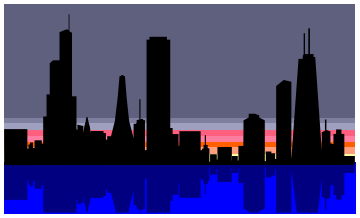
2. Washington State Department of Ecology, February 1992. Storm Water Management Manual for the Puget Sound Basin (The Technical Manual).

3. Pitt, Robert E., 6 November 1987, Small-Storm Urban Flow and Particulate Washoff Contributions to Outfall Discharges, Ph.D. Dissertation; Civil and Environmental Engineering Department, University of Wisconsin, Madison, Wisconsin.

4. Pitt, Robert E., August 1994, General Urban Runoff Model for Water-Quality Investigations, ASCE 1994 Conference on Hydraulic Engineering, Buffalo, New York.

5. Sandstrom, Bruce, March 14, 1994, Minnesota Board of Water and Soil Resources, Interoffice memorandum.

Sec. III - WATER-QUALITY IMPACTS



Introduction

Often the discharge of storm water and snow melt into wetlands can have an adverse and sometimes devastating impact on a wetland because of the contaminating material carried by runoff. The following discussion describes the changes that can occur in water quality when an area undergoes urbanization.

Quantity of Runoff

Changes in runoff character usually yield much larger volumes of runoff water over shorter time periods. This high-energy runoff moves over less permeable surfaces and picks up virtually anything that has been deposited there. The concentrated runoff flows through the urban conveyance system and may exit a storm sewer into a stream or natural channel where erosion can be accentuated.

Quality of Runoff

Urban surfaces are subject to the deposit of contaminants, which are then subject to wash-off by rainfall or snow melt. Typical contributors to pollutants in runoff include vehicular traffic, industry and power production, lawn care, pets, eroded sediments, and vegetative litter.

Some kinds of pollution that urban activities produce and the problems they cause are as follows:

Solids

- Inorganic (sediment, salt) and organic (vegetative, animal waste) debris can be moved by urban runoff in both particulate and dissolved forms.
- The particulate suspended and bed-load solids are caused by such things as de-icing grit, windblown dust and dirt, litter, vegetative debris, lawn clippings, and construction erosion.
- The dissolved forms include de-icing salt and various dissolved organics.
- Problems caused in receiving waters by these pollutants include turbidity, aquatic habitat destruction (burying, alteration of bottom material), transport of adsorbed contaminants, clogging of drainage systems, and direct impact on aquatic organisms (respiration, light penetration, increased temperature). Road salt can also become a ground-water problem where infiltration occurs and a lake problem when allowed to concentrate and alter water density.
- Control of solids prior to wetland discharge can be achieved by such BMPs as detention (ponding), housekeeping (street sweeping), and

enhanced infiltration to reduce total water movement.

Nutrients

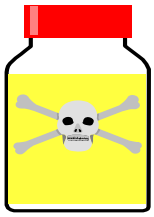
Phosphorus and Nitrogen

Many naturally occurring materials are essential for life, and are therefore termed "nutrients." However, an excess of these elements can lead to explosive growth of noxious life such as algae, or can be toxic to some forms of aquatic life, such as with ammonia.

Of particular concern for receiving waters are nutrients which get into urban runoff from such sources as lawn-care products, vegetative and animal debris, automotive additives, and atmospheric deposition (wind erosion, industrial activity). Nitrate nitrogen, most commonly from fertilizer over-use, can also adversely impact ground water when concentrated to high enough levels.

Control of nutrients prior to wetland discharge can be achieved by such measures as source control (fertilizer application limits), housekeeping (pet control ordinances, street sweeping), detention, and enhanced infiltration.

Toxicants



Many of the everyday activities that go on in an urban area also contribute substantial amounts of toxic material to urban receiving waters. Essentially, anything that is applied to the land or emitted from fertilizer or pesticide applications, a smokestack, or a vehicular tailpipe can be deposited on and washed off of an urban surface.

- Hydrocarbons and Organic Chemicals: These materials permeate urban waters and can exert a detrimental effect on aquatic life if the toxins are at a high enough level. These materials also move easily, exist for extended periods of time in a toxic state, and concentrate in sediments, from which they can be re-suspended later. The petroleum that leaks from cars or comes out the tailpipe, or the pesticides applied to urban lawns, can wash into gutters and eventually drain to a receiving waterbody.
- Metals: All airborne sources of metal and all of the worn metals that erode within an urban area can generate toxic input to our waters. Sources of these metals include automobiles, industrial emissions, and downspouts on houses.
- Control of toxic materials prior to discharge to a wetland can be achieved through such BMPs as detention, source control, proper vehicular maintenance, and good housekeeping.

Oxygen-Demanding Substances

- Much of the material washing off from urban surfaces exerts a demand for oxygen as it degrades in the water. Organic debris, oxidizable metals, and nutrients all require some oxygen in their material degradation. If the levels of these materials are high enough, the oxygen otherwise available for aquatic life is depleted, resulting in stress or death for these organisms. Oxygen

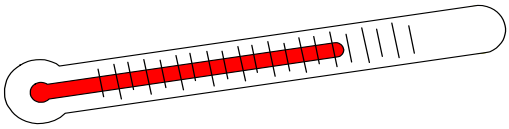
depletion can cause water-quality problems in any kind of receiving water body.

- Oxygen-demanding substances can be limited through such BMPs as erosion control, leaf and litter management, and detention.

Bacteria and Virus

- Numerous bacteria and virus strains occur in high concentrations in urban runoff. The sources of these pathogens include sanitary sewer leaks, pets, vermin, and discarded infected material. The result of contact with these pathogens can be disease.
- Pathogens can be controlled by good urban housekeeping, disconnection of illegal sanitary sewer connections, and pet control.

Temperature Changes



While temperature is usually not considered a critical factor for discharges to most wetlands, streams can be significantly impacted by temperature differences

There are various types of temperature criteria which can affect the success and mortality of organisms in waterways. Temperature changes which occur over a short period of time can have a shock effect, resulting in the death of organisms. There can also be long-term temperature effects which cause changes in the growth, reproduction, or mortality of organisms. These mean and maximum temperature changes vary from organism to organism and can be different even for the same organism in a different waterway. In Minnesota, the water-quality standards reflect daily maximum average temperatures for most waterways, or changes above the ambient which are limited to a few degrees on a monthly average basis (Minn. Rules 7050).

The Washington Council of Governments (Galli, John, December 1990) concluded that several factors affect extreme temperatures. Assuming that the air in other local meteorological conditions and the size of the stream cannot be realistically adjusted (an assumption that is not always true), the primary determinants of extreme temperature were indicated by watershed imperviousness and riparian canopy coverage. In addition, they studied four BMP types: 1) an infiltration dry pond; 2) extended detention artificial wetland; 3) extended detention dry pond; and 4) wet pond. They concluded that all four caused positive temperature increases, and each monitored BMP violated applicable water temperature standards at least once.

It is important to note that BMPs cannot completely mitigate the impacts caused by urbanization. A combination of practices, including land-use controls, riparian or stream buffer requirements, and employment of temperature sensitive BMPs will be required to maintain water quality, especially in cold-water streams. The significance of thermal impacts and their mitigation through appropriate BMP implementation needs further research and careful site-specific evaluation for critical areas.

CITY OF MILWAUKEE
BANNERMAN ET AL
APRIL 23, 1992
FIGURE III-1

Table 6: Means and coefficient of variation for the source area and stormsewer outfall concentrations. (1)

Source Area	Pollutant											
	Total Solids (mg/L)	Susp. Solids (mg/L)	Total Phos. (mg/L)	Diss. Phos. (mg/L)	Diss. Cd (µg/L)	Diss. Cu (µg/L)	Total Cd (µg/L)	Total Cr (µg/L)	Total Cu (µg/L)	Total Pb (µg/L)	Total Zinc (µg/L)	Total Hard. (mg/L)
Geometric Mean												
S_IndustRoof	78	41	0.11	0.02	0.2	2	0.3	--	6	8	1155	--
S_ArterialST	879	690	0.94	0.20	0.6	14	2.5	23	74	60	575	38
S_FeederST	958	763	1.50	0.53	0.4	18	3.3	15	76	86	480	43
S_ParkingLot	531	312	0.39	0.05	0.3	15	1.0	12	41	38	304	42
S_Outfall	267	146	0.34	0.14	0.2	10	1.0	6	28	25	265	31
M_ResiDriveway	306	173	1.16	0.49	0.5	9	0.5	2	17	17	107	33
M_FlatRoof	113	15	0.20	0.08	0.5	6	0.3	--	9	9	331	34
M_CollectorST	494	326	1.07	0.31	0.3	24	1.4	12	56	55	339	30
M_ArterialST	374	233	0.47	0.10	0.9	18	1.8	16	46	50	508	35
M_ParkingLot	127	58	0.19	0.05	0.4	9	0.6	5	15	22	178	22
M_ResiLawn	600	397	2.67	1.45	--	6	--	--	13	--	59	39
M_ResiRoof	91	27	0.15	0.06	0.2	3	0.1	--	5	8	149	20
M_FeederST	796	662	1.31	0.37	0.5	9	0.8	5	24	33	220	29
M_Outfall	369	262	0.66	0.27	0.3	5	0.4	5	16	32	204	26
Arithmetic Mean												
S_IndustRoof	83	54	0.13	0.02	0.3	2	0.3	--	7	8	1348	--
S_ArterialST	993	875	1.01	0.25	1.0	17	2.8	26	85	85	629	41
S_FeederST	1134	969	1.57	0.62	0.6	22	3.7	17	97	107	574	47
S_ParkingLot	603	474	0.48	0.07	0.5	18	1.2	16	47	62	361	48
S_Outfall	293	174	0.38	0.16	0.2	12	1.1	7	31	26	295	32
M_ResiDriveway	328	193	1.50	0.87	1.3	11	0.5	2	20	20	113	34
M_FlatRoof	126	19	0.24	0.11	0.8	8	0.4	--	10	10	363	44
M_CollectorST	544	386	1.22	0.36	0.8	30	1.7	13	61	62	357	32
M_ArterialST	389	241	0.53	0.14	2.0	22	2.6	18	50	55	554	37
M_ParkingLot	165	91	0.26	0.07	0.7	14	0.8	7	21	30	249	24
M_ResiLawn	656	457	3.47	2.40	--	7	--	--	13	--	60	51
M_ResiRoof	105	36	0.19	0.08	0.2	3	0.2	--	5	10	153	22
M_FeederST	1152	1085	1.77	0.55	1.3	11	0.8	7	25	38	245	30
M_Outfall	462	374	0.86	0.34	0.7	7	0.6	5	20	40	254	27
Coefficient of Variation												
S_IndustRoof	0.40	0.71	0.72	0.54	0.75	0.81	0.47	--	0.44	0.30	0.46	--
S_ArterialST	0.52	0.64	0.38	0.90	1.25	0.68	0.49	0.53	0.47	0.85	0.40	0.39
S_FeederST	0.60	0.66	0.29	0.60	0.62	0.63	0.49	0.57	0.77	0.60	0.56	0.39
S_ParkingLot	0.44	0.61	0.50	0.65	1.04	0.70	0.51	0.64	0.44	0.65	0.50	0.63
S_Outfall	0.41	0.60	0.50	0.59	0.70	0.79	0.44	0.42	0.50	0.42	0.45	0.39
M_ResiDriveway	0.43	0.51	0.84	1.08	1.60	0.67	0.42	0.46	0.62	0.53	0.37	0.32
M_FlatRoof	0.48	0.68	0.54	0.75	1.19	0.59	0.87	--	0.52	0.42	0.44	0.72
M_CollectorST	0.42	0.58	0.54	0.58	1.95	0.64	0.75	0.43	0.32	0.49	0.33	0.38
M_ArterialST	0.30	0.26	0.53	0.86	1.78	0.62	1.18	0.47	0.43	0.48	0.44	0.43
M_ParkingLot	0.74	0.91	0.95	0.96	1.22	1.07	0.86	0.84	0.86	0.82	0.90	0.57
M_ResiLawn	0.48	0.58	0.68	0.90	--	0.58	--	--	0.21	--	0.24	0.79
M_ResiRoof	0.60	0.68	0.59	0.82	0.73	0.47	0.57	--	0.25	0.58	0.24	0.36
M_FeederST	1.02	1.19	0.90	1.02	1.48	0.53	0.41	0.91	0.38	0.50	0.44	0.29
M_Outfall	0.64	0.75	0.70	0.67	1.97	0.63	0.81	0.54	0.67	0.66	0.66	0.25

1) Double dash indicates insufficient sample size.

AVERAGE EVENT MEAN CONCENTRATIONS
1991 and 1992 Storm Water Runoff Studies

SITE Minneapolis	BOD mg\l	COD mg\l	TSS mg\l	TDS mg\l	TN mg\l	NH3-N mg\l	TP mg\l	DP mg\l	Cd ug\l	Cu ug\l	Pb ug\l	Zn ug\l
Chain of Lakes (1991)	30.000	na	135.000	na	2.640	0.670	0.430	0.250	1.010	16.900	4.780	67.230
South Side	17.070	110.008	42.491	56.436	0.632	0.213	0.728	0.476	bdl	6.537	93.074	41.040
Target Center	32.185	35.935	29.017	50.357	0.562	0.098	0.085	0.032	bdl	30.231	0.924	66.240
Jimmy's	31.321	468.965	373.501	69.964	12.450	0.734	1.770	0.796	bdl	62.250	188.929	329.036
Seymour	13.715	64.929	83.280	71.692	1.394	0.335	0.443	0.234	bdl	16.467	49.174	83.382
Metrodome	5.203	58.460	56.857	55.568	1.832	0.349	0.301	0.163	bdl	22.674	10.413	88.225
HERC	6.284	98.909	176.436	132.444	1.004	0.173	0.529	0.352	10.176	57.420	224.035	462.572
Average (1992)	17.630	139.534	126.930	72.744	2.979	0.317	0.643	0.342	na	32.597	94.425	178.416
Std. Dev.	10.787	149.398	120.264	27.794	4.258	0.206	0.541	0.246	na	20.570	85.225	159.192
Max	32.185	468.965	373.501	132.444	12.450	0.734	1.770	0.796	10.176	62.250	224.035	462.572
Min	5.203	35.935	29.017	50.357	0.562	0.098	0.085	0.032	na	6.537	0.924	41.040
Mean (1991 & 1992)	24.912	141.924	133.333	69.232	2.694	0.629	0.456	0.261	1.105	18.581	14.463	78.383
Mean (1991 & 1992) w/o Jimmy's	24.454	71.844	126.723	69.075	2.486	0.627	0.428	0.249	1.105	17.652	10.751	73.050

SITE Richfield	BOD mg\l	COD mg\l	TSS mg\l	TDS mg\l	TN mg\l	NH3-N mg\l	TP mg\l	DP mg\l	Cd ug\l	Cu ug\l	Pb ug\l	Zn ug\l
Wood Lake	13.754	79.105	58.167	53.916	1.183	0.087	0.320	0.129	bdl	6.009	16.156	42.574
Legion Lake	25.039	78.028	18.090	60.077	0.408	0.046	0.452	0.223	bdl	1.347	3.142	13.344
Average (Richfield Sites)	19.3965	78.5665	38.1285	56.9965	0.7955	0.0665	0.386	0.176	0	3.678	9.649	27.959
Std. Dev.	5.6425	0.5385	20.0385	3.0805	0.3875	0.0205	0.066	0.047	0	2.331	6.507	14.615
Max	25.039	79.105	58.167	60.077	1.183	0.087	0.452	0.223	0.000	6.009	16.156	42.574
Min	13.754	78.028	18.090	53.916	0.408	0.046	0.320	0.129	0.000	1.347	3.142	13.344

TABLE 6. MEDIAN STORMWATER POLLUTANT CONCENTRATIONS FOR ALL SITES BY LAND USE
(Nationwide Urban Runoff Program, NURP)

Poliutant	Residential		Mixed Land Use		Commercial		Open/Nonurban	
	Median	COV[1]	Median	COV	Median	COV	Median	COV
BOD_5, mg/L	10.0	0.41	7.8	0.52	9.3	0.31	--	--
COD, mg/L	73	0.55	65	0.58	57	0.39	40	0.78
TSS, mg/L	101	0.96	67	1.14	69	0.85	70	2.92
Total Kjeldahl Nitrogen, µg/L	1900	0.73	1288	0.50	1179	0.43	965	1.00
NO_2 - N + NO_3 - N, µg/L	736	0.83	558	0.67	572	0.48	543	0.91
Total P, µg/L	383	0.69	263	0.75	201	0.67	121	1.66
Soluble P, µg/L	143	0.46	56	0.75	80	0.71	26	2.11
Total Lead, µg/L	144	0.75	114	1.35	104	0.68	30	1.52
Total Copper, µg/L	33	0.99	27	1.32	29	0.81	--	--
Total Zinc, µg/L	135	0.84	154	0.78	226	1.07	195	0.66

[1]COV: coefficient of variation = standard deviation/mean

Source: EPA 1983

Section III

Sources of Pollutants

Bannerman and others have studied the runoff of pollutants, trying to determine their source and the relationship between concentration and loading from various urban land uses. The table showing the findings of the studies is in Figure III-1. The studies (Bannerman, April 23, 1992) show that one or two source areas in each land use usually contribute most of the pollutants. Data from Minneapolis (Figure III-2) compare reasonably well with the Bannerman data. In order to determine pollutant loading, the study areas must be accurately characterized for both pollutant concentration and the volume of runoff. As discussed in other papers (Pitt, 1993), determining the infiltration rates for pervious areas can be a significantly difficult, especially if the models used have been derived from agricultural areas or from storm-water flood and drainage models which are generally derived for higher flow events. Since 90 percent of the storms in Minnesota occur are under one inch of rainfall (State Climatologist, 1993), a significant portion of the runoff occurs from smaller storm events. Pitt has estimated that 75 to 85 percent of the runoff volume in Milwaukee, which has similar events to Minneapolis and St. Paul, is from rainfalls under 1.25 inches (Pitt, 1993).

It is important to understand the pollutants of concern to the system, their sources (especially by land-use type), the source-area concentrations in runoff, and the source-area loading. This requires a knowledge of the hydrology of the source areas, especially the small-storm hydrology and the differences between small-storm and flood-water routing models.

For further information, we recommend the following:

1. Minnesota Pollution Control Agency, October 1989. “Protecting Water Quality in Urban Areas.”

2. EPA, December 1983. “Results of the National Urban Runoff Program.”

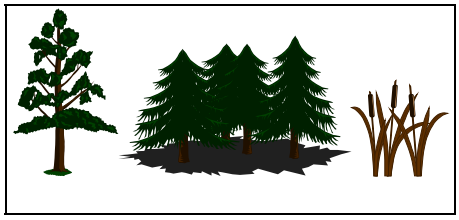
3. Hennepin Conservation District, February 1991. “Toxic Hazardous Substances in Urban Runoff, An Interim Report.”

4. Bannerman, Roger T., et al., April 23, 1992. “Sources of Pollutants in Wisconsin Storm Water,” Wisconsin Department of Natural Resources, for EPA Region V.

5. City of Minneapolis, 1993. Storm Water Runoff Permit, Phase I Application.

6. Pitt, Robert E., (1994) “Storm Water Detention Pond Design for Water Quality Management,” 1994, Lewis Publishers.

SEC. IV - WETLAND SUSCEPTIBILITY



Alteration and degradation of wetlands typically occurs when a predominately rural watershed is converted to urban use, as with the growth of the Twin Cities Metropolitan Area. Urban runoff is often directed into wetlands via storm-sewer systems. Some municipalities have designed their entire storm-sewer system using wetlands as the discharge point. Cases also exist where numerous isolated wetland basins were artificially connected via a storm-sewer network creating a "flow through" system where none existed previously. Use of wetlands for such storm-water purposes is often justified on the basis of cost savings, convenience, or ease of construction, since many wetlands are topographic depressions. But it could also reflect a lack of understanding or lack of concern about how the input of urban storm water can degrade wetlands and the functions and values they provide.

Wetland Sensitivity

The many types of wetlands are determined by their hydrology, vegetation and soils. Figure IV-1 lists wetland types according to their susceptibility to degradation by storm-water input. It is important to note that there can be exceptions to the general categories listed. Figures IV-2, 3, 4 and 5 (found on pages39 and 40) give a quick summary of wetland types and a general indication of wetland susceptibility by type. A summary of Eggers and Reed is provided on pages 33-38 for detailed descriptions of the types of wetlands found in Minnesota. Given this diversity of wetland types, it's not surprising that wetlands have a broad range of tolerance to urban storm-water input. Some wetlands (e.g., bogs and fens) are sensitive to any disturbance and will show signs of degradation with even low-level inputs of urban storm water. On the other hand, some wetlands (e.g., floodplain forests) are better adapted to handle the fluctuating water levels and influx of sediment often associated with urban storm water. Each wetland should be carefully evaluated to determine potential impacts from a proposed urban storm-water project.

Discussion

Diverse, sensitive, native plant communities can be readily degraded by storm-water impacts, resulting in monotypes of sediment- and nutrient-tolerant species such as reed canary grass and/or cattails..

SECTION IV

Highly Susceptible Wetland Types:[1]	Moderately Susceptible Wetland Types:[2]	Slightly Susceptible Wetland Types:[3]	Least Susceptible Wetland Types:[4]
Sedge Meadows	Shrub-carrs[a.]	Floodplain Forests[a.]	Gravel Pits
Open Bogs	Alder Thickets[b.]	Fresh (Wet) Meadows[b.]	Cultivated Hydric Soils
Coniferous Bogs	Fresh (Wet) Meadows[c.,e.]	Shallow Marshes[c.]	Dredged Material/Fill Material Disposal Sites
Calcareous Fens	Shallow Marshes[d.,e.]	Deep Marshes[c.]	
Low Prairies	Deep Marshes[d.,e.]		
Coniferous Swamps			
Lowland Hardwood Swamps			
Seasonally Flooded Basins			

1. Special consideration must be given to avoid altering these wetland types. Inundation must be avoided. Water chemistry changes due to alteration by storm water impacts can also cause adverse impacts.

Note:
All scientific and natural areas and pristine wetlands should be considered in this category regardless of wetland type.

2. **a**.,**b**.,**c**. can tolerate inundation from 6 inches to 12 inches for short periods of time. May be completely dry in drought or late summer conditions.
d. can tolerate +12" inundation, but adversely impacted by sediment and/or nutrient loading and prolonged high water levels.
e. some exceptions.

3. **a**. Can tolerate annual inundation of 1 to 6 feet or more, possibly more than once/year.
b. Fresh meadows which are dominated by reed canary grass.
c. Shallow marshes dominated by reed canary grass, cattail, giant reed or purple loosestrife.

4. These wetlands are usually so degraded that input of urban storm water may not have adverse impacts.

NOTES: ° **There will always be exceptions to the general categories listed above. Use best professional judgment.**
° **Appendix A contains a more complete description of wetland characteristics under each category.**
° **Pristine wetlands are those that show little disturbance from human activity.**

FIGURE IV-1

Greater frequency and duration of inundation can destroy native plant communities, as can depriving them of their water supply The construction of curb and gutter systems diverts surface runoff and can have either of these effects depending on the direction of diversion. Other modifications, such as granular bedding used for installing utility pipelines, can cause more subtle alteration of ground-water flows by acting as a conduit that accelerates ground-water movement. Furthermore, changes in water or soil chemistry can lead to degradation of wetlands that have a specific pH range and/or other parameter, such as the acidic conditions of sphagnum bogs and alkaline conditions of calcareous fens.

Highly Susceptible wetland communities can be composed of dozens of species of native trees, shrubs, grasses, sedges and forbs, providing habitat for a variety of wildlife in addition to providing excellent water-quality functions. In sedge meadows, the formation of tussocks by some species of sedges is an adaptation to fluctuating water levels; but urban storm-water input can exceed the water depths and frequency/duration of inundation that occurred under natural conditions, leading to a die-out of the sedges. Deposition of sediment carried by urban storm water can have the same effect, causing replacement of diverse species with monotypes of reed canary grass or cattails, which are much more tolerant of sedimentation and fluctuating water levels. In contrast to sedge meadows, monotypes of reed canary grass consist of a single, aggressive species. The result is no vegetative diversity and lower-quality wildlife habitat values.

Moderately susceptible wetland types are generally more likely to tolerate some degree of urban storm-water input compared to sensitive wetlands. But, as is true of all natural systems, there are limits to this tolerance. These wetlands, which include shrub-carr, alder thicket and shallow/deep marshes, typically have water regimes ranging from saturated soil conditions to three feet or more of standing water in the case of deep marshes. Soil saturation and water levels can fluctuate within a certain range from year to year and season to season. However, urban storm-water input can change the hydrology/hydroperiod of these wetlands. In some cases, the changes could be drastic. Depending on the magnitude, frequency and duration of inundation due to storm-water input, these wetlands can be degraded and even converted to cattail monotypes, mud flats, or deep, open water.

Slightly Susceptible wetlands, such as fresh or shallow meadows dominated by reed canary grass, giant reed, purple loosestrife, cattail, and / or floodplain forests, are less likely to be degraded by urban storm-water input compared to the highly and moderately sensitive wetland types discussed above. As mentioned previously, monotype-vegetation wetlands, especially those dominated by reed canary grass and cattail, are more tolerant of nutrient and sediment loading (that's why so many urban wetlands are composed of these monotypes). Floodplain forests are well adapted for fluctuating water levels and sediment deposition (within limits), as that is similar to what occurs under natural conditions. Use for urban storm-water purposes may, within limits, mimic or at least not significantly alter this condition.

Least-susceptible wetlands are highly degraded and should be viewed as candidates for rehabilitation or restoration. These serve functions such as flood storage and should be maintained for the values and

functions they may provide. However, if there is no feasible alternative to directing storm-water to wetlands, it would be less environmentally damaging to discharge urban storm water to these types of wetlands rather than the more sensitive wetland types described above. Consideration should be given to enhancing the effectiveness of these highly degraded wetlands to process storm-water runoff.

Wetland "Connectedness"

Establishment of "green corridors" is a crucial factor when looking at the "big picture" and how wetlands fit into an urbanizing landscape. Linking wetlands, lakes, streams and high-value upland habitats has many benefits that can offset to some degree the fragmentation that occurs due to urbanization. An excellent example of this planning tool is the system of primary environmental corridors identified by the Southeastern Wisconsin Regional Planning Commission for the seven-county area that includes the cities of Milwaukee, Waukesha, Racine and Kenosha.

Wetland connections and linkage may not directly affect vegetation but may be a significant factor in the habitat value and function of the wetland. Maintaining the wetland connections in a natural state will also help to avoid impacts from subtle hydrologic changes that may be caused by disturbance of these connections.

Hydroperiod Standards

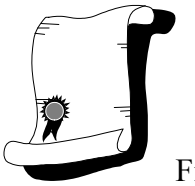


Figure IV-6 describes the recommended hydroperiod standards for wetlands. This guidance recommends these standards unless site-specific guidelines can be developed.

The term "existing" in this chart means the existing hydrologic conditions. If there have been recent significant changes in conditions, it means the conditions that established the current wetland. Recent hydrologic changes may alter or destroy a currently existing wetland unless retrofitting can be accomplished. To protect some long-lived species (e.g., tamarack trees), the conditions that established the original vegetation may need to be analyzed through many previous years to determine the appropriate hydrologic regime.

The hydrologic analysis must be conducted on an annualized basis or a broad range of storm events from very small (1/4-inch) to large, i.e. 10- or 25-year storms. The storm bounce -and inundation should be the maximum that occurs for each event over the ambient conditions for similar events.

In some cases, these guidelines can allow for changes in hydraulics. Storm-water input to wetland basins supporting monotypes, such as purple loosestrife or reed canary grass, could flood out this vegetation, creating open water areas that may eventually revegetate with greater diversity.

Figure IV-6

Recommended Hydroperiod Standards For Wetlands

A number of considerations factor into how storm water should be routed through a natural wetland. The best approach is for local governments to set standards based upon a truly comprehensive watershed management plan that considers local goals for water quality and quantity in conjunction with assessments of wetland functions and values, existing and future land uses, finances available, existing problems, and government structure. Until that has been done, some guidance needs to be followed to limit the negative impacts of storm-water discharges on a community's wetland resources. Based upon the foregoing discussions and in consideration of the chapter on the susceptibility of wetlands to storm-water discharges, the following criteria should be followed when no specific design standards have been established.

Relative Susceptibility Of Wetlands To Storm-Water Impacts

Hydroperiod standard	Highly susceptible wetlands	Moderately susceptible wetlands	Slightly susceptible wetland	Least-susceptible wetlands
Storm bounce	Existing	Existing plus 0.5_ft	Existing plus 1.0_ft	No limit
Discharge rate	Existing	Existing	Existing or less	Existing or less
Inundation period for 1 & 2 yr. precipitation event	Existing	Existing plus 1 day	Existing plus 2 days	Existing plus 7 days
Inundation period for 10 yr. precipitation event & greater	Existing	Existing plus 7 days	Existing plus 14 days	Existing plus 21 days
Run-out control elevation (free flowing)	No change	No change	0 to 1.0 feet above existing run out	0 to 4.0 feet above existing run out
Run-out control elevation (landlocked)	Above delineated wetland	Above delineated wetland	Above delineated wetland	Above delineated wetland

SECTION IV

Wetland alteration for any reason, even for improvements, should only be conducted after careful analysis to insure that the desired outcome will result.

The baseline condition of some wetland types may be so degraded that urban storm-water input may not cause appreciable adverse impacts. Some gravel pits, dredge /fill disposal sites, and cultivated hydric soil areas are examples. An analysis of other potential impacts such as ground-water contamination, or opportunity for enhancement, should determine the storm-water discharge tolerances in these cases.

However, for most wetlands, especially the sensitive and highly sensitive wetlands, changes in the hydroperiod may have detrimental impacts

Conclusion

Wetlands are susceptible to changes in water quality and quantity Therefore, it is essential to avoid hydrologic changes to sensitive wetlands and to minimize the impacts where discharges of urban storm water to wetlands are unavoidable. For some highly sensitive wetlands, flow controls which split the flow to the wetland may be needed. Discharges to some wetlands can be altered to some extent, but the hydroperiod guidance should be observed and monitored.

For further information, we recommend the following:

1. Cowardin et al. December 1979. "Classification of Wetlands and Deep Water Habitats of the United States." U.S. Fish & Wildlife Service, USDI.

2. Eggers, Steve D. and Donald M. Reed. December 1987. "Wetland Plants and Plant Communities of Minnesota and Wisconsin." U.S. Army Corps of Engineers, St. Paul District, December 1987, 201 pp.

3. Eggers, Steve D. February 1992. "Compensatory Wetland Mitigation: Some Problems and Suggestions for Corrective Measures." U.S. Army Corps of Engineers, St. Paul District, 63 pp.

4. U.S. EPA,. February 1993. "Natural Wetlands and Urban Storm Water: Potential Impacts and Management."

5. Wisconsin Department of Natural Resources. November 1992. "Rapid Assessment Methodology for Evaluating Wetland Functional Values." 9 pp.

6. Southeastern Wisconsin Regional Planning Commission. 1992, “A Regional Land Use Plan for Southeastern Wisconsin 2010,” SEWRPC Report No. 40, 473 pp.

7. Minnesota Department of Natural Resources. January 1995, “Technical Criteria for Identifying and Delineating Calcareous Fens in Minnesota,” 22 pp.

SECTION IV

WETLAND SUSCEPTIBILITY TO STORM-WATER DEGRADATION [1]

1. Highly Susceptible Wetland Types

Sedge Meadows

Sedge meadows are dominated by the sedges (*Cyperaceae*) growing on saturated soils. Most of the sedges present are in the genus *Carex,* but also present are those of *Eleocharis* (spike rushes), *Scirpus* (bulrushes), and *Cyperus* (nutgrasses). Grasses (*Gramineae*), especially Canada bluejoint grass, and true rushes *(Juncus)*, may also be present. The forb species are diverse but scattered, and may flower poorly under intense competition with the sedges.

Soils are usually composed of peat or muck. Some sedges, especially the hummock sedge, form hummocks that may be accentuated by grazing and frost action. The peat/muck and hummocks are composed of undecayed fibrous roots and rhizomes. Sedge meadows often grade into shallow marshes, calcareous fens, low prairies, and bogs. Occasional fires stimulate spring growth of the sedges while setting back invading woody vegetation.

There are over 150 species of *Carex* in Minnesota and Wisconsin, many of which are found in wetland habitats. Because they have specific habitat requirements, *Carex* are good indicators of environmental conditions such as soil and water chemistry, water levels, shading, silt deposition, and floating mats.

The fertile organic soils associated with sedge meadows have traditionally been used for muck farming. The lowering of water tables through artificial drainage is suspected of causing shrub invasion in some of the remaining sedge meadows.

Bogs

Bogs are a specialized wetland type found on saturated, acid peat soils that are low in nutrients. They support a unique assemblage of trees, low shrubs and herbs growing on a mat of *sphagnum* mosses (Curtis 1971). In Minnesota and Wisconsin, most bogs are found north of the vegetation tension zone, which is the zone where both prairie-forest floristic province and the northern forest species coexist. The area separates the northeastern third of the state from the south and western thirds of the state.

Bogs are one stage in succession from open-water lake to climax mesic hardwood forest (Curtis 1971). The bog originates on a floating mat of sedges, which becomes colonized by sphagnum mosses. As the mat gradually thickens and becomes more stable, it is invaded by the evergreen shrubs of the heath family (*Ericaceae*). Eventually, tamarack and black spruce can be supported by the mat. The final stage of succession is, theoretically, climax mesic hardwood forest. Note that succession is rarely without

[1] From (Eggers and Reed, December 1987).

interruption. It is typically a series of advancements and setbacks, primarily due to fire. Also note that there are similar successional patterns for other wetland plant communities.

The values and uses of bogs include harvesting of sphagnum moss, aesthetics, and conversion to commercial cranberry production.

Coniferous Bogs

Coniferous bogs are similar to open bogs in plant community composition and structure except that mature trees (breast-height diameter greater than six inches) of black spruce and/or tamarack are the dominant species growing on the sphagnum moss mat. Sphagnum mosses are still the dominant ground-layer species, and a few sedges, orchids and pitcher plants that have endured the shaded conditions are often present, along with the shrubs of the heath family (*Ericaceae*).

Open Bogs

Open bogs are composed of a carpet of living sphagnum moss growing over a layer of acid peat. Herbs and/or the low shrubs of the heath family (*Ericaceae*) colonize the sphagnum moss mat. Scattered, usually immature or stunted (breast-height diameter less than six inches) trees of black spruce and/or tamarack may be present. Lack of forest is probably due to conditions too wet for the tree species, sphagnum moss mat too thin to support trees, recurrent fires, summer frosts, and/or lack of a seed source for the tree species.

Calcareous Fens

Calcareous fens are the rarest wetland plant community in Minnesota and Wisconsin, and probably one of the rarest in North America. A calcareous fen is a peat-accumulating wetland dominated by distinct ground-water inflows having specific chemical characteristics. The water is characterized as circumneutral to alkaline, with high concentrations of calcium and low dissolved oxygen content. The chemistry provides an environment for specific and often rare hydrophytic plants. Characteristic species include shrubby cinquefoil, sterile sedge, fen beak-rush, Ohio goldenrod, common valerian and lesser fringed gentian. Also included are species disjunct from the tundra, alpine meadows, and salt marshes. Therefore, calcareous fens have been referred to as a hybrid community by Curtis (1971).

Calcareous fen communities in general have a disproportionate number of rare, threatened, and endangered plant species as compared to other plant communities in the Great Lakes region.

Low Prairies

Prairies are open, herbaceous plant communities covered by low-growing plants dominated by native grass-like species; at least half of the vegetative cover is made up of true grasses (Curtis 1971). Low prairies include both wet and wet-mesic prairies as described by Curtis (1971). These communities are similar to fresh (wet) meadows, but are dominated by native grasses and forbs associated with the prairies, such as prairie cord-grass, big bluestem, gayfeather, New England aster, culver's root, prairie dock, and sawtooth sunflower. Low prairie communities only occur south of the vegetation tension zone, although a few low prairie species may be found in sandy barrens and wet swales north of the tension zone.

Coniferous Swamps

Coniferous swamps are forested wetlands dominated by lowland conifers, primarily northern white cedar and tamarack, growing on soils that are saturated during much of the growing season, and that may be inundated by as much as a foot of standing water. Soils are usually organic (peat/muck) and can vary from nutrient-poor to acid, to fertile and alkaline or neutral. Tamarack typically dominates on the former soils, and northern white cedar on the latter. A sphagnum moss mat is not present. Coniferous swamps occur primarily in and north of the vegetation tension zone.

Lowland Hardwood Swamps

Lowland hardwood swamps are dominated by deciduous hardwood trees, have soils that are saturated during much of the growing season, and may be inundated by as much as a foot of standing water (Shaw and Fredine 1971). Dominant trees include black ash, red maple, yellow birch and, south of the vegetation tension zone, silver maple. Northern white cedar can be a subdominant species in stands north of the vegetation tension zone. American elm is still an important component of this community, although its numbers have been greatly reduced by Dutch elm disease. These communities are commonly found on ancient lake basins.

Seasonally Flooded Basins

Seasonally flooded basins are poorly drained, shallow depressions that may have standing water for a few weeks each year, but are usually dry for much of the growing season. These basins may be kettles in glacial deposits, low spots in outwash plains, or depressions in floodplains. They are frequently cultivated. However, when these basins are not cultivated, wetland vegetation can become established. Typical species include smartweeds, beggarticks, nut-grasses, and wild millet. One unique aspect of seasonally flooded basins is that the alternating periods of flood and drought can eliminate perennial plants so that annual plant species typically dominate the community.

Seasonally flooded basins are important for waterfowl and shorebirds. These temporary water-holding basins frequently have an abundance of plant seeds and invertebrates, which makes them ideal feeding and resting areas for migrating waterfowl and

shorebirds. In spring, seasonally flooded basins are used as pairing ponds by ducks, and the abundant invertebrate population provides a protein-rich diet for egg-laying hens.

2. Moderately Susceptible Wetland Types:

Shrub-carrs

Shrub-carrs are plant communities composed of tall, deciduous shrubs growing on saturated to seasonally flooded soils. They are usually dominated by willows and/or red-osier dogwood, and sometimes silky dogwood. Shrub-carrs usually retain some of the forbs, grasses, and sedges of the inland fresh meadows. These communities are common both north and south of the vegetation tension zone.

It should be noted that three alien (non-native) shrub species are invading shrub-carrs, especially where disturbances such as drainage and pasturing have occurred. These are honeysuckle *(Lonicera* x *bella)*, fen buckthorn *(Rhamnus frangula)*, and common buckthorn *(Rhamnus cathartica)*.

Alder Thickets

Alder thickets are a tall, deciduous shrub community similar to shrub-carrs except that speckled alder is dominant. Speckled alder can pioneer exposed peat or alluvial soils because of its tiny seeds and ability to fix nitrogen. Alder thickets are generally found in and north of the vegetation tension zone.

Speckled alder may occur as a monotype, but the alder thicket community can have a diversity of shrubs including high-bush cranberry *(Viburnum trilobum)*, sweet gale *(Myrica gale)*, and common winterberry holly *(Ilex verticillata)*.

Fresh (Wet) Meadows

Fresh (wet) meadows are dominated by grasses, such as red-top grass and reed canary grass, and by forbs such as giant goldenrod, growing on saturated soils. The grass family (*Gramineae*) and aster family (*Compositae*) are well represented in fresh meadows. The forbs and grasses of these meadows are characterized by less competitive, more nutrient-demanding, and often shorter-lived species than the sedges of the sedge meadow community. Therefore, fresh meadows probably represent younger communities that indicate recent disturbances and degradation of other inland fresh meadows by drainage, siltation, cultivation, pasturing, peat fires, and/or temporary flooding. Once established, the forbs and grasses of the fresh meadow community may persist for extended periods of time.

Shallow and Deep Marshes

Shallow marsh plant communities have soils that are saturated to inundated, by standing water up to six inches in depth, throughout most of the growing season (Shaw and

Fredine 1971). Herbaceous emergent vegetation such as cattails, bulrushes, arrowheads, and lake sedges characterize this community.

Deep Marsh

Deep marsh plant communities have standing water depths of between six inches and three or more feet during most of the growing season (Shaw and Fredine 1971). Herbaceous emergent, floating, floating-leafed, and submergent vegetation occurs in this community, with the major dominance by cattails, hardstem bulrush, pickerelweed and/or giant bur-reed.

The vegetation of marshes is characterized by emergent aquatic plants growing in permanent to semi-permanent shallow water. Also present are species of shallow open-water communities, as well as those found in sedge meadows and seasonally flooded basins. The species of sedge meadows and seasonally flooded basins may be found growing on muskrat lodges, on floating mats, and on muck soils exposed during droughts or artificial drawdown. Emergent aquatic plants typically become established and spread when water levels are low or when the marsh substrate is exposed, and then persist when water levels rise. However, if water levels rise too quickly, or rise to higher than normal levels, emergent vegetation may not survive, or it may rise to the water surface as floating mats. Muskrats may "eat out" emergent vegetation, creating open water areas within the marsh that favor waterfowl use. Unchecked, however, muskrats can eliminate emergent vegetation, leaving an open water area until the next drought or draw-down allows emergent vegetation to recover.

Marshes are among the most productive of all wetlands for water birds and furbearers, and they can also provide spawning and nursery habitat for some fish species. Birds that use marshes for breeding and feeding include ducks, geese, rails, herons, egrets, terns, and songbirds. Raptors such as the osprey, bald eagle, and northern harrier frequent marshes in search of prey. Important furbearers inhabiting marshes include muskrat and mink. Excellent winter habitat can be provided for upland wildlife, including ring-necked pheasant and eastern cottontail. Marshes can help replenish fish populations in adjacent lakes and rivers by providing spawning habitat, most notably for northern pike and muskellunge.

In addition to providing fish and wildlife habitat, marshes have other functions including floodwater retention, protection of shorelines from erosion, aesthetics, and water-quality functions involving the trapping of sediments and assimilation of nutrients.

3. Slightly Susceptible Wetland Types:

Floodplain Forests

Floodplain forests are wetlands dominated by mature, deciduous hardwood trees growing on alluvial soils associated with riverine systems. The soils are inundated during flood events, but are usually somewhat well-drained for much of the growing season (Shaw

and Fredine 1971). The most characteristic feature of floodplains is the alluvial soil that is constantly being deposited in some locations while being eroded away in others. Floodplain forests typically include the northern and southern wet-mesic hardwood forest associations described by Curtis (1971). Dominant hardwoods include silver maple, green ash, river birch, eastern cottonwood, American elm, and black willow. The herbaceous ground layer is commonly composed of jewelweed and nettles.

Floodplain forests have a great diversity of plant and animal species because they serve as migration corridors. Some of the many species of wildlife that inhabit floodplain forests are wood duck, barred owl, herons, egrets, and a variety of songbirds. Pools within the forest may provide habitat for amphibians and invertebrates, while adjoining areas of open sand may provide habitat for reptiles. During high-water periods, these forests even provide habitat for fish.

Floodplain forests are extremely important for floodwater storage. Diking of floodplain forests to allow development or agricultural use can aggravate both upstream and downstream flooding impacts.

Fresh Wet Meadows and Shallow Marshes

When dominated by cattail giant reed, reed canary grass or purple loosestrife, these wetland types can be considered slightly susceptible wetland types. These wetlands provide a variety of wetland benefits, but they are not as diverse and are dominated by species able to tolerate more fluctuation of water level. Some opening of the vegetation by additional water may even be beneficial.

4. Least-Susceptible Wetland Types:

The baseline condition of some wetlands may be already degraded to such an extent that storm-water input would not cause any additional adverse impacts. Cultivated hydric soils, dredge/fill disposal sites and some gravel pits are examples of this condition.

SECTION IV

SUSCEPTIBILITY OF WETLANDS
TO STORM WATER INPUT

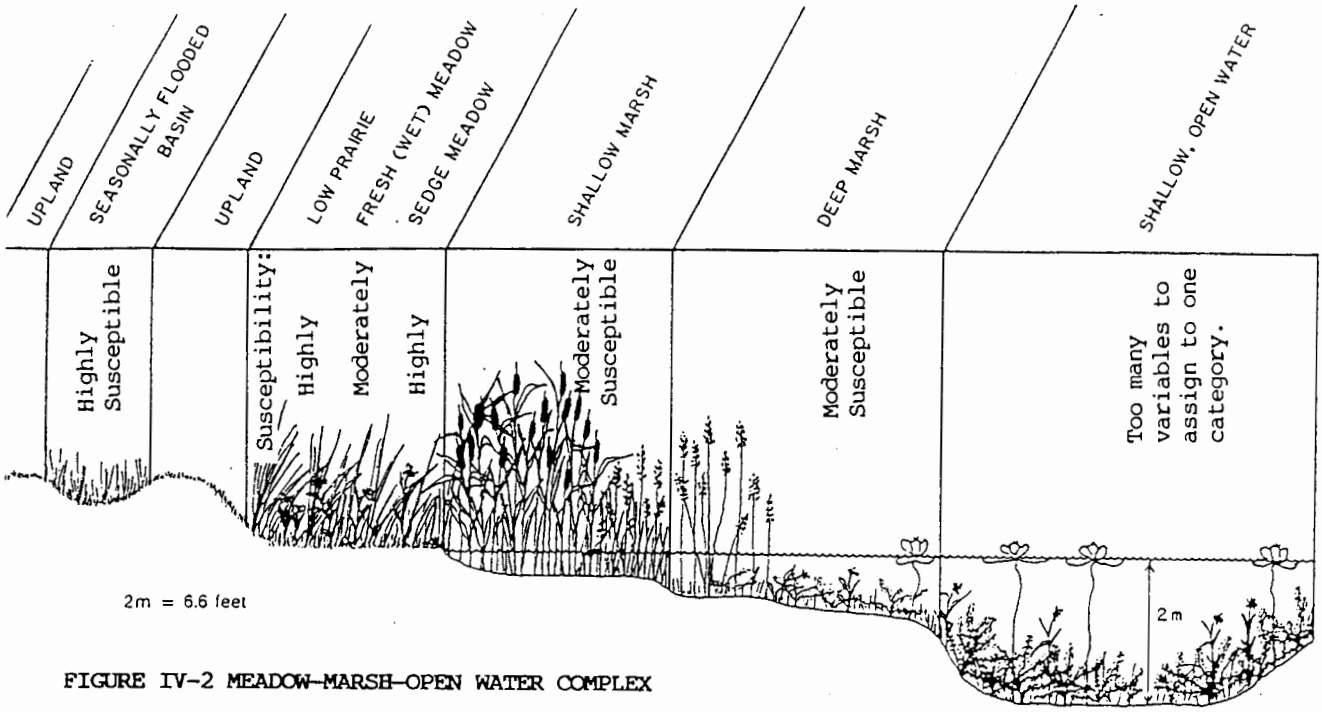


FIGURE IV-2 MEADOW-MARSH-OPEN WATER COMPLEX

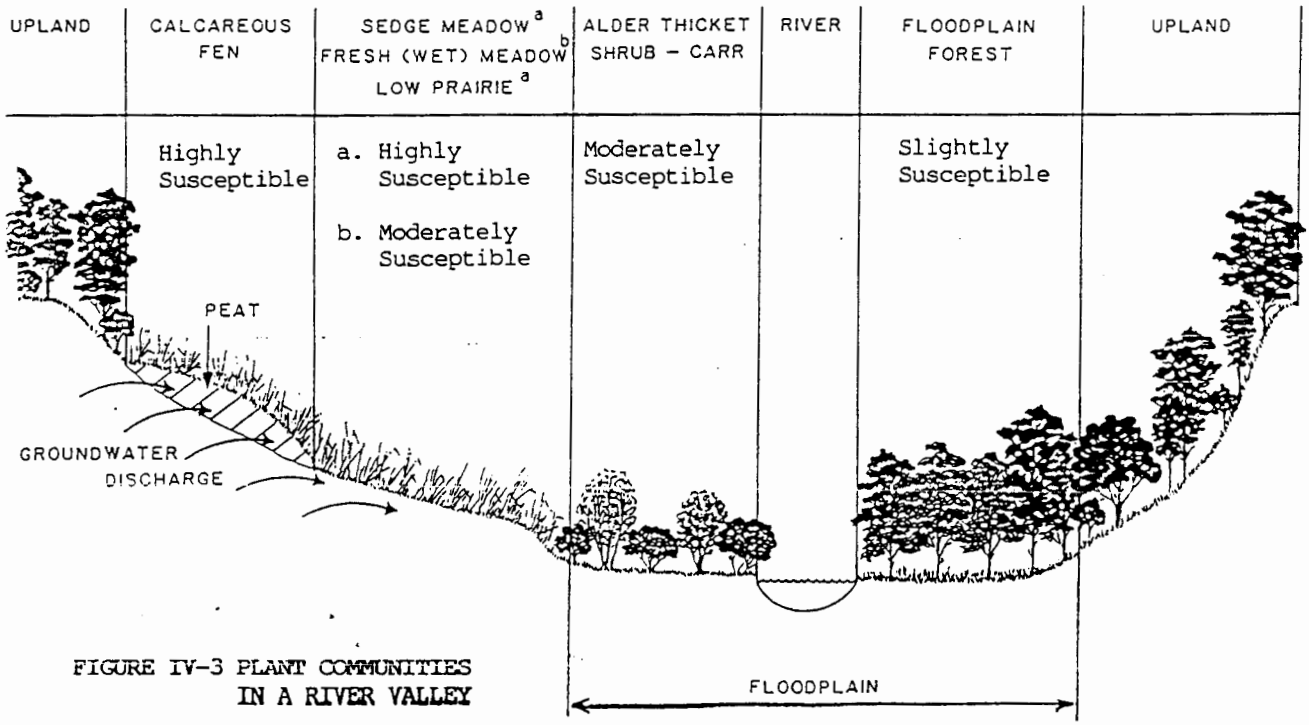


FIGURE IV-3 PLANT COMMUNITIES
IN A RIVER VALLEY

SECTION IV

SUSCEPTIBILITY OF WETLANDS TO STORM WATER INPUT

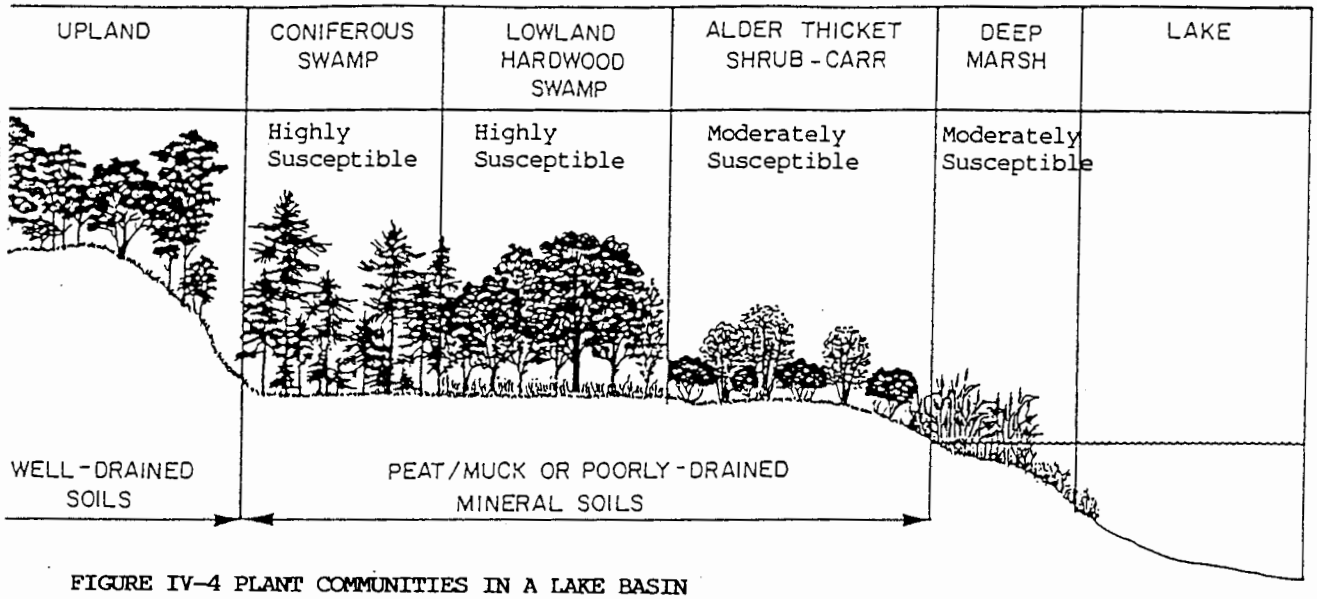


FIGURE IV-4 PLANT COMMUNITIES IN A LAKE BASIN

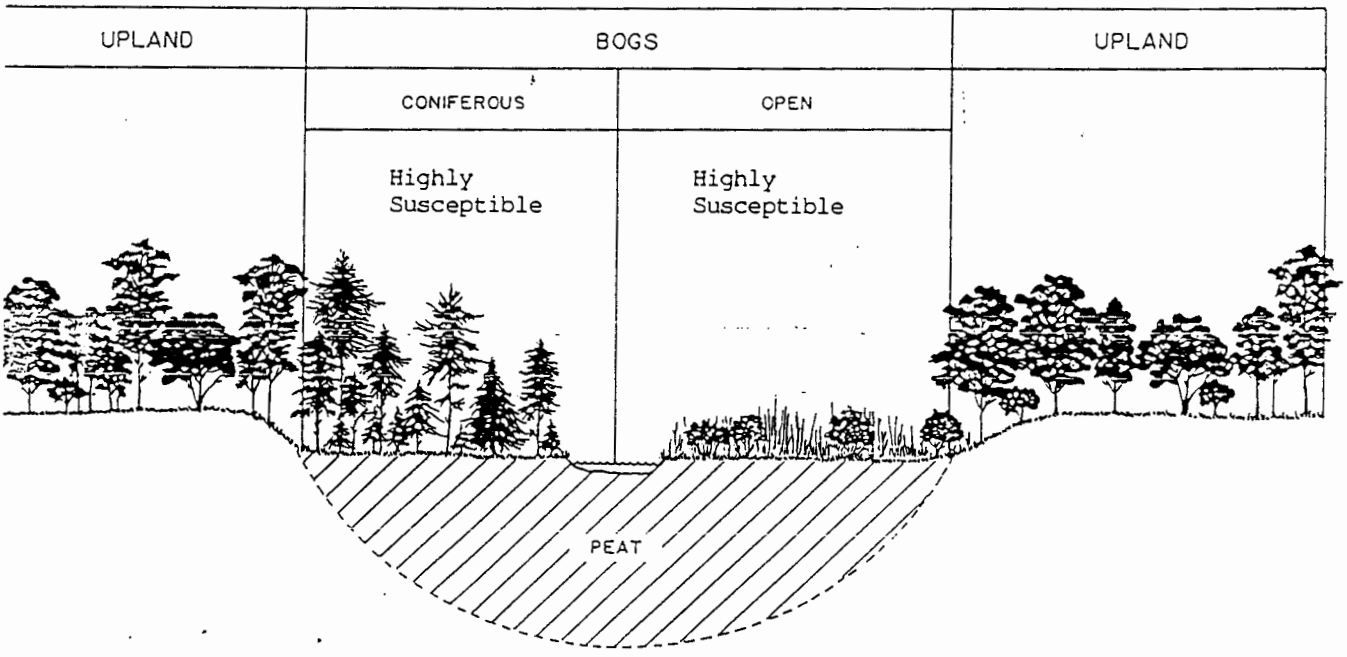


FIGURE IV-5 GENERALIZED CROSS SECTION OF A BOG

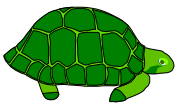
SECTION V

Sec. V - VALUES AND FUNCTIONS OF WETLANDS

Wetland Values

Wetlands have widely been cited as providing numerous ecological and socioeconomic values. In enacting the Wetland Conservation Act of 1991 the state Legislature acknowledged the importance of comprehensive planning to maintain and increase the quantity, quality and biological diversity of Minnesota's wetlands. Among the many reasons for preserving and protecting wetlands is their benefit to water quality, which is recognized in the state water-quality standards, Minn. Rules Ch. 7050. These standards establish the designated uses for all waters of the state including wetlands.

The designated uses for wetlands can be partitioned into three broad groups of wetland functions or values: biological, physical/hydrological, and socioeconomic.



Biological benefits of wetlands:

- Maintenance of biological diversity indigenous to wetlands
- Wildlife habitat

Physical/hydrological benefits of wetlands:

- Erosion control
- Ground water recharge
- Low-flow augmentation
- Stream sedimentation

Socioeconomic benefits of wetlands:

- Maintaining recreational activities associated with wetlands
- General commercial and industrial needs
- Maintain agricultural benefits
- Storm-water retention
- Aesthetic values
- Water-quality enhancement

Many of these designated uses occur in individual wetland basins, however, others occur on a landscape scale. The regulatory/permitting structure typically focuses on project-specific activities. The Corps of Engineers acknowledges the importance of cumulative impacts:

"*The impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable actions... Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time*."[2]

Any single wetland loss may not cause any noticeable impacts to water quality, but similar changes in many basins within a watershed will adversely affect water quality. To maintain the integrity of water resources it is important to undertake a comprehensive planning process.

The values and functions which nature and society derive from wetlands are varied and complex, often depending on wetland type.

[2] 40 CFR pt. 1508.7

Freshwater wetlands are separated into types by various classification systems. These types range widely in characteristics. Some are saturated for only a few weeks a year, while others are flooded all year. Some wetlands are treeless, containing only grasses and/or shrubs, while others are completely forested. The difficult task is to properly allocate the proportions and many types of public values each wetland might provide.

Water-Quality Protection

Protecting the water quality of other water bodies is one major value of wetlands. But, because they are waters of the state, the water quality of wetlands themselves must also be protected since their own water supports aquatic life. The loss of wetlands results in a depletion of water quality both in the wetland and downstream. Filtering of pollutants by wetlands is an important function and benefit. Wetland forests retain ammonia during seasonal flooding. Wetlands take up metals both by adsorption in the soils and by plant uptake via the roots. They also allow metabolism of oxygen-demanding materials and reduce fecal coliform populations. These pollutants are often then buried by newer plant material, isolating them in the sediments.

The assimilation of nutrients by wetlands helps reduce excessive plant growth in lakes and rivers. The main nutrients of concern are phosphorus and nitrogen. Common sources of nutrients in runoff are urban storm water, cultivated fields, and feedlots. If a lake becomes polluted because of excess nutrients or sediments, lake restoration must be undertaken. Most lake restoration methods are very costly, and this cost is borne by the public. Thus, the public value of wetlands that assimilate nutrients can be significant.

Low-Flow Augmentation and Ground-Water Interchange

The value of wetlands for low-flow augmentation and ground-water interchange may not be significant in all cases. However, increased impervious surface related to urbanization significantly affects ground-water interflow, or the shallow ground-water flow, which maintains the lower base flow to streams. With every increment of impervious surface, the contribution of water to the interflow becomes more critically threatened. Therefore, the contribution of wetlands to streams maintaining the low flows and the ground-water interchange can be cumulatively significant.

These values can be replaced by structural measures, such as infiltration devices. Some examples of infiltration devices include French drains, infiltration ponds, and other measures that directly put water back into the ground. The value of these types of structures is probably not a one-to-one replacement value for the existing ground-water recharge system, especially in unaffected natural areas. These structures replace large areas of infiltration with deep discharge facilities to handle hydraulic capacities. This may change the nature of the deep vs. shallow interflow.

One of the main concerns of these devices is that ground water may become vulnerable to greater pollutant loading, based on new land uses in the vicinity and on the direct discharge of storm water to the ground utilized by some of these devices. Precaution should be taken to prevent ground-water contamination whenever infiltration practices are used.

Maintaining Biological Diversity and Preserving Wildlife Habitat

These are some of the most difficult designated uses to replace because there are so many factors to consider in maintaining biological diversity and preserving wetland wildlife habitat. A wetland may provide a singular but important value such as temporary foraging or breeding area for waterfowl, as with as prairie potholes or northern pike spawning areas, which may not be inundated most of the year. Other wetland types may provide essential habitat throughout the year, including habitat for upland species such as deer and pheasants. We must also account for the value these areas might have as corridors and strive to maintain the environmental continuity and integrity of the watershed or of the wildlife corridor. Maintaining rare and endangered species habitat is an important part of maintaining diversity.

Maintaining wildlife diversity and habitat may not be specific to any location. It may be possible to replace a duck pond in another location and maintain the same number of animals. But diverse habitat types and wildlife species require careful site-specific determinations when we strive to maintain wetland functions and values.

Providing Recreational Opportunities and Enhancing the Natural Beauty of the Landscape

Preserving the aesthetic and recreational uses of wetlands can be the most subjective judgment in the evaluation process. People may have various perspectives on whether a natural setting or park-like setting is more appropriate. A community's desires in recreational values and aesthetic qualities must be factored in to land-use decisions made by local, state and federal agencies. The total package of public uses should be considered in the determination, and the value of a specific site should not be underestimated. For example, it may be difficult to offset the lost value of a scenic porch view with a mitigation site constructed miles or even blocks away.

Erosion Control, Floodwater Retention, Sedimentation Controls

By reducing the velocity and volume of flow, wetlands provide erosion control, floodwater retention, and reduced stream sedimentation. Although there are many other ways to provide erosion control, such as riprap or other structural solutions, we have to look at the primary and secondary impacts of our projects and remember that our solutions may create impacts downstream.

Dams and impoundments can reduce peak storm-water flows, but they do not reduce the total flows that have been increased by increased impervious surface area due to development. They also cause temperature increases and/or dissolved oxygen depletion in some situations. A pond or a dam with widely fluctuating water levels does not provide the quality of habitat a natural wetland with a seasonal or less frequently flooded condition provides. Therefore, the total impact should be considered, not just the primary impacts.

SECTION V

	Dredge	Drain	Inundate	Fill	On Site	Community	Region	Statewide
Designated uses of wetlands include:								
Low-flow augmentation		X		X	2	1	3	4
Maintaining biological diversity	X	X	X	X	3	2	1	4
Preserving wildlife habitat	X	X	X	X	3	2	1	4
Providing recreational opportunities	X	X	X	X	3	1	2	4
Erosion control		X		X	1	2	3	4
Floodwater retention		X		X	2	1	3	4
Reducing stream sedimentation which maintains water quality		X		X	2	1	3	4
Ground-water recharge		X		X	2	1	3	4
Enhancing the natural beauty of the landscape	X	X	X	X	1	2	3	4

NOTE: "X" indicates a potential loss of use caused by a physical alteration.

1 = most important
4 = least important

Mitigation should be provided in the area where there is most basis of concern.

Communities and regions should consider the value of wildlife corridors, watersheds and subwatersheds for maintaining environmental continuity and integrity.

SECTION V

Sediments are trapped in wetlands in several ways.

1) When the narrow channel of a stream widens into a wetland, stream velocity slows. This allows the sediments to drop out and settle in the wetland. We should note that it is possible for sediment to be resuspended from wetlands, that is, settling might not equal permanent removal.

2) Sedimentation also occurs along the riparian grassy border of a stream where vegetation filters the sediment load, capturing eroded sediments before they can get to the stream.

3) When wetlands decrease stream velocity, downstream bank scouring is also diminished. This further decreases sediment downstream of the wetland and enhances water quality.

Conclusions

Wetlands have varied and diverse characteristics, functions, and benefits. Recognizing public values and determining trade-offs are major challenges but are necessary if we are to maintain no-net-loss of wetlands and their functions.

For further information, we recommend the following:

1. MPCA 1993. “Minn. Rules Ch. 7050” and “Statement of Need and Reasonableness.”

2. Board of Soil and Water Resources, 1993 and 1996 “Wetland Conservation Act,” Minnesota Statute Ch. 103B.

3. Board Of Soil And Water Resources, 1995. “Minnesota Assessment Methodology,” State of Minnesota.

4. Wisconsin Department of Natural Resources, November 1992, “Rapid Assessment Methodology for Evaluating Wetland Functional Values.”

Sec.VI -.BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are generally defined as the best practices available for a particular site to prevent damage to water quality. They have also been defined as "a combination of land use, conservation practices, and management techniques which, when applied to a unit of land, will result in the opportunity for reasonable development with an acceptable level of water quality." There are also many other legal and commonly used definitions. (See Appendices - p.92)-

Avoidance

The first and best BMP is to avoid impacts. In order to avoid impacts, we must develop policies that reproduce pre-development hydrological conditions. It means looking at reproducing the full spectrum of hydrologic conditions, including peak discharge, runoff volume, infiltration capacity, base flow levels, ground-water recharge, and maintenance of water quality. A comprehensive approach to hydrology is difficult and involves the whole context of site planning. The issues of runoff volume, infiltration recharge, and water quality revolve around the amount of impervious surface required by development and its configuration in terms of its relationship to drainage paths and vegetative cover. Try to avoid connecting streets, roofing and parking areas with pipes or other structures. Utilize natural topography and vegetated waterways to convey acceptable levels of runoff (Figure VI-1).

One goal should be to preserve and utilize the natural drainage system. Keep pavement and other impervious surfaces out of low areas, swales and valleys. This means working toward site plans that keep the roads and parking areas high in the landscape and along ridges wherever possible (as shown schematically in Figure VI-2).

This is more difficult to achieve than it appears, because it goes against long-established policies which too often increase flows and destroy the waterways we wish to utilize.

Avoid development-related construction activity in the most sensitive areas. This means avoiding development along the shorelines of lakes or streams, in natural drainage ways, or in areas which are dominated by steep slopes, dense vegetation, porous soils, scientific and natural areas, or other identified resources.

Fit development to the terrain by choosing road patterns that provide access schemes which match the and form. For example, in rolling or dissected terrain (typical in much of Minnesota), use strict street hierarchies with local streets branching from collectors in short loops and cul-de-sacs along ridge lines. This approach results in a road pattern which resembles the branched patterns of ridge lines and drainage ways in the natural landscape.

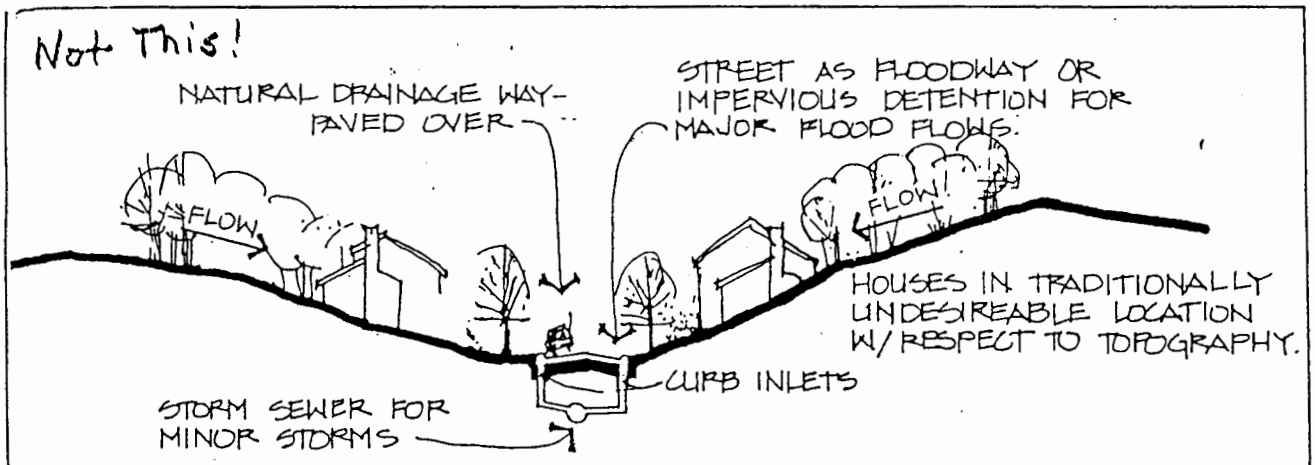


FIGURE VI-1 Conventional curb-and-gutter streets with storm sewers tend to gravitate to low areas where the hydraulic efficiency of the storm sewer is maximized.

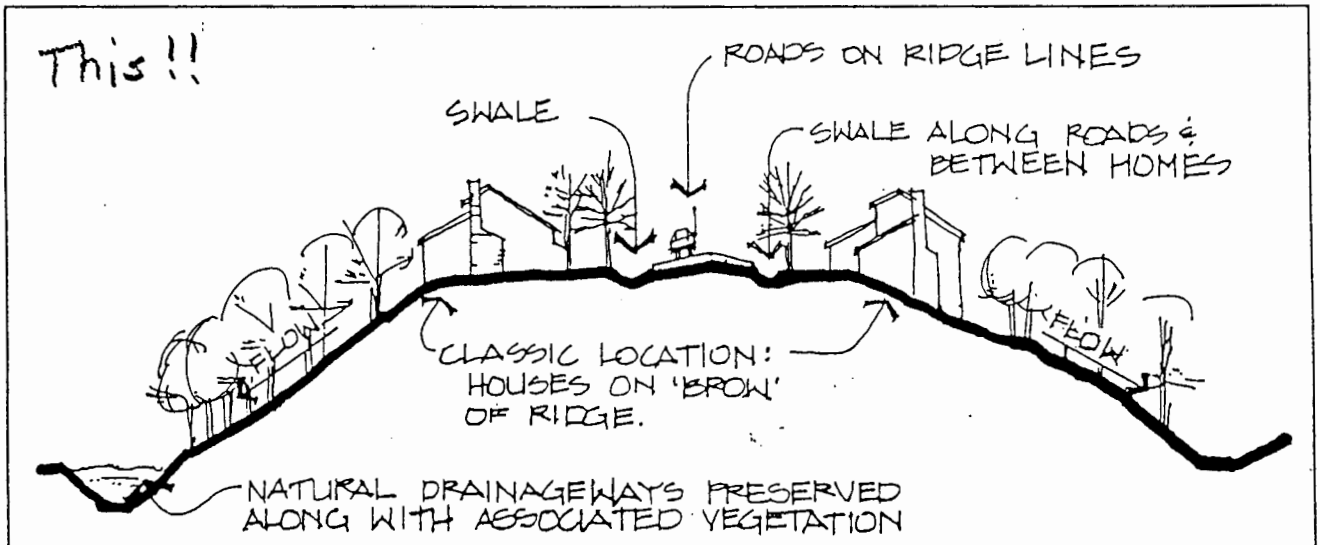


FIGURE VI-2 Place roads along ridge lines. Keep construction areas away from low areas and valley flow lines.

FIGURE VI-3 Use sensitive areas such as natural drainage areas to form boundaries or buffer zones between clusters of housing.

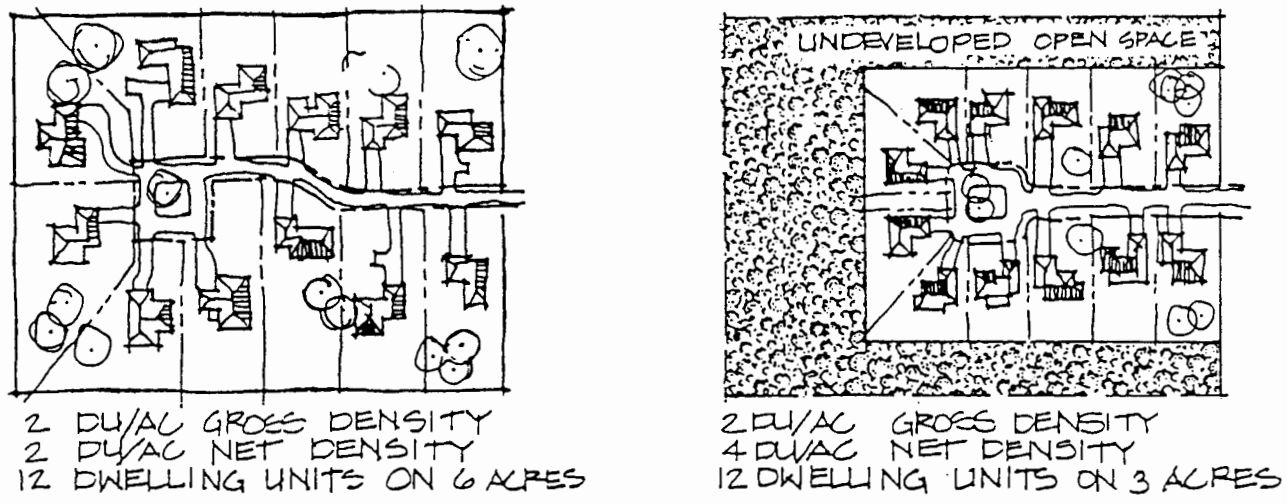


FIGURE VI-4 Cluster development using the PUD approach can result in narrower lot frontages, shorter street and utility rows plus the preservation of significant blocks of undeveloped open space.

This facilitates the development of plans which work with the land form and minimize disruption of existing grades and natural drainage (See Figures VI-3 and 4).

Quantity and Quality Connections

To properly implement BMPs it is important to understand the storm-water problems that need correction. This means identifying the sources of problem pollutants, including concentrations, loading, and flows. Then design the control program to fit local needs. There are important differences between the pollutants expected from various source areas (Bannerman, 1992). We should also be aware that source areas can vary in importance, depending on the type of rainfall (Pitt, 1993). If the hydrology does not correctly predict sources of pollutants and flows, then we cannot get the expected storm-water control benefits.

As explained in detail in the section on hydrology, most of the pollutant loads from storm water are associated with relatively small rain events of less than one inch. It is estimated that 75 to 85 percent of runoff is generated by storms under 1.25 inches in depth (Pitt, 1993). In the Minnesota metropolitan area, we know that over 90 percent of our daily rainfall events are under 1 inch in depth (State Climatologist, 1993). Since many existing urban runoff models originate from drainage- and flood-evaluating procedures that emphasize flood events, this has lad to some incorrect assumptions regarding runoff from the smaller, but important, rainfall events (Pitt, 1993). Assumptions about impervious and pervious areas that could be correct for large rainfall events are often incorrect for small events.

The significance of storm hydrology to receiving waters increases with the sensitivity of the receiving water. Ponds which provide pretreatment prior to discharge to a wetland (see Figure VI-5) may be acceptable for most situations, but may not be acceptable for highly sensitive wetlands or areas where thermal impacts could be critical. Sensitive wetlands can be affected by small changes in water depth and duration of inundation. Therefore, sensitive wetlands, and water bodies that have been stressed by flow changes and pollutant loading, will need to have the small-storm hydrology addressed in detail. Without proper hydrologic data, we cannot correctly assess hydrologic and pollutant loading changes. Chapters on hydrology and wetland sensitivity discusses these issues in greater detail.

BMPs for Highly Sensitive Wetlands

A common method of utilizing wetlands for storm water has been to increase the depth of ponding on a permanent or temporary basis. The end result is the transformation of a natural wetland into a storm-water wetland, with the attendant loss of diversity and functional values. The transformation occurs regardless of whether the natural wetland is replaced by a permanent pool or by temporary extended detention.

No single BMP will reproduce predevelopment hydrology once development has occurred upstream. However, the Washington Metropolitan Council of Governments suggests several structural alternatives that are close to reproducing natural hydrology (Schueler, 1992).

FIGURE VI-5

PRETREATMENT OF STORM WATER

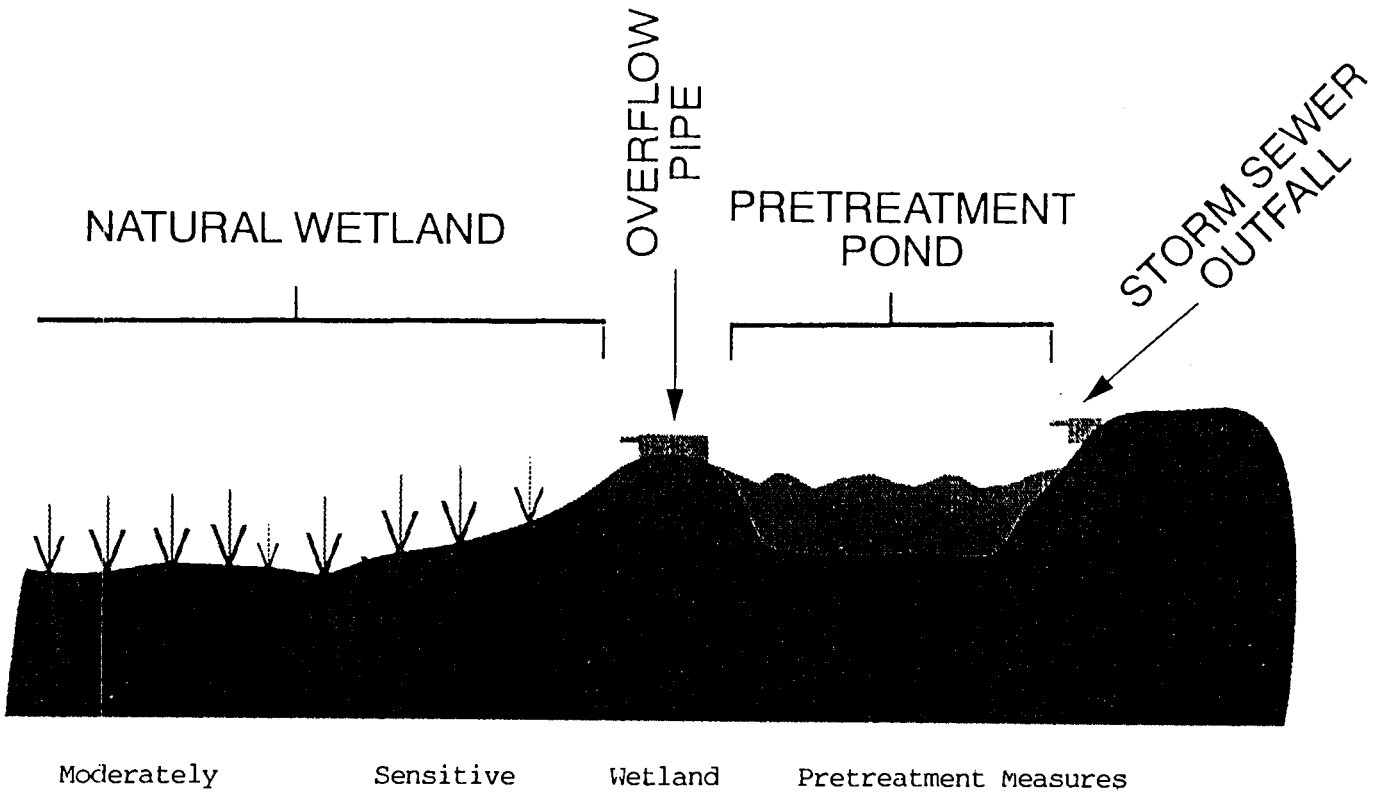
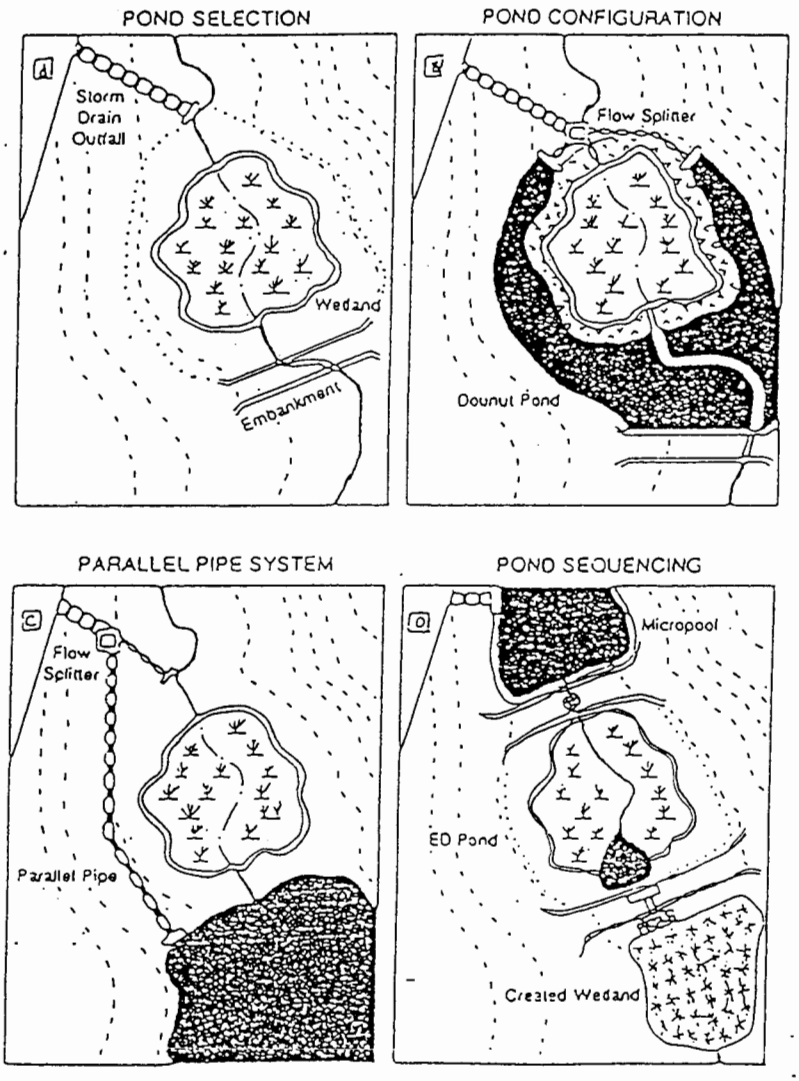


FIGURE VI-6

Highly Sensitive Wetland
Pretreatment Measures

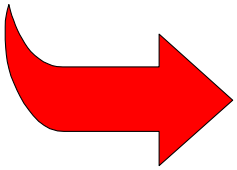
Techniques for Fingerprinting a Stormwater Wetland Around a Natural Wetland



Panel A. Existing natural wetland is severely impacted by upstream stormwater inputs and frequent inundation. Panel B. Existing wetland is protected by berm; stormwater bypassed to the two arms of the wet pond. Panel C. Excess stormwater diverted around natural wetland to a more favorable location via a parallel pipe system. Panel D. Stormwater pretreated before it reaches wetland, where temporary extended detention is provided. A downstream stormwater wetland is created to compensate for impacts to the existing wetland.

The preferred course of action is to locate the storm-water control in an upstream or off-stream location. This is easier said than done, as some quantity of base flow is required to maintain water elevations within a storm-water wetland. (See Figure VI-6, Panel A.)

An alternative is to create a "donut" configuration around the wetland, as shown in Figure VI-6, Panel B. In this scenario, a flow splitter is installed upstream of the sensitive wetland. The required storage for the storm-water pond or wetland is then excavated outside of the natural wetland. The upstream flow splitter is used to apportion flow to the wetland and the storm-water system. The base flow is directed into the existing wetland while the storm flow is routed to the storm-water ponds.



A second technique is to install a parallel pipe system that diverts storm flows around the existing wetland to a downstream storm-water control system (Figure VI-5, Panel C). Again, a flow splitter is installed above the sensitive wetland that diverts the storm flows from the development away from the wetland, yet sends dry-weather base flow to the wetland. The design should attempt to mimic the original water balance to the wetland. In some cases, it is possible to split the needed base flow away from the stream into an off-line or storm-water system, which empties downstream of the wetland to be protected (see Figure VI-6, panel C). This usually involves extensive sewer construction with related storm-sewer costs. It also results in transferring the problem elsewhere rather than solutions which could have provided enhancement opportunities.

A third technique involves employing a series of smaller storm-water pools and wetland areas above and below the sensitive wetland. One such scheme is shown in Figure IV-5 (Panel D). Runoff is pre-treated before it enters the sensitive wetland. This scenario will still result in significant storm-water influence to the existing wetland, but by lowering peak flows it can reduce the overall degradation that might occur.

Temperature

One study (Galli, John, December, 1990) concluded that the temperature in small, free-flowing headwater streams was largely determined by the following interrelated factors:

1) Air temperature and other local meteorological conditions;
2) Watershed imperviousness;
3) Riparian canopy coverage;
4) Stream order/size.

Others (Salo Engineering, MPCA correspondence, September 14, 1994) have summarized the critical factors as:

1) Climate, which means temperature, solar heating, and wind loss;
2) Soil moisture;
3) Rainfall; and
4) Stream level, meaning drought or full-flowing conditions.

These summaries of critical factors do not conflict; rather, they show that there may be

different ways of grouping or summarizing the critical data.

The Metropolitan Washington Council of Governments (Galli, December, 1990) studied temperature and dissolved oxygen effects from four BMPs:

1) infiltration-dry pond;
2) extended detention artificial wetland;
3) extended detention dry pond; and
4) wet pond.

They concluded that none of the four BMPs were "thermally neutral." All four BMPs caused a rise in temperature and each violated Maryland standards some of the time. Temperature-standard violations occurred under both base-flow and storm-flow conditions. The infiltration-dry pond produced the smallest temperature increases, whereas the wet pond had the highest recorded maximum change in temperature.

In Minnesota, it is not clear what the effect of ponding strategies might be on temperature, and especially on the aquatic environment. While most fish species would probably not be significantly affected by the changes in temperature produced by ponds, trout are extremely sensitive to temperature changes and may be significantly affected in certain cases. Another significant affect may be the impact to aquatic macroinvertebrates, that is, aquatic insects. Cold-water aquatic insects such as stone flies could be eliminated or severely stressed under certain temperature change conditions. The change in insect populations may also change the success and viability of the cold-water fishery population.

Comprehensive Approach

The Metropolitan Washington Council of Governments recommends a long-term holistic approach to watershed management. Their BMP design features recommended increasing the performance of infiltration devices by improving the infiltration design capacity and intentionally oversizing the basins. They also recommend buffer strips and shading of pilot and riprap outflow channels via landscaping or other means. Also recommended is the practice of employing long, wide, riprap outfall channels. Whenever possible, outflow channels should be heavily shaded and should include a deep, narrow base-flow channel to quickly return the water back to a natural stream channel. They also recommend carefully examining long periods of extended detention control. They recommend a six- to 12-hour detention-period limit be established for sensitive areas and that shading in the storage pool be required. In addition, they recommend future research on the case-specific effects of BMPs and their effectiveness at controlling temperature increases. Water-temperature monitoring for thermally sensitive areas should be greatly increased.

Construction BMPs

Once a plan is formulated to avoid impacts of the proposed project to the maximum practicable extent, the next step is to minimize impacts of construction. Careful planning is an important part of erosion and sediment control. Careful planning will anticipate problem areas, which will minimize both the erosion potential and the cost of sediment control measures. There are several good manuals listing available BMPs that are appropriate for construction sites. These include the MPCA's "Protecting Water Quality in Urban Areas"

and the Board of Water and Soil Resources' "Minnesota Construction Site Erosion and Sediment Control Planning Handbook." The Minnesota Department of Transportation's "Manual of Practice" is also an excellent source. The problem is finding the proper BMPs for site-specific situations.

Housekeeping and Prevention

We must utilize good housekeeping practices and maintenance to avoid problems related to storm-water pollutant loading. Erosion control ordinances, street sweeping, fuel storage plans, trash removal education, and other measures should be implemented as needed.

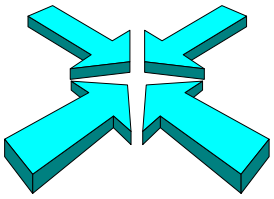
Minimizing and Mitigating Post-Project Hydrologic Changes

Generally, some form of storm-water detention will be needed to achieve a desired level of hydrologic control from developments. The advantage to deciding this in the planning stage is that storm-water detention structures can be made to serve several purposes if properly planned. These structures can trap pollutants, reduce peak discharges, and improve aesthetics and recreation. Storm-water detention practices can also serve as sediment basins during construction on the site. Regardless of the practices selected, the cost of structural measures is usually lower if they are planned and installed at the time of development. The actual post-project BMPs are discussed later.

BMPs as a System

It is usually necessary to use a combination of practices to meet water-quality goals rather than rely upon one practice such as a detention pond. Housekeeping practices should always be used, but will rarely achieve the desired results alone. Figure VI-7 provides a general indication of the effectiveness of various structural BMPs. This is a general chart that is only intended to provide an awareness of the capabilities of various BMPs. Combinations of BMPs must be adopted on a site-specific basis.

Effect on Other Resources



When planning a BMP, consider the effect it will have on other resources. Without proper design, it is possible your BMP will simply shift a water-quality problem elsewhere. Stream temperature, peak-flow timing, aesthetics, and ground water can be adversely affected by improperly designed BMPs. Examples of other resources that can be adversely affected are fish and wildlife. Studies have shown that pollutants such as trace metals can bioaccumulate in plants and fish that live in areas where sediment from urban storm water is trapped (Smith, 1988; Meiorin, 1986). Many BMPs trap pollutants that need to be disposed of in an environmentally sound manner.

Public Acceptance

In an urban environment, aesthetics are an important consideration for gaining public acceptance of BMPs. In many cases, practices such as detention ponds can be a visual asset to the surrounding area.

However, if a detention pond is designed, for example, in a square shape with uniform slopes, it will not appear natural and can detract aesthetically from the surrounding area.

The potential for odor, insects, weeds, turbidity and trash are also important to residents who live near structural BMPs. With regular maintenance, these problems can usually be overcome or be made very temporary.

Physical Site Suitability

BMPs should only be used in areas where the physical site characteristics are suitable. Some of the physical characteristics that are important are soil type, watershed area, water table, depth to bedrock, site size, and topography. If these conditions are not suitable, a BMP can lose effectiveness, require excessive maintenance, or stop working altogether after a short period of time.

Sometimes, unfavorable site conditions can be overcome with special design features. For example, the bottom of a detention pond can be sealed to prevent seepage into permeable soils at a site where a permanent pool is desired. In other cases, a practice will be excluded from consideration for a site because of conditions that are not practical to overcome. An example of this would be where a high water table or clay soils eliminate an infiltration basin from consideration. The physical site conditions must be examined for each practice.

Cost Effectiveness

Economics is an important consideration in the selection of BMPs that will achieve the water-quality goal at the least cost. This should be considered when selecting BMPs and deciding how they will be implemented. To properly compare alternatives, all costs for the design life of a BMP should be included. These include expected maintenance costs as well as the initial costs for land, engineering and construction. To create a true economic picture of a BMP, benefits other than water quality and flood prevention should also be considered. Some benefits, such as increases in land values for property adjacent to an attractive detention pond, are direct economic benefits. Other benefits, such as incidental recreation benefits or wildlife benefits, may be more difficult to quantify.

Maintenance Requirements

Maintenance is an important part in the operation of any BMP. The initial design of the BMP should take maintenance requirements into account. A feature such as a forebay in a detention pond may increase annual maintenance costs slightly, but the interval between costly sediment cleanouts in the whole pond may be extended significantly. Locations for disposal of material should be taken into account during this phase of planning.

SECTION VI

For further information, we recommend the following:

1. MPCA, October 1989. "Protecting Water Quality in Urban Areas."

2. Metropolitan Washington Council of Governments, March 1992. "A Current Assessment of Urban Best Management Practices, Techniques for Reducing Nonpoint Source Pollution in the Coastal Zone."

3. Metropolitan Washington Council of Governments. "Design of Storm-Water Wetland System, Guidelines for Creating Diverse and Effective Storm-water Wetland Systems in the Mid-Atlantic Region." Anacosta Restoration Team, Department of Environmental Programs.

4. Washington State Department of Ecology, February 1992. "Storm-Water Management Manual for the Puget Sound Basin," Olympia, Wash.

FIGURE VI-7

A COMPARATIVE ASSESSMENT OF THE EFFECTIVENESS OF STRUCTURAL URBAN BEST MANAGEMENT PRACTICES

GROUP	URBAN BMP OPTIONS	RELIABILITY FOR POLLUTANT REMOVAL	LONGEVITY*	APPLICABLE TO MOST DEVELOPMENTS	REGIONAL CONCERNS	ENVIRONMENTAL CONCERNS	COMPARATIVE COST	SPECIAL CONSIDERATIONS
I	Extended Detention Ponds	Moderate, but not always reliable	20+ years, but frequent clogging and short detention common	Widely applicable	Very few ** ***	Possible stream warming and habitat destruction	Lowest cost alternative* in size range	Recommended with design improvements and with the use of micropools & wetlands
	Wet Pond	Moderate to high	20+ years	Widely applicable	** ***	Possible stream warming, trophic shifts, habitat destruction, safety hazards, sacrifice of upstream channels	Moderate to high compared to conventional storm water detention	Recommended, with careful site evaluation
	Storm Water Wetlands	Moderate to high	20+ years	Space may be limiting	winter die off release of P ** ***	Stream warming, natural wetland alteration	Marginally higher than wet ponds	Recommended
	Multiple Pond Systems	Moderate to high; redundancy increases reliability	20+ years	Many pond options	** ***	Selection of appropriate pond option minimizes overall environmental impact	Most expensive pond option	Recommended
II	Infiltration Trenches	Presumed moderate	50% failure rate within five years	Highly restricted (soils, ground water, slope, area, sediment input)	Arid and cold regions; sole-source aquifers ****	Slight risk of ground water contamination	Cost effective on smaller rehab costs can be considerable	Recommended with pretreatment and geotechnical evaluation
	Infiltration Basins	Presumed moderate, if working	60-100% failure within five years	Highly restricted (see infiltration trench)	Arid and cold regions; sole-source aquifers ****	Slight risk of ground water contamination	Construction cost moderate, but rehab cost high	Not widely recommended until longevity is improved
	Porous Pavement	High (if working)	75% failure within five years	Extremely restricted (traffic, soils, ground water, slope, area, sediment input).	Cold climates; wind erosion; sole-source aquifers ****	Possible ground water impacts; uncontrolled runoff	Cost-effective compared to conventional asphalt when working properly	Recommended in highly restricted applications with careful construction and effective maintenance
III	Sand Filters and Peat Filters	Moderate to high	20+ years	Applicable (for smaller developments)	Few restrictions	Minor	Comparitively high construction costs and frequent maintenance	Recommended, with local demonstration
IV	Grassed Swales	Low to moderate, but unreliable	20+ years	Low density development and roads	Arid and cold regions	Minor	Low, compared to curb and gutter	Recommended, with checkdams, as one element of a BMP system
	Filter Strips Pocket Wetlands	Unreliable in urban settings	Unknown, but may be limited	Restricted to low density area	Arid and cold regions	Minor	Low	Recommended as one element of a BMP system
V	Water Quality Inlets Expanded Pipes	Presumed low	20+ years	Small, highly impervious catchments (<2 acres)	Few	Resuspension of hydrocarbon loadings. Disposal of hydrocarbon and toxic residuals	High, compared to trenches and sand filters	Not currently recommended as a primary BMP option

I=Ponds; II=Infiltration; III=Filters; IV=Biofilters; V=Inlets

*Based on current designs and prevailing maintenance practices

**Adverse Flood Route Timing can increase peak floods

***Increased flow volume can extend duration of erosive flows

****Significant ground water concerns especially in industrial areas

Adopted from Schuler Oct. 92

APPENDICES

Glossary

Adsorption - Adhesion of the molecules of a gas, liquid or dissolved substance to a surface. Adsorption differs from absorption in that absorption is the assimilation or incorporation of a gas, liquid or dissolved substance into another substance.

Adjustable gate valve - A knife-gate valve, activated by a hand wheel, used to control the internal diameter of reverse-slope pipes or allow rapid opening of the pond drain pipe.

Aggregate - Stone or rock gravel needed to fill in an infiltration BMP such as a trench or porous pavement. Clean-washed aggregate is simply aggregate that has been washed clean so that no sediment is associated with it.

Aquatic bench - A 10- to 15-foot bench around the inside perimeter of a permanent pool that is approximately one foot deep. Normally vegetated with emergent plants, the bench augments pollutant removal, provides habitat, conceals trash and water-level drops, and enhances safety.

Artificial marsh creation - Simulation of natural wetland features and functions via topographic and hydraulic modifications on non-wetland landscapes. Typical objectives for artificial marsh creation include ecosystem replacement or storm-water management.

Bacterial decomposition or microbial decomposition - Micro-organisms, or bacteria, have the ability to degrade organic compounds as food resources and to absorb nutrients and metals into their tissues to support growth.

Bank run - Gravel deposits consisting of smooth round stones, generally indicative of the existence of a prehistoric sea. Such deposits are normally found in coastal plain regions.

Bank stabilization - Methods of securing the structural integrity of earthen stream-channel banks with structural supports to prevent bank slumping and undercutting of riparian trees, and for overall erosion prevention. To maintain the ecological integrity of the system, recommended techniques include the use of willow stakes, riprap, or brush bundles.

Bank-full discharge - A flow condition where stream flow completely fills the stream channel up to the top of the bank. In undisturbed watersheds, this condition occurs on average every 1-1/2 to two years and controls the shape and form of natural channels.

Base flow - The portion of stream flow that is not due to storm runoff, and is supported by ground-water seepage into a channel.

Berm, earthen - An earthen mound used to direct the flow of runoff around or through a BMP.

Biofiltration - The use of a series of vegetated swales to provide filtering treatment for storm water as it is conveyed through the channel. The swales can be grassed, or contain emergent wetlands or high marsh plants.

Biological monitoring - Periodic surveys of aquatic biota as an indicator of the general health of a water body. Biological monitoring surveys can span the trophic spectrum, from macro-invertebrates to fish species.

BMP (best management practice) - A combination of land use, conservation practices, and management techniques which, when applied to a unit of land, will result in the opportunity for a reasonable economic return with an acceptable level of water quality.

BMP fingerprinting - Refers to a series of techniques for locating BMPs (particularly ponds) within a development site as to minimize their impacts to wetlands, forests and sensitive stream reaches.

Catchment - See **contributing watershed area**

Channel erosion - The widening, deepening, and headward cutting of small channels and waterways, due to erosion caused by moderate to larger floods.

Check dam - (a) A log or gabion structure placed perpendicular to a stream to enhance aquatic habitat. (b) An earthen or log structure used in grass swales to reduce water velocities, promote sediment deposition, and enhance infiltration.

Contributing watershed area - Portion of the watershed contributing its runoff to the BMP in question.

Delta-T - The magnitude of change in the temperature of downstream waters.

Design storm - A rainfall event of specified size and return frequency (e.g., a storm that occurs only once every two years) that is used to calculate the runoff volume and peak discharge rate to a BMP.

Detention - Temporary storage of runoff from rainfall and snow-melt events to control peak discharge rates and provide an opportunity for physical, chemical and biological treatment to occur.

De-watering - Refers to a process used in detention/retention facilities, whereby water is completely discharged or drawn down to a pre-established pool elevation by way of a perforated pipe. De-watering allows the facility to recover its design storage capacity in a relatively short time after a storm event.

Downstream scour - Downstream channel erosion usually associated with an upstream structure that has altered hydraulic conditions in the channel.

Drop structure - Placement of logs with a weir notch across a stream channel. Water flowing through the weir creates a plunge pool downstream of the structure and creates fish habitat.

Draw-down - The gradual reduction in water level in a pond BMP due to the combined effect of infiltration and evaporation.

Dry pond conversion - A modification made to an existing dry storm-water management pond to increase pollutant removal efficiencies. For example, the modification may involve a decrease in orifice size to create extended detention times, or the alteration of the riser to create a permanent pool and/or shallow marsh system.

ED (extended detention) zone - A pondscaping zone that extends up from the normal pool to the maximum water surface elevation during extended detention events. Plants within this zone must be able to withstand temporary inundation from five to 30 times per year.

Embankment - A bank (of earth or riprap) used to keep back water.

Emergent plant - An aquatic plant that is rooted in the sediment but whose leaves are at or above the water surface. Such wetland plants provide habitat for wildlife and waterfowl in addition to removing urban pollutants.

End-of-pipe control - Water-quality control technologies suited for the control of existing urban storm water at the point of storm-sewer discharge to a stream. Due to typical space constraints, these technologies are usually designed to provide control of water quantity rather than quality

Exfiltration - The downward movement of runoff through the bottom of an infiltration BMP into the subsoil.

Extended detention - A storm-water design feature that provides for the gradual release of a volume of water (0.25 - 1.0 inches per impervious acre) over 12- to 48-hour interval times to increase settling of urban pollutants and protect channel from frequent flooding.

Extended detention (ED) pond - A conventional ED pond temporarily detains a portion of storm-water runoff for up to 24 hours after a storm using a fixed orifice. Such extended

detention allows urban pollutants to settle out. The ED ponds are normally "dry" between storm events and do not have any permanent standing water.

An enhanced ED pond is designed to prevent clogging and resuspension. It provides greater flexibility in achieving target detention times. It may be equipped with plunge pools near the inlet and a micropool at the outlet, and utilize an adjustable reverse-sloped pipe at the ED control device.

Extended detention wetland - A storm-water wetland design alternative in which the total treatment volume is equally split between a shallow marsh and temporary detention of runoff above the marsh. After a storm, the normal pool of the shallow marsh may rise by up to two feet. The extra runoff is stored for up to 24 hours to allow pollutants to settle out before being released downstream.

Filter fabric - Textile of relatively small mesh or pore size that is used to (a) allow water to pass through while keeping sediment out (permeable), or (b) prevent both runoff and sediment from passing through (impermeable).

Flow path - The distance that a parcel of water travels through a storm-water wetland. It is defined as the distance between the inlet and outlet, divided by the average width. During dry weather, the flow path of a storm-water wetland can be increased by placing marsh wedges perpendicular to the normal flow path.

Flow splitter - An engineered, hydraulic structure designed to divert a portion of stream flow to a BMP located out of the channel, or to direct storm water to a parallel pipe system, or to bypass a portion of base flow around a pond.

Forebay - An extra storage area provided near an inlet of a BMP to trap incoming sediments before they accumulate in a pond BMP. See sediment forebay.

Frequent flooding - A phenomenon in urban streams whereby the number of bank-full and sub-bank-full flood events increases sharply after development. The frequency of these disruptive floods is a direct function of watershed imperviousness.

Fringe wetland - Narrow emergent wetland areas that are created by the use of shallow underwater benches along the perimeter of a wet pond. The benches are usually 15 feet wide and covered with water up to 12 inches deep. Fringe wetlands enhance pond pollutant removal, conceal trash and water-level changes, reduce safety hazards, and create a more natural appearance.

Fringe wetland creation - Planting of emergent aquatic vegetation along the perimeter of open water to enhance pollutant uptake, increase forage and cover for wildlife and aquatic species, and improve the appearance of a pond.

Gabion - A large rectangular box of heavy-gauge wire mesh which holds large cobbles and boulders. Used in streams and ponds to change flow patterns, stabilize banks, or prevent erosion.

Geomembrane - Lining of filter fabric on the bottom and sides of porous pavement to prevent lateral or upward movement of soil into the stone reservoir.

Geotextile fabric - See **filter fabric**.

Grassed swale - A conventional grass swale is an earthen conveyance system in which the filtering action of grass and soil infiltration are utilized to remove pollutants from urban storm water. An enhanced grass swale, or biofilter, utilizes check dams and wide depressions to increase runoff storage and promote greater settling of pollutants.

Gravitational settling - The tendency of particulate matter to "drop out" of storm water runoff as it flows downstream when runoff velocities are moderate and/or slopes are not too steep.

Head - Hydraulic pressure.

High marsh - Diverse wetland type found in areas that are infrequently inundated or have wet soils. In pond systems, the high marsh zone extends from the permanent pool to the maximum ED water surface elevation.

Hydroperiod - The extent and duration of inundation and/or saturation of wetland systems. Storm-water wetlands tend to have a hydroperiod characterized by frequent to chronic inundation by standing water.

Infiltration basin - An impoundment where incoming storm-water runoff is stored until it gradually exfiltrates through the soil of the basin floor.

Infiltration trench - A conventional infiltration trench is a shallow, excavated trench that has been backfilled with stone to create an underground reservoir. Storm-water runoff diverted into the trench gradually exfiltrates from the bottom of the trench into the subsoil and eventually into the water table. An enhanced infiltration trench has an extensive pretreatment system to remove sediment and oil. It requires an on-site geotechnical investigation to determine appropriate design and location.

Level spreader - A device used to spread out storm-water runoff uniformly over the ground surface as sheet flow (i.e., not through channels). The purpose of level spreaders is to prevent concentrated, erosive flows from occurring and to enhance infiltration.

Low marsh - Wetland type with emergent plant species that require some depth of standing water throughout the year. The low marsh zone in pond systems is created in areas where the permanent pool is up to 12 inches deep.

Low-flow channel - An incised or paved channel from inlet to outlet in a dry basin which is designed to carry low runoff flows and/or base flow directly to the outlet without detention.

Micropool - A smaller permanent pool used in a storm-water pond due to extenuating circumstances, i.e., concern over the thermal impacts of larger ponds, impacts on existing wetlands, or lack of topographic relief.

Microtopography - Refers to the contours along the bottom of a shallow marsh system. A complex microtopography creates a great variety of environmental conditions that favor the unique requirements of many different species of wetland plants.

Monotype - Dominated by a simple type of vegetation, e.g. cattails.

Multiple pond system - A collective term for a cluster of pond designs that incorporate redundant runoff treatment techniques within a single pond or series of ponds. These pond designs employ a combination of two or more of the following: extended detention, permanent-pool shallow wetlands, or infiltration. Examples of a multiple pond system include the wet ED pond, ED wetlands, infiltration ponds, and pond-marsh systems.

Natural buffer - A low sloping area of maintained grassy or woody vegetation located between a pollutant source and a water body. A natural buffer is formed when a designated portion of a developed piece of land is left unaltered from its natural state during development. A natural vegetative buffer differs from a vegetated filter strip in that it is "natural" and not necessarily intended solely for water-quality purposes. To be effective, such areas must be protected from concentrated flow.

NURP - Nationwide Urban Runoff Program, a study by the U.S. Environmental Protection Agency. A key component of this program was to assess the effectiveness of urban runoff detention/retention basins (e.g., ponds).

Observation well - A test well installed in an infiltration trench to monitor draining times after installation.

Off-line BMP - A water-quality facility designed to treat a portion of storm water (usually 0.5 to 1.0 inches per impervious acre) which has been diverted from a stream or storm drain.

Off-line treatment - A BMP system located outside of the stream channel or drainage path. A flow splitter is used to divert runoff from the channel and into the BMP for subsequent treatment.

Oil/grit separator - A BMP consisting of a three-stage underground retention system designed to remove heavy particulates and absorbed hydrocarbons. Also known as a water quality inlet.

Outfall - The point of discharge for a river, drain, pipe, etc.

Parallel pipe system - A technique for protecting sensitive streams. Excess storm-water runoff is piped in a parallel direction along the stream buffer instead of being discharged directly into the stream.

Peat sand filter - A BMP that utilizes the natural adsorptive features of fabric or hemic peat. Consists of a vertical filter system with a grass cover crop, alternating layers of peat and sand, and a sediment forebay feature. The peat sand filter is presently used for municipal waste-treatment systems and is being adapted for use in storm-water management.

Permanent pool - A three- to 10-foot-deep pool in a storm-water pond system, that provides removal of urban pollutants through settling and biological uptake. (Also referred to as a wet pond.)

Physical filtration - As particulates pass across or through a surface, they are separated from runoff by grass, leaves and other organic matter on the surface.

Pilot channel - A riprap or paved channel that routes runoff through a BMP to prevent erosion of the surface.

Plunge pool - A small permanent pool located at either the inlet of outfall of a BMP. The primary purpose of the pool is to dissipate the velocity of storm-water runoff, but it also can provide some pretreatment as well.

Pocket wetlands - A storm-water wetland design adapted for small drainage areas with no reliable source of base flow. The surface area of pocket wetlands is usually less than a tenth of an acre. The pocket wetland usually has no deep water cells, and is intended to provide some pollutant removal for very small development sites.

Pondscaping - A method of designing the plant structure of a storm-water wetland or pond using inundation zones. The proposed wetland or pond system is divided into zones which differ in the level and frequency of inflow. For each zone, plant species are chosen based on their potential to thrive, given the inflow pattern of the zone.

Porous pavement - An alternative to conventional pavement whereby runoff is diverted through a porous asphalt layer and into an underground stone reservoir. The stored runoff then gradually exfiltrates into the subsoil.

Retention - The permanent storage of runoff from rainfall and snow-melt events with volume reduction coming from infiltration, evaporation, or emergency release.

Retrofit - The creation/modification of storm-water management systems in developed areas through the construction of wet ponds, infiltration systems, wetland plantings, stream-bank stabilization, and other BMP techniques for improving water quality and creating aquatic habitat. A retrofit can consist of the construction of a new BMP in the developed area, the enhancement of an older storm-water management structure, or a combination of improvements and new construction.

Reverse-slope pipe - A pipe that extends downwards from a riser into a permanent pool that sets the water-surface elevation of the pool. The lower end of the pipe is located up to one foot below the water surface. Very useful technique for regulating ED times that seldom clogs.

Riparian - A relatively narrow strip of land that borders a stream or river, often coincides with the maximum water-surface elevation of the one-hundred-year storm.

Riparian reforestation - The replanting of the banks and floodplain of a stream with native forest and shrub species to stabilize erodible soils, improve both surface and ground-water quality, increase stream shading, and enhance wildlife habitat.

Riprap - A combination of large stones, cobbles and boulders used to line channels, stabilize banks, reduce runoff velocities, or filter out sediment.

Riser - A vertical pipe extending from the bottom of a pond BMP that is used to control the discharge rate from a BMP for a specified design storm.

Rototilling - Mechanical means of tilling, or rotating, the soil.

Runoff, storm water - The overland and near-surface flow from storm water and snow melt.

Runoff conveyance - Methods for safely conveying runoff to a BMP to minimize disruption of the stream network and promote infiltration or filtering of the runoff.

Runoff frequency spectrum - The frequency distribution of unit/area runoff volumes generated by a long-term, continuous time-series of rainfall events. Used to develop BMP and storm-water sizing rules.

Runoff pretreatment - Techniques to capture or trap coarse sediments before they enter a BMP to preserve storage volumes or prevent clogging within the BMP. Examples include forebays and micropools for pond BMPs, and plunge pools, grass filter strips, and filter fabric for infiltration BMPs.

Safety bench - A 10- to 15-foot bench located just outside the perimeter of a permanent pool. The bench extends around the entire shoreline to provide for maintenance access and eliminate hazards.

Sand filter - A relatively new technique for treating storm water, whereby the first flush of runoff is diverted into a self-contained bed of sand. The runoff is then strained through the sand, collected in underground pipes, and returned back to the stream or channel. An enhanced sand filter utilizes layers of peat, limestone, and/or topsoil, and may also have a grass cover crop. The adsorptive media of an enhanced sand filter is expected to improve removal rates.

Sa/v ratio - The surface area to volume ratio is a useful measure of the capacity of storm-water wetland to remove pollutants via sedimentation, adsorption, and microbial activity. The SA/V ratio can be increased by either increasing the surface area of a wetland or increasing the internal structural complexity within the wetland.

Sediment forebay - Storm-water design feature that employs the use of a small settling basin to settle out incoming sediments before they are delivered to a storm-water BMP. Particularly useful in tandem with infiltration devices, wet ponds, or marshes.

Seedbanks - Refers to the large number and diversity of dormant seeds of plant species that exist within the soil. The seeds may exist within the soil for years before they germinate under the proper moisture, temperature or light conditions. Within wetland soils, this seedbank helps to maintain above-ground plant diversity and can also be used to rapidly establish wetland plants within a newly constructed storm-water wetland.

Short-circuiting - The passage of runoff through a BMP in less than the theoretical or design treatment time.

Slurry - Thin mixture of water and any of several fine, insoluble materials; for example, an oil slurry is a thin mixture of water and oil.

Storm-water treatment - Detention, retention, filtering or infiltration of a given volume of storm water to remove urban pollutants and reduce frequent flooding.

Storm-water-influenced wetland - Refers to a natural wetland in an urban area that receives urban storm-water runoff.

Storm-water wetland - A conventional storm-water wetland is a shallow pool that creates growing conditions suitable for the growth of marsh plants. A storm-water wetland is designed to maximize pollutant removal through wetland uptake, retention and settling.

A storm-water wetland is a constructed system that typically is not located within a delineated natural wetland. In addition, a storm-water wetland differs from an artificial wetland created to

comply with mitigation requirements in that the storm-water wetland does not replicate all the ecological functions of natural wetlands.

An enhanced storm-water wetland is designated for more effective pollutant removal and species diversity. It also includes design elements such as forebays, complex microtopography, and pondscaping with multiple species of wetland trees, shrubs and plants.

Stream buffer - A variable-width strip of vegetated land adjacent to a stream that is preserved from development activity to protect water quality and aquatic and terrestrial habitats.

Subsoil - The bed or stratum of earth lying below the surface soil.

Substrate amendments - A technique to improve the texture and organic content of soils in a newly excavated pond system. The addition or organic-rich soils is often required to ensure the survival of aquatic and terrestrial landscaping around ponds.

Sump pit - A single-chamber oil/grit separator used to pretreat runoff before it enters an infiltration trench.

Swale - A natural or constructed depression or shallow-sided ditch used to temporarily store, route, or filter runoff.

Trash and debris removal - Mechanical removal of debris, snags, and trash deposits from stream banks to improve the appearance of the stream.

Treatment volume (Vt) - The volume of storm-water runoff that is treated within a storm-water wetland. Typically expressed in terms of inches of runoff per impervious acre. For example, in the Washington metropolitan area, the recommended Vt for sizing a storm-water wetland is 1.25 inches per impervious acre.

Underdrain - Plastic pipes with holes drilled through the top, installed on the bottom of an infiltration BMP or sand filter, which are used to collect and remove excess runoff.

Vacuum sweeping - Method of removing quantities of coarse-grained sediments from porous pavement in order to prevent clogging. Not effective in removing fine-grained pollutants.

Vegetated filter strip - A vegetated section of land designed to accept runoff as overland sheet flow from upstream development. It may adopt any natural vegetated form, from grassy meadow to small forest. The dense vegetative cover facilitates pollutant removal.

Filter strips cannot treat high-velocity flows; therefore, they have generally been recommended for use in agriculture and low-density development.

A vegetated filter strip differs from a natural buffer in that the strip is not "natural;" rather, it is designed and constructed specifically for the purpose of pollutant removal. A filter strip can also be an enhanced natural buffer, however, wherein the removal capability of the natural buffer is improved through engineering and maintenance activities such as land grading or the installation of a level spreader.

A filter strip also differs from a grassed swale in that a swale is a concave vegetated conveyance system, whereas a filter strip has a fairly level surface.

Water-quality inlet - BMP consisting of a three-stage underground retention system designed to remove heavy particulates and absorbed hydrocarbons. Also known as an oil/grit separator.

Weir - A structure that extends across the width of a channel and is intended to impound, delay or in some way alter the flow of water through the channel. A check dam is a type of weir, as is any other kind of dam.

A ported weir is a wall or dam that contains openings through which water may pass. Ported weirs slow the velocity of flow and, therefore, can assist in the removal of pollutants in runoff by providing opportunities for pollutants to settle, infiltrate or be adsorbed.

Wet pond - A conventional wet pond has a permanent pool of water for treating incoming storm-water runoff. In enhanced wet pond designs, a forebay is installed to trap incoming sediments where they can be easily removed; a fringe wetland is also established around the perimeter of pond.

Wetlands - Areas inundated or saturated by surface or ground water with sufficient frequency and duration to support a prevalence of vegetation typically adapted for saturated soil conditions. In short, wetlands are areas inundated or saturated for long enough periods of time to result in the development of hydric soils and dominance by hydrophytic (water tolerant) vegetation. (See legal definitions in appendix IV A.) (Cowardin System Attached)

Wetland mitigation - Regulatory requirement to replace wetland areas destroyed or impacted by proposed land disturbances with artificially created wetland areas.

Wetland mulch - A technique for establishing low or high marsh areas where the top 12 inches of wetland soil from a "donor" wetland are spread thinly over the surface of a created wetland site as a mulch. The seedbank and organic matter of the mulch helps to rapidly establish a diverse wetland system.

Wetland plant uptake - Wetland plant species rely on nutrients (i.e., phosphorus and nitrogen) as a food source; thus, they may intercept and remove nutrients from either surface or subsurface flow.

APPENDICES

WWAR (wetland/watershed area ratio) - The ratio of the wetland surface area to contributing watershed surface area. Good pollutant removal performance is often achieved when the ratio is greater than one percent

APPENDICES

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Appendix I

laws and rules

Minnesota Rules Chapter 8410
Metropolitan Area Local Water Management
Effective August 1, 1992

Summary of Content : Watershed Management Organization Plan Requirements

Executive Summary

* purpose of WMO
* membership of board of managers
* boundaries of WMO
* brief history
* summary of WMO's goals, problems, potential solutions
* general content of local plans

Land and Water Resource Inventory

* inventory of water resource and physical factors affecting water resource
* precipitation
* geology, topographic relief, aquifers, groundwater and surface water connections, map of subwatershed units
* surface water resource data including;
  a. map of public waters and public ditches
  b. National Wetlands Inventory map
  c. inventory of functional values of wetlands or a process for that
  d. DNR table of hydrologic characteristics of public waters
  e. maps of storm-water system
  f. information on 100-year flood levels, flood profile information
  g. map or discussion of areas of known flooding problems
  h. list of existing flood insurance studies
  i. summary of water-quality data from MPCA, DNR, MDH, MnDOT, Met Council, MWCC, WMO, SWCD, affected counties and cities
  j. map or list of water-quality and -quantity monitoring sites
  k. list of municipalities with approved shoreland ordinances
  l. table of DNR surface water appropriations
* groundwater data
* soil data
* land use and public utility services
* water-based recreation areas and land ownership

* fish and wildlife habitat
* unique features and scenic areas
* pollutant sources (if this information is included in a county groundwater plan, it may be referenced)
  a. known closed and open sanitary landfills, closed and operating open dumps, hazardous waste sites, summary of water-quality data relating to these sites
  b. feedlots, abandoned wells, under and above ground storage tank sites, permitted wastewater discharges, summary of water-quality data relating to these sites

Impact on other units of government

* inconsistencies between WMO's goals and policies and those of local, regional, and state review authorities

Establishment of Goals and Policies

* specific goals and policies of the plan
* water-quantity goals and policies for storm-water runoff management
* water-quality goals and policies (including land use and standards)
* recreation and fish and wildlife
* information and education
* goals and policies for public ditch systems
* groundwater (if no county groundwater plan)
* wetland management goals and policies including identifying high priority areas
* erosion goals and policies

Assessment of Problems - existing and potential

* specific lakes and streams with water-quality problems
* flooding and storm-water rate control issues
* impacts of water-quality and -quantity management practices on recreation
* impacts of storm-water discharges on water quality and fish and wildlife resources
* impact of soil erosion on water quality and quantity
* impact of land use practices, land development and wetland alteration on water quality and quantity
* adequacy of existing regulatory controls to manage or mitigate adverse impacts on public waters and wetlands
* adequacy of programs to;
  1) limit soil erosion and water-quality degradation
  2) maintain values of natural storage and retention systems
  3) maintain water level control structures

* adequacy of capital improvement programs to correct problems relating to; water quality, water quantity, fish and wildlife habitat and public waters and wetland management, recreational opportunities
* future potential problems within a 20-year period

Implementation Program

* nonstructural, structural, and programmatic solutions to problems issues, and goals listed in previous two parts
* regulatory goals
  a. regulation of activities in wetlands, responsibilities for the WCA
  b. erosion and sedimentation controls
  c. construction erosion controls
  d. shoreland and floodplain ordinances
  e. manage or regulate land uses that constitute a public nuisance
* storm-water and drainage design performance standards
  a. target in-lake nutrient concentrations, and sediment and nutrients loading
  b. runoff rates for design storms
  c. standards to reduce impacts of flooding
  d. design criteria for storm-water outlet structures
  e. pond design methodology for nutrient entrapment
  f. pollutant loading consistent with water-quality standards
* information program about WMO and plan
* data collection programs
* maintenance programs for:
  a. street, parking lot sweeping
  b. inspecting storm-water outfalls, sumps, and ponds
  c. storm-water facilities and water level control structures
  d. public ditches
  e. water body management classification system for water quality and quantity
  f. local spill containment clean-up plans
  g. others as necessary
* potential structural solutions to problems

Impact on Local Government

* existing local controls
* financial impact on local government
  adoption by reference

Implementation Priorities

Implementation Components

* controls
* responsibilities

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* schedule
* capital improvement program
* enforcement
* administration process

Plan Contents; Amendments

Annual Reporting Requirements

* financial report
* activity report
* audit report

Content of Local Plans

* general structure includes at a minimum;
  1. table of contents
  2. purpose
  3. water resource related agreements
  4. executive summary
  5. land and water resource inventory
  6. establishment of goals and policies
  7. relation of goals and policies to local, regional, state, and federal plans, goals and programs
  8. assessment of problems
  9. corrective actions
  10. financial considerations
  11. implementation priorities
  12. amendment procedures
  13. implementation program
  14. appendix
  15. each community should consider including its local plan as a chapter

Determinations of failure to implement

APPENDICES

APPLICABLE FEDERAL AND STATE WETLAND LAWS

Federal Wetland Definitions

Section 404 of the Clean Water Act

> Those areas that are inundated or saturated by surface or ground water 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.

(EPA, 40 CFR 230.3 and CE, 33 CFR 328.3)

Food Security Act of 1985

> Wetlands are defined as areas that have a predominance of hydric soils and that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions, except lands in Alaska identified as having a high potential for agricultural development and a predominance of permafrost soils.*

(National Food Security Act Manual, 1988)

U.S. Fish and Wildlife Service Wetland Classification System

> Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

**Special Note:* The Emergency Wetlands Resources Act of 1986 also contains this definition, but without the exception for Alaska.

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State Rules

7050.0130 Definitions.

F. "Wetlands" are 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. Wetlands must have the following attributes:

(1) a predominance of hydric soils;
(2) inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil conditions; and
(3) under normal circumstances support a prevalence of such vegetation.

Legal Authority

The federal Clean Water Act (CWA) Section. 303 (c)(1) states:

"The Governor of a state or the state water pollution control agency of such state shall from time to time (but at least once every three years period ...) hold public hearings for the purpose of reviewing applicable water-quality standards and, as appropriate, modifying and adopting standards. Results of such review shall be made available to the [U.S. Environmental Protection Agency (EPA)] Administrator."

CWA Sec. 303 (c)(3) states:

"If the Administrator, within sixty days after the date of submission of the revised or new standard, determines that such standard meets the requirements of this Act, such standard shall thereafter be the water-quality standard for the applicable waters of the state. If the Administrator determines that any such revised or new standard is not consistent with the applicable requirements of this Act, he shall not later than the ninetieth day after the date of submission of such standard notify the state and specify the changes to meet such requirements. If such Wetlands are "waters of the United States" and "waters of the state," just like lakes and rivers. changes are not adopted by the state within ninety days after the date of notification, the Administrator shall promulgate such standard pursuant to paragraph (4) of this subsection."

State authority arises from Minn. Stat. Chs. 115.03, 115.44 and 115.01:

Ch. 115.03, subd. 1: "To establish and alter such reasonable pollution standards for any waters of the state in relation to the public use to which they are or may be put as it shall

deem necessary for the purposes of this chapter and, with respect to the pollution of the waters of the state, chapter 116."

Ch. 115.44, subd. 4. "The agency ... shall adopt and design standards of quality and purity for each such classification necessary for the public use or benefit contemplated by such classification. Such standards shall prescribe what qualities and properties of water shall indicate a polluted condition of the waters of the state which is actually or potentially deleterious, harmful, detrimental or injurious to the public health, safety or welfare, to terrestrial or aquatic life or to the growth and propagation thereof, or to the use of such waters for domestic, commercial and industrial, agricultural, recreational or other reasonable purposes, with respect to the various classes established ..."

Ch. 115.01 Definitions.

Subd. 22. "'Waters of the state' means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof."

Subd. 13. "'Pollution of water,' 'water pollution,' or 'pollute the water' means: (a) the discharge of any pollutant into any waters of the state or the contamination of any waters of the state so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially harmful or detrimental or injurious to public health, safety or welfare, to domestic, agricultural, commercial, industrial, recreational or other legitimate uses, or to livestock, animals, birds, fish or other aquatic life; or (b) the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state."

Subd. 12. "'Pollutant' means any 'sewage,' 'industrial waste,' or 'other waste,' as defined in this chapter, discharged into a disposal system or to waters of the state.

Subd. 9. "'Other wastes' means garbage, municipal refuse, decayed wood, sawdust, shavings, bark, lime, sand, ashes, offal, oil, tar, chemicals, dredged spoils, solid waste, incinerator residue, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, cellar dirt or municipal or agriculture waste, and all other substances not included within the definitions of sewage and industrial waste set forth in this chapter which may pollute or tend to pollute the waters of the state."

7050.0130 Definitions.

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A. The terms “waters of the state,” “sewage,” “industrial wastes,” and “other wastes,” as well as any other terms for which definitions are given in the pollution control statutes, as used herein have the meanings ascribed to them in Minnesota Statutes, sections 115.01 and 115.41, with the exception that disposal systems or treatment works operated under permit or certificate of compliance of the agency shall not be construed to be “waters of the state.”

MDNR Authorities
Minn. Stat. 103G.101-315
Minn. Rules 6115.0150-0280

1991 Wetland Conservation Act

Article 6, 103G.005, sub. 19

> (a) “Wetlands” means lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this definition, wetlands must have the following three attributes:
>
> (1) have a predominance of hydric soils;
> (2) are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
> (3) under normal circumstances support a prevalence of such vegetation.
>
> (b) Wetlands does not include public waters wetlands as defined in subdivision 18.

APPENDICES

DEVELOPING THE PLAN[3]

The preparation of a plan follows a logical sequence:

1) Gathering information on existing resources and resource management programs (data collection) -- Find out what you have, and who's doing what.
2) Resource assessment -- Determine the condition and adequacy of existing resources and management programs.
3) Issue identification -- Identify problems and opportunities to address.
4) Issue prioritization -- Determine which issues are in the most critical need of attention.
5) Development of goals and objectives -- Determine the end result to achieve.
6) Formulation of actions -- Develop specific steps for solving problems and taking advantage of opportunities, while meeting goals and objectives.

A. Data Assembly

Data includes inventory information, descriptions of existing management programs, and other background information.

The objectives of data assembly should be:

1) To Help Identify Water Resource Issues: Relevant and existing data should be assembled to identify water resource issues.

2) To Measure the Scope and Severity of Water Resources Issues and Problems: As an example, if water quality is the issue, data that provides a direct measure of contamination in lakes, rivers and aquifers should be used, such as test well data. Data that measures related, contributing factors should also be used, such as information on the number and size of feedlots, runoff potential, distance from sensitive water resources, etc.

3) To Provide a Summary of Existing Conditions and an Indication of Future Trends: While individual data items provide a lot of useful information to the planner, when it is aggregated and summarized it can provide a better picture of what the issues and problems are, and if it can be compared to similar data from the past or projected into the future, it can be used to predict trends which should be planned for.

4) To Provide an Inventory of Water Resources Information: An inventory of water resources information will not only provide a catalog of available water resources information, but it will suggest areas where such information is lacking or inadequate. Water resource data sets should be briefly described and an indication of the utility of the data, or lack thereof, should be included.

Suggestions:

a. Use National Wetland Inventory map and DNR protected waters inventory as starting point.

[3] Modified from: Minnesota Board of Soil and Water Resources, Minnesota Department of Natural Resources, July, 1990, "Summary of the Comprehensive Local Water Planning Process"

b. Locate each wetland on a base map, a computerized Geographic Information System (GIS) can be useful.

c. Indicate size (acres).

d. Determine hydrologic flow routing of present and future development condition.

e. Determine sensitivity of vegetation by site surveys and sensitivity classification

f. Determine the small storm and flood storm hydrology of the sensitive and problem areas, including analysis of flooding, erosion control, pollutant loading, wetland water level fluctuation and inundation concerns.

g. Regulatory framework including, Federal: 404 and Section 10 Clean Water Act, State: Safe Drinking Water Act, NPDES Programs, Wetland Conservation Act, DNR work in water permits, Shoreland Act, Local: zoning, building code, nuisance requirement. Appendix I.A. and I.B. contain summaries of plan requirements and applicable laws.

B. Resource Assessment

Assessment is a critical link between the data assembled in Step A above and issue identification, discussed in Step C below. The data, and especially the summaries of the data as discussed above, provides the raw facts about a particular problem or issue. An assessment, however, analyzes the data to provide an understanding of the problem and can lead to possible solutions.

The present condition of water and related land sources, as evidenced by the data, as well as the adequacy of existing management and regulatory programs, will form the basis of many of the issues to be addressed in the plan. Assessment will also help determine the severity of the problems identified, thus helping in the setting of priorities in the action planning and implementation phases of the planning process.

Note that the rules require a discussion of the implications of many of the information items. This should include an analysis of how existing resource conditions and management programs will impact the attainment of goals and what challenges will be faced in dealing with the identified problems.

Assessments and discussions of implications need not be lengthy, but should be detailed enough to facilitate the development of issues and goals, objectives and actions.

Suggestions:

a. Choose a useful and consistent method to assess functions and values:

(1) Rapid assessment (qualitative) evaluation method, on a first step and overall assessment on temporary basis. A rapid assessment method such as that developed by the Wisconsin Department of Natural Resources (1992) can be employed until funds become available for more complete assessment.

(2) Long-term, research-type quantitative method for critical sites and long term on a priority basis.

CAUTION: Most wetlands are of high value for some functions, moderate value for other functions and low value for still others; thus, it is difficult to arrive at an aggregate value of high, medium of low. Ranking a wetland as "low value" for one function does not necessarily mean that wetland is expendable for all functions. Even severely degraded wetlands can be important for functions such as storm-water retention.

b. Define proposed watershed changes:

(1) Proposed zoning and development descriptions.
(2) Proposed physical alterations.
(3) Resultant changes in pollutant concentration and loading.
(4) Check for compliance with all federal, state and local requirements.

c. Analyze the hydraulic changes related to development and the sensitivity of the wetland to impacts. Determine the need for avoidance, pretreatment, or other management options.

C. Issue Identification

A good plan rests on a foundation of clear issue identification. The issue identification process should be open to all water-related resources issues, including not only direct water issues such as water quality and supply, but related issues which affect water such as land use practices, and "dependent" uses such as fish and wildlife. The Handbook for Comprehensive Local Water Planning should be consulted for additional information; the first portion of Chapter 6, titled Identifying Problems and Opportunities, provides guidance in this area.

1) Ground-Water Quality: sub-issues include abandoned wells, leaking storage tanks, chemical use, nonpoint source pollution, etc.

2) Surface-Water Quality: Sub-issues include sedimentation, erosion, wetland protection, nonpoint source pollution, poorly functioning on-site sewer systems, chemical use, stream bank erosion, etc.

3) Ground-Water Quantity: Sub-issues include water allocation, well interference problems, etc.

4) Surface-Water Quantity: Sub-issues include flooding, structural water control measures, wetland protection, drought contingency planning, etc.

5) Water-based Recreation: Sub-issues include providing public access to lakes and rivers, surface water crowding, shoreland development problems, promotional opportunities, etc.

6) Fish and Wildlife: Sub-issues include loss of critical habitat and species, developing additional fish and wildlife habitat, wetlands protection, etc.

7) Related Land Use: Sub-issues include agricultural and urban land use.

D. Goals and Objectives Development

Goals and Objectives form the linkage between issues and the actions. Since issues change over time, the primary goals and objectives focus should be on high-priority issues -- those to address in the near future.

Suggestions:

a. Explicitly state the existing community and public values - this means defining what functions the critical areas perform for the local regional and statewide public interest. Recreation, water quality, flood control, wildlife habitat and other functions should all be described in as detailed a manner as possible.

b. Examples of goals include:

(1) Preserve wetlands
(2) Improve water quality
(3) Enhance wildlife habitat
(4) Maximize recreational/educational opportunities
(5) Mitigate unavoidable adverse impacts

E. Action Plan

Actions should be specific projects, programs or activities which have a good likelihood of being achievable in the short term. That is, they are likely to be funded and/or to be achieved within the existing programs of any agency or organization. Identifying realistic actions increases the chances that a plan will bring results. Towards the end of developing a meaningful plan, counties should state actions that require accomplishment as a measure of success. The actions should use proactive language, require effective activities, or propose specific programs to deal with the issues. Actions such as encourage, promote and facilitate often will not go very far in addressing complex water resource problems, and allow no measure of accomplishment. Such actions may have less chance of receiving state or federal funding support. There are a number of issues where consideration should be given to teaming educational efforts with immediate and direct action such as regulation, and enforcing existing regulations. *Suggestions:*

a. Ensure coordination between cities, counties, watershed districts, state agencies and federal agencies and their respective programs (e.g., local ordinances, Wetlands Conservation Act, Section 404 permits)

b. Implement management techniques needed to protect priority wetlands and provide enhanced benefits, such as:

(1) Avoidance of Impacts

(2) Use of finger printing or pretreatment ponds before discharging urban storm water to wetlands.

(3) Plantings/landscaping using desirable vegetation.

(4) Control of noxious weeds (e.g., purple loosestrife, buckthorn)

(5) Placement of nesting boxes, nesting island.

(6) Buffers (e.g., no grading or mowing of adjacent uplands).

(7) Incorporate wetlands into "green corridors" that link them with lakes, streams, upland habitats, wildlife travel corridors, etc.

(8) Acquire in public ownership higher-quality wetlands and associated uplands if feasible.

(9) Limit upland development in areas with unacceptable hydrologic impacts.

c. Develop a plan for mitigation of unavoidable impacts from development.

(1) Identify previously drained or converted wetlands that possess high potential for restoration then take measures to implement (e.g., blocking drainage ditches, breaking drain tile, removing fill) to meet mitigation, banking needs, water quality and other goals.

Establishing Priorities

The actions should be prioritized to reflect the urgency of the problems they are intended to address, as well as the resources which can be expected to be available for addressing them. Priorities should reflect the rankings established in the Issue Identification step discussed previously. By incorporating estimates of costs and time and money available, priorities can be established using the same methods used for the issue rankings.

F. Implementation Program

The purpose of the Implementation Program is to state how and when the plan will be carried out to meet the objectives and achieve the actions identified. It will identify the agency or organization that will perform each action, provide a cost estimate for each, and lay out a schedule of when each will be undertaken. A brief description of these steps follows:

1) Who will perform the action? Actions may be accomplished either by the county or by other agencies or organizations. The amount of staff and financial resources necessary (and available) must be considered. Please note that the Handbook states that if actions require the cooperation of other agencies or local units of governments, the plan must indicate whether commitments for that assistance have been obtained.

2) What will it cost? While detailed cost estimates may not be possible or practical at this state, "ballpark" estimates should be made so that a realistic implementation schedule can be developed. Grandiose plans may look impressive, but if they can't be funded, goals will not be achieved.

3) When will it be initiated? Based on project costs and funds and staff available, you should develop an implementation schedule that accomplishes the most important objectives first.

APPENDICES

(Sec.2)

Laws Relating to Hydroperiod of Storm Water[4]

There are a number of laws, rules and guidelines relate to the issue of changing the hydrology of a given site.

1. **Minnesota Statutes Section 103B.3365.** Passed in 1991, this law requires local governments to require water-retention devices or areas for all developments creating more than one acre of new impervious surface. The Board of Water and Soil Resources developed guidelines for local governments to use in achieving compliance with this law. They are entitled "Guidelines on Water Retention," dated August 1993. Copies of this document can be acquired from the Minnesota Board of Water and Soil Resources. **(REPEALLED and no longer applicable)**

2. **Local comprehensive water management plans and standards. (MR - 8410)** Almost all areas of the state are affected by comprehensive water management plans developed by cities, townships, counties, watershed districts and water management organizations. In the seven-county metro area, the planning was mandated in 1982 by the Minnesota Legislature and is done on a watershed basis. Many of these plans contain policies and standards for specific design requirements for managing changes in water quality and quantity from developments. After 1995, both metro and non-metro plans will be required to adopt standards specific to their areas of jurisdiction relating to runoff from developments if their existing plans do not already contain them.

3. **Flood Plain Management Standards.** Minnesota law and rule allow local governments administering flood plain regulations to permit up to a 0.5 foot increase in flood elevation over the existing 100-year flood elevation for areas mapped as flood-prone. Higher increases may be authorized in very few circumstances and only after substantial documented justification and review. The Minnesota Department of Natural Resources provides oversight to the administration of local flood plain controls. Many local governmental units have adopted more restrictive flood-plain management ordinances than state and federal laws may allow. Local governments and land developers must be certain that all land rights are secured either through flowage easements or fee title when ever natural hydrologic conditions are altered.

4. **Water Quality Standards**. Minn. Rules Ch. 7050 establishes water-quality standards for waters of the state. The rules may affect a project if it requires an individual "Section 404" permit from the U.S. Army Corps of Engineers. If an individual permit is required, a "Section 401" certification from the Minnesota Pollution Control Agency is required. MPCA 401 certifications assess project proposals for compliance with Ch. 7050 rules. Projects covered under USCE nationwide and general permits do not require individual 401 certification from the MPCA.

[4] Bruce Sandstrom (March 14, 1994), Board of Water and Soil Resources, office memorandum.

5. **Department of Natural Resources Regulation of Public Waters.** Natural "bounce" from runoff events on ponds, lakes and wetlands varies considerably, even in watersheds with limited development. A common water-management problem in Minnesota has been flooding on landlocked lakes. State rules allow a man-made outlet to be installed no lower than 1.5 feet below the ordinary high-water level of a landlocked lake when the solution to a flooding problem is to install an outlet.

6. **Common Law Considerations.** Under the riparian water law concept that prevails in Minnesota, numerous common law precedents provide protection to landowners who might be impacted by the hydrology changes resulting from development. This law is always evolving and usually lags behind technology and our base of knowledge of the environmental impacts of changing hydrology. The basic concept of common water law will not change, however. And that is that an upstream landowner cannot alter the flow of water to the detriment of downstream interests. This concept may be the most compelling aspect of trying to design developments so that post-development hydrology closely replicates pre-development conditions.

7. **Wetland Conservation Act.** Minn. Rules Ch. 8420 allow credit for replacement of altered wetlands if a "created" wetland contains two cells and the downstream cell has no more than one foot of bounce for a 10-year runoff event.

Analysis of Documented Naturally Occurring Water-Level Variance

Data from the Minnesota Department of Natural Resources, Division of Waters reflect the natural variance for the 100 or so natural, free-flowing water bodies where the DNR has valid data. It should reflect the variance that might be expected on wetlands. Factors strongly influencing "bounce" are likely related to outlet configuration, capacity of the outlet stream, watershed to water basin surface area, and relative position of the basin in the watershed.

Recorded Fluctuation Above Runout Elevation For Natural Lakes

	Ordinary High WL	**10-yr Flood Elev.**	**100-yr Flood Elev.**
Average	1.41 ft.	2.86 ft.	4.60 ft.
Range	-.45 to 4.90 ft.	.02 to 7.00 ft.	.60 to 9.26 ft.

When the Department of Natural Resources restores wetlands for wildlife management purposes, it uses criteria which limit the "bounce" for 10-year and 100-year runoff events to one foot and two feet, respectively, above the runout elevation.

APPENDICES

MnRAM Appendix A - User Guidance supplement

Comparison of the U.S. Fish and Wildlife Service's Circular 39[1] wetland classification system to that of Cowardin et al. (1979)[2] used on National Wetland Inventory maps and of Eggers and Reed (1987)[3].

	CIRCULAR 39	COWARDIN ET AL. 1979	EGGERS AND REED 1987
TYPE 1	Seasonally flooded basin or flat	PEMA PFOA PUS	Floodplain Forest Seasonally flooded basin Fresh (wet) meadow Low prairie
TYPE 2	Wet meadow	PEMB	Fresh (wet) meadow Low prairie Calcareous fen Sedge meadow
TYPE 3	Shallow marsh	PEMC *and* F PSSH PUBA *and* C	Shallow marsh
TYPE 4	Deep marsh	L2ABF L2EMF *and* G L2US PABF *and* G PEMG *and* H; PUBB *and* F	Deep marsh
TYPE 5	Shallow open water	L1[4] L2ABG *and* H L2EMA, B, *and* H L2RS L2UB PABH PUBG *and* H	Shallow, open water
TYPE 6	Shrub swamp	PSSA, C, F, *and* G PSS1, 5, *and* 6B	Alder thicket Shrub-carr
TYPE 7	Wooded swamp	PFO1, 5, *and* 6 B PFOC *and* F	Coniferous swamp Lowland hardwood swamp
TYPE 8	Bogs	PFO2, 4, *and* 7B PSS2, 3, 4, *and* 7B	Coniferous bog Open bog

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[1] Shaw, S.P. and C.G. Fredine. 1956. Wetlands of the United States. U.S. Fish and Wildlife Service, Circular 39. 67 pages.

[2] Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, FWS/OBS-79/31. 131 pages.

[3] Eggers, S.D. and D.M. Reed. 1987. Wetland plants and plant communities of Minnesota & Wisconsin. U.S. Army Corps of Engineers, St. Paul District. 201 pages.

[4] The Cowardin habitats of L1, PUBG, and PUBH are often considered as deep water habitats.

APPENDICES

Minnesota Statutes and Definitions of BMPs[5]

MS 103F.711 Minnesota Clean Water Partnership Act

> "Best Management Practices" means practices, techniques, and measures that prevent or reduce water pollution from nonpoint sources by using the most effective and practicable means of achieving water quality goals. Best management practices include, but are not limited to, official controls, structural and nonstructural controls, and operation and maintenance procedures.
>
> "Official controls" means ordinances and regulations that control the physical development of the whole or part of a local government unit or that implement the general objectives of the government unit.

MS 103h Ground Water Act

> "Best Management Practices" means practicable voluntary practices that are capable of preventing and minimizing degradation of ground water, considering economic factors, availability, technical feasibility, implementability, effectiveness and environmental effects. Best management practices apply to schedules of activities; design and operation standards; restrictions of practices; maintenance procedures; management plan practices to prevent site releases, spillage, or leaks; application and use of chemicals; drainage from raw material storage; operating procedures; treatment requirements; and other activities causing ground water degradation.
>
> See attached flow chart.

MS 103G.2241 Wetland Conservation Act

> "Best Management Practices" means state-approved and published practices associated with draining, filling, or replacement wetlands that are capable of preventing and minimizing degradation of surface water and ground water.
>
> This act sets the guidelines for the avoid, minimize and mitigate policy for protection of wetlands. This also states in order to qualify for the exemptions provided for by the act you must use BMPs.

MS 17.498 Rules; Financial Assurance. (aquaculture) no definition.

[5] Klang, Jim, June 1994, Minnesota Pollution Control Agency office memorandum

APPENDICES

MS 17.115 Shared Savings and Loan Program.

MS 17.116 Sustainable Agriculture Demonstration Grants

> Both statutes use the term BMP without a definition, yet meaning practices which are not water quality related.

MS 18B.04 Pesticide Impact on Environment. No definition given

MS 18C.005 Fertilizers, Soil Amendments Refers to MS Ch. 103H.

MS Section 103B.3365 (Reding Bill)

> Best Management Practices means any design criteria or land use management technique (or combination) to limit nonpoint pollution from land uses that is either advocated by a formal publication of a state or federal agency publication or a public research institution.

(note: Repealed and no longer applicable)

Federal and State Delegations of Authority

MS 103F.751 Nonpoint Source Pollution Control Plan and Program Evaluation

> For the purpose of coordinating the programs and activities used to control nonpoint sources of pollution to achieve Minnesota's water quality goals, the agency (MPCA) shall:
>
> 1) develop a state plan for the control of nonpoint source water pollution in order to meet the requirements of the federal Clean Water Act;
> 2) work through the environmental quality board to coordinate the activities and programs of federal, state and local agencies involved in nonpoint source pollution control, and where appropriate, develop agreements with federal and state agencies to accomplish the purposes and objectives of the state nonpoint source pollution control plan; and
> 3) evaluate the effectiveness of programs in achieving water quality goals and recommend to the legislature under sections 103F.701 to 103F.761.

MS 103h Provides for the Department of Agriculture and MPCA Authority

Clean Water Act authority has been delegated to the MPCA by EPA and MS 115 and 116 for:

NPDES Programs
Construction Grants Program
Section 319 Nonpoint Source Pollution coordination

APPENDICES

History of MPCA Programs and Objectives

Two-pronged approach

1) categorical state-wide
2) specific targeted

CWA Section 208, 208 Agriculture Report August 1979,. the report laid out many of the BMPs and management practices in use today.

CWA Section 319 Management Plan, 1988 (see attachment)

LCMR project in 1987 to 1989 which developed BMPs without a specific program application in mind.

MS Chapter 103H, 1989-1990

1) doesn't alter any pre-existing statute
2) defines who can develop ground water BMPs
3) voluntary before regulatory flow path

The variety of statutes have created confusion between definitions, procedures and authority.

Who has authority to identify BMPs

Why is this authority important

WCA decisions are based on BMP implementation
Publications and reproduction of information
Public vs. private interests
Local vs. state interests
Regulation vs. voluntary

The language is not precise and this causes problems.

the word BMP
the words "developing" versus "identifying"

APPENDICES

Local Jurisdiction

In the past, MPCA programs have encouraged the locals to choose when to enforce BMPs rather than encourage volunteer use, ordinance or incentive promotional paths, for BMP adoption. However, recently Renville District Court has issued a finding which states the local governments can no longer require stricter feedlot controls (BMPs) by ordinance, that the state permit program requires.

Upcoming changes in Federal Clean Water Act

Both the Baucus and Oberstar reauthorization of the CWA versions include mandatory BMP language for some categories.

Coastal Zone Management

This program is still being negotiated, however, EPA is suggesting for MPCA to adopt the management measures as a minimum. There is also discussion about 100 percent adoption of Management Measures in the watershed and a legal means for the state to have authority to require adoption.

Where should we go from here?

Continue to identify BMPs and their efficiencies, limits and costs.

Create a new term to clarify the confusion due to the lack of precise language.

Identify a process for “state approved” or define the authorities and their limits.

APPENDICES

Appendix II

Erosive Flow Control

STORMWATER DETENTION PERFORMANCE BASED ON DOMINANT DISCHARGE

Patrick D. Powers, P.E.
State of Washington
Department of Fisheries
Habitat Management Division

March 15, 1990

Introduction

The physical characteristics of fish spawning and rearing habitat in small streams can be protected by preserving the channels dominant discharge. Dominant discharge is that flow which is most effective in performing work on the channel, in terms of its magnitude, frequency of occurrence and duration. The frequency of occurrence is generally accepted as the 2-year flood. When a drainage basin is developed, the change in the hydrologic regime is most significant for frequent floods, such as the 2-year. Past stormwater management policies have only considered peak release rates for conveyance of flood waters for the higher magnitude less frequent storms. As a result, the frequency of dominant discharge events for many stream channels has increased causing significant channel widening and degradation of physical habitat. Preservation of the channel dominant discharge requires a significant increase in detention volume over existing standards. This will allow the frequent storms to be metered out at a magnitude and duration which will not result in a increase in work to the channel. Rainfall-runoff relationships should be analyzed using a watershed model such as the Hydrologic Simulation Program - Fortran (HSPF), which is a continuous simulation model that computes the complex interactions of the hydrologic cycle. Detention volumes should be calculated for several design storms using a storage routing process for each storm frequency, so that preexisting magnitudes and durations are maintained. In many cases, watershed modeling is not available. In this case run-off based on an event model can be used. The recommended event for Western Washington is the 24-hour, Type 1A design storm. Using this storm in a Soil Conservation Service (SCS)-based hydrograph method for calculating run-off and a storage routing process for detention volume has been shown to give reasonable results. An event model can only be used to approximate the design theory of dominant discharge. It is recommended here that the two-year preexisting peak release rate be reduced by fifty percent to account for the inadequacies in event based models overpredicting preexisting run-off, and the extended duration of release which occurs after the 24-hour design storm event. These recommended methods for computing stormwater run-off and detention were compared to past methods. As a baseline for past methods the 10-year Rational, Yrjanainen and Warren method was chosen. Twelve case studies (URS, 1989) were compared and the results showed a 4-fold increase in detention volume. The increase in cost for the required detention volume may be offset by the benefits gained from reduced bank erosion, increased flood protection and enhanced stormwater quality.

Dominant Discharge for Habitat Protection

The discharge regime from a drainage area forms a fundamental independent control of channel cross-section morphology (area, shape and bedforms). Maintaining this channel morphology has many benefits, including preservation of fisheries habitat, minimizing bank erosion and bank protection demands, reducing fine sediment loads to the stream, and aesthetics. The channel morphology does not adjust with every short term variation of discharge, but depends on a discharge measure which typifies the range and frequency of competent discharges experienced over a long time. The channel dominant discharge can then be defined as that discharge that has been most effective in performing work on the channel; a measure of this work is the product of its magnitude and frequency of occurrence. Richards (1982), notes that the flow

which just fills the section of an alluvial channel without overtopping the banks "the bankfull discharge", is the dominant event controlling channel form. Wolman and Leopold (1957) suggest a frequency of occurrence for bankfull discharge of 1 to 2 years. Frequency studies and other channel geometry studies indicate that the most effective flow, defined here as the channel dominant discharge, can be approximated by the bankfull discharge and the annual flood equals or exceeds this discharge once every 1.5 years or on an average of twice in 3 years (Wolman and Miller, 1960; Shen, 1971).

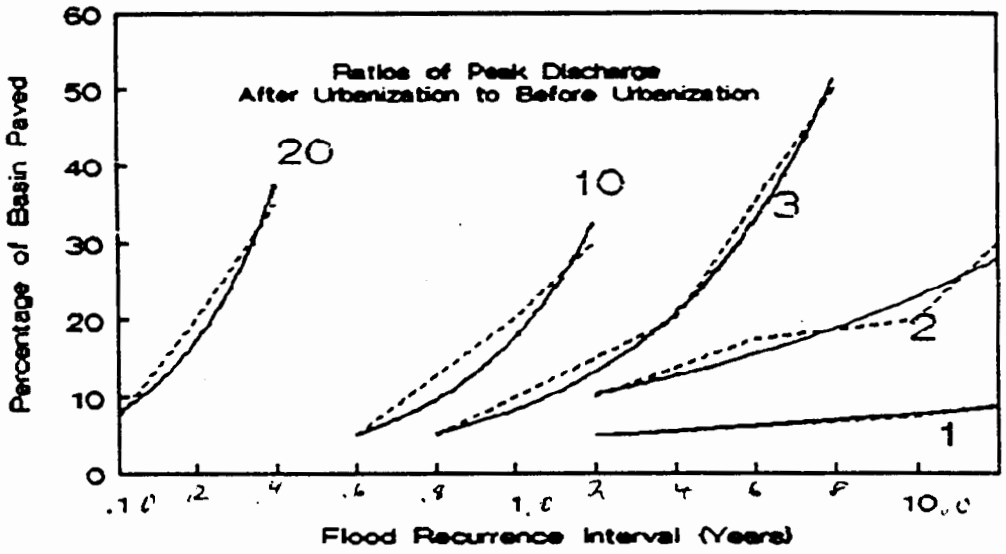
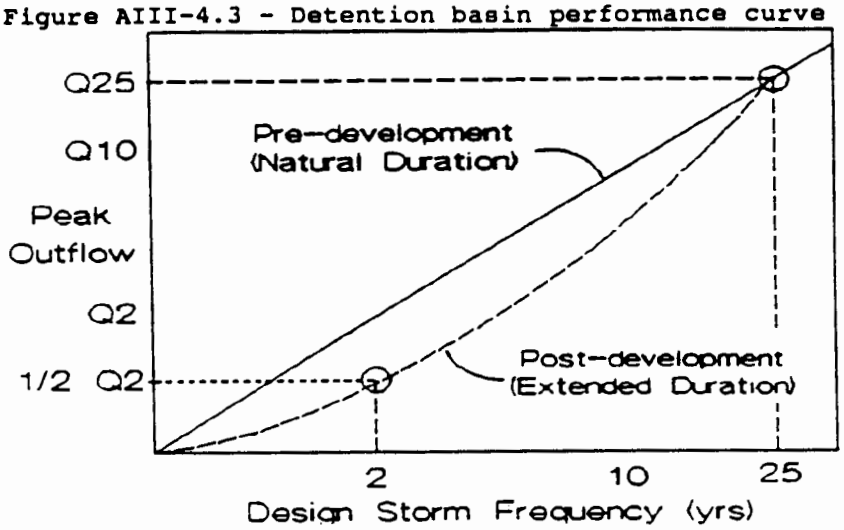


Figure AIII-4.2 - Increases in floods of varying recurrence in relation to percentage of basin paved (Hollis, 1975)

Increases in Frequent Floods From Development

Impervious surfaces on developed land reduce depression storage and infiltration so a higher percentage of the rainfall becomes run-off. Overland flow velocities become faster on smoother surfaces resulting in run-off entering the channel system more quickly. Thus, the run-off regime is flashier with shorter lag times and time bases, and with higher peaks. Flood peaks from urbanization increase with varying degrees according to their return periods. Hollis (1975) shows that smaller frequent floods increase up to 10 times after 20 percent urbanization, while extreme events are barely increased at all (Figure AIII-4.2). This is because extreme floods in natural basins are generated by high magnitude storms onto fully saturated soils, and they have a hydrological response similar to that of an urban basin. Past stormwater management policies have not considered frequent floods to protect channel form. Design methods have dealt mainly with conveyance of flood waters. These smaller floods however, are the ones which have the greatest impact on channel form. Bates (1983), summarizing impacts to fisheries habitat from stormwater run-off notes the importance of attenuating the channel dominant discharge in stormwater management, and that current stormwater ordinances can be expected to cause a trend in channel enlargements in the range of 50 percent. This is a result of the increase in "work" done on the stream channel from a increased occurrence of more channel forming flows. Also, under existing policies design of stormwater detention basins are based on metering run-off to preexisting peak rates, without regard to the duration of the release.

Figure AIII-4.3 - Detention basin performance curve



Methods such as the Rational-Yrjanainen and Warren (YW) method apply too many simplifications in an attempt to model the hydrologic response of a drainage basin, and should only be used for sizing conveyance facilities. Recent research (King Co, 1990) has resulted in major changes in the design of stormwater facilities in the Puget Sound area. Revised design methods in the 1990 King County Stormwater Manual utilize SCS-based hydrograph methods for calculating run-off, and storage routing for detention basin sizing. The detention basin design must meet a performance curve so pre-existing peaks are maintained at the 2 and 10 year storms. The manual uses event-based models with a theoretical design storm distribution and duration. The 24-hour, type 1A design storm was selected as best representing storms in Western Washington. Detention basin design is still based on releasing flows at preexisting peak rates without considering the extended duration of release caused by the increased volume of run-off. To design using the theory of dominant discharge, preexisting peaks for the more frequent storms should be reduced by some amount to account for the extended duration of release. As a guideline, it is recommended that the 2-year release be reduced by 50 percent, and that this reduction taper off to the pre-existing peak at the 25-year event. In general, storms above the 25-year event have very little impact on channel form, because of how infrequent they occur. The detention basin performance curve for these two design storms (i.e. 2 and 25-year) is shown in Figure AIII-4.3 The reasoning for this is discussed below.

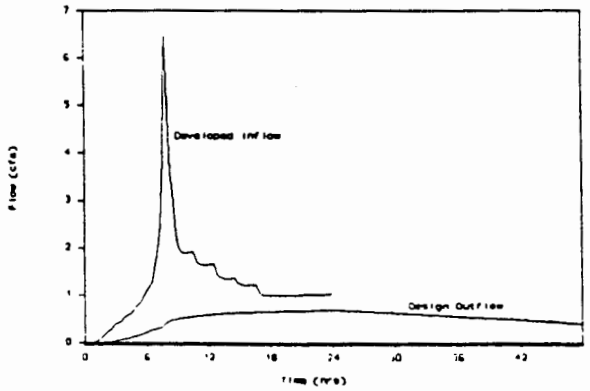


Figure AIII-4.4 - Detention basin inflow-outflow hydrograph for 2-year frequency (case study 12)

Peak Reduction - Extended Duration

Under some existing stormwater policies detention basin releases are metered to match pre-existing peak rates. Because of the significant increase in run-off volume from the developed state, the duration of the peak release rate cannot be matched to the pre-existing state unless a significant amount of run-off is infiltrated. When the pre-existing peak release rates are used to design a detention facility, calculations show that actual metering of stormwater run-off from a 24-hour storm can last for several days. Figure AIII-4.4, shows how the stormwater would be metered for a 2-year peak release rate. The hydrograph data was derived from case study 12 (URS, 1989). The developed inflow hydrograph in Figure AIII-4.4 is only a theoretical storm. Actual conditions in the Western Washington could extend the peak release rate even longer as rainfall before and after the storm could partially fill the basin. It is recommended that the peak release rate for the 2-year event be reduced by 50 percent for the following reasons.

1. In an attempt to establish a guideline for peak flow reduction at the 2-year frequency the author conducted the following study. USGS stream flow data for 13 small streams with undeveloped drainages were selected (Table AIII-4.1 from the Puget Sound area. Each station had at least 10 years of record. Flows for the 2-year frequency highest mean flow based on a log-Pearson Type III analyses for various consecutive days of occurrence were analyzed. The highest mean flow at the 2-year frequency was recorded for the annual peak and the 1, 3 and 7 day consecutive occurrence. Each of these values were then divided by the peak flow, averaged and plotted according to their corresponding durations (Figure AIII-4.5). This curve shows that as the duration of the 2-year event approaches 3 days, the reduction in peak flow is approximately 50 percent. The standard deviation for the 3 duration points on the curve in Figure AIII-4.5 was 0.1, which is a measure of the degree to which these values vary from the mean.

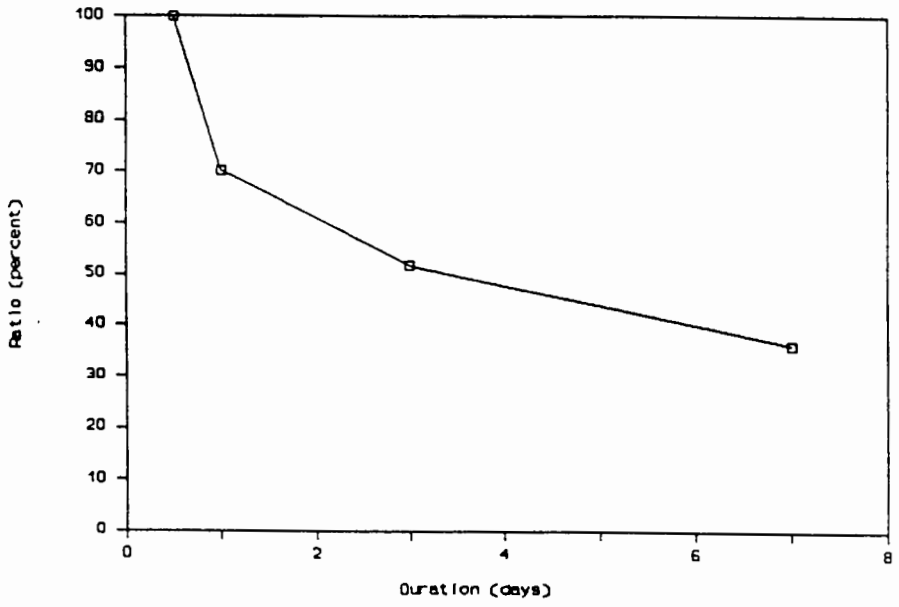


Figure AIII-4.5 - Ratio (percent) of 2-year peak and duration for natural catchments. Data from Table AIII-4.1

USGS Station	Drainage Area(sq.mi)	Consecutive Days of Peak	Occurrence 1	3	7
12047500	15.5	430	249	169	111
12050500	11.2	208	151	113	83
12063000	3.2	290	194	140	95
12063500	19.8	920	567	411	278
12065500	1.5	118	74	52	35
12066000	6.0	330	294	220	151
12067500	15.0	708	632	494	352
12068500	18.4	1034	792	579	398
12070000	5.0	130	77	57	40
12072000	15.3	475	366	293	222
12073500	6.5	120	98	75	55
12078400	17.4	762	563	438	347
12081000	24.6	91	71	63	57

Table AIII-4.1. 2-year frequency stream flow data for sleected Puget Sound streams from USGS, 1985

2. SCS-based hydrograph methods over-predict run-off in the pre-existing state. It assumes rainfall intensity exceeds infiltration. Justification for the accuracy of models such as the Santa Barbara Urban Hydrograph (SBUH) is that much of the drainage is impervious and the infiltration component is negligible. This is not true for frequent storm events, as the infiltration is a significant factor in the run-off regime. Also, event based models do not account for antecedent conditions prior to the simulation.

3. The actual run-off from a 24-hour storm event lasts more than 48 hours (Figure AIII-4.4). If rainfall occurs before and after the theoretical 24-hour storm, the actual pre-existing rates could occur for a duration of 3 to 4 days. The theoretical model for the pre-existing state shows the peak release only lasting for a short period, less than 6 hours. Therefore, there could be a 12 to 16-fold increase in the duration of the pre-existing peak.

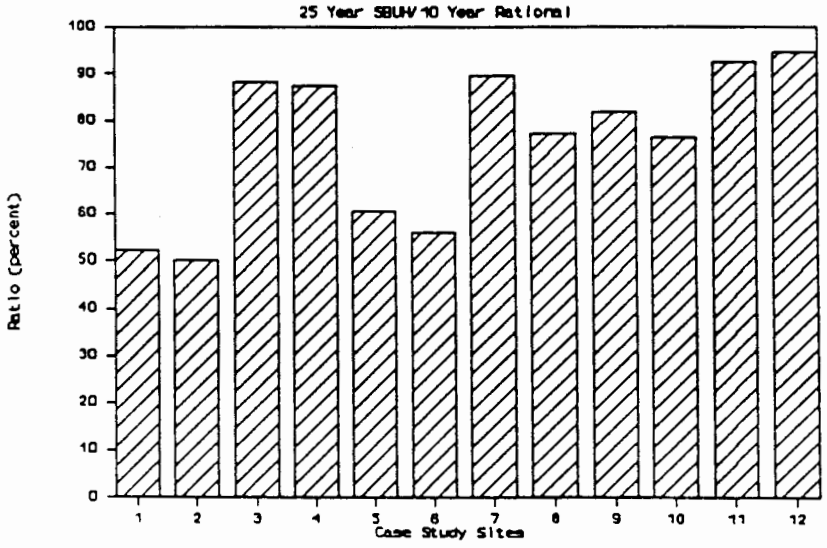


Figure AIII-4.6 - Comparison of peak flow rates for developed conditions between 25-yr. SBUH, and 10-yr. Rational

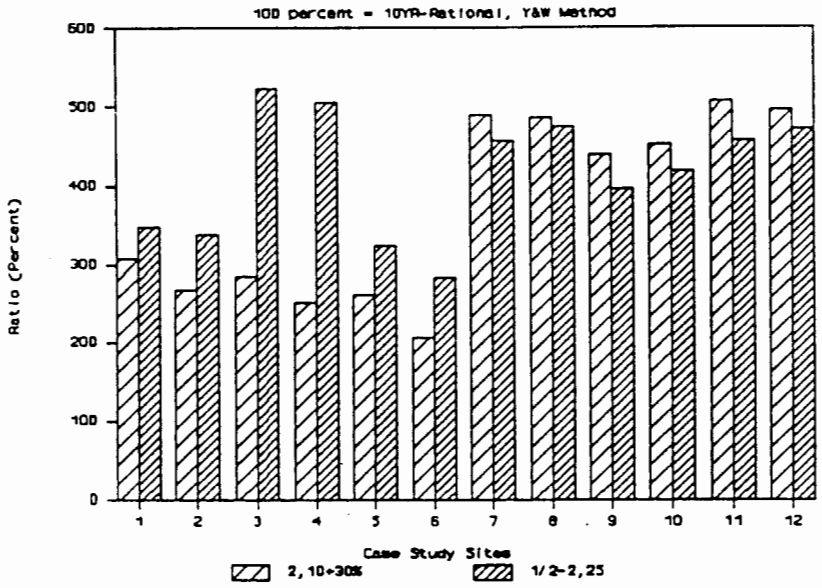


Figure AIII-4.7 - Comparison of detention volume for 2 and 10-year events plus 30 percent, and 1/2-2,25-year events

4. An assumption in using a event model is that the frequency of a rainfall event results is the same frequency run-off event. This is rarely true within a drainage basin, and with the limitations of a event based model it cannot be analyzed. Therefore, to protect stream channels against a potential increase in the critical channel forming flows a factor of safety should be applied to the release rate. Reducing the 2-year peak by 50 percent is a reasonable reduction given the uncertainty of the drainage characteristics.

Impacts From Suggested Guidelines

The basic criteria for stormwater detention design recommended in this paper for protecting physical habitat features in streams is as follows:

1. Fifty percent of the pre-existing 2-year peak release rate for the 2-year design storm.

2. The pre-existing 25-year peak relea*se rate for the 25-year design storm, and

3. Storage routing for determination of detention volume.

Overall costs for construction of stormwater facilities are expected to increase due to the increase in required detention storage. To estimate the impact of this increase, the suggested criteria were applied to 12 case studies. Data for the case studies were taken from (URS,1989), where an analysis was conducted to determine the impacts of the proposed King County Surface Water Design Manual. In the King County impacts analysis, detention volumes were calculated using storage routing for pre-existing peak release rates at the 2, 10 and 100-year frequencies and compared to the 10-year Rational-Y&W method. Run-off was calculated using the SCS-based Santa

Barbara Urban Hydrograph (SBUH). For a comparison, design standards suggested in this paper where compared to the proposed King County standards and the ten-year Rational-Y&W method. Detention volumes were calculated for the 2-year and 25-year frequencies, with the 2-year being released at 50 percent of the pre-existing peak, and the 25-year at the pre-existing peak. Figure AIII-4.6 is a comparison of how peak flow rates calculated using the SCS-based SBUH for the 25-year storm compare to the ten-year Rational method. Figure AIII-4.6 shows that increasing the high design' storm from the 10 to the 25-year event will not result in a increase in the size of conveyance facilities. Figure AIII-4.7 shows the increase in detention volume for the 12 case studies. The larger detention facility translates into a greater capital cost and some potential increase in maintenance. The following is a summary of results from applying the suggested criteria to the 12 case studies:

1. Detention storage increases an average of 4.2 times over that which is required using the ~~10~~ 10-year Rational, Y&W methods. For residential units this results in a average capital cost increase for detention facilities from $362 to $1,585 dollars per dwelling unit.

2. Detention storage increases an average of 1.2 times over the accepted King County standards for the 2 and 10-year

3. Average peak discharge/acre for the 3-year frequency in the pre-existing state was 0.046 cfs/acre.

4. Average detention volume per impervious acre was 11,073 cubic feet/acre. This includes the standard error with a one-sided 80 percent confidence interval.

While storage volume costs will increase, it is expected that reduced downstream erosion, increased flood protection and enhanced water quality will offset these costs. These benefits are difficult to quantify in monetary terms, but are substantial when considering the fisheries and other natural resource values from streams.

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Editors Note Regarding Detention Design for Fisheries Habitat Management

The previous papers prepared by P.D. Powers of the Washington Department of Fisheries compared their proposed design with those used by King County. The standards in this manual (following advice from the Technical Advisory Group) differ slightly from those of Fisheries. The standard in this manual is release of the 2-year storm at 50 percent of the pre-developed rate and the 10 and 100-year storms at 100 percent of the pre-developed rate (2-½, 10, 100). Fisheries standards require the same release rate for the 2-year storm and release of the 25-year storm at 100 percent of the predeveloped rate (2-½, 25).

Pat Powers prepared the tables and figures to compare all proposed standards using the case studies prepared by King County. Note that the 2-½, 10, 100 standard in this manual results in an average increase of 26 percent in detention volume compared with the Fisheries standard (2-½, 25) and an increase of 43 percent compared with the current King County standard (2, 10 + 30%). All of these standards require considerably more volume (400-500%) than the old King County standard that used the Rational/Y&W method and only controlled the 10-year storm.

APPENDIX G

Soil Erosion and Sediment Control
City Code 11-2000

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed.

11-1900.72 NUISANCE ABATEMENT PROCEEDING

If an ordered abatement or correction has not been implemented by the deadline for compliance, the condition shall be considered a public nuisance and subject to abatement under the City's nuisance abatement codes.

11-1900.73 EMERGENCY ABATEMENT

Notwithstanding the foregoing, if the situation meets the criteria for emergency abatement under the City's nuisance code, the City may proceed under the emergency provisions thereof.

11-2000 SOIL EROSION AND SEDIMENT CONTROL

INTRODUCTION/PURPOSE:

During the construction process, soil and debris is highly vulnerable to erosion by wind and water. Eroded soil and debris endangers water resources by reducing water quality and causing the siltation of aquatic habitat or fish and other desirable species. Eroded soil and debris also necessitates cleaning sewers and ditches.

The purpose of this Code is to control and eliminate, to the greatest extent possible, storm water pollution and soil erosion and sedimentation in order to protect and safeguard the general health, safety, and welfare of the public. It establishes standards and specifications for development and conservation practices and planning activities designed to:

1) Minimize increases in stormwater runoff from any new development or redevelopment in order to reduce flooding, siltation, streambank erosion and maintain the integrity of stream and ditch channels;

2) Minimize increases in non-point source pollution caused by stormwater runoff from new development or redevelopment which would otherwise degrade local water quality;

3) Minimize the total annual volume of surface water runoff which flows from any specific site during and following development to not exceed the pre-development hydrologic regime to the maximum extent practicable.

4) Reduce stormwater runoff rates and volumes, soil erosion and non-point source pollution, wherever possible, through stormwater management controls and to ensure that these management controls are properly maintained and pose no threat to public safety.

The information in this Code is supplemental to language in other City Code, ordinances, plans, policies, guidelines and contracts included but not limited to the following:

1) City of Ham Lake Stormwater Pollution Prevention Plan (SWPPP);
2) Building Rules and Guidelines; and
3) Development contracts.

11-2000.10 DEFINITIONS

Best Management Practices (BMP'S): Technique or series of techniques, which are proven to be effective in controlling runoff, erosion, and sedimentation and construction debris confinement.

City: City of Ham Lake.

City Engineer: Ham Lake City Engineer or other designated authority charged with the administration and enforcement of this Code.

Clearing and Grubbing: The cutting and removal of trees, shrubs, bushes, windfalls and other vegetation including removal of stumps, roots and other remains in the designated areas.

Common Plan of Development or Sale: A contiguous area where multiple separate and distinct land disturbing activities may be taking place at different times, or on different schedules, but under one proposed plan. This item is broadly defined to include design, permit application, advertisement or physical demarcation indicating that land-disturbing activities may occur.

Construction Debris: Any waste generated as a result of construction including but not limited to discarded building materials, concrete truck washout, chemicals, litter or refuse and sanitary waste.

Contractor: Any person who's responsible for abiding by the applicable requirements set forth in this Code.

Detention facility: A temporary or permanent natural or man-made structure that provides for the temporary storage of stormwater runoff.

Discharge: The release, conveyance, channeling, runoff or drainage of stormwater, including snowmelt, from a construction or development site.

Disturbed ground: Any clearing, grading, excavating or other activity that removes vegetation and/or exposes or loosens the soil making it susceptible to erosion by wind, water, vehicular traffic or man-made activity.

DNR: Minnesota Department of Natural Resources.

Erosion: The wearing away of the ground surface as a result of the movement of wind, water, ice and/or land disturbance activities.

Erosion Control: A measure that prevents erosion. Examples include soil stabilization practices, horizontal slope grading, temporary or permanent cover, and construction phasing.

Established Yard: A yard that has permanent ground cover established suitable for long-term erosion control including but not limited to seed, sod, native plants, shrubbery, trees, rock or mulch.

Exposed soil areas: Areas of the construction site where the vegetation (trees, shrubs, brush, grasses, etc.) or impervious surfaces have been removed,

thus rendering the soil more prone to erosion. This includes topsoil stockpile areas; borrow areas and disposal areas within the construction site. It does not include temporary stockpiles or surcharge areas of clean sand, gravel, concrete or bituminous, which have less stringent protection requirements. Once soil is exposed, it is considered "exposed soil", until it meets the definition of "final stabilization".

Fill: A deposit of soil or other earth materials placed by artificial means.

Final Stabilization: Requires that all soil disturbing activities at the site have been completed and all soils must be stabilized by a uniform perennial vegetative cover with a minimum density of 70% over the entire pervious surface area, or other equivalent means necessary to prevent soil failure under erosive conditions.

Floodplain: The channel or beds proper and the areas adjoining a wetland, lake or watercourse that have been or hereafter may be covered by the regional flood.

Final Stabilization: Requires that all soil disturbing activities at the site have been completed and all soils must be stabilized by a uniform perennial vegetative cover with a minimum density of 70% over the entire pervious surface area, or other equivalent means necessary to prevent soil failure under erosive conditions.

Grading, Erosion and Sediment Control Plan: A City and local watershed approved plan required prior to commencement of any site grading, which details grading requirements, drainage characteristics and erosion control methods.

Impaired Waters: Water bodies that do not meet water quality standards and designated uses because of pollutant(s), pollution, or unknown causes of impairment.

Impervious surface: A constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than existed prior to development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, or gravel roads. Class 5 gravel surfaces are considered to be impervious surfaces.

Land disturbance activity: Any land change that may result in soil erosion from water or wind and the movement of sediments into or upon waters or lands within this government's jurisdiction, including, but not limited to construction, clearing and grubbing, grading, excavating, transporting and filling of land. Within the context of this ordinance, land disturbance activity does not mean:

1) Minor land disturbance activities including, but not limited to, underground utility repairs, home gardens, home landscaping, minor repairs and maintenance work which do not disturb more than two thousand (2,000) square feet of land or exceed one hundred (100) cubic yards of earthwork provided work does not obstruct or modify a watercourse or storm sewer system and is not located in a floodplain

2) Installation and maintenance of fences, signs, posts, poles, electric,

telephone, cable television, utility lines or individual service connections to these utilities; or

3) General farming practices, or

4) Emergency work to protect life, limb, or property and emergency repairs, unless the land disturbing activity would have otherwise required an approved erosion and sediment control plan, except for the emergency. If such a plan would have been required, then the disturbed land area shall be shaped and stabilized in accordance with the City's requirements as soon as possible.

Local Watershed: The local regulating authority for watershed management; the three servicing Ham Lake include the Coon Creek Watershed District (CCWD), Sunrise River Watershed Management Organization (SRWMO) and Upper Rum River Watershed Management Organization (URRWMO).

MPCA: Minnesota Pollution Control Agency.

Ordinary High Water Level (OHW): The boundary of water basins, watercourses, public waters, and public waters wetlands, and:

1) the ordinary high water level is an elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial;

2) for watercourses, the ordinary high water level is the elevation of the top of the bank of the channel; and

3) for reservoirs and flowages, the ordinary high water level is the operating elevation of the normal summer pool.

Outfall: The point of discharge to any watercourse from a public or private stormwater drainage system.

Permanent cover: Means "final stabilization". Examples include grass, gravel, asphalt and concrete. See also the definition of "final stabilization".

Person: Any individual, firm, company, association, society, corporation or group.

Public Waters: Waters of the state as defined in Minnesota Statutes, Section 103G.005, Subdivision 15.

Retention facility: A temporary or permanent natural or manmade structure that provides for the storage of storm water runoff by means of a permanent pool of water.

Rough Grade: The stage at which the grade approximately conforms to the approved plan.

Runoff: Rainfall, snowmelt, dewatering discharge, irrigation or any man-made sources of water flowing over the ground surface.

Sediment: The product of an erosion process; solid material both mineral and organic, which is in suspension, is being transported, or has been moved by water, wind, or ice and has come to rest on the earth's surface either above or below water level.

Site: Any real property upon which improvements are to be made.

Site Grading: Excavation or fill of material, including the resulting conditions thereof.

Special Water*:* *S*urface water or receiving water that is of a high quality or is deemed worthy to receive extra protection.

Stormwater: Under Minnesota Rule 7077.0105, Subpart 41b, storm water, "means precipitation runoff, stormwater runoff, snow melt runoff and any other surface runoff and drainage". According to the Code of Federal Regulations (CFR), under 40 CFR 122.26 [b][13], "Stormwater means storm water runoff, snow melt runoff and surface and drainage". Stormwater does not include construction site dewatering.

Stormwater Pollution Prevention Plan*:* Joint stormwater, erosion prevention and sediment control plan that is a document containing the requirements of 11-2000.51. When implemented, the plan will define the methods to be used to reduce soil erosion on a parcel of land and off-site non-point pollution. The plan involves both temporary and permanent controls.

Stormwater pond: (also referred to as wet sedimentation basin, wet retention basin, or simply wet pond) is a man-made or modified natural basin constructed to capture and retain stormwater runoff for the purpose of removing pollutants and mitigating downstream water quantity impacts.

Storm sewer system: Includes but is not limited to, the combination of roadway gutters, roadway section ditches, culverts, storm sewer piping, overflow channels, infiltration trenches, detention and retention water quality treatment basins and other methods or devices used for capturing, conveying, controlling and treating stormwater and snow melt runoff.

Surface Waters: *A*ll streams, ponds, lakes, marshes, wetlands, reservoirs, springs, rivers, drainage systems, waterways, watercourses, and irrigation systems, whether natural or artificial, public or private.

Suspended Solids: Total suspended matter that either floats on the surface of, or is in suspension in water and/or other liquids.

Temporary Erosion Protection: Short-term methods installed to prevent erosion. Examples include: silt fence, straw mulch, wood fiber blanket, wood chips and erosion netting.

Vegetated (Grassy) swale: A vegetated earthen channel that conveys storm water while treating the stormwater by biofiltration. Such swales aid in the removal of pollutants by both filtration and infiltration.

Waters of the State: As defined in Minnesota Statutes Section 115.01, Subdivision 22, the term, " . . . waters of the state means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof". *Commentary: According to Minnesota Rules 7050.0130, Subpart A, disposal systems or treatment works operated under either a Minnesota Pollution Control Agency (MPCA) permit or an agency certificate of compliance are not considered "waters of the state." Under Minnesota Rules 7050.0130, Subpart*

F, constructed wetlands designed for wastewater treatment are not "waters of the state." Also see the definition of "Wetlands".

Wetlands: Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this definition, wetlands must have the following three attributes:

1) have a predominance of hydric soils;

2) are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and

3) under normal circumstances support a prevalence of such vegetation (MN Statutes 103.G.005).

11-2000.20 APPLICATION AND SWPPP REQUIREMENTS FOR CONTRACTOR:

It is the responsibility of the Contractor to obtain all the necessary permits from The MPCA, City and local watersheds and abide by all the requirements set forth in the General Stormwater Permit for Construction Activity (Permit Number: MN R100001).

In order to achieve compliance with the Municipal Separate Storm Sewer System (MS4) permit coverage extended to the City by the Minnesota Pollution Control Agency (MPCA), and to be consistent with the Local Surface Water Management Plan adopted by the City of Ham Lake, all public and private development and redevelopment projects, alterations, or improvements shall meet the requirements of this ordinance, the NPDES Construction Stormwater Permit (if applicable) and the rules of whichever Water Management Organization has jurisdiction on the subject property. Except where a variance is granted or ordinance does not require, any person, firm, sole proprietorship, partnership, corporation, state agency, or political subdivision proposing a land disturbance activity within the City shall apply to the City for project approval which shall include one or more of the following:

1) Grading, Erosion and Sediment Control Plan,

2) Stormwater Pollution Prevention Plan (SWPPP) and

3) Stormwater Management Plan.

No land shall be disturbed until the project is approved by the City, has received a watershed permit, any other applicable permits, and conforms to the standards set forth herein.

112000.21 GENERAL CRITERIA

The Grading, Erosion and Sediment Control plan shall be required for any land disturbance activity or project disturbing more than 10,000 square feet and shall minimize exposed soil and unstable soil conditions in area and duration, disturbance of natural soil cover and vegetation, work in and

adjacent to water bodies and wetlands, off-site sediment transport by trucks and equipment, and disturbance to the surrounding soils, root systems and trunks of trees adjacent to site activity that are intended to be left standing. The Plan shall also protect receiving water bodies, wetlands, storm sewer inlets and adjacent properties from sediment deposition. It shall provide a plan for minimal compaction of site soils.

11-2000.30 RIGHT OF ENTRY AND INSPECTION PROVISION:

1) Every licensee shall allow any peace officer, health officer, or properly designated officer or employee of the City to enter, inspect, and search the grounds of the licensee at reasonable hours without a warrant for the purpose of obtaining information, examination of records, conducting investigations or surveys. The authorized representatives may bring in such equipment upon the permitted development as is necessary to conduct surveys and investigations, may examine and copy and books, papers, records or memoranda pertaining to activities or records required to be kept under the terms and conditions of this permitted site.

11-2000.40 ONSITE ACTIVITY REQUIREMENTS:

1) **Debris Storage:** All construction debris shall be kept in an enclosed building or properly contained in a covered container designed for such purposes throughout the construction process.
2) **Waste Disposal:** It shall be the responsibility of the Contractor to dispose of all construction debris in a manner approved by the City.
3) **Construction Entrance Criteria:** The Contractor shall take all the necessary measures to prevent sediment from entering the City streets during the construction process. Such practices shall occur in the manner as prescribed in the Ham Lake Construction Requirements.
4) **Site Dewatering:** Water pumped from the site shall be treated prior to entering a wetland, lake, river or stream to meet requirements set forth by DNR, MPCA and local watershed rules and regulations.

11-2000-50 SUBMITTAL COMPONENTS

An acceptable application for construction will include the following requirements and contain the components detailed in the following sections.

11-2000-51 GRADING, EROSION AND SEDIMENT CONTROL PLANS

The Grading Plan Checklist should be used as a reference. These can be obtained from the City of Ham Lake. All grading and erosion and sediment control plans shall include the following items:

a) Plans for existing and proposed conditions. A complete site plan and specifications, signed by the person who designed the plan shall be in compliance with the City Engineer's requirements, shall be clearly labeled with a north arrow and a date of preparation, and shall include, at a minimum, the following information:

i) Project map indicating site boundaries and existing elevations, property lines and lot dimensions in relation to surrounding roads, buildings and other structures, and other significant geographic features

ii) Identification of all surface waters, on and adjacent to the site and within 1/2 mile of project boundary, including, but not limited to lakes, ponds, streams (including intermittent streams), wetlands, natural or artificial water diversion or detention areas, public and private ditches, subsurface drainage facility (including drain tile), stormwater conveyance, and storm sewer catch basins. Show ordinary high water marks of all navigable waters, 100-year flood elevations, normal and high water elevations of ponds, and delineated wetland boundaries, if any. If not available, appropriate flood zone determination or wetland delineation, or both, maybe required at the applicant's expense.

iii) For projects that have a discharge point on the project that is within one mile of, and flows to, an impaired water, the applicant must identify the impaired water(s) in the SWPPP, and whether there is a USEPA approved TMDL for the pollutant(s) or stressor(s) identified in this part. Unless otherwise notified by the MPCA in writing, the applicant's identification of impaired waters must be based on the most recent USEPA approved section 303(d) Clean Water Act list of impaired waters and USEPA approved TMDLs at the time a complete permit application is submitted. The applicant's identification must include those TMDLs applicable to the project's stormwater discharge that were approved at any time prior to permit application submittal and are still in effect.

iv) Map of watershed drainage areas showing direction of flow for pre and post construction drainage, soil types, infiltration rates, and depth to seasonal high water table.

v) Existing and proposed grades showing drainage on and adjacent to the site using 2 foot contours or less

vi) Existing and proposed impervious surfaces.

vii) Steep slopes of 12% or more existing over a distance for 50 feet or more.

viii) Location of all areas not to be disturbed during construction

including trees, vegetation, and designated areas for infiltration.

ix) Proposed grading or other land-disturbing activity; areas of soil or earth material storage; quantities of soil or earth material to be removed, placed, stored or otherwise moved on site, and delineated limits of disturbance.

x) Locations of proposed runoff control, temporary and permanent erosion and sediment control, and temporary and permanent soil stabilization measures.

xi) If more than 10 acres are disturbed and drained to a single point of discharge temporary sediment basins must be installed, however, if the site has special waters as defined by the NPDES Construction Permit requirements, then temporary sediment basins must be installed where 5 or more acres are disturbed. When site restrictions do not allow for a temporary sediment basin, equivalent measures as approved by the City may be used.

xii) Any mitigation measures required as a result of any review conducted for the project (e.g. wetland mitigation, etc.).

b) A Stormwater Pollution Prevention Plan (SWPPP) specific to the conditions and site.

11-2000-52 SWPPP DESIGN COMPONENTS

The SWPPP Review Checklist should be used as a reference. All SWPPPs shall be reviewed by the City for effectiveness of erosion and sediment control measures in the context of the site topography and drainage, proposed design, suggested location and phased implementation of effective practicable stormwater pollution prevention measures.

1) General Criteria. Design, engineering and implementation of these measures shall use the following performance standards, BMPs, and design criteria:

a) Project Compliance – Statement of how the project will comply with all requirements of the NPDES Phase II regulations.

b) Description – Explanation of the project and associated construction activity.

c) Contact information for the on-site individual responsible for implementation of the SWPPP; and for the project manager and contractor.

d) Training - The applicant must identify a person knowledgeable and experienced in the application of erosion prevention and sediment control BMPs who will oversee the implementation of the SWPPP, and the installation, inspection and maintenance of the erosion prevention and sediment control BMPs before and during construction. Name of person(s) trained, proof of training, date and course

name/provider must be on record and made available as part of the permit application.

e) Runoff easements - If a stormwater management plan involves directing some or all runoff from the site, the applicant shall obtain from adjacent property owners any necessary easements or other property interests concerning flowage of water.

f) Scheduling site activities – The applicant shall schedule site activities to lessen their impact on erosion and sediment creation. A detailed schedule indicating dates and sequence of land alteration activities; implementation, maintenance and removal of erosion and sedimentation control measures; and permanent site stabilization measures shall be provided.

2) Best Management Practices Implementation. All erosion and sediment control and water quality BMP's must be constructed and or installed prior to the commencement of land disturbing activities. These measures shall be coordinated with the different stages of development.

3) Monitoring and inspection. The trained person identified in the SWPPP or their assigned designee must routinely inspect the entire construction site at least once every seven (7) days during active construction and within 24 hours after a rainfall event greater than 0.5 inches in 24 hours. Following an inspection which occurs within 24 hours after a rainfall event, the next inspection must be conducted within seven (7) days after that. All inspections and maintenance conducted during construction must be recorded in writing and these records must be retained with the SWPPP in accordance with the NPDES Construction Site Permit.

4) Other information. The City will require additional or modified information as warranted.

a) The City may require soil borings or other site investigation to be conducted and may require submission of a soils engineering or geology report. The report shall include information as requested by the City.

b) The City may require a stormwater runoff volume and rate analysis report or other hydrologic, water quality and hydraulic computations to be submitted.

c) The SWPPP shall be modified when there is a change in design, operation, maintenance, weather or seasonal conditions that have a significant effect on discharge and/or inspections indicate that the plan is not effective and existing BMP's are not controlling pollutants and discharges from the site.

5) Contractor/Owner inspections and maintenance - The contractor or owner shall be responsible for inspections and maintenance on the site.

a) Inspections and maintenance must be documented and readily available for review on-site. Inspections are required as follows:

i) Once every 7 days on exposed soil areas.

ii) Within 24 hours after a 0.5 inch rain event over 24 hours.

iii) Once every 30 days on stabilized areas.

iv) As soon as runoff occurs or prior to resuming construction on frozen ground.

a) Maintenance is required as follows:

i) When sediment reaches 1/3 the height of the BMP on perimeter control devices, sediment must be removed within 24 hours.

ii) If the perimeter control device is not functional it must be repaired or replaced within 24 hours.

iii) Temporary sediment basins shall be maintained when sediment reaches ½ the outlet height or ½ the basin storage volume. Basin must be drained or sediment removed within 72 hours.

iv) Sediment tracked from construction site vehicle entrance and exit locations must be removed from paved surfaces within 24 hours of discovery.

v) Inlet protection devices must be cleaned weekly or more frequently as necessary. Sediment and other debris captured in these devices must be deposited in appropriate locations or containers.

11-2000-53 SWPPP IMPLEMENTATION COMPONENTS

1) Minimize exposed soil – Land shall be developed in increments of workable size such that adequate erosion and sedimentation control can be provided as construction progresses. At no time shall more than 20 acres be exposed. Special consideration shall be given to the stabilization of steep slopes. Development shall be carefully reviewed to insure adequate measures have been taken to prevent erosion, sedimentation and structural damage.

2) Restabilization - The area exposed shall be covered by an approved ground cover within fourteen (14) days after work is completed. When construction work is completed, a minimum depth of four (4) inches of topsoil meeting current MnDOT specifications shall be spread over the developed area and turf establishment started

3) Reduce Compaction – To reduce soil compaction and enhance vegetation establishment all compacted soil shall be tilled to a depth of at least six inches before revegetation.

4) Perimeter sediment controls - Perimeter sediment control measures shall be properly installed before construction activity begins. These control measures shall be designed to contain

sediment on site and control the quality and quantity of stormwater leaving a site before, during, and after construction. Control measures may include sit fence, compost logs, berms, or other approved methods.

5) Channel protection - Channels shall be diverted around disturbed areas if practical, or other channel protection measures will be required. The normal wetted perimeter of any temporary or permanent drainage channel must be stabilized within 200 lineal feet of the property edge, or from a point of discharge to any surface water. Stabilization must be completed within 24 hours of connecting to surface water. Sediment control is required along channel edges to reduce sediment reaching the channel. Stabilization of all waterways and outlets shall conform with the stipulations of this ordinance.

6) Outlet Protection - Pipe outlets must have approved energy dissipation measures installed within 24 hours of connection to a surface water.

7) Slope Protection - The following control measures shall be taken to control erosion during construction.

- **a)** No exposed slopes shall be steeper in grade than four (4) feet horizontal to one (1) foot vertical.
- **b)** Exposed slopes steeper than ten (10) feet horizontal to one (1) foot vertical shall be stabilized to minimize erosion.
- **c)** At the foot of exposed slopes or slopes with long runs a channel and berm may be required to be constructed to control erosion. The channeled water shall be diverted to the sedimentation basin (debris basin, sediment basin, or silt trap) before being allowed to enter the natural drainage system.
- **d)** At the foot of exposed slopes or slopes with long runs a channel and berm may be required to be constructed to control erosion. The channeled water shall be diverted to the sedimentation basin (debris basin, sediment basin, or silt trap) before being allowed to enter the natural drainage system.
- **e)** Exposed slopes shall be protected by whatever means will effectively prevent erosion considering the degree of slope, soils materials, and expected length of exposure. Slope protection shall consist of mulch, burlap, jute netting, sod blankets, fast growing seeds, temporary plantings or annual grasses. Mulch shall consist of hay, straw, or other approved protective materials. Mulch must be anchored to the slopes by an approved method to provide additional slope stability.
- **f)** Control measures, other than those specifically stated above, may be used in place of the above measures if it can be demonstrated that they will effectively protect exposed

slopes and are approved by the Engineering Department.

g) Wind Erosion. Snow fences or other wind reducing means shall be employed during construction on-site to reduce wind erosion of the soil. These measures shall be employed as soon as construction has started and shall be extended as needed throughout the development.

h) All exposed soil areas with a continuous positive slope that are within 200 lineal feet of any surface water, or any conveyance (curb, gutter, storm sewer inlet, drainage ditch, etc.) to a surface water, must have temporary or permanent cover year around. The area shall be stabilized if it has not been worked for seven (7) days on slopes greater than three feet horizontal to one foot vertical (3:1), fourteen (14) days on slopes ranging from 3:1 to 10:1 and twenty-one (21) days for flatter slopes. On sensitive sites or sites with special waters, exposed soil areas with a greater than three feet horizontal to one foot vertical (3:1) must be stabilized within three (3) days and slopes flatter than 3:1 must be stabilized within seven(7) days. All exposed soil areas must have temporary erosion protection or permanent cover no later than November 1st regardless of the stabilization requirements listed above. All exposed soils from construction activities taking place after November 1st must provide temporary erosion protection or permanent cover by the end of the work day if conditions warrant.

i) If more than 10 acres are disturbed and drained to a single point of discharge temporary sediment basins must be installed. When site restrictions do not allow for a temporary sediment basin, equivalent measures such as smaller basins, check dams, and vegetated buffer strips can be included.

j) For disturbed areas less than ten (10) acres, temporary sedimentation basins are encouraged, but not required. The applicant shall install erosion and sediment controls at locations that result in maximum protection and sediment capture. Minimum requirements include silt fences, rock check dams, or other equivalent control measures along slopes. Silt fences, rock check dams, etc. must be regularly inspected and maintained.

8) Silt fence – Silt fence shall be properly installed by being trenched and buried at least six inches into the soil. Generally, sufficient silt fence will be required to contain sheet flow runoff generated at an individual site. This method is used to prevent sediment damage to adjacent properties and sensitive environmental areas such as water bodies, plant communities, rare, threatened and/or endangered species habitat, wildlife corridors, greenways, wetlands, etc. Provide that all silt fences used for erosion and

sedimentation control and all other temporary controls shall not be removed until the City and other permitting agencies have determined that the site has been permanently stabilized and shall be removed within 30 days thereafter.

9) Soil stockpiling - Temporary stockpiling of one hundred (100) cubic yards or more of excess soil on any lot or other vacant area will not be allowed without issuance of a permit for the earth moving activity in question. Stockpiles of soil or other materials subject to erosion by wind or water shall be covered, vegetated, enclosed, fenced on the down gradient side or otherwise effectively protected from erosion in accordance with the amount of time the material will be on site and the manner of its proposed use. No stockpiling is allowed in the street.

10) Stockpile protections - For soil stockpiles greater than ten (10) cubic yards the toe of the pile must be more than twenty-five (25) feet from a road, drainage channel or stormwater inlet. If left for more than seven (7) days, they must be stabilized with mulch, vegetation, tarps or other means. If left for less than seven (7) days, erosion from stockpiles must be controlled with perimeter control devices such as silt fence. If for any reason a soil stockpile is located closer than twenty-five (25) feet to a road, drainage channel or stormwater inlet, it must be covered with tarps or a more permanent protection and controlled with perimeter control devices immediately.

11) Vehicle exits/entrances - Vehicle tracking of sediment from the construction site must be minimized by BMPs such as stone pads, concrete or steel wash racks, or equivalent systems. Street sweeping must be used if such BMPs are not adequate to prevent sediment from being tracked onto the street. The exit must be at least 50 feet long, and the exit must be graded so runoff does not enter the adjacent street. Place a geotextile fabric under a layer of aggregate at least 6 inches thick. The aggregate size must be a minimum of 1 to 3 inches or an approved equal. Direction should be given to use the designated construction exits.

12) Street cleaning - Streets and outlying roads shall be cleaned and swept within 24 hours whenever tracking of sediments occurs and before sites are left idle for weekends and holidays.

13) Dewatering treatment required – Sediment laden water that is being removed from the site by pumping or trenching shall be treated to remove a minimum of 80 percent of suspended solids before discharge. Water may not be discharged in a manner that causes erosion to receiving channels or flooding of the discharge site.

14) Storm drain protection - All storm drain inlets shall be protected during construction with control measures as approved by the City. These devices shall remain in place until final stabilization of the

site. A regular inspection and maintenance plan shall be developed and implemented to assure these devices are operational at all times, providing protection of storm sewer infrastructure from sediment loading/plugging. Silt fence fabric under catch basin grates will not be considered appropriate protection. Protective devices shall be removed prior to freeze up and replaced when temperature permits.

15) Waste Containment – Appropriate on-site containment must be provided for all trash, solid waste, construction debris, floating debris, and hazardous materials. Disposal of collected sediment shall be deposited only in approved locations.

16) Special Precautions – Extra precautions must be taken to contain sediment when working in or crossing water bodies.

11-2000-54 REVIEW

The City shall complete a review of the SWPPP concurrent with other submittals. City approval is contingent on issuance of all other permits required by other agencies having jurisdiction on the project. There shall be no work on the site until the requirements are met and approval has been granted.

1) Compliance – A SWPPP will be considered compliant when the City determines that the SWPPP meets the requirements of this ordinance and all other requirements for project approval. Compliance assumes implementation and maintenance of the SWPPP components.

2) Non-compliance - If the City determines that the SWPPP does not meet the requirements of this ordinance the City shall not issue approval for the land disturbance activity. The SWPPP must be resubmitted for approval before the land disturbance activity begins.

3) City inspections and enforcement - Inspections are required before any land disturbing activity begins, at the completion of the project and prior to the release of financial securities. The City shall also conduct inspections on a regular basis during the course of construction to ensure that erosion and sediment control measures are properly installed and maintained. In all cases the inspectors will attempt to work with the applicant to maintain proper erosion and sediment control at all sites. In cases where cooperation is withheld or applicant fails to achieve compliance, enforcement proceedings will be applied as outlined in 11-2000.58 below. An inspection must be conducted before any work is allowed to restart.

11-2000-55 MODIFICATION OF PLAN

The applicant must amend the SWPPP as necessary to include additional requirements such as additional or modified BMPs designed to correct problems identified or address situations whenever:

1) A change in design, construction, operation, maintenance, weather, or seasonal conditions that has a significant effect on the discharge of pollutants to surface waters or underground waters.
2) Inspections indicate the SWPPP is not effective in eliminating or significantly minimizing the discharge of pollutants to surface waters or underground waters or that the discharges are causing water quality standard exceedences.
3) The SWPPP is not achieving the general objectives of controlling pollutants and sediments or is not consistent with the terms and conditions of the approved project plans.

11-2000-56 FINANCIAL SECURITIES

The applicant shall be subject to the financial security provisions of the Development Agreement or other Agreements.

11-2000-57 EMERGENCY ACTION

If circumstances exist such that non-compliance with this ordinance poses an immediate danger to the public health, safety and welfare, as determined by the City, the City may take emergency preventative action. The City shall also take every reasonable action possible to contact and direct the applicant to take any necessary action. Any cost to the City may be recovered from the applicant's financial security.

11-2000-58 NOTIFICATION OF FAILURE OF THE SWPPP

The City shall notify the project contact of the failure of the SWPPP's measures**.**

1) Initial contact. The initial contact will be to the party or parties listed on the application and/or the SWPPP as contacts. Except during an emergency action, forty-eight (48) hours after notification by the City or seventy-two (72) hours after the failure of erosion control measures, whichever is less, the City at its discretion, may begin corrective work. Such notification should be in writing, but if it is verbal, a written notification should follow as quickly as practical. If after making a good faith effort to notify the responsible party or parties, the City has been unable to establish contact, the City may proceed with corrective work. If there are conditions when time is of the essence in controlling erosion, the City may take immediate action, and then notify the applicant as soon as possible. Any cost incurred by the City may be recovered from the applicant's financial security.
2) Erosion off-site. If erosion breaches the perimeter of the site, the applicant shall immediately develop a cleanup and restoration plan, obtain the right-of entry from the adjoining property owner, and implement the cleanup and restoration plan within forty-eight (48) hours of obtaining the adjoining property owner's permission. In no case, unless written approval is received from the City, may more

than seven (7) calendar days go by without corrective action being taken. If in the discretion of the City, the permit holder does not repair the damage caused by the erosion, the City may do the remedial work required. Any cost incurred by the City may be recovered from the applicant's financial security. When restoration to wetlands and other resources are required, the applicant will be required to work with the appropriate agency to ensure that the work is done properly.

3) Erosion into streets, wetlands or water bodies. If eroded soils (including tracked soils from construction activities) enter or appear likely to enter streets, wetlands, or other water bodies, cleanup and repair shall be immediate. The applicant shall provide all traffic control and flagging required to protect the traveling public during the cleanup operations.

4) Failure to do corrective work. When an applicant fails to conform to any provision of this policy within the time stipulated, the City may take one or more of the following actions:

- **a)** Issue a stop work order, withhold the scheduling of inspections, and/or the issuance of a Certificate of Occupancy
- **b)** Correct the deficiency or hire a contractor to correct the deficiency. Project approval constitutes a right-of-entry for the City or its contractor to enter upon the construction site for the purpose of correcting deficiencies in erosion control.
- **c)** Require reimbursement to the City for all costs incurred in correcting stormwater pollution control deficiencies. If payment is not made within thirty (30) days after costs are incurred by the City, payment will be made from the applicant's financial securities.

11-2000.60 SANCTIONS FOR COMPLIANCE:

1) Violations Declared: A case where a BMP has failed, was removed, was not properly installed, was not installed or was not managed properly, which increases the potential for pollutants to waters of the state includes but is not limited to the following:

- **a)** Silt fence failure or improper installation;
- **b)** Non-storm water discharges on impervious surfaces;
- **c)** Garbage, refuse, construction debris; and
- **d)** The presence of barren soils for an extended period of time.

2) Corrective Measures: The following are corrective measures that shall be taken, as directed by the City:

- **a)** Repairing and/or adding silt fence;
- **b)** Removing pollutants from impervious surfaces including

streets and gutters not limited to sand or other sediment, brush, garbage, refuse, construction debris, oils and concrete washout by an effective means;

c) Picking up garbage, refuse or construction debris in and amongst the grounds of the development and/or adjacent properties; and

d) Stabilizing the site by furnishing adequate ground cover to lessen wind and water erosion as prescribed in the Ham Lake Construction Requirements.

3) **Procedure for Correction:** Upon the determination of a violation, a deadline for correction shall be given with notification of penalties for failing to comply. The Contractor shall be notified both orally and in writing, and will be given a reasonable timeframe for correcting the violation.

4) **Penalties for Non-compliance:** Failure to meet the deadline will result in one or more of the following penalties:

a) The City performing the necessary work or contracting for the completion of the work and billing the contractor for said services and/or using escrow funds;

b) Discontinuing the issuance of any permits or Certificate of Occupancies development or for the individual lot;

c) Stop work orders; and

d) Discontinuing scheduled inspections.

Violation; Misdemeanor: Any person who is found to violate any section of this Code shall be charged with a misdemeanor and, upon conviction thereof, shall be subject to a misdemeanor penalty as then defined by Minnesota law. Additionally, the City may exercise any civil remedy available under Minnesota law for enforcement of this Code including civil action, mandamus, injunctive relief, declaratory action, or the levying of assessments.

11-2100 SUBSURFACE SEWAGE TREATMENT SYSTEM (SSTS) AND WELL WATER LOAN PROGRAM

Pursuant to the authority of Minnesota Statutes Chapter 115.57, the City of Ham Lake hereby establishes the following SSTS and Well Loan Program. The program is intended to offer loans to eligible parties to repair or replace existing SSTS or water wells. The program is to be funded from monies made available from the Anoka County Housing and Redevelopment Authority (HRA) out of a special tax levy that has been and is being imposed on Ham Lake properties for the benefit of Ham Lake housing issues.

11-2110 Eligibility: Conditions

APPENDIX H

Post Construction Storm Water Management
City Code 11-2300

11-2230 – Procedure

a) **Application -**Application for a Fill Permit shall be made to the City's Building Official. The Building Official may issue the permit for projects involving the transport of less than 1,200 cubic yards of fill. For permits involving greater than 1,200 cubic yards of fill, the permit shall be reviewed by the Planning Commission with recommendations from the Building Official and Engineer, and acted upon by the City Council for final decision. The Building Official may, in his or her discretion, require a public hearing with such notice to nearby properties as is deemed reasonable by the Building Official.

b) Conditions of Permit – all Permits shall contain, at a minimum, conditions that regulate the routes and times of delivery, the frequency of delivery, the quantity of fill, and erosion or silt control deemed appropriate by the City, and a requirement that the applicant observe all of the regulations or rules of any other agency having jurisdiction over the activity, including, without limitation, the local watershed district.

c) Development Agreement and Security for Performance and/or Maintenance – on all Permits reviewed by the Planning Commission, it shall be a condition of issuance that the City and the applicant enter into a Development Agreement to enforce conditions, which may require the posting of adequate security by the Applicant to guarantee performance and maintenance, and reimbursement to the City for costs incurred in the review process.

d) Fees – Fees for Fill Permits shall be established by ordinance.

11-2300 POST-CONSTRUCTION STORM WATER MANAGEMENT

This Code shall be applicable to all subdivision or site plan applications, unless eligible for an exemption or granted a waiver by the City under the specifications of Article 11-2300.50 of this Code. This Code also applies to land development activities that are smaller than the minimum applicability criteria if such activities are part of a larger common plan of development that meets the following applicability criteria, even though multiple separate and distinct land development activities may take place at different times on different schedules. In addition, all plans must also be reviewed by local environmental protection officials to ensure that established water quality standards will be maintained during and after development of the site and that post construction runoff levels are consistent with any local and regional watershed plans. Projects disturbing more than one acre shall follow the most current General Permit to Discharge Stormwater Associated with Construction Activity under the National Pollutant Discharge Elimination System/State Disposal System permit program (the Permit) issued by the MPCA, as

amended, and shall take the necessary precautions to prevent soil erosion, damage to adjacent property and control runoff to surface water.

11-2300.10 Definitions

Accelerated Erosion: erosion caused by development activities that exceeds the natural processes by which the surface of the land is worn away by the action of water, wind, or chemical action.

Applicant: a property owner or agent of a property owner who has filed an application for a storm water management permit.

Building: any structure, either temporary or permanent, having walls and a roof, designed for the shelter of any person, animal, or property, and occupying more than 100 square feet of area.

Best Management Practices (BMPs): erosion and sediment control and water quality management practices that are the most effective and practicable means of controlling, preventing and minimizing degradation of waters of the state, including avoidance of impacts, prohibitions of practices, general housekeeping practices, pollution prevention and educational practices, operating and maintenance procedures, and other applicable management practices.

Channel: a natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

Common Plan of Development: a contiguous area where multiple separate and distinct land disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. One plan is broadly defined to include design, permit application, advertisement or physical demarcation indicating that land disturbing activities may occur.

Construction Activity: a land disturbing activity where one half (1/2) acre or more new impervious surfaces is created and/or developed, or one (1) acre of land disturbance occurs. Construction activity includes land disturbing activities that are part of a large common plan of development.

Dedication: the deliberate appropriation of property by its owner for general public use.

Detention: the temporary storage of storm runoff in a storm water management practice with the goals of controlling peak discharge rates and providing gravity settling of pollutants.

Detention Facility: a detention basin or alternative structure designed for the purpose of temporary storage of stream flow or surface runoff and gradual release of stored water at controlled rates.

Developer: a person who undertakes land disturbance activities.

Drainage Easement: a legal right granted by a landowner to a grantee allowing the use of private land for storm water management purposes.

Grading, Drainage and Erosion Control Plan: a plan that is designed to minimize the accelerated erosion and sediment runoff at a site during construction activities.

Green Infrastructure: a wide array of practices at multiple scales that manage wet weather and that maintains or restores natural hydrology by infiltrating, evapotranspiration, or harvesting and using stormwater. On a regional scale, green infrastructure is the preservation or restoration of natural landscape features, such as forests, floodplains and wetlands, coupled with policies such as infill and redevelopment that reduce the overall imperviousness in a watershed. On a local scale, green infrastructure consists of the site and neighborhood-specific practices such as bioretention, trees, green roofs, permeable pavements and cisterns.

Hotspot: an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water.

Hydrologic Soil Group (HSG): a Natural Resource Conservation Service classification system in which soils are categorized into four runoff potential groups. The groups range from A soils, with high permeability and little runoff production, to D soils, which have low permeability rates and produce much more runoff.

Impervious Surface: a constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to the development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, compacted gravel, concrete, asphalt, or gravel roads.

Industrial Storm Water Permit: a National Pollutant Discharge Elimination System permit issued to a commercial industry or group of industries which regulates the pollutant levels associated with industrial storm water discharges or specifies on-site pollution control strategies.

Infiltration: the process of percolating storm water into the subsoil.

Infiltration Facility: any structure or device designed to infiltrate retained water to the subsurface. These facilities may be above grade or below grade.

Jurisdictional Wetland: an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

Land Disturbance Activity: any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation, or any activity which bares soil or rock or involves the diversion or piping of any natural or man-made watercourse.

Landowner: the legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land

New Development: all construction activity that is not defined as redevelopment.

Nonpoint Source Pollution: pollution from any source other than from any discernible, confined, and discrete conveyances, and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

Off-Site Facility: a storm water management measure located outside the subject property boundary described in the permit application for land development activity.

On-Site Facility: a storm water management measure located within the subject property boundary described in the permit application for land development activity.

Operation and Maintenance (O&M) Agreement: a legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance of storm water management practices.

Recharge: the replenishment of underground water reserves.

Redevelopment: any construction activity where, prior to the start of construction, the areas to be disturbed have 15 percent or more of impervious surface(s).

Stop Work Order: an order issued which requires that all construction activity on a site be stopped.

Storm Water Management: the use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, peak flow discharge rates and detrimental changes in stream temperature that affect water quality and habitat.

Storm Water Retrofit: a storm water management practice designed for an existing development site that previously had either no storm water management practice in place or a practice inadequate to meet the storm water management requirements of the site.

Storm Water Runoff: rain water runoff, snow melt and subsurface runoff and drainage.

Storm Water Treatment Practices (STPs): measures, either structural or nonstructural, that are determined to be the most effective, practical means of preventing or reducing point source or nonpoint source pollution inputs to storm water runoff and water bodies.

Structural Stormwater BMPs: stationary and permanent BMPs designed, constructed and operated to prevent or reduce the discharge of pollutants in stormwater.

Water Quality Volume (WQ_v): the storage needed to capture and treat 90% of the average annual storm water runoff volume. Numerically **(WQ_v)** will vary as a function of long term rainfall statistical data.

Watercourse: a permanent or intermittent stream or other body of water, either natural or man-made, which gathers or carries surface water.

11-2300.20 Applicability

To prevent the adverse impacts of storm water runoff, the City has developed a set of performance standards that must be met at new development sites. These standards apply to any construction activity disturbing 10,000 or more square feet of land.

11-2300.21 Exemptions

The following activities may be exempt from these storm water performance criteria:

a) Any agricultural activity which is consistent with an approved localized or City-wide soil conservation plan or stormwater management plan prepared or approved by the City, and is consistent with the rules and regulations of other agencies having jurisdiction over such activities a

b) Additions or modifications to existing single family structures.

c) Repairs to any storm water treatment practice deemed necessary by the City.

d) Projects that are covered by other portions of this Code, which require City permits or other City approvals, and which contain requirements for dealing with stormwater runoff that are of equal or better effectiveness than the requirements of Article 11-2300, or which may be duplicitous of the requirements of Article 11-2300. Such portions of the City Code include, but are not limited to the Subdivision Code and portions of the Code dealing with excavations and land reclamation projects.

11-2300.22 Redevelopment Projects

When a Site Plan is submitted that qualifies as a redevelopment project as defined in Article 11-2300.30 of this Code, decisions on permitting and on-site storm water requirements shall be governed by special storm water sizing criteria found in the current Storm Water Pollution Prevention Plan (see Article 11-2300.20 below). This criteria is dependent on the amount of impervious area created by the redevelopment and its impact on water quality. Final authorization of all redevelopment projects will be determined after a review by the City of Ham Lake.

11-2300.23 Compatibility with Other Permit and Ordinance Requirements

This Code is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, stature, or other provision of law. The requirements of this Code should be considered minimum requirements, and where any provision of this Code imposes restrictions different from

those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

11-2300.30 Post-Construction Stormwater Standards

1) The following volume control standards shall be met as described below for all construction activities. Construction activities are land disturbing activities where one half (1/2) acre or more of new impervious surfaces are created and/or redeveloped, or one (1) acre of land disturbance occurs. Construction activity includes land disturbing activities that are part of a larger common plan of development.

a) All new development projects shall retain, on-site (i.e. infiltration or other volume reduction practices) and not discharge off-site, a runoff volume equal to 1 inch from the proposed increase of impervious surfaces.

b) All redevelopment projects, shall retain, on-site (i.e. infiltration or other volume reduction practices) and not discharge off-site, a runoff volume equal to 1 inch from the proposed increase of impervious surfaces.

c) To the maximum extent practicable, volume control measures should be distributed evenly throughout the development areas.

d) Green infrastructure techniques and practices (including, but not limited to, infiltration, evapotranspiration, reuse/harvesting, conservation design, urban forestry, green roofs), shall be given preference as design options consistent with zoning, subdivision and PUD requirements.

e) Best management practices must meet design specifications as outlined and incorporated in 11-2300.30.

f) For linear projects, a reasonable attempt must be made to obtain right-of-way during the project planning process for volume control practices. For linear projects where the lack of right-of-way precludes the installation of volume control practices, exceptions, as described 11-2300.30 can be applied.

g) Wetlands/ponds are considered to be an impervious surface. While subject to rate control requirements, rainfall on wetlands/ponds is not subject to volume control standards.

h) As sites redevelop, the proposed site modifications must meet or exceed the stormwater volume standards that were previously achieved.

2) Infiltration techniques are restricted, without detailed engineering review, when the infiltration device will receive discharges from, or be constructed in:

a) Areas of predominately Hydrologic Soils Group D (clay) soils.

b) Areas within 1,000 feet up-gradient, or within 100 feet down-gradient of active karst features.

c) Areas within a Drinking Water Supply Management Area (DWSMA) as defined in subpart 13 of Minnesota Rules 4720.5100.

d) Areas where soil infiltration rates are more than 8.3 inches per hour.

3) Infiltration treatment methods are prohibited in the following areas:

a) Where industrial facilities are not authorized to infiltrate industrial stormwater under an NDPES/SDS Industrial Stormwater Permit issued by the Agency.

b) Where vehicle fueling and maintenance occur.

c) With less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock.

d) Where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater.

4) The following rate control standards shall be met as described below:

a) Discharge rates shall be derived using the standards methods of the *Natural Resources Conservation Service TR-55 or TR-20* as defined in the current *Hydrology Guide for Minnesota.*

b) In cases where the downstream conveyance system is a clearly defined manmade system of limited capacity, the allowable discharge will be limited to the prorated share of the property to the overall service area. Typically, this type of system will require the 100-year post-development rate of discharge to be equal or less than the 5-year post-development rate of discharge, but it may be considerably less with no correlation to a given rainfall event frequency.

c) In cases where the downstream conveyance system is a natural system, features shall be incorporated into the stormwater management plan to meet the following requirements: 100-year post-development rate of discharge to be equal or less than the 10-year pre-development rate of discharge.

d) For receiving systems where rates are of limited concern, the rate of discharge after development/redevelopment must be equal or less than the existing rate of discharge for the following rainfall events: 2-year, 10-year and 100-year.

5) All stormwater design calculations, specifications, site plans and supporting hydraulic modeling are subject to the review and approval of the City Engineer or its designee.

6) Property owner shall maintain all stormwater facilities in proper condition Consistent

11-2300.40 Post-Construction Stormwater Standards Exceptions and Mitigation

1) Projects shall fully attempt to comply with the volume control requirements in 11-2300.30. A reduced volume control on the site of the original construction activity may be applied, at the discretion of the City, under the following circumstances:

a) The owner and/or operator of the construction activity is precluded from infiltrating stormwater through a designed system due to limitations as specified and incorporated in 11-2300.30(3).

b) The owner and/or operator of the construction activity implements to the maximum extent practicable volume reduction techniques, other than infiltration, on the site of the original construction activity that reduces stormwater discharge volumes.

2) If the owner and/or operator of a construction activity is granted a volume control exception, alternatives 1, 2 and 3 below are required to be followed. This process includes mitigation provisions for requirements that cannot be met on the site of the original construction activity.

a) Alternative #1: Applicant attempts to comply with the following conditions:

i) Achieve at least half of the volume reduction required.

ii) Remove 75% of the annual TP load from the increase in impervious surfaces if the

iii) site is new development or from the new and/or fully reconstructed impervious

iv) surfaces for a redevelopment site.

v) Options considered and presented shall examine the merits of relocating project

vi) Elements to address varying soil conditions and other constraints across the site.

b) Alternative #2: Applicant attempts to comply with the following conditions:

i) Achieve volume reduction to the maximum extent practicable.

ii) Remove 60% of the annual TP load from the increase in impervious surfaces if

iii) The site is new development or from the new and/or fully reconstructed

iv) Impervious surfaces for a redevelopment site.

v) Options considered and presented shall examine the merits of relocating project

vi) Elements to address varying soil conditions and other constraints across the site.

c) Alternative #3: Off-site mitigation, as approved by the City Engineer, equivalent to the volume reduction requirement for the construction activity, can be used in areas selected in the below order of preference. Off-site mitigation projects shall be completed within 24 months after the start of the original construction activity.

i) Locations that yield benefits to the same receiving water that receives runoff

ii) From the original construction activity.

iii) Locations within the same Department of Natural Resources (DNR) catchment

iv) Area as the original construction activity.

v) Locations in the next adjacent DNR catchment area up-stream.

vi) Locations anywhere within the City.

3) The owner and/or operator of a construction activity must provide appropriate documentation to the City as support for volume control exceptions and/or mitigation provisions above.

11-2300.50 Post Construction Maintenance and Inspections of Structural Stormwater BMPs

Any structural stormwater BMP that the City determines to be private shall meet the following requirements:

1) A permanent public easement shall be provided to the City for access for inspection and/or maintenance purposes. Costs incurred by the City for any maintenance of private systems will be billed and/or assessed to the owner per 11-2300.70.

2) The owner shall enter into a recorded Maintenance Agreement with the City. The agreement shall include as an attachment an inspection and maintenance plan. The terms and conditions of the Maintenance Agreement with attachments shall be binding upon, and shall insure to the benefit of the parties and their respective successors and assigns.

3) The permanent public easement and Maintenance Agreement shall be recorded with the County Recorder or Registrar of Titles in the respective County where the Structural Stormwater BMP is located. A

copy of the recorded permanent public easement and Maintenance Agreement shall be provided to the City prior to the certificate of occupancy or one (1) year after the site's land disturbance permit is approved, whichever comes later.

4) The inspection and maintenance plan shall be developed, approved, and included as an attachment with the Maintenance Agreement. At a minimum, maintenance plans must include the following information:
- **a)** Responsible person(s) for completing inspections and conducting maintenance;
- **b)** Frequency of inspections of maintenance; and
- **c)** Inspection checklist and type of maintenance anticipated

5) If site configurations or structural stormwater BMPs change, decreasing BMP effectiveness, new or improved structural stormwater BMPs must be designed and implemented to meet the requirements of this section. New and/or improved BMP plans must be submitted to the City Engineer for review and approval.

6) The property owner shall maintain all structural stormwater BMPs in proper condition consistent with the performance standards for which they were originally designed.

7) The property owner shall keep on file all structural stormwater BMP annual inspection and maintenance records for 5 years and submit to the City as requested.

11-2300.60 Public Structural Stormwater BMPs and Drainage Easements

Alterations affecting the function of a public structural BMP, and/or drainage easement, must be approved by the City Engineer.

11-2300.70 Violations and Enforcement

1) Violation Enforcement

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Code, Development Agreements and recorded Operation and Maintenance Agreements.

a) Immediate Danger

Whenever in the judgment of the Public Works Superintendent or designee charged with enforcement, it is determined upon investigation the violation constitutes an immediate dance to the public health or public safety, an administrative citation may immediately be issued to the property owner. In other instances where an immediate public health or safety threat does not exist, the enforcement official may issue a notice and order to correct.

b) Notification

Upon the issuance of an immediate administrative citation, the Public Works Superintendent or designee will also send written

notification of the violation to the person committing or maintaining the violation, and require the person to terminate and abate the violation within 24 hours or such other period specified by the enforcement official. The written notice will be served upon the person committing or maintaining the violation in person or by first class mail, or if unknown, then by posting a copy of the notice on the site.

2) Abatement of Violation

If the violation is not corrected as described in the notice and order to correct, the abatement of the violation will be under the direction of the Public Works Superintendent, or designee. The expenses for the abatement will include a $75.00 administrative fee in addition to the actual costs of the abatement. Abatement actions that require the presence of City staff for more than one hour during the abatement or other extraordinary coordination efforts will be billed to the property owner at the rate of $60.00 per hour. If abatement expenses are not paid, they will be levied against the property as a special assessment and collected as in the case of other special assessments. A $50.00 charge will be added to all accounts certified to the County Auditor's office for collection. This fee is to be considered separate and distinct from any penalty or interest that may be charged by the County as a result of the certification.

3) Penalties

Any person who is found to have violated any provision of this Code, or permits, agreements, and orders issued hereunder, shall be fined in an amount not to exceed $1,000 per violation. Each calendar day on which noncompliance shall occur or continue shall be deemed a separate distinct violation. Unpaid charges, fines and penalties shall constitute a lien against the subject property. Users desiring to dispute such fines must file a request.

4) Costs

In addition to the penalties provided herein, the City may recover court costs, court reporter's fees and other expenses of litigation by an appropriate action against the person found to have violated this Code shall become liable to the City for any expense, loss or damage. The Public Works Superintendent may add to the violator's charges and fees, the costs assessed for any cleaning, repair or replacement work caused by the violation or discharge. Additional inspections caused by noncompliance will be billed to the affected property owner at 2.5 times the base hourly salary of the inspector.

11-2300.80 Development of a Storm Water Pollution Prevention Plan

The City of Ham Lake may furnish additional policy, criteria and information including specifications and standards, for the proper implementation of the requirements of this Code and may provide such information in the form of the Storm Water Pollution Prevention Plan. This Plan will include a list of acceptable storm water treatment practices, including the specific design criteria and operation and maintenance requirements for each storm water practice. The Plan may be updated and expanded from time to time, at the discretion of the local review authority, based on improvements in engineering, science, monitoring and local maintenance experience. Storm water treatment practices that are designed and constructed in accordance with these design and sizing criteria will be presumed to meet the minimum water quality performance standards.

11-2300.90 Permit Procedures and Requirements

No land owner or land operator shall receive any of the building, grading or other land development permits required for land disturbance activities without first meeting the requirements of this Code prior to commencing the proposed activity.

11-2300.91 Application Requirements

Unless specifically excluded by this Code, any land owner or operator desiring a permit for a land disturbance activity shall submit to the City of Ham Lake a permit application on a form provided for that purpose prior to the start of construction. Unless otherwise excepted by this Code, a permit application must be accompanied by the following in a form established by the City in order that the permit application be considered:

a) a Site Plan, which includes post-construction stormwater management BMPs;

b) an operation and maintenance agreement;

c) a non-refundable permit review fee.

11-2300.92 Application Procedure

Applications shall be made on forms and to specifications established by City staff. All application materials will be forwarded to the City Engineer for review. Review shall be limited to evaluating compliance with the provisions of this Code and other regulations or rules of agencies having jurisdiction of the activities. Upon completion of review, the Engineer shall forward comments and recommendations to the City Council for final action. Final review shall not be deemed completed until all aspects of the review process have been completed. City Council action shall be completed within Minnesota statutory rules for such approvals, if

applicable. Then Engineer's recommendations shall include a mandatory completion date and security requirements, if any.

Prior to making a decision on any application, the City Council may, but is not required to conduct a public hearing on the project, providing such published and mailed notice as is deemed appropriate by the City Council.

11-2300.93 Development Agreement

Projects approved for permits under this Code shall be contingent upon execution of a written Development Agreement between the City and the applicant addressing such matters as the City deems appropriate.

11-2300.94 Reimbursement of Costs

All costs incurred by the City in reviewing and inspecting projects covered by this Code shall be reimbursed by the applicant in the manner provided by the Development Agreement.

11-2300.95 Inspection

All projects for which a storm water management plan is required shall be subject to periodic inspections by the City's agent, as outlined in the Development Agreement.

11-2300.100 Waivers to Storm Water Management Requirements

In lieu of submitting the application and materials outlined in Article 11-2300.40, an applicant may submit a written request for a waiver of the requirements of this Code. The minimum requirements for storm water management may be waived in whole or in part by the City Council, on recommendation of the City Engineer, provided that at least one of the following conditions applies:

a) It can be demonstrated that the proposed development is not likely to impair attainment of the objectives of this Code;

b) Alternative minimum requirements for on-site management of storm water discharges have been established in a storm water management plan that has been approved by the City Engineer and the implementation of the plan is required by local ordinance.

c) Provisions are made to manage storm water by an off-site facility. The off-site facility is required to be in place, to be designed and adequately sized to provide a level of storm water control that is equal to or greater than that which would be afforded by on-site

practices and there is a legally obligated entity responsible for long-term operation and maintenance of the storm water practice.

d) The City Engineer finds that meeting the minimum on-site management requirements is not feasible due to the natural or existing physical characteristics of a site.

e) The project is covered by another portion of the City Code providing sufficient attention to stormwater runoff.

11-2300.110 General Performance Criteria for Storm Water Management

Unless judged by the City to be exempt or granted a waiver, the following performance criteria shall be addressed for storm water management at all sites:

11-2300.111 Peak Flow Rates

All site designs shall establish storm water management practices to control the peak flow rates of storm water discharge associated with specified design storms and reduce the generation of storm water. These practices should seek to utilize pervious areas for storm water treatment and to infiltrate storm water runoff from driveways, sidewalks, rooftops, parking lots, and landscaped areas to the maximum extent practical to provide treatment for both water quality and quantity.

11-2300.112 Discharge

Storm water runoff generated from new development shall not discharge untreated storm water directly into a jurisdictional wetland or local water body without adequate treatment. Where such discharges are proposed, the impact of the proposal on wetland functional values shall be assessed using a method acceptable to the City Engineer. In no case shall the impact on functional values be any less than allowed by the Army Corps of Engineers or the Watershed Management Organization/Watershed District responsible for natural resources.

11-2300.113 Channel Protection

To protect stream channels from degradation, specific channel protection criteria shall be provided as prescribed in the Storm Water Pollution Prevention Plan.

11-2300.114 Sensitive Areas

Storm water discharges to critical areas with sensitive resources (i.e., cold water fisheries, shellfish beds, swimming beaches, recharge areas,

water supply reservoirs) may be subject to additional performance criteria, or may need to utilize or restrict certain storm water management practices.

11-2300.115 NPDES Compliance

Certain industrial sites are required to prepare and implement a storm water pollution prevention plan, and shall file a Notice of Intent (NOI) under the provisions of the National Pollutant Discharge Elimination System (NPDES) general permit. The storm water pollution prevention plan requirement applies to both existing and new industrial sites.

11-2300.116 Hotspots

Storm water discharges from land uses or activities with higher potential pollutant loadings, known as “hotspots”, may require the use of specific structural STPs and pollution prevention practices.

11-2300.117 Additional Requirements

Prior to design, applicants are required to consult with the City Engineer to determine if they are subject to additional storm water design requirements.

11-2300.118 Sizing

The calculations for determining peak flows as found in the Storm Water Pollution Prevention Plan shall be used for sizing all storm water management practices.

11-2300.120 Basic Storm Water Management Design Criteria

Stormwater practice plans shall meet the following design criteria.

11-2300.121 Minimum Control Requirements

All storm water management practices will be designed so that the specific storm frequency storage volumes (e.g., recharge, water quality, channel protection, 10-year, 100-year) as identified in the current Storm Water Pollution Prevention Plan are met, unless the City grants the applicant a waiver or the applicant is exempt from such requirements. In addition, if hydrologic or topographic conditions warrant greater control than that provided by the minimum control requirements, the City reserves the right to impose any and all additional requirements deemed necessary to control the volume, timing, and rate of runoff.

11-2300.122 Site Design Feasibility

Storm water management practices for a site shall be chosen based on the physical conditions of the site. Among the factors that should be considered:

a) Topography
b) Maximum Drainage Area
c) Depth to Water Table
d) Soils
e) Slopes
f) Terrain
g) Head
h) Location in relation to environmentally sensitive features or ultra-urban areas

Applicants shall consult the Storm Water Pollution Prevention Plan for guidance on the factors that determine site design feasibility when selecting a storm water management practice.

11-2300.123 Conveyance Issues

All storm water management practices shall be designed to convey storm water to allow for the maximum removal of pollutants and reduction in flow velocities. This shall include, but not be limited to:

a) Maximizing of flow paths from inflow points to outflow points
b) Protection of inlet and outfall structures
c) Elimination of erosive flow velocities
d) Providing of under drain systems, where applicable

The Storm Water Pollution Prevention Plan shall provide detailed guidance on the requirements for conveyance for each of the approved storm water management practices.

11-2300.124 Pretreatment Requirements

Every storm water treatment practice shall have an acceptable form of water quality pretreatment, in accordance with the pretreatment requirements found in the current Storm Water Pollution Prevention Plan. Certain storm water treatment practices, as specified in the Storm Water Pollution Prevention Plan, are prohibited even with pretreatment in the following circumstances:

a) Storm water is generated from highly contaminated source areas known as “hotspots”.
b) Storm water is carried in a conveyance system that also carries contaminated, non- storm water discharges.
c) Storm water is being managed in a designated groundwater recharge area.

d) Certain geologic conditions exist (e.g., karst) that prohibit the proper pretreatment of storm water.

11-2300.125 Treatment/Geometry Conditions

All storm water management practices shall be designed to capture and treat storm water runoff according to the specifications outlined in the Storm Water Pollution Prevention Plan. These specifications will designate the water quantity and quality treatment criteria that apply to an approved storm water management practice.

11-2300.126 Landscaping Plans Required

All storm water management practices must have a landscaping plan detailing both the vegetation to be in the practice and how and who will manage and maintain this vegetation. This plan must be prepared by a registered landscape architect or soil conservation district.

11-2300.127 Operation and Maintenance Agreements

All storm water treatment practices shall have an enforceable operation and maintenance agreement to ensure the system functions as designed. This agreement will include any and all maintenance easements required to access and inspect the storm water treatment practices, and to perform routine maintenance as necessary to ensure proper functioning of the storm water treatment practice. In addition, a legally binding covenant specifying the parties responsible for the proper maintenance of all storm water treatment practices shall be secured prior to issuance of any permits for land disturbance activities.

11-2300.128 Non-Structural Storm Water Practices

The use of non-structural storm water treatment practices is encouraged in order to minimize the reliance on structural practices. Credit in the form of reductions in the amount of storm water that must be managed can be earned through the use of non-structural practices that reduce the generation of storm water from the site. These non-structural practices are explained in detail in the current Storm Water Pollution Prevention Plan and applicants wishing to obtain credit for use of non-structural practices must ensure that these practices are documented and remain unaltered by subsequent property owners.

APPENDIX I

Commercial Site Plan Requirements

City of Ham Lake

Commercial Grading, Drainage and Erosion Control Plan Checklist

The following items are to be completed and approved by the City Engineer prior to placing the Grading, Drainage and Erosion Control Plan on the City Council Agenda for City Council Approval:

Grading, Drainage and Erosion Control Drawings:

All Sheets:

- ☐ Drawings to be on sheets no larger than 24 inch x 36 inch
- ☐ Graphic scale and north arrow
- ☐ Scale to be no larger than 1"=50'
- ☐ Signature of engineer
- ☐ Date of Preparation
- ☐ Date of revision(s) (if any)

First Sheet Only:

- ☐ Vicinity map
- ☐ Legend

Existing conditions:

- ☐ Underground and overhead utilities including wells and septic fields within 150 feet of the site boundaries
- ☐ Indicate which existing well and septic fields within the site boundaries are to be abandoned and which are to remain
- ☐ Easements shown and labeled
- ☐ Easements to be vacated shown and labeled
- ☐ Streets and street right-of-way shown and labeled
- ☐ Topographic information, including trees, with maximum contour intervals of 2 feet within 150 feet of the site boundary
- ☐ Spot grades along proposed site entrance gutter
- ☐ Buildings within the site boundary
- ☐ Existing structure location and indication of demolition or relocation
- ☐ Wetlands shown on the Grading, Drainage and Erosion Control Plan match wetlands shown in wetland delineation report
- ☐ Wetland impacts and wetland mitigation areas shown as approved by Watershed District/Watershed
- ☐ Management Organization
- ☐ Ponds, lakes, ditches and storm drains
- ☐ NWL and HWL for pond, lakes and ditches
- ☐ Rim elevations, invert elevations, pipe size and type pipe to all drainage structures, storm

drains and culverts
- ☐ FEMA Zone A limits

Proposed conditions:
- ☐ Wells and ISTS area. Wells must not be within 50’ of ISTS areas and septic tanks (unless shallow <50 feet deep, then 100’ of ISTS), within 20’ of storm water drain pipe, within 35’ of HWL of a stream, river, pond, lake or wetland and 50’ from an unused, unsealed well or boring. Refer to MN Dept. Of Health Chapter 4725.
- ☐ ISTS areas are subject to the Building Department’s approval. References: City Code 11-450 and MPCA Statute 7080.
- ☐ Label all proposed easements
- ☐ Located with “overlay district” and conforming with Ordinance 05-11?
- ☐ Pavement sections - parking and truck and indicate where apply
- ☐ Label all setbacks. Setbacks to meet Table 10-1 standards for structure, parking and access drives from residential or PUD zoning of 20’, 30’ building setback for recreational facilities, entertainment facilities, motels, all business uses and all industrial uses, and 40’ building setback for churches, schools, and public or semi public functions.
- ☐ Building pad
- ☐ Access to pond outlets
- ☐ Contours, spot elevations along buildings, entrances, etc.
- ☐ Site not to drain to street right-of-way
- ☐ Grading within site, right-of-way and easements
- ☐ 1% minimum swale grade
- ☐ Fire access to building 150’ from any point a fire truck is allowed to traverse or sprinkler required. Min lane is 20’ wide, min turn radius 20’ CDS radius is 35’, Drive T min 60’
- ☐ Ditches designed to 100-year event
- ☐ Manhole rim elevation ½” and catch basin rim elevations 1" below pavement/gutter grade
- ☐ 4 foot minimum sump depth is required to prevent resuspension (CCWD)
- ☐ Grading is not blocking off-site drainage and/or flooding adjacent property
- ☐ Topography on Grading Plan matches survey
- ☐ Maximum entrance slope within right-of-way does not exceed 3%
- ☐ Maximum bituminous slope within the site does not exceed 6%
- ☐ 4:1 maximum slopes
- ☐ Ponds, pond bench, pond side slopes and pond depth. Reference the City SWPPP Section VIIIC12.
- ☐ Minimum pond permanent pool depth of four feet, maximum 10 feet (if permanent pool volume of 0.1 acre-feet or less then pond slopes and depth may be modified to City Engineer approval)
- ☐ HWL of ponds and wetlands below finished grade of parking areas
- ☐ Pond outlet details
- ☐ Elevation and width of top of berm, four foot minimum (twelve foot minimum for access routes)
- ☐ Baffle support post spacing, four foot maximum
- ☐ Baffle extends two feet minimum into berm
- ☐ Emergency overflows
- ☐ HWL and NWL of ditches, ponds and delineated wetlands
- ☐ Storm drain, culverts and storm drain structures including rims, inverts, size of catch basin, pipe material, length, and slope

- ☐ RCP in right-of-way
- ☐ Minimum pipe size of 15 inches
- ☐ No 21 or 27 inch CPP
- ☐ One foot minimum pipe cover
- ☐ Erosion control details
- ☐ Details showing fabric wrap for manholes and catch basins
- ☐ Back of curb return entrance radius of 30 foot for truck entrance, 25 foot otherwise. Non-entrance back of curb radius of 3 foot minimum.
- ☐ Sight triangle
- ☐ Sawcut at pavement match points
- ☐ Positive drainage on the site
- ☐ Retaining wall detail
- ☐ Dimensions of parking, drive isles, sidewalk, etc.
- ☐ Dumpster location
- ☐ Concrete pad and fencing/screening for dumpster location
- ☐ Driveway entrance/catch basin conflict
- ☐ Finished floor elevation (1 foot above mottles or 100-year HWL)
- ☐ Changes from Plat Grading Plan (if applicable)
- ☐ Curb and gutter shown and labeled
- ☐ Detail of curb and gutter
- ☐ Sidewalk/curb and details
- ☐ Proper separation from entrance to intersection
- ☐ Fire lane
- ☐ Turning radius inside site
- ☐ Handicap ramp detail
- ☐ All soil borings shown (one soil borings per building pad and 4 soil borings per ISTS)

Required notes on Grading Plan:

- ☐ All match points and pavement patches to be sawcut at full depth
- ☐ Turf area to be seeded within 7 days after completion of rough grading or inactivity
- ☐ All pipe aprons provided with trash guards
- ☐ Provide class III riprap with filter fabric for all pipe outlets

Drainage Calculations:

- ☐ Time of concentration
- ☐ Calculations match Grading Plan including details, pond bench
- ☐ Pond baffle calculations, 0.5 cfs maximum for 1-year event
- ☐ Existing and proposed drainage area maps
- ☐ Drainage maps match topography and building roofs
- ☐ Baffle weir calculations
- ☐ Outlet control structures minimum round opening is 4” diameter
- ☐ Walker calculations for dead storage calculations
- ☐ Perk rates when using infiltration above the NWL - ½ rate per Soil Survey or test results
- ☐ CN values reflect impervious area, pond and wetlands
- ☐ Landlocked ponds and wetland back to back storms calculations
- ☐ Storm drain sized for 10-year storm event
- ☐ Maximum velocity in storm drain of 8 fps for 10-year storm event (minimum 2 fps)
- ☐ Starting hydraulic model elevation should be NWL for wet basins/wetlands

- ☐ Calculations (SHSAM) indicating sumps are sized to meet district removal rates of 80% TSS.
- ☐ Energy dissipation reducing storm drain outlet velocity to less than 4 fps for 10-year storm event
- ☐ Copy of Storm Water Pollution Prevention Plan submitted to MPCA for NPDES phase 1 or II
- ☐ compliance if grading one acre or more

Review comments/approvals from:

- ☐ MnDOT for Grading, Drainage and Erosion Control Plans next to or draining to MnDOT right-of- way
- ☐ Anoka County for Grading, Drainage and Erosion Control Plans if increased runoff to Anoka County right-of-way
- ☐ Watershed District - this may include onsite and offsite stockpile disposal site approval.

Review comments/approvals may be required from:

- ☐ Army Corps of Engineer if wetlands are involved
- ☐ DNR if wetlands are involved and/or for dewatering (the Watershed District approves wetlands)
- ☐ Owners of existing easements

Note to Developer: This checklist is provided as a tool whereby to aid in determining whether any items have been excluded when reviewing a Grading, Drainage and Erosion Control Plan. This checklist is not to be construed as all-inclusive. Ordinance 10 provides the specific detail in regard to commercial site development within the City of Ham Lake.

APPENDIX J

Erosion and Sediment Control/Grading
Ordinance 12-08

ORDINANCE NO. 12-08

An Ordinance relating to Erosion and Sediment Control/Grading.

Be it ordained by the City Council of the City of Ham Lake, Anoka County, Minnesota, as follows:

I. Ordinance 05-12 is repealed.

II. Article 11-2000 – Control of Post-Construction Storm Water Runoff is hereby repealed, to be replaced by the following Article 11-200 – Erosion and Sediment Control/Grading.

11-2000 Erosion and Sediment Control/ Grading Ordinance

INTRODUCTION/PURPOSE:
During the construction process, soil and debris is highly vulnerable to erosion by wind and water. Eroded soil and debris endangers water resources by reducing water quality and causing the siltation of aquatic habitat or fish and other desirable species. Eroded soil and debris also necessitates cleaning sewers and ditches.

The purpose of this ordinance is to safeguard persons, protect property and prevent damage to the environment in the City. It is intended to also promote the public welfare by guiding, regulating and controlling the design, construction, use and maintenance of any development or other activity that disturbs or breaks the topsoil or results in the movement of earth on land and generates debris.

The information in this ordinance is supplemental to language in other ordinances, plans, policies, guidelines and contracts included but not limited to the following:

1. City of Ham Lake Stormwater Pollution Prevention Plan (SWPPP);
2. Building Rules and Guidelines; and
3. Development contracts.

11-2000.10 DEFINITIONS:
BEST MANAGEMENT PRACTICES (BMP'S): Technique or series of techniques, which are proven to be effective in controlling runoff, erosion, sedimentation and construction debris confinement.
CITY: City of Ham Lake.
CITY ENGINEER: Ham Lake City Engineer or other designated authority charged with the administration and enforcement of this chapter.
CONSTRUCTION DEBRIS: Any waste generated as a result of construction including but not limited to discarded building materials, concrete truck washout, chemicals, litter or refuse and sanitary waste.
CONTRACTOR: Any person who's responsible for abiding by the applicable requirements set forth in this ordinance.

DNR: Minnesota Department of Natural Resources.
EROSION: The wearing away of the ground surface as a result of the movement of wind, water, ice and/or land disturbance activities.
EROSION CONTROL: A measure that prevents erosion.
ESTABLISHED YARD: A yard that has permanent ground cover established suitable for long-term erosion control including but not limited to seed, sod, native plants, shrubbery, trees, rock or mulch.
GRADING, DRAINAGE AND EROSION CONTROL PLAN: A city and local watershed approved plan required prior to commencement of any site grading, which details grading requirements, drainage characteristics and erosion control methods.
LOCAL WATERSHED: The local regulating authority for watershed management; the three servicing Ham Lake include the Coon Creek Watershed District (CCWD), Sunrise River Watershed Management Organization (SRWMO) and Upper Rum River Watershed Management Organization (URRWMO).
MPCA: Minnesota Pollution Control Agency.
PERSON: Any individual, firm, company, association, society, corporation or group.
ROUGH GRADE: The stage at which the grade approximately conforms to the approved plan.
SITE: Any real property upon which improvements are to be made.
SITE GRADING: Excavation or fill of material, including the resulting conditions thereof.
STORM DRAIN/STORM SEWER: A drain or sewer for conveying storm water runoff, ground water, subsurface water or unpolluted water from any source.
SUSPENDED SOLIDS: Total suspended matter that either floats on the surface of, or is in suspension in water and/or other liquids.

11-2000.20 APPLICATION AND SWPPP REQUIREMENTS FOR CONTRACTOR:
It is the responsibility of the Contractor to obtain all the necessary permits from the MPCA, City and local watersheds and abide by all the requirements set forth in the General Stormwater Permit for Construction Activity (Permit Number: MN R100001).

11-2000.30 RIGHT OF ENTRY PROVISION:
Every licensee shall allow any peace officer, health officer, or properly designated officer or employee of the City to enter, inspect, and search the grounds of the licensee at reasonable hours without a warrant.

11-2000.40 ONSITE ACTIVITY REQUIREMENTS:
1) Debris Storage: All construction debris shall be kept in an enclosed building or properly contained in a covered container designed for such purposes throughout the construction process.

2) Waste Disposal: It shall be the responsibility of the Contractor to dispose of all construction debris in a manner approved by the City.

3) Construction Entrance Criteria: The Contractor shall take all the necessary measures to prevent sediment from entering the City streets during the construction process. Such practices shall occur in the manner as prescribed in the Ham Lake Construction Requirements.

4) Site Dewatering: Water pumped from the site shall be treated prior to entering a wetland, lake, river or stream to meet requirements set forth by DNR, MPCA and local watershed rules and regulations.

11-2000.50 EROSION CONTROL AND SITE STABILIZATION:

1) Erosion Control Placement Requirements: Silt fence shall be installed on individual lots to protect the following:

1. Wetlands;
2. Sedimentation ponds, basins or drainage swales;
3. Established yards;
4. Valuable pieces of natural lands; and
5. Special circumstances determined by the City Engineer or designee.

2) Silt Fence Installation Procedures: Silt fence shall be installed to meet the City of Ham Lake standards.

3) Site Erosion Control Timelines for Compliance: Silt fence shall be installed in all the locations of the site per the Grading, Drainage and Erosion Control Plan. No grading shall take place until verbal authorization is given by the City Engineer or designee.

Silt fence shall be installed in the locations as prescribed in the City of Ham Lake Single Family Residential Construction Erosion/Sediment Control Standards prior to the release of a building permit to the builder for each individual lot. No permit shall be issued until the City Engineer or designee signs the Building Permit Application.

4) Temporary Site Stabilization: Sites that are to be left with barren soils exposed for more than two weeks following the completion of rough grading due to weather conditions, time of season, construction phase or other reason shall be temporarily stabilized by establishing adequate ground cover with City or watershed approved measures, which may include but is not limited to one or more of the following:

1. Straw fiber blanket;
2. Mulch;
3. Hay;
4. Seed or sod; or
5. Tarping

11-2000.60 Section VII. INSPECTIONS AND INVESTIGATIONS:

The City shall do periodic inspections to ensure that proper erosion control and construction debris containment measures are met.

11-2000.70 SANCTIONS FOR COMPLIANCE:

1) Violations Declared: A case where a BMP has failed, was removed, was not properly installed, was not installed or was not managed properly, which increases the potential for pollutants to waters of the state includes but is not limited to the following:

1. Silt fence failure or improper installation;

2. Non-storm water discharges on impervious surfaces;
3. Garbage, refuse, construction debris; and
4. The presence of barren soils for an extended period of time.

2) Corrective Measures: The following are corrective measures that shall be taken, as directed by the City:

1. Repairing and/or adding silt fence;
2. Removing pollutants from impervious surfaces including streets and gutters not limited to sand or other sediment, brush, garbage, refuse, construction debris, oils and concrete washout by an effective means;
3. Picking up garbage, refuse or construction debris in and amongst the grounds of the development and/or adjacent properties; and
4. Stabilizing the site by furnishing adequate ground cover to lessen wind and water erosion as prescribed in the Ham Lake Construction Requirements.

3) Procedure for Correction: Upon the determination of a violation, a deadline for correction shall be given with notification of penalties for failing to comply.

The Contractor shall be notified both orally and in writing, and will be given a reasonable timeframe for correcting the violation.

4) Penalties for Non-compliance: Failure to meet the deadline will result in one or more of the following penalties:

1. The City performing the necessary work or contracting for the completion of the work and billing the contractor for said services and/or using escrow funds;
2. Discontinuing the issuance of any permits or Certificate of Occupancies (CO's) in the development or for the individual lot;
3. Stop work orders; and
4. Discontinuing scheduled inspections.

5) Violation; Misdemeanor: Any person who is found to violate any section of this Ordinance shall be charged with a misdemeanor and, upon conviction thereof, shall be subject to a misdemeanor penalty as then defined by Minnesota law. Additionally, the City may exercise any civil remedy available under Minnesota law for enforcement of this Ordinance including civil action, mandamus, injunctive relief, declaratory action, or the levying of assessments.

Presented to the Ham Lake City Council on June 18, 2012 and adopted by a unanimous vote this 2nd day of July, 2012.

_____
Tom Johnson, Acting Mayor

_____
Doris Nivala, Administrator

APPENDIX K

Natural Resources Inventory and Assessment

A Natural Resources Inventory and Assessment for the City of Ham Lake

Completed April 2008

A Joint Project of the City of Ham Lake
and the Anoka Conservation District

Project Funding Provided by a Grant from:
The Legislative-Citizen Commission on Minnesota Resources (LCCMR)

Purposes and Introduction

The City of Ham Lake is located in central Anoka County, Minnesota, on the northern edge of the Twin Cities (Minneapolis-St. Paul) metropolitan area. While still rural in many places, Ham Lake is facing significant development pressure. Given this growth pressure, the City saw a unique opportunity to protect the natural resources and open spaces that define the character that draws so many to the community. Likewise, the Anoka Conservation District has a mission to help protect the natural resources of Anoka County, and specializes in providing technical assistance on natural resource management and conservation to local land owners and units of government. Recognizing their shared goals and an opportunity for intergovernmental cooperation, in 2006 the Anoka Conservation District and the City of Ham Lake formed a partnership to undertake a Natural Resources Inventory and Analysis (NRI/A).

The purpose of the NRIA was to identify and evaluate natural areas—those areas where natural vegetative cover is present and that provide ecological functions, including as wildlife habitat—within the City. This report and the accompanying maps relate the findings of the NRI/A, ranking of the conservation value of individual habitat patches. The report also describes some of the approaches, tools, and resources which the City might use to protect the natural areas described by the NRI/A.

Background and Ecological Context

Ham Lake is located entirely within the Anoka Sand Plain (see Map 1 in Map Appendix) Ecologcial Subsection. Ecological subsections are defined based on shared geological history, soils, and typical plant and animal associations. Generally speaking, the Sand Plain is dominated by fine sandy knolls and flats, surrounded by large peat deposits and mineral hydric soil areas. The landscape can be divided into three categories, which include dry upland, mesic upland, and wetland or shoreland. The dry upland areas support oak forests and oak savanna, while the mesic upland areas support mixed hardwood forests which can include red maple, trembling aspen, and northern pin oak. The wet areas support a variety of wetland types, including open water marshes, cattail swamps, sedge meadows, shrub and hardwood swamps, tamarack and spruce bogs and white cedar swamps (Wovcha et. al 1995).

Over the years, much of the landscape of the City of Ham Lake has been converted from its natural vegetative cover to residential, commercial, transportation, and agricultural uses. The impact of this development on natural systems and communities has been significant.

When a natural community, say a wet meadow, is converted to another use, such as a sod farming field, the wet meadow itself is obviously lost. But there are other effects on both surrounding communities and the natural systems which connect the landscape. For example, the excavation of drainage ditches can significantly change the hydrology of

areas both down and upstream from the excavation. Downstream aquatic and shoreland communities, as well as water quality, may also be impacted. Further, the disturbance of land cover conversion also creates the opportunity for non-native and/or invasive species to colonize adjacent communities. Agricultural chemicals and nutrient and soil run-off also can impact receiving waters. Clearing of natural communities also leads to fragmentation of wildlife habitat.

Urban development impacts natural communities and systems even more extensively. Hydrological changes tend to be more extensive, and include the creation of large areas of impervious surface. Additional pollutants from roadway run-off and lawn and garden chemicals also enter wetlands and water bodies. And while residential development leads to less than total land cover conversion, it results in natural community and habitat fragmentation and edge effects on a large scale.

Despite the cumulative effects of development, significant patches of natural vegetative communities still exist in Ham Lake, and remaining vegetation reflects most—if not all—of the vegetative communities that would have been present prior to European settlement. Individual communities, termed “patches” identified in this report represent the largest and best remaining examples within the City of Ham Lake of a select group of increasingly rare natural vegetative communities once common throughout the Anoka Sand Plain. The patches are categorized according to ecotype, a classification system which uses factors of hydrology (how wet an area is, and how often it is wet) and the type and species make-up of vegetation.

However, while hydrology and vegetative make-up are easily visible and thus a convenient way to categorize, they are not the only factors influencing community type. Rather, the vegetative and hydrological characteristics of a community are representative and indicative of the wildlife that use that particular patch for forage, shelter or breeding, and of the larger web of processes and relationships that compose an ecosystem. Hydrological characteristics in particular may also help us to understand other important functions a particular natural area may provide, such as the infiltration, detention, and/or purification of stormwater.

Summary of Findings

Using geographic data sets, field survey, ecological principles, and spatial analysis techniques, the Anoka Conservation District ACD) inventoried and analyzed these remnant communities to produce a set of tables and maps which described the overall picture of natural resources communities in Ham Lake and highlights the largest and most significant patches. The Natural Resources Inventory and Analysis (NRI/A) conducted by Anoka Conservation District identified 381 different patches of high quality natural vegetative communities, totaling just over 3738 acres. Descriptions of individual community types can be found in Appendix B to this report. While many of the remaining natural communities surveyed are small in size (186 patches cover less than five acres), there are 40 individual habitat patches of greater than 20 acres in the City of Ham Lake. Further, these individual patches aggregate into larger habitat

complexes, 20 of which are profiled in this report. Most importantly, there is still an opportunity to, through, careful planning and a commitment to preservation, strengthen and maintain a city-wide network of natural areas that will not only help maintain healthy regional ecosystems, but also provided a permanent network of green, open spaces for Ham Lake residents.

As indicated above, the natural resources inventory and analysis conducted by Anoka Conservation District identified a total of 3738 acres of high quality natural communities. Based on dominant vegetative form and hydrology, the ecotypes of the various patches can be grouped into four broad classes: Upland Forest, Prairie/Savannah/Grassland, Wet/Lowland/Floodplain Forest, and Non-Forested Wetland. Of these four classes, Upland Forest and Non-Forested Wetland communities make up the vast bulk of the patches and acreage. While more open community types, such as prairie, grasslands, and savannah were likely once more dominant in the area, suppression of wildfires since European settlement—particularly in more recent years—has allowed successional processes to proceed, leading to more dense shrubland and forest communities. All identified high quality communities are shown on Map 2. Based on input from city representatives, ACD identified the 20 largest contiguous expanses of undeveloped upland area as key habitat complexes which the city may wish to focus any future efforts on. These complexes appear on Map 3. All maps are presented in the Map Appendix at the end of the report.

Methodology

The NRI/A conducted by Anoka Conservation District used both Geographic Information Systems (GIS) mapping and analysis as well as field survey work to inventory and characterize the natural resources present in the City of Ham Lake. In addition, ACD staff collaborated with a committee convened by the City of Ham Lake. The approach used can be summarized as consisting of the following steps:

1. Primary data collection (GIS)
2. Preliminary data analysis (GIS)
3. Committee input
4. Field verification
5. Development mapping and data refinement (GIS)
6. Habitat/Patch analysis (GIS)
7. Field verification
8. Committee input
9. Final data analysis (GIS)

Primary data sources (1) included MLCCS land cover data (Minnesota Land Cover Classification System data set, generated by the Minnesota Department of Natural Resources (DNR), ACD, and other contractors), Metropolitan Council land use data (2005), Anoka County parcel maps, digital road maps, SSURGO soils data, and DNR Natural Heritage Program Data.

In preliminary analysis (2), data layers were overlain to assess concordance between data sets and to determine if gaps in data existed. Preliminary analysis also provided a rough natural areas map for comparison to existing regional and metropolitan NRI/As.

In the first committee input session, committee members were briefed on NRI/A process, provided feedback on preliminary maps, and contributed local knowledge regarding resources.

Field verification (4) involved assessment of data set accuracy and completeness, and assessment of applied mapping and analytical techniques.

Development mapping (5) used existing land-use data sets, roads layers, and available plat and parcel maps to determine spatial extent of development. Developed areas were defined to be those where land had been subdivided and/or platted, and where it appeared unlikely that additional subdivision would occur prior to future redevelopment under different land market conditions. Under this definition of development most platted areas are considered developed. Thus, on large lots where a majority of the property still has natural vegetative cover, there may be significant overlap between areas determined to be developed and those identified as natural resources patches. Factors including parcel size, ownership, building age, and homestead status were used to assess whether or not a given property was developed.

Habitat/Patch analysis (6) used a number of factors including community eco-type/land cover, patch size, and connectivity to identify high-quality natural resource areas, also known as patches as defined earlier in this report. For individual patch calculations, all patches less than two acres in size were excluded. When habitat patch complexes were examined, the total contiguous area was considered, regardless of the size of individual patches.

A second round of field verification (7) was performed to further check land cover data quality, evaluate the accuracy of the development analysis, and check classification of sod fields.

A second round of committee input (8) focused on review of development and habit/patch analyses, as well as review of range of conservation goals recommended for consideration by City of Ham Lake.

Final data analysis (9) included final run of data analyses based on final parameters, and generation of patch and habitat complex statistics.

NRI/A Results

The Natural Resources Inventory and Analysis (NRI/A) conducted by Anoka Conservation District identified 381 different patches of high quality natural vegetative communities, totaling just over 3738 acres. Of the total acres, 1696.5, or 45.4% are

upland community types. The remaining 54.6% (2041.6 acres) are wetland community types. Descriptions of individual community types can be found in Appendix B to this report.

The NRI/A also assessed the level of development of natural resource patches. That is, the NRI/A looked at what portion of identified resource patches fell on properties that, based on parcel size, building age, and ownership information, were unlikely to see further development (i.e., subdivision and/or construction of net new major structures) prior to large-scale community redevelopment. Based on this definition of development, the NRI/A found that 36% of upland patch acreage and 42% of wetland acreage, or 39% of the total area of all natural vegetative communities, were developed. Whether or not an individual patch is partially or completely developed has important implications for what types of conservation strategies are most appropriate.

Based on dominant vegetative form and hydrology, the ecotypes of the various patches can be grouped into four broad classes: Upland Forest, Prairie/Savannah/Grassland, Wet/Lowland/Floodplain Forest, and Non-Forested Wetland. Of these four classes, Upland Forest and Non-Forested Wetland communities make up the vast bulk of the patches and acreage. The distribution of remaining patches and natural acreage among the four classes defined above—namely the predominance of Upland Forest and Non-Forested Wetland—is likely an effect of natural processes, human influence and usage patterns, and regulation.

Non-Forested Wetlands are common in Ham Lake and throughout Anoka County, and have become more common relative to other remaining vegetative communities due primarily to two factors: difficulty of development, and more recently, regulation. Even without regulation to consider, wetlands are in general difficult to develop, due to standing water, high water tables, and/or occasional flooding. Then in 1991, the Wetlands Conservation Act (WCA), state legislation, was enacted, putting wetlands off-limits for development. The notable exception to wetland development has been sod farms, which were all in production prior to the WCA. Today, as rising land values and development pressure mean that sod farming may no longer be the most economical use for land, the legacy of these lands as former wetlands is an issue of great importance. Maps 4 and 5 show identified hydric soils (the type of soils found in wetlands) and sod fields within the City of Ham Lake.

Forested lands now also make up larger percentage of natural vegetative communities than they once did. On the Anoka Sand Plain, upland areas tend to have, in general, sandy, well-drained soils. Prior to European settlement, regularly-occurring natural wildfires played a very important role in the ecologies of these communities. The regular burns tended to keep fuel supplies—downed wood, underbrush, and grasses—in check, and were less intense than the less-frequent wildfires that occur today. In these conditions, communities such as prairies and oak savannas, which regular fires help to maintain, were likely much more common than they are today. In addition to the suppression of wildfires, other human land management practices have also favored the growth of forest over more open community types. Overall, the result has been that

forested areas make up a large share of the remaining natural vegetative communities in Ham Lake.

Overall, distribution of patches within the city is relatively even. Although Ham Lake abuts Carlos Avery Wildlife Management Area—one of the most significant natural areas in Anoka County, if not the entire metropolitan region—and is in close proximity to Bunker Hills Regional Park, another significant natural area, there are no major public lands within the city boundaries. However, there is potential for helping to make ecological connections, by protecting land within conceptual greenway corridors, between these larger areas of concentrated natural resources. The idea of greenway corridors is not to protect everything within identified corridors, but rather to help focus any investments that are made in land protection to have the highest impact, from an ecological standpoint. Although Ham Lake committee members expressed reservations about officially adopting greenway corridors at this time, Anoka Conservation District has identified potential corridors as part of a larger, county-wide greenways network (see Map 6).

Despite the lack within city boundaries of major concentrations of high quality communities on public lands, there are several locations where patches aggregate to form larger clusters. The individual patches that make up these clusters act to form larger habitat complexes, the ecological value of which is greater than the total value of the patches if they were not spatially connected. It should be noted that these clusters are

generally spread out over a number of separately owned parcels, both developed and undeveloped (as defined earlier in this report), and are made up of both wetland and upland portions. Clusters are shown on Map 3.

Data Tables

The following table shows some key characteristics of the patches of natural vegetative communities identified in the NRI/A conducted by the Anoka Conservation District. In particular it shows the different community types (ecotypes) present and the amount of each, in acres. It also gives some description of the amount of upland versus wetland communities, and how much of the various community types is considered developed under the criteria outlined earlier in this report and used in the NRI/A. These factors are important when considering the overall picture for natural resources in the City of Ham Lake and in the discussion of natural resource preservation options.

Table 1.

Aggregated Eco-Type	acres (total)	developed acres	% developed	Up/Wet
Aspen forest	64.8	25.8	40%	Upland
Aspen forest (wet)	98.3	41.1	42%	Wetland
Birch bog, spiraea shrubland (wet)	60.8	20.9	34%	Wetland
Cattail marsh	410.2	136.9	33%	Wetland
Dry prairie	10.1	9.7	96%	Upland
Floodplain forest	10.2	5.9	58%	Wetland
Lowland hardwood forest	31.8	11.4	36%	Wetland
Mixed emergent marsh	4.6		0%	Wetland
Mixed hardwood swamp	668.1	311.2	47%	Wetland
Oak forest	1604.2	571.3	36%	Upland
Poor fen	131.2	22.9	17%	Wetland
Rich fen	110.4	55.4	50%	Wetland
Deciduous forest	17.4	11.7	67%	Upland
Deciduous forest (wet)	392.0	195.5	50%	Wetland
Tamarack swamp	41.0	17.2	42%	Wetland
Wet meadow	82.9	38.3	46%	Wetland
Total	3738.0	1475.2	39%	-

Table 2 shows key characteristics of the 20 natural resources clusters, or patch aggregations, with the largest amount of undeveloped land. Note that maps for each cluster, found in the Map Appendix, include a table showing make-up by patch ecotype and size.

Table 2.

Cluster	Total Acres	Undeveloped Acres	% Developed	Upland	Wetland	% Upland
1	349.3	349.3	0%	184.5	155.7	52.8%
2	88.8	83.4	6%		88.8	0.0%
3	78.6	72.0	8%	73.4	4.0	93.4%
4	113.8	69.7	39%	21.1	90.5	18.5%
5	89.9	69.5	23%	38.2	50.3	42.5%
6	86.0	69.1	20%	34.9	51.1	40.6%
7	68.7	58.7	15%	35.5	32.0	51.6%
8	141.9	54.7	61%		141.7	0.0%
9	51.2	48.5	5%	51.2		100.0%
10	42.4	42.4	0%	14.7	27.0	34.6%
11	54.6	39.5	28%	18.3	36.3	33.5%
12	55.8	39.4	29%		55.8	0.0%
13	43.3	39.0	10%	38.7	4.0	89.3%
14	100.1	35.7	64%	77.9	20.3	77.8%
15	36.5	35.3	3%	2.4	29.8	6.7%
16	35.7	33.7	6%	5.8	28.7	16.3%
17	71.8	32.6	55%	15.2	55.3	21.2%
18	35.4	30.1	15%	11.2	24.3	31.5%
19	43.3	28.8	33%	22.0	21.2	51.0%
20	70.8	27.8	61%	27.9	42.8	39.5%

Natural Resource Protection Objectives

Representatives from Anoka Conservation District and the members of the committee convened by the City of Ham Lake to oversee the NRI/A process examined a number of potential objectives for natural resource preservation that the City might adopt. Based on these objectives, the City can use the information gathered in the NRI/A process to set specific conservation goals, including identification of specific areas for preservation, restoration, or protection measures.

Objectives for protection of natural resources can include a wide number of desired outcomes. Open natural areas are aesthetically pleasing, and many residents of communities such as Ham Lake are drawn by the opportunity to live in close proximity to natural areas. Natural areas also provide opportunities for both passive recreation—such as hiking or bird-watching—and active recreation—such as hunting, fishing, or snowmobiling. While increasing population and urbanization may necessitate the curtailing of some activities, particularly hunting, opportunities for activities can be preserved through careful planning and preservation of public and privately owned natural areas and corridors.

Protection of green infrastructure may also be a goal of natural resource protection activities. Just as communities invest in built infrastructure—roads, wastewater treatment facilities, and utilities—some communities choose to invest in green infrastructure. Green infrastructure refers to a network of open spaces protected not only because of

their aesthetic qualities or for recreational purposes, but because they help to perform vital ecological services. These might include the storage, conveyance, and treatment of stormwater run-off, or the protection and recharge of groundwater.

Finally, natural resource protection goals may focus on maintaining wildlife habitat and movement corridors, or the preservation of regional biodiversity. Critical factors in evaluating and/or ranking habitat patches/complexes include:

- Type
- Quality
- Quantity
- Size
- Mix
- Location
- Connectivity

Other considerations in designating areas for protection might include examination of edge effects, buffers, amount of interior habitat, edge-to-area ratio, and the effects of human disturbance. In Anoka County, considering the balance between wetland and upland, and protection of the wetland-upland transition zone are also of particular importance.

Protection Mechanisms

There are a wide variety of mechanisms available for protection of natural resources, ranging from public acquisition of high quality natural areas to private landowner management to innovative zoning and sub-division regulations.

A key question in evaluation of what approach is most appropriate for protecting a given natural area is ownership and likely future disposition of a piece of property. Land that is in agricultural production, or was initially developed for homestead use more than 25 years ago and has large acreage might be more likely to face development pressure in the near future. If there is landowner interest, such properties are good candidates for acquisition programs. By contrast, more recently developed and/or smaller residential properties are less likely to see significant change in land-use in the near future, and might be better candidates for natural resources restoration an/or protection through educational and/or incentive programs.

A summary of potential approaches to land protection appears below.

Outright Purchase:
Also known as "fee simple acquisition," the outright purchase of land gives a local government unit full control over all rights to a property.

Outright purchase by a unit of government requires:

1. A determination that the land serves a public purpose. Natural areas can be said to serve public purposes (e.g., flood control, enhancement of air and water quality) even when public access to a site is not feasible, desirable, or practical.
2. Necessary funding to finance the purchase. Acquisition may be financed through general revenue funds, bound referenda, lend-lease programs, special taxation, and government grants, trust funds, and matching progress. Cost of acquisitions may be reduced by use of "bargain sale," in which the seller agrees to sell at below market value (the difference is recognized by the IRS as a charitable contribution for the seller's income tax purposes).
3. Financial and staffing resources to provide for site management and maintenance.

Washington County used a lease-purchase arrangement to finance an acquisition of park land in the St. Croix Valley.

The DNR administers a matching grant program to assist local governments with acquisitions of natural and scenic areas.

The Trust for Public Land (TPL) is a nonprofit land conservation organization that applies its expertise in negotiation, public finance, and law to help local governments acquire public open space.

Perpetual Conservation Easements:
These easements are legally binding agreements made between a landowner and a qualifying organization, in which permanent limits are placed on a property's use and development.

Conservation easements achieve a number of goals:

1. They protect natural and open space values of public land available for sale.
2. They provide permanent protection of required open space in developments.
3. They promote voluntary conservation by landowners.
4. They provide protection for highly sensitive areas on public land
5. They ensure private ownership rights.

Easements may be sold or donated by a landowner; a local government may require an easement to protect a natural or open space area; easements can keep land in private ownership and on the tax roles.

Voluntary Management/Protection:
A private landowner takes voluntary action to restore, manage, or protect important vegetative communities/wildlife habitat and/or other important natural resources on his/her property. City may or may not be involved; if involved City might act as a clearinghouse for, or help to connect landowners with, technical assistance resources. There may also be an opportunity for the City to meet obligations for surface water management plans.

Sub-Division/Land Use Regulations:
Alternative performance based-standards (as opposed to standard, proscriptive subdivision ordinances) for subdivision ordinances have an objective of meeting natural resources conservation and other goals as the basis for approval of new developments. Other alternative approaches to land use regulation include subdivision ordinances based on Open Space Design or Conservation Subdivision principles. These approaches could be used alone or in conjunction with incentive strategies (such a density bonuses) or conservation easements (where appropriate).

Incentives:
A variety of incentives for both individual landowners and larger-scale developers might be used to help achieve natural resource goals. Some examples include reductions in fees, cost-share on habitat improvement or water-quality protection projects, or density bonuses or more flexible ordinances for developers meeting certain criteria.

Technical Assistance:
Help landowners do the right thing when it comes to managing their property. Often this is as easy as getting residents connected with existing information and resources. Anoka

Conservation District recently published the Anoka County "Homeowner's Guide" which provides information on identification and management of natural resources that might occur in your own backyard. ACD can also be contacted at 763/434-2030 to provide more in-depth or targeted technical assistance.

Transfer of Development Rights (TDR):
In a TDR program, two zones are established in a given geographic area; a "sending" (preservation) zone and a "receiving" zone. Landowners with property in the sending zone may sell their (unused) development rights on the open market to land developers and broker, who then use the purchased rights to increase their allowable building density in the receiving zone.

To work effectively, TDR programs require:
1. A high demand for housing or other development in the receiving zone.
2. The capability of the administering government unit to set up and oversee the program on an ongoing basis.
3. Residents in receiving zone amenable to higher density.

This is appropriate for large-scale efforts where keeping land in private ownership is desirable.

Minnesota recently passed enabling legislation, which allows for TDR programs.

Purchase of Development Rights (PDR):
A PDR program typically involves the purchase of development rights by a local government unit or nonprofit organization in order to accomplish protection of natural features, open space, or agricultural values. PDR programs are generally applied as part of a formal program with specific criteria used to select acquisitions. A PDR program may be viewed as a systematic use of conservation easements.

The PDR programs require:
1. The capability of the administering government unit to set up and oversee the program on an ongoing basis.
2. A funding mechanism to finance the acquisitions of development rights.

This is appropriate for large-scale efforts where keeping land in private ownership is desirable.

The Land Stewardship Project has been involved in the use of PDR and TDR programs in and around the metro area.

Registry Programs:
Registry programs are a way to acknowledge and encourage the voluntary protection of natural features by private citizens. Landowners make a non-binding agreement to protect their land by enrolling in a registry. In turn, they are provided with information

and technical assistance regarding appropriate conservation practices for their particular site.

1. Local governments may either start their own registry program (if they have qualified natural resource staff) or may instead educated citizens about the availability of registry programs offered by other government agencies or private, non-profit conservation organizations.

The MN Chapter of the Nature Conservancy administers a registry program.

Special Designation:
High quality natural areas may qualify for special designation under a state or federal program such as the National Register of Historic Places or the state Scientific and Natural Areas Program, administered by the DNR. Special designation generally requires public access to land.

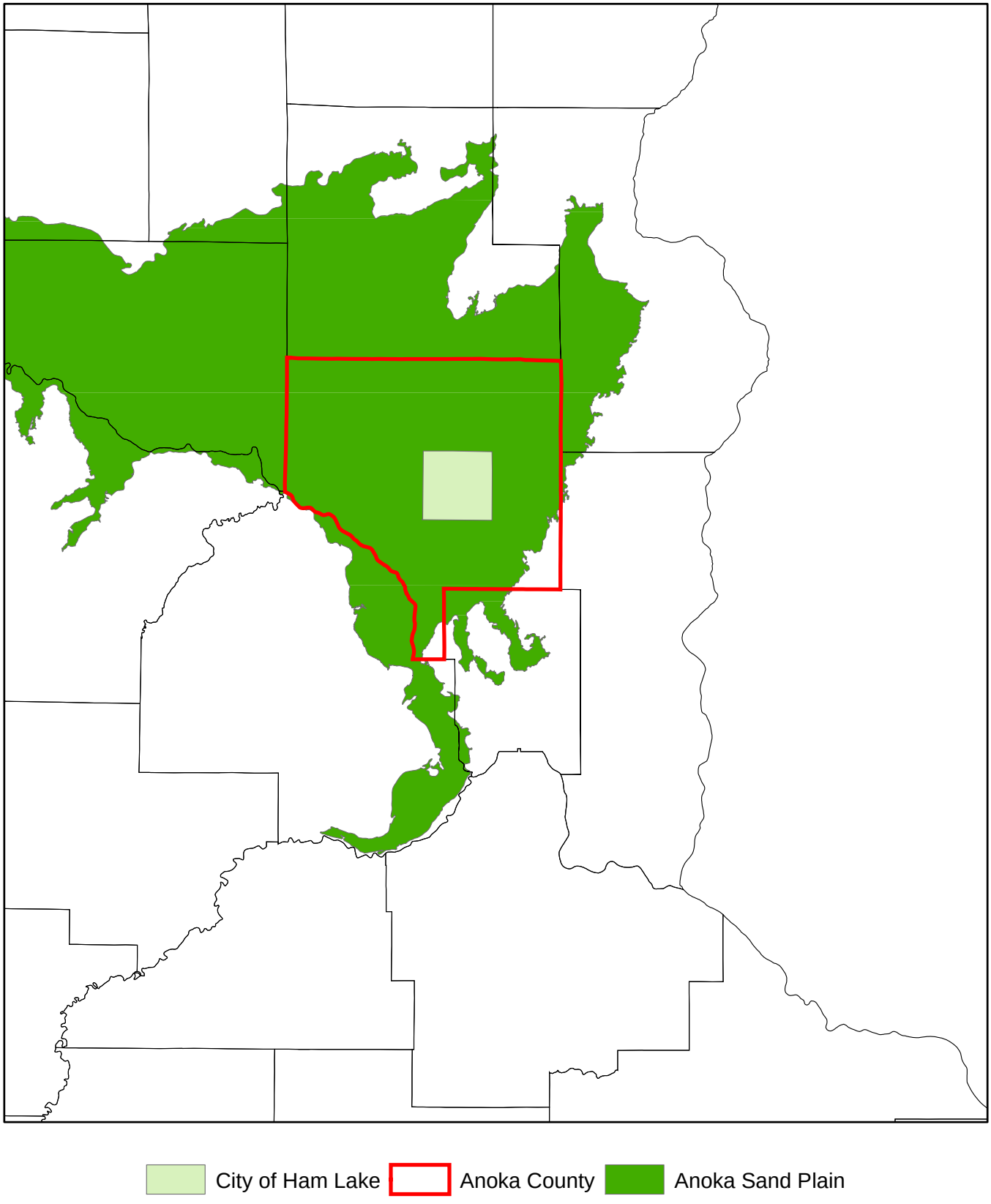
1. Special designation may increase legal protection and potential for financial support for acquisitions and management of selected sites.
2. With sites appropriate for special designation, an outside agency may be interested in acquiring the property and managing it for protection of its natural features. This allows the local community to benefit from protection of a site without being obligated for the cost of acquisitions or management.
3. Appropriate options only for natural areas with features of state/national significance.

If a natural area has historic or cultural significance, call the State Historical Preservation Office. To find out whether a natural area might qualify for designation as a state Scientific and Natural Area, call (651) 297-2357.

Appendix A
(Map Appendix)

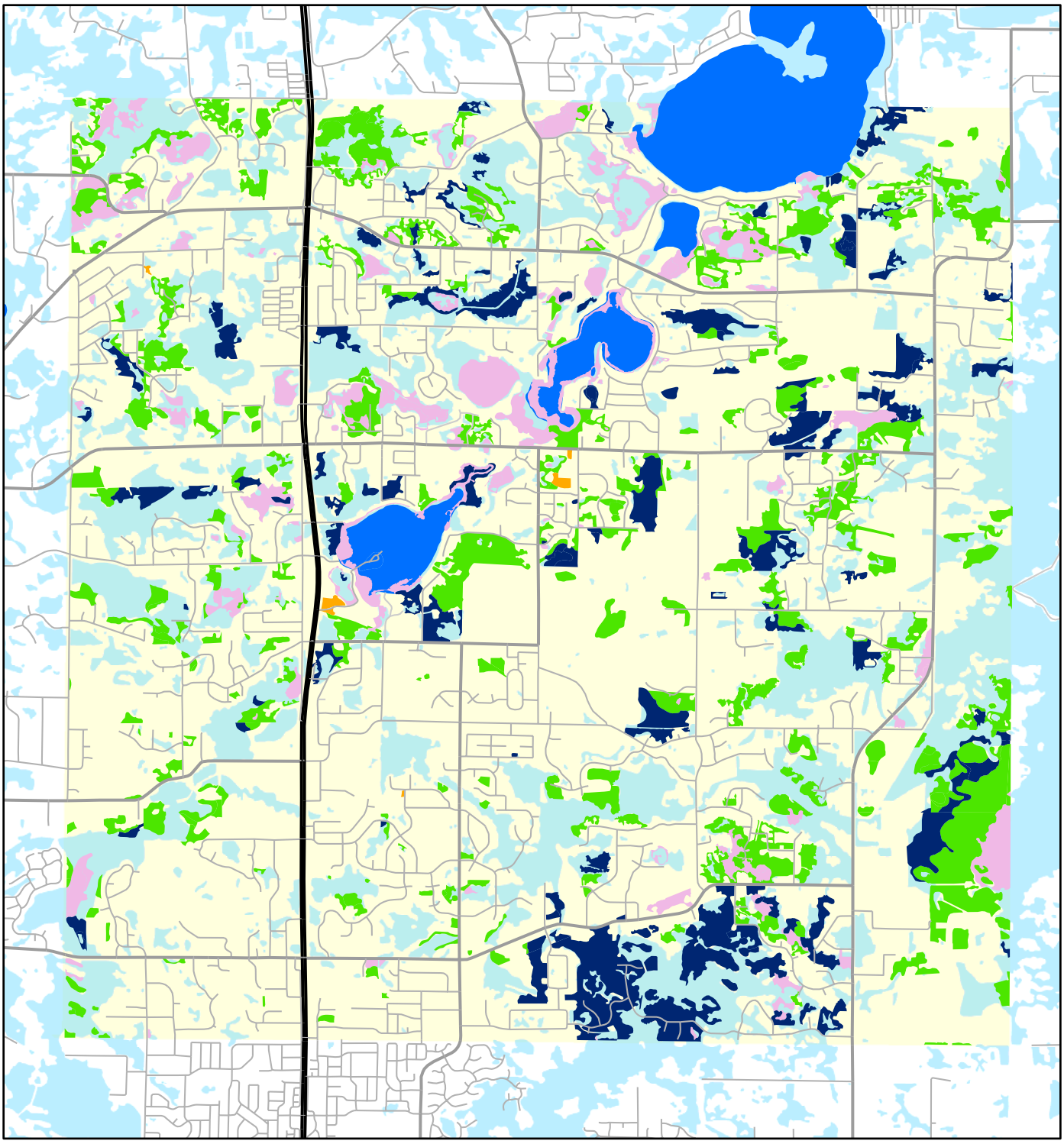
Map 1.

Anoka Sand Plain



Map 2.

City of Ham Lake
Natural Resource Patches



Legend

Roads

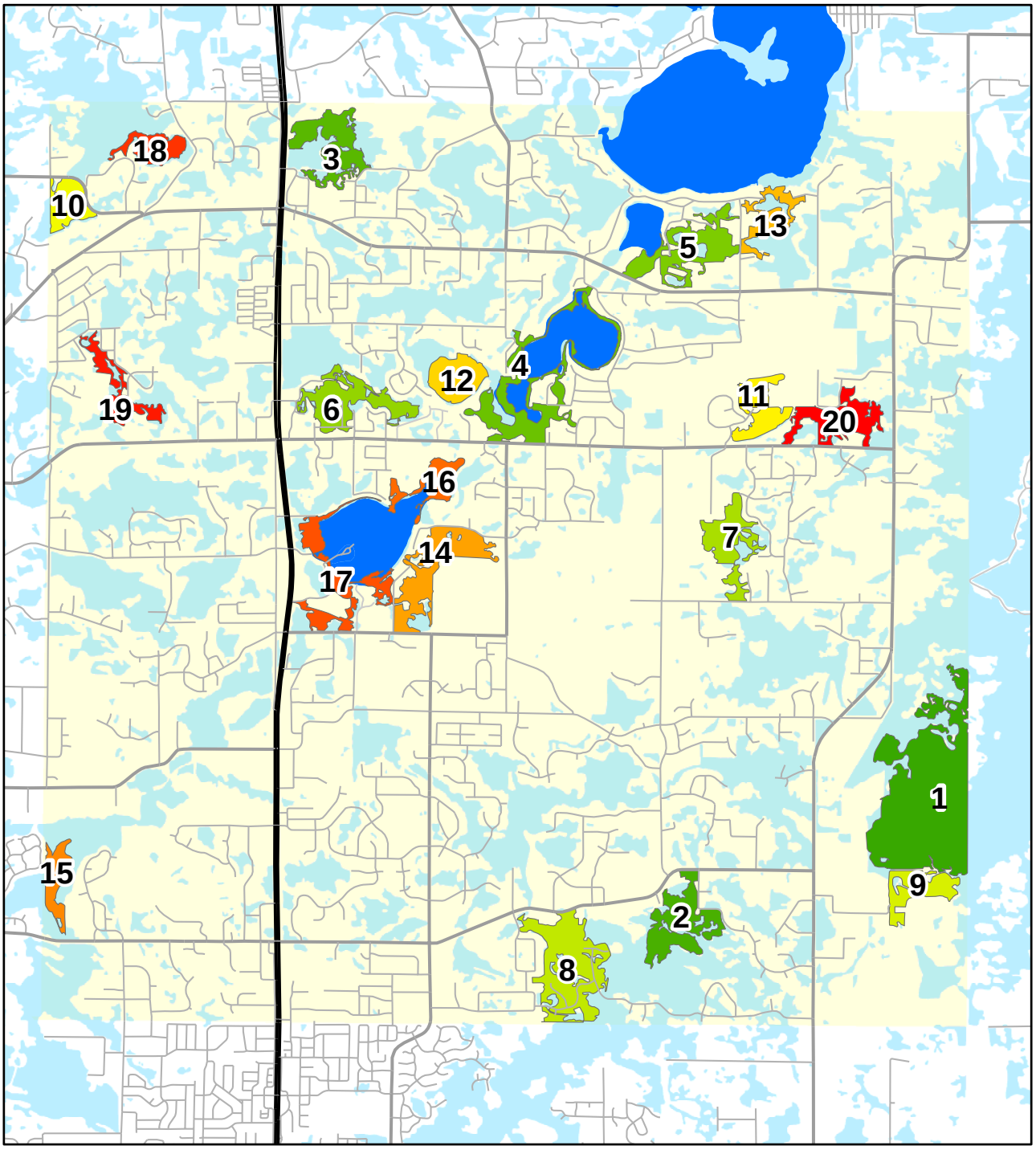
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

- Prairie/Savanna/Grassland
- Wet/Lowland/Floodplain Forest
- Upland Forest
- Non-Forested Wetland

- Lakes
- Wetlands

Major Natural Resource Concentrations

City of Ham Lake



Natural Resource Clusters

(Top 20 Natural Resource Clusters, by Undeveloped Acreage)

- Largest Undeveloped Acreage
- Smallest Undeveloped Acreage

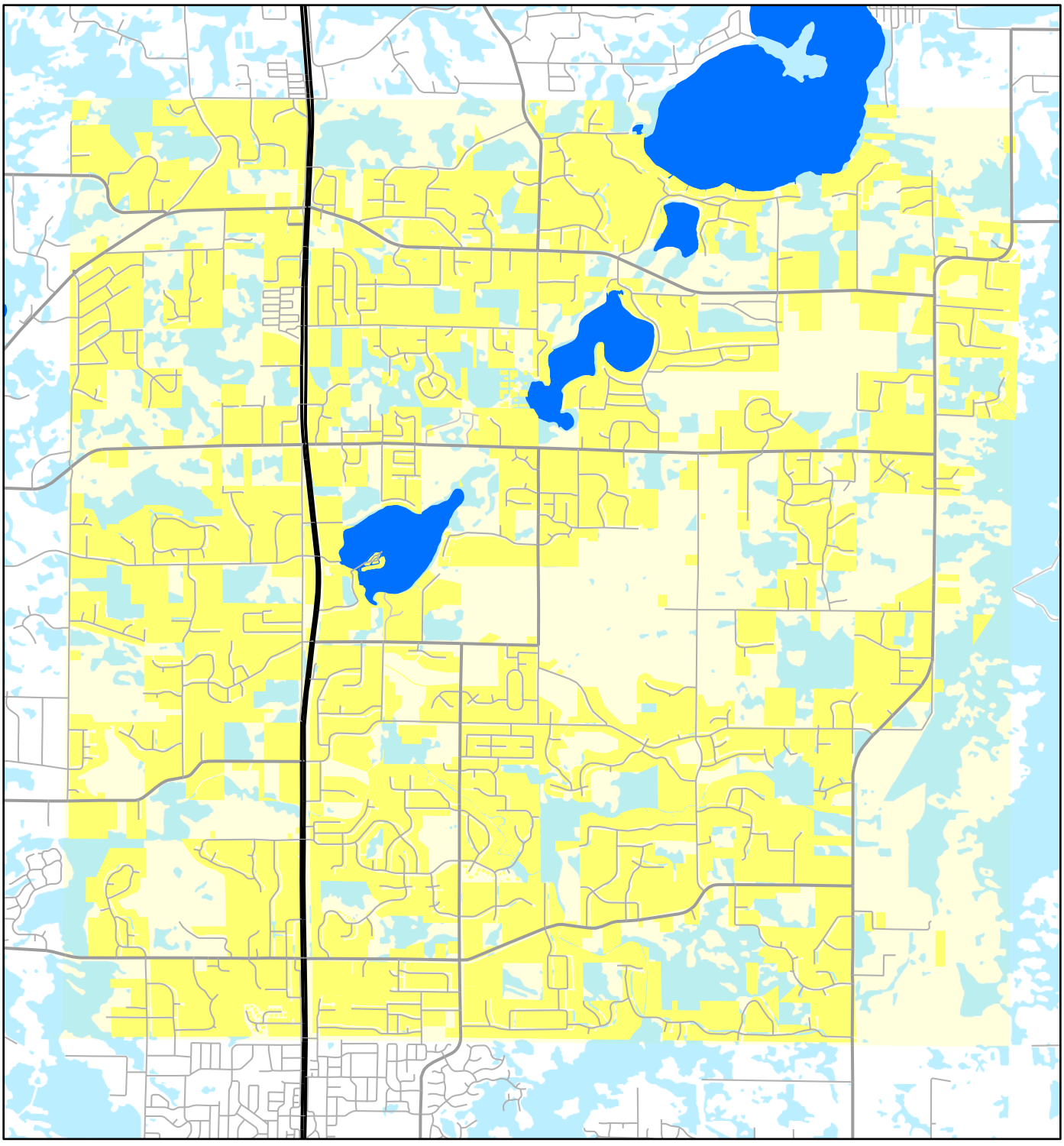
Lakes

Wetlands

Roads

- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

City of Ham Lake
Developed Area

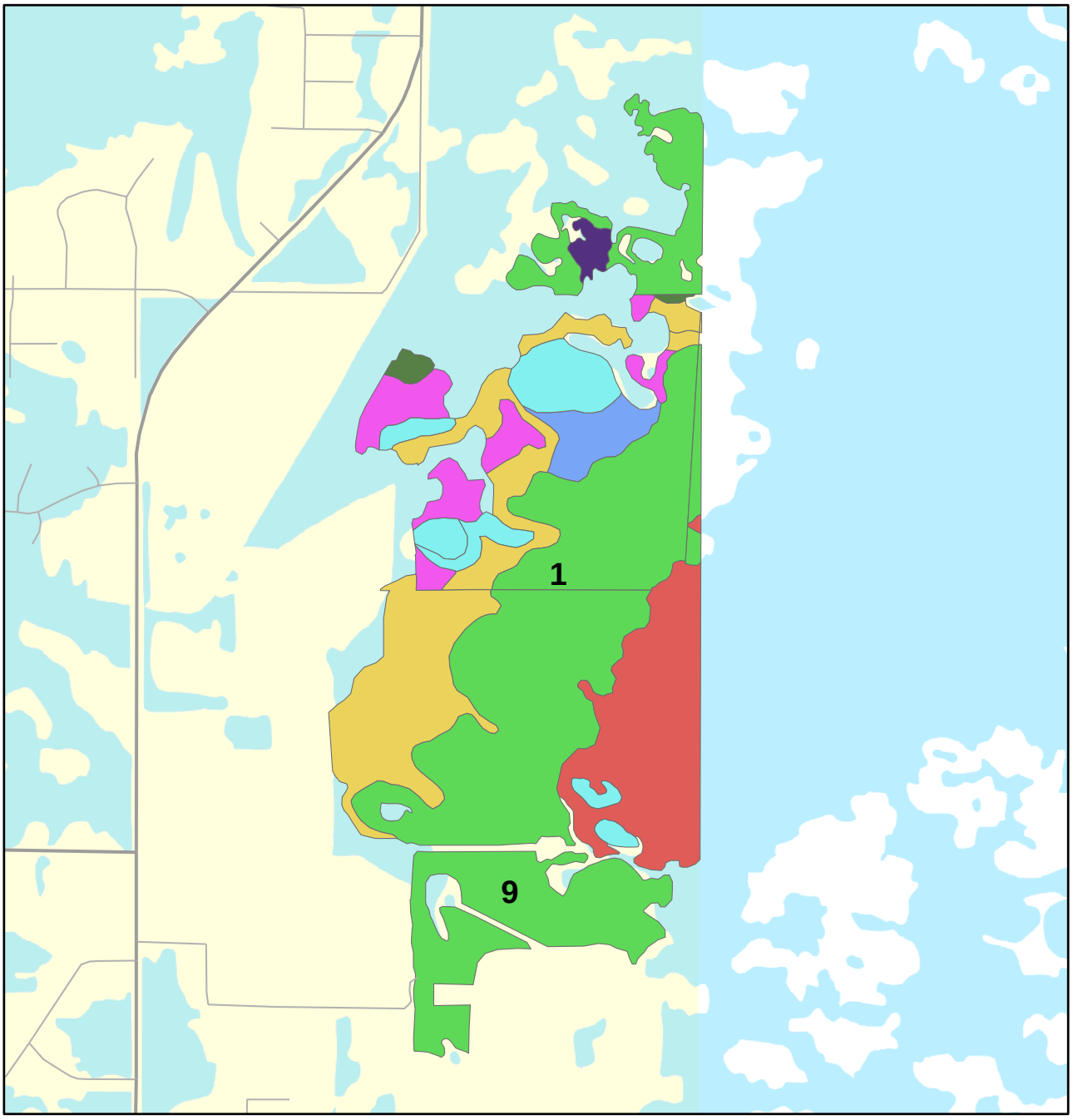


Legend

Roads

- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other
- Developed Area
- Lakes
- Wetlands

Natural Resource Clusters #1 and #9
City of Ham Lake



1:18,000

NR Patches

- Aspen forest
- Aspen forest - saturated soils
- Cattail marsh - semipermanently fl
- Lowland hardwood forest
- Mixed hardwood swamp
- Mixed hardwood swamp - seasonally
- Oak forest
- Oak forest dry subtype

Lakes

Wetlands

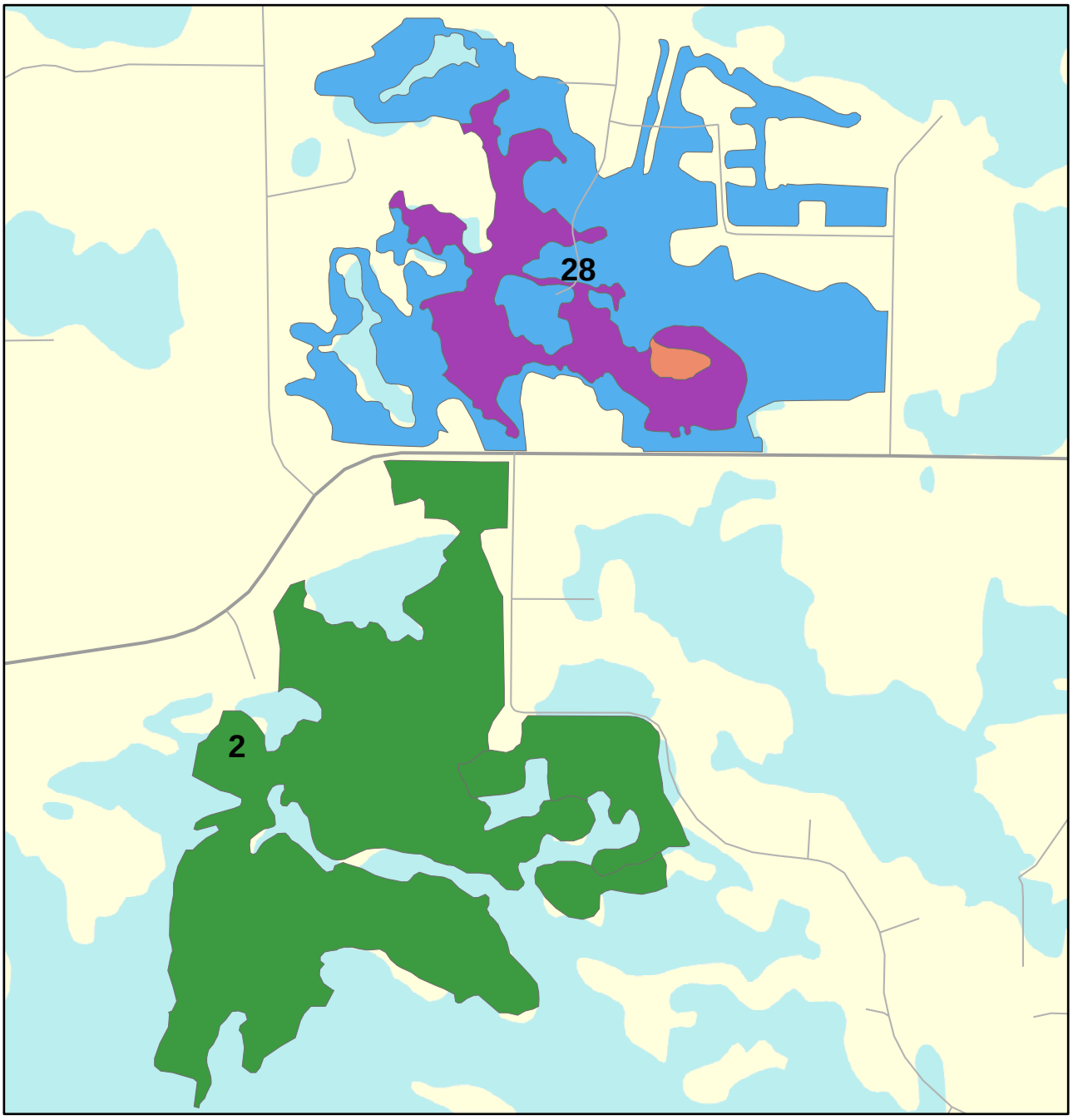
Roads

- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 1
Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Aspen forest	not developed	2.2		Upland	Upland
Aspen forest - saturated soils	not developed	8.2		Wetland	Saturated
Aspen forest - saturated soils	not developed	5.2		Wetland	Saturated
Aspen forest - saturated soils	not developed	4.4		Wetland	Saturated
Aspen forest - saturated soils	not developed	2.1		Wetland	Saturated
Cattail marsh - semipermanently fl	not developed	54.2		Wetland	Semi-permanently flooded
Lowland hardwood forest	not developed	11.2		Wetland	Temporarily flooded
Mixed hardwood swamp	not developed	3.5		Wetland	Saturated
Mixed hardwood swamp - seasonally	not developed	42.2		Wetland	Seasonally flooded
Mixed hardwood swamp - seasonally	not developed	18.6		Wetland	Seasonally flooded
Mixed hardwood swamp - seasonally	not developed	3.8		Wetland	Seasonally flooded
Mixed hardwood swamp - seasonally	not developed	2.2		Wetland	Seasonally flooded
Oak forest	not developed	12.4		Upland	Upland
Oak forest	not developed	4.5		Upland	Upland
Oak forest	not developed	3.4		Upland	Upland
Oak forest	not developed	2.8		Upland	Upland
Oak forest dry subtype	not developed	81.9		Upland	Upland
Oak forest dry subtype	not developed	48.8		Upland	Upland
Oak forest dry subtype	not developed	18.3		Upland	Upland
Oak forest dry subtype	not developed	7.4		Upland	Upland
Oak forest dry subtype	not developed	2.8		Upland	Upland

Natural Resource Clusters #2 and #28
City of Ham Lake



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NR Patches

- Birch bog, spiraea shrubland - sea
- Oak forest dry subtype
- Rich fen sedge subtype
- Saturated deciduous forest

Lakes

Wetlands

Roads

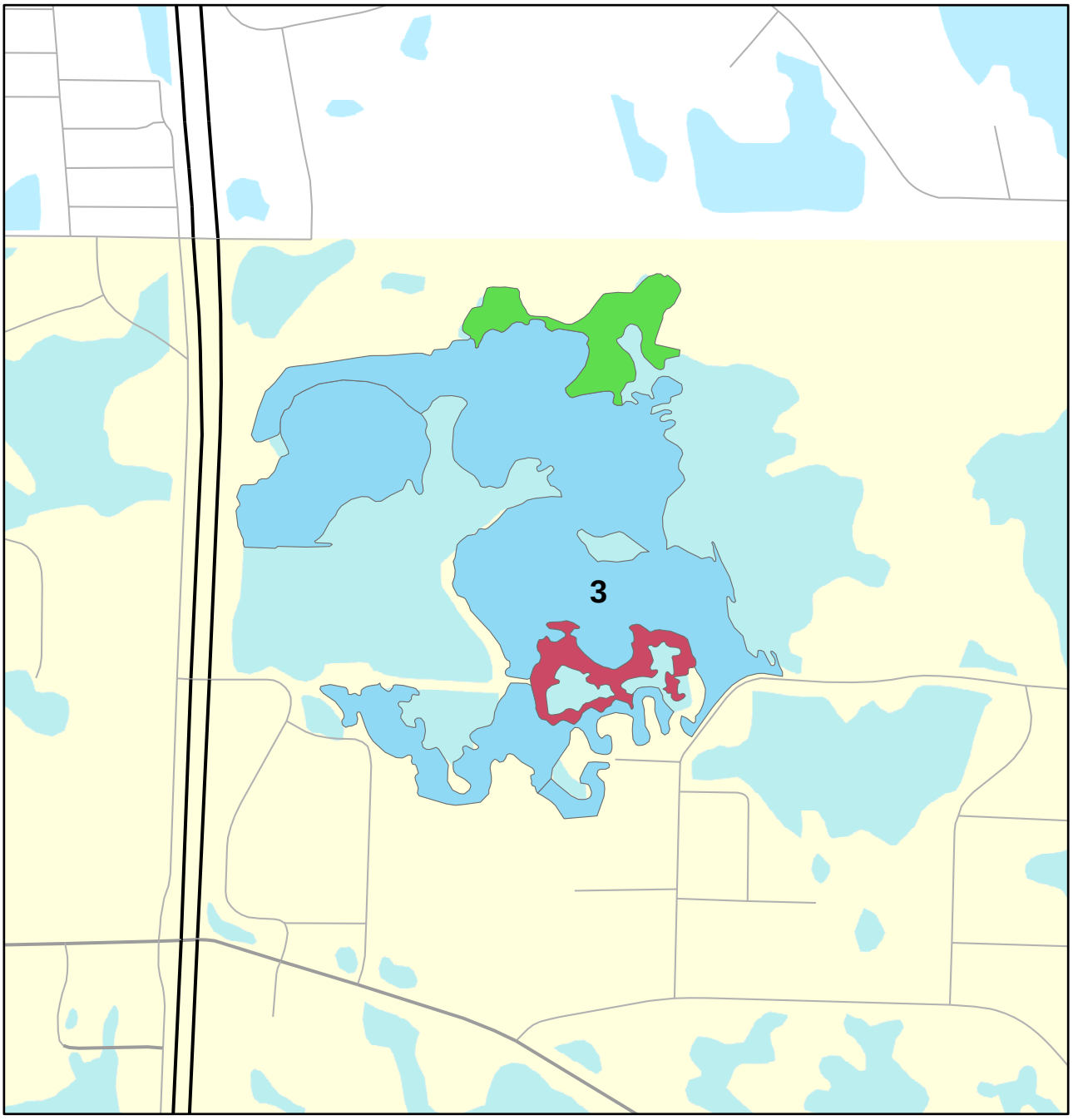
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 2

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Saturated deciduous forest	partial	75.6	5.2	Wetland	Saturated
Saturated deciduous forest	partial	10.2	0.2	Wetland	Saturated
Saturated deciduous forest	not developed	2.9		Wetland	Saturated

Natural Resource Clusters #3
City of Ham Lake



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NR Patches
- Aspen forest
- Oak forest dry subtype
- Poor fen sedge subtype

Lakes

Wetlands

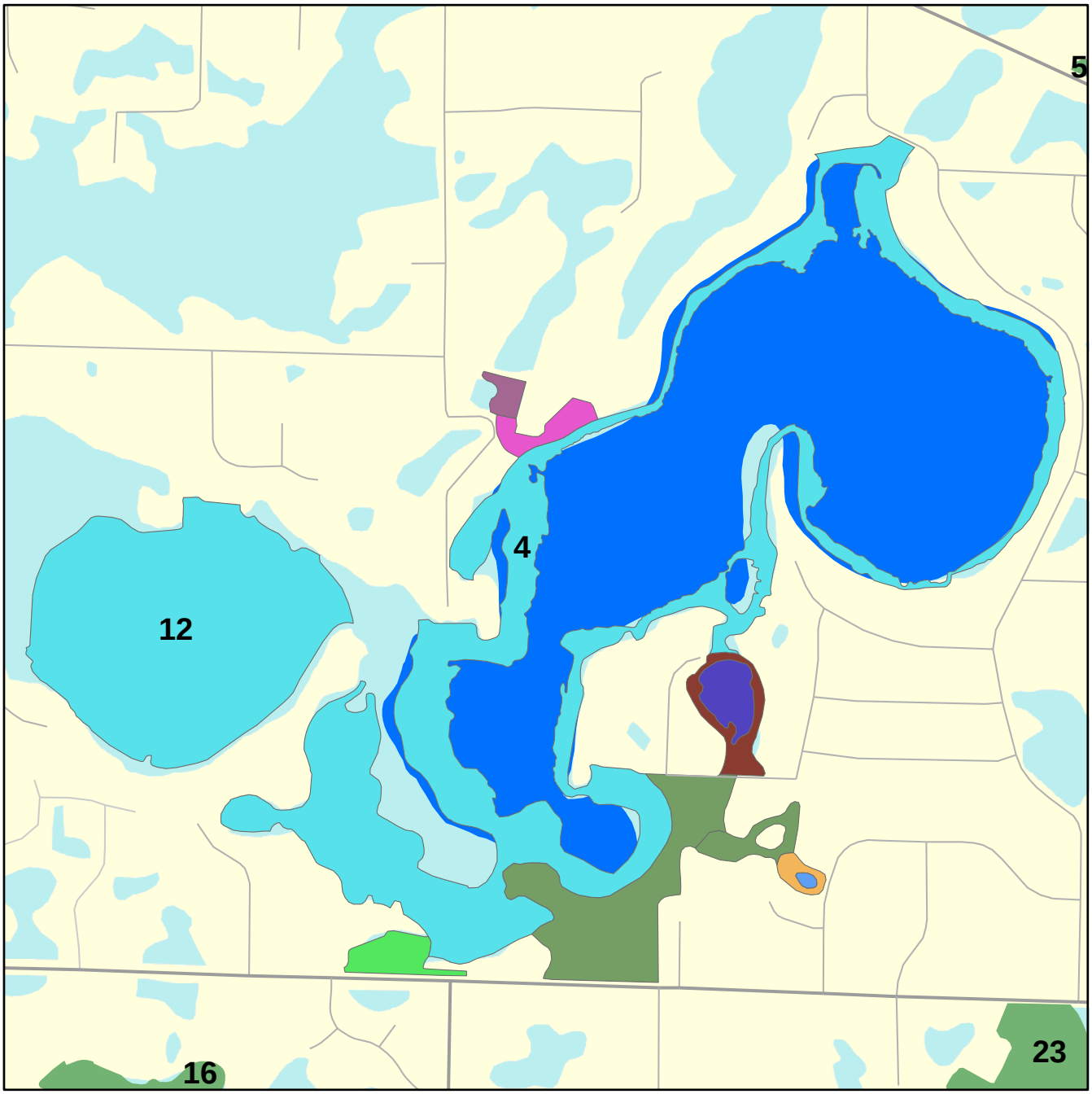
Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 3

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Aspen forest	not developed	6.1		Upland	Upland
Oak forest dry subtype	partial	45.0	0.4	Upland	Upland
Oak forest dry subtype	not developed	12.8		Upland	Upland
Oak forest dry subtype	partial	9.4	4.6	Upland	Upland
Poor fen sedge subtype	partial	4.0	0.6	Wetland	Saturated
Cattail marsh - semipermanently fl	partial	81.7	26.3	Wetland	Semi-permanently flooded

Natural Resource Clusters #4 and #12
City of Ham Lake



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NR Patches

- Aspen forest
- Birch bog, spiraea shrubland - sat
- Cattail marsh - saturated soils
- Cattail marsh - semipermanently fl
- Mixed hardwood swamp
- Oak forest
- Oak forest dry subtype
- Rich fen sedge subtype
- Tamarack swamp sphagnum subtype

Lakes

Wetlands

Roads

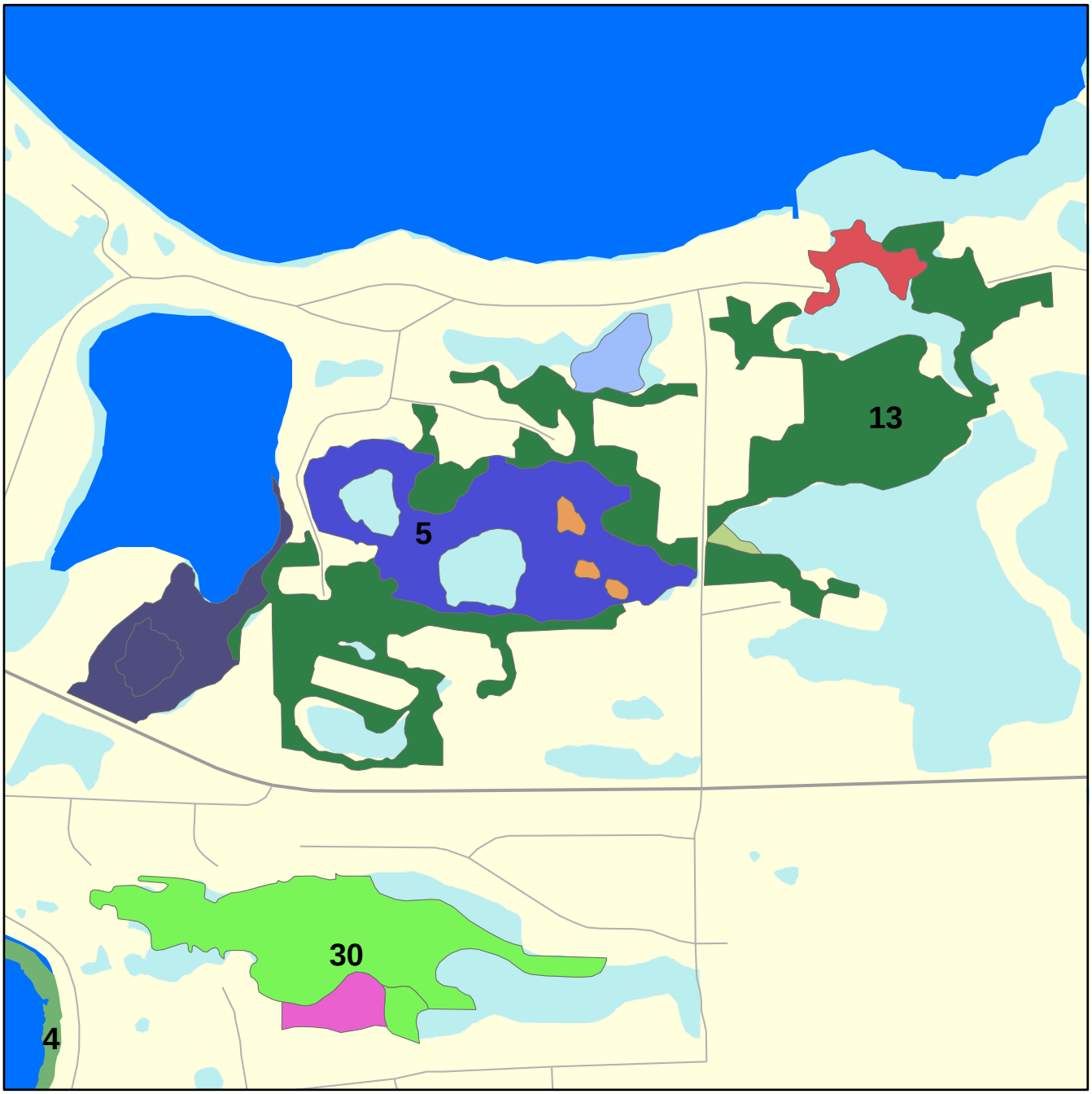
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 4

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Cattail marsh - semipermanently fl	partial	81.7	26.3	Wetland	Semi-permanently flooded
Mixed hardwood swamp	partial	2.9	2.4	Wetland	Saturated
Oak forest	partial	16.4	4.5	Upland	Upland
Oak forest	complete	2.4	2.4	Upland	Upland
Oak forest dry subtype	partial	2.2	0.6	Upland	Upland
Rich fen sedge subtype	partial	2.9	2.8	Wetland	Saturated
Tamarack swamp sphagnum subtype	complete	3.0	3.0	Wetland	Saturated

Natural Resource Clusters #5, #13, and #30
City of Ham Lake



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NR Patches
- Cattail marsh - semipermanently fl
- Mixed hardwood swamp
- Oak forest
- Oak forest dry subtype
- Poor fen
- Poor fen sedge subtype
- Tamarack swamp sphagnum subtype
- Upland mixed coniferous-deciduous
- Wet meadow - seasonally flooded

Lakes

Wetlands

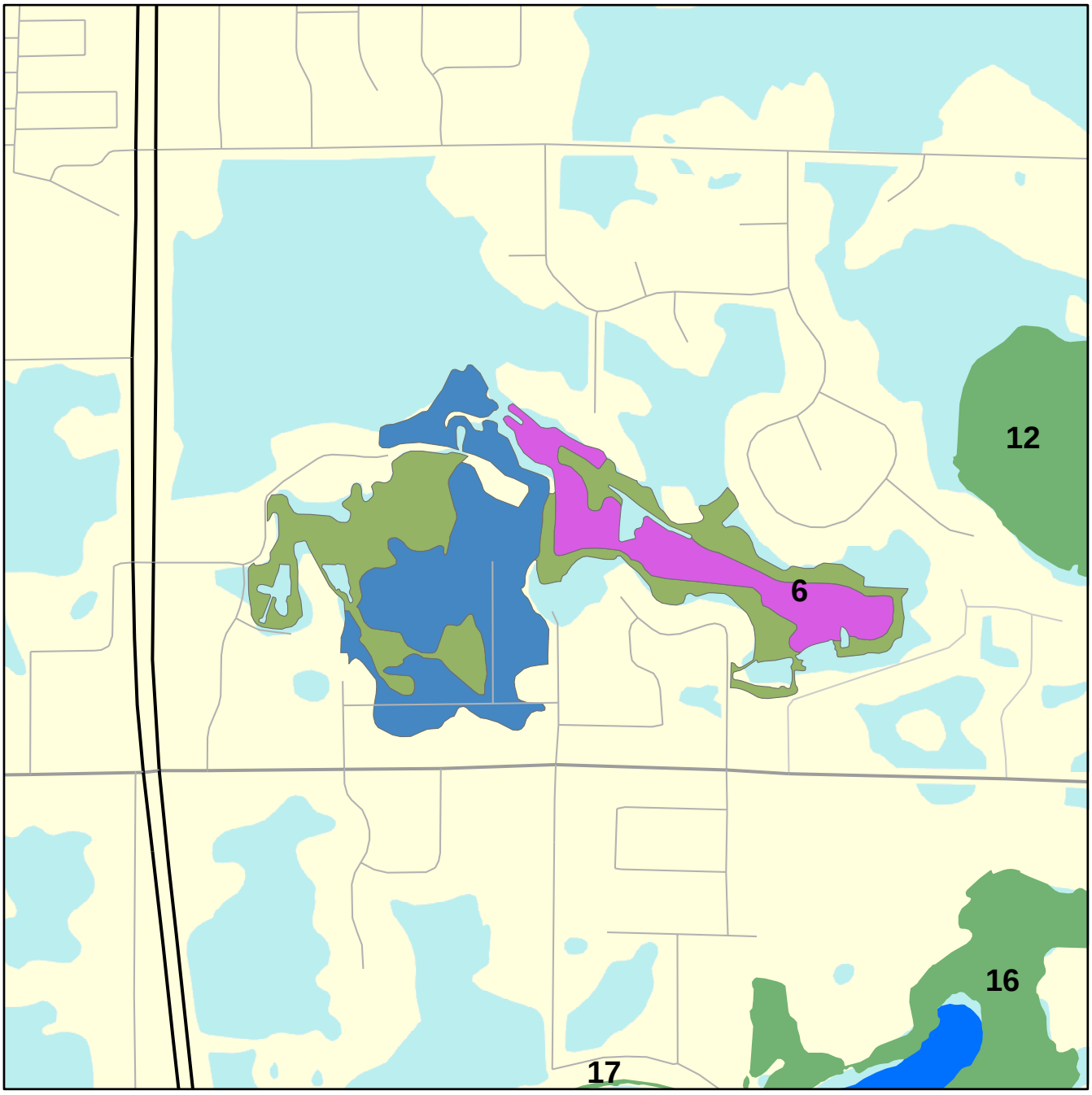
Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 5

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Oak forest dry subtype	partial	23.3	1.6	Upland	Upland
Oak forest dry subtype	partial	11.6	5.3	Upland	Upland
Oak forest dry subtype	partial	3.3	0.6	Upland	Upland
Poor fen	not developed	12.5		Wetland	Saturated
Poor fen	not developed	2.9		Wetland	Saturated
Poor fen sedge subtype	partial	31.1	10.4	Wetland	Saturated
Tamarack swamp sphagnum subtype	partial	3.9	1.5	Wetland	Saturated
Birch bog, spiraea shrubland - sea	partial	16.6	1.3	Wetland	Seasonally flooded

Natural Resource Clusters #6
City of Ham Lake



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NR Patches
- Birch bog, spiraea shrubland - sea
- Oak forest dry subtype
- Rich fen sedge subtype

Lakes

Wetlands

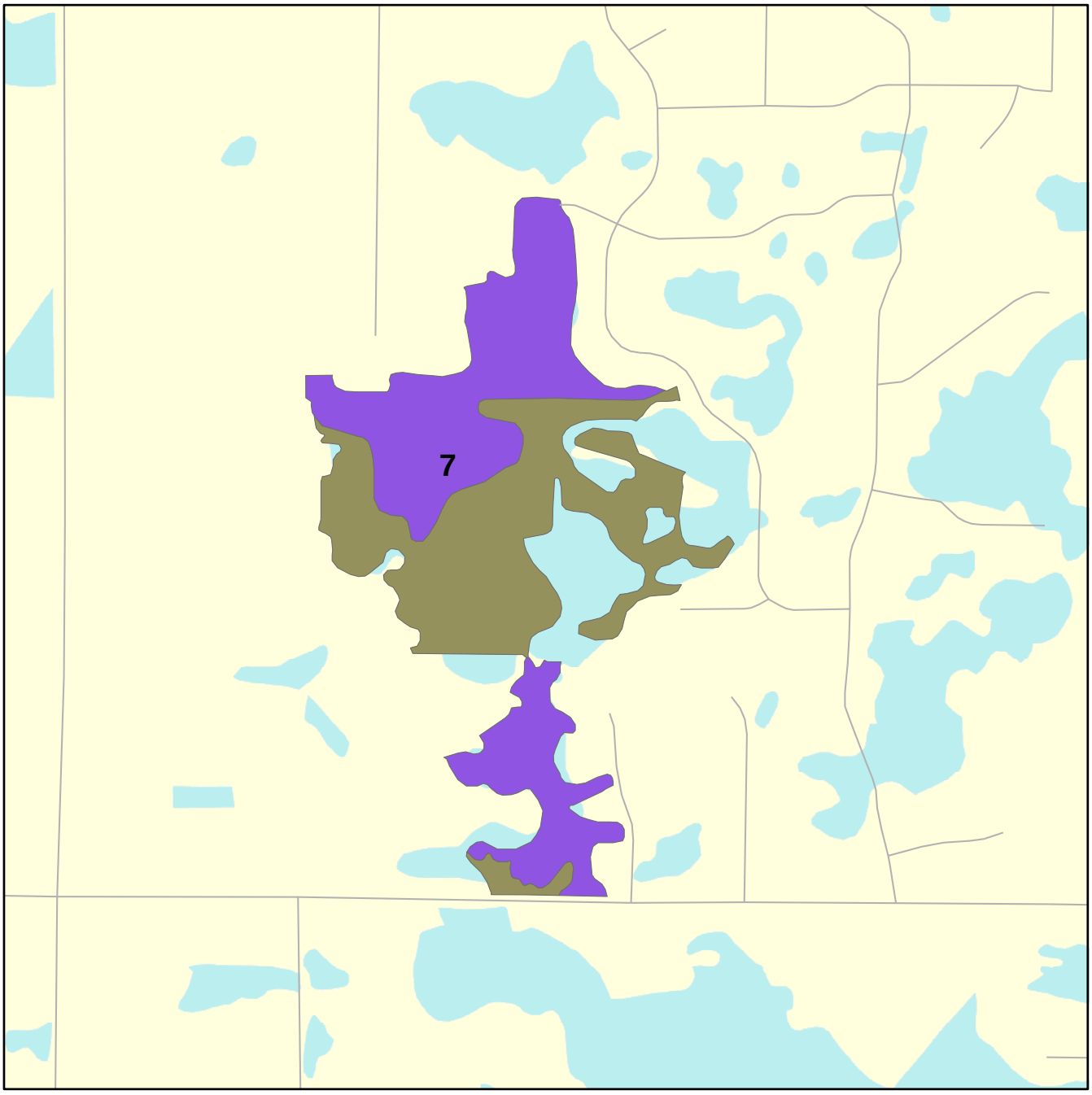
Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 6

Component Patches

Birch bog, spiraea shrubland - sea	partial	16.6	1.3	Wetland	Seasonally flooded
Oak forest dry subtype	partial	34.9	3.4	Upland	Upland
Rich fen sedge subtype	partial	19.4	8.4	Wetland	Saturated
Rich fen sedge subtype	partial	8.3	1.0	Wetland	Saturated
Rich fen sedge subtype	partial	6.7	2.7	Wetland	Saturated
Mixed hardwood swamp	partial	32.0	0.7	Wetland	Saturated

Natural Resource Cluster #7
City of Ham Lake



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NR Patches
- Mixed hardwood swamp
- Oak forest dry subtype

Lakes

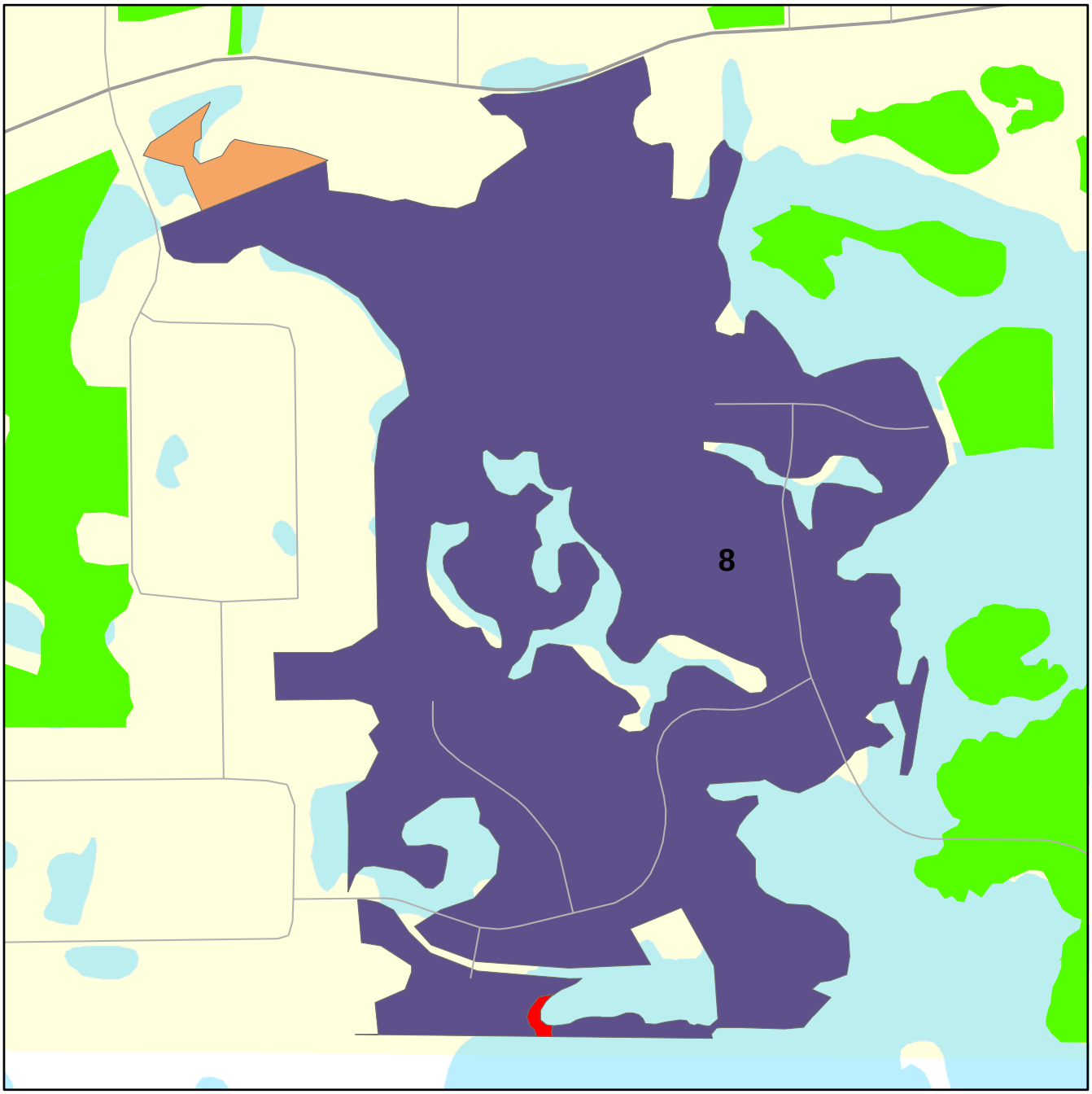
Wetlands

Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 7
Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Mixed hardwood swamp	partial	32.0	0.7	Wetland	Saturated
Oak forest dry subtype	partial	24.8	2.2	Upland	Upland
Oak forest dry subtype	partial	10.7	6.4	Upland	Upland

Natural Resource Cluster #8
City of Ham Lake



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Ecotypes of Featured Cluster
- Cattail marsh - semipermanently fl
- Mixed hardwood swamp
- Saturated deciduous forest

Lakes

Wetlands

Other HQ Patches
- Other Ranked Clusters
- All Other Patches

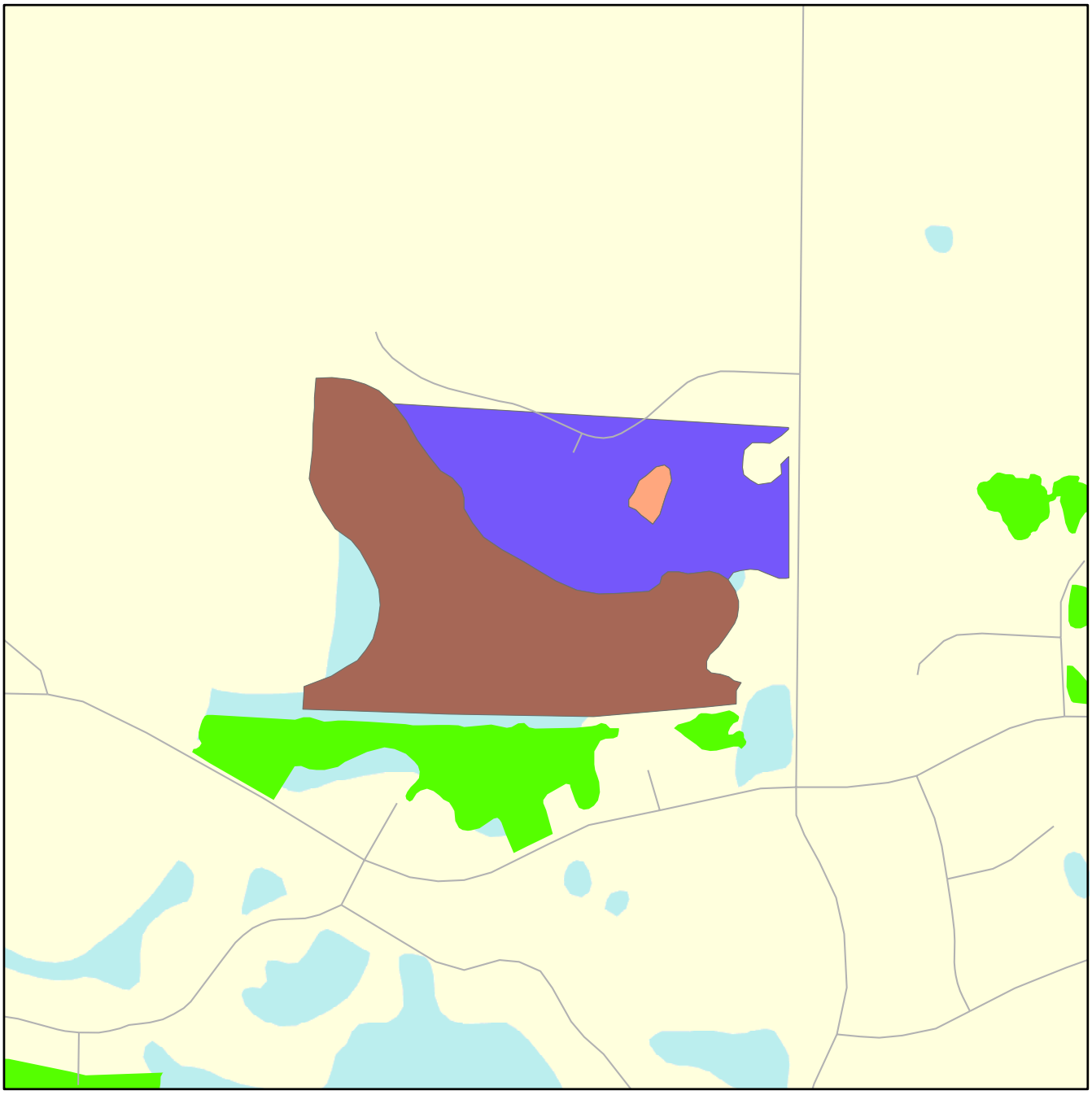
Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 8

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Mixed hardwood swamp	partial	2.5	2.2	Wetland	Saturated
Saturated deciduous forest	partial	134.5	80.9	Wetland	Saturated
Saturated deciduous forest	partial	4.7	4.0	Wetland	Saturated

Natural Resource Cluster #9
City of Ham Lake



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Ecotypes of Featured Cluster

- Mixed hardwood swamp
- Oak forest mesic subtype
- Wet meadow

Lakes

Wetlands

Other HQ Patches

- Other Ranked Clusters
- All Other Patches

Roads

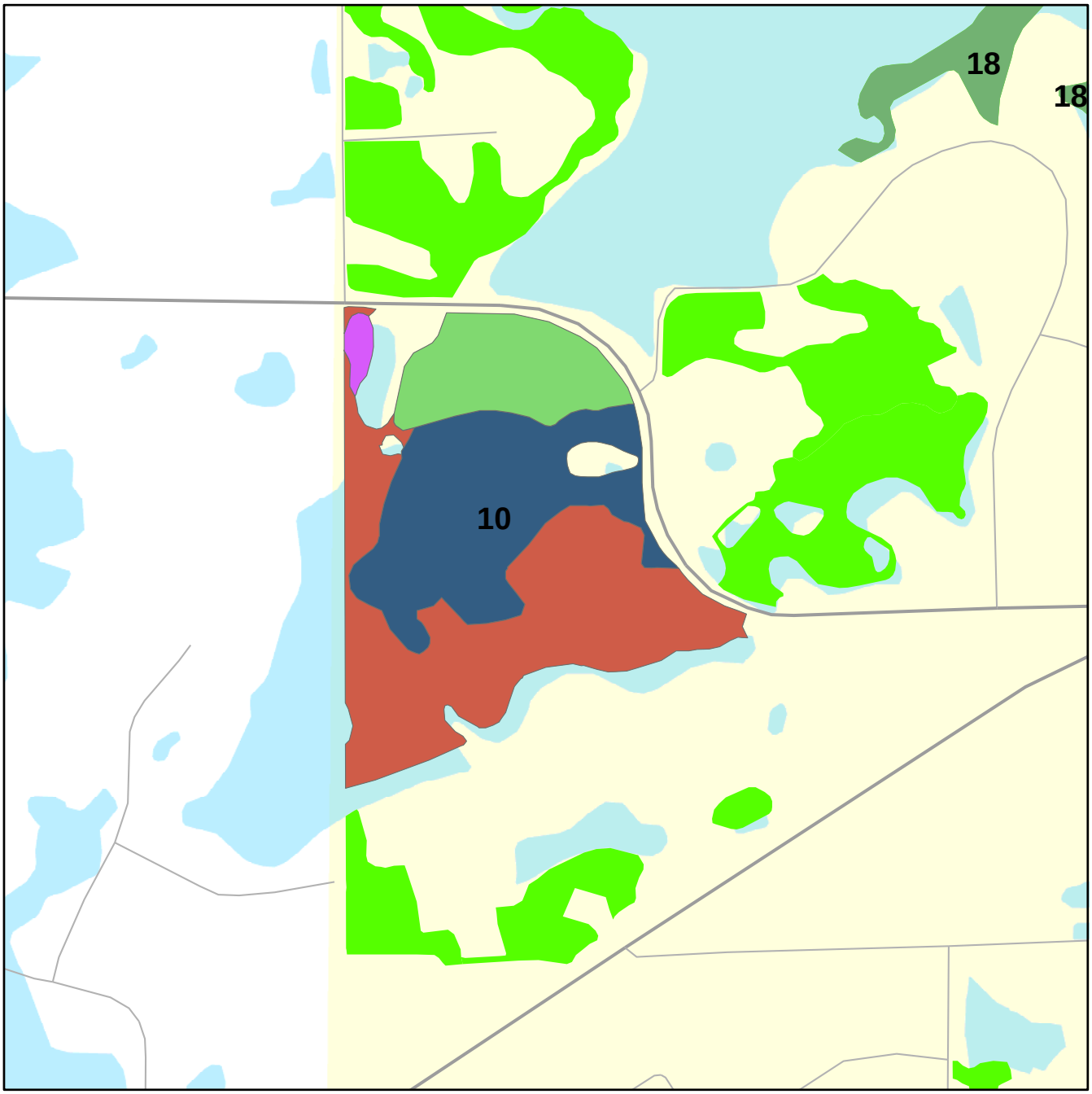
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 9

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Oak forest dry subtype	partial	51.2	2.6	Upland	Upland

Natural Resource Cluster #10
City of Ham Lake



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Ecotypes of Featured Cluster
- Cattail marsh - seasonally flooded
- Oak forest dry subtype
- Poor fen
- Wet meadow

Lakes

Wetlands

Other HQ Patches
- Other Ranked Clusters
- All Other Patches

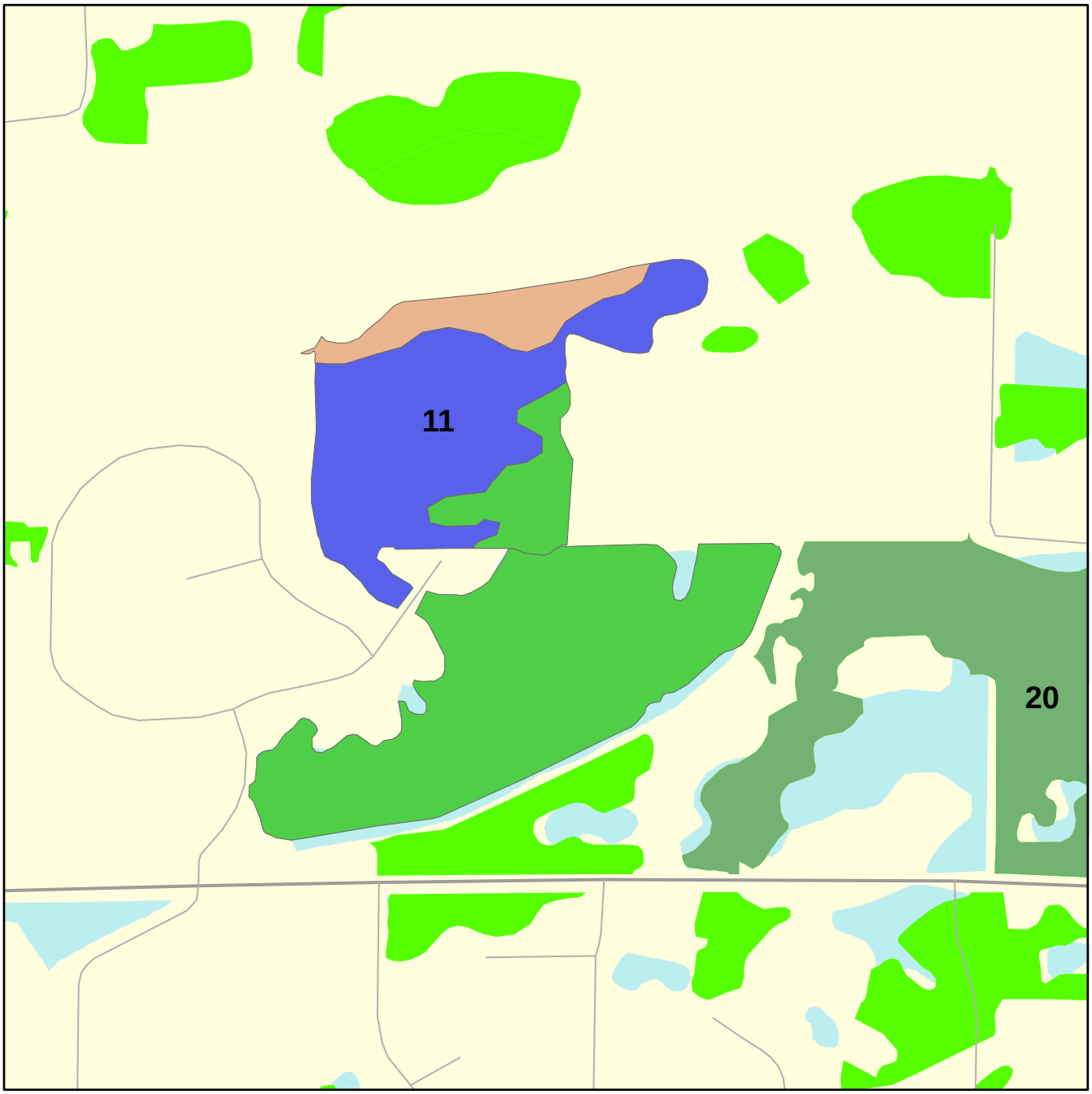
Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 10

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Cattail marsh - seasonally flooded	not developed	7.0		Wetland	Seasonally flooded
Oak forest dry subtype	not developed	14.7		Upland	Upland
Poor fen	not developed	20.0		Wetland	Saturated

Natural Resource Cluster #11
City of Ham Lake



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Ecotypes of Featured Cluster
- Lowland hardwood forest
- Mixed hardwood swamp
- Oak forest mesic subtype

Lakes

Wetlands

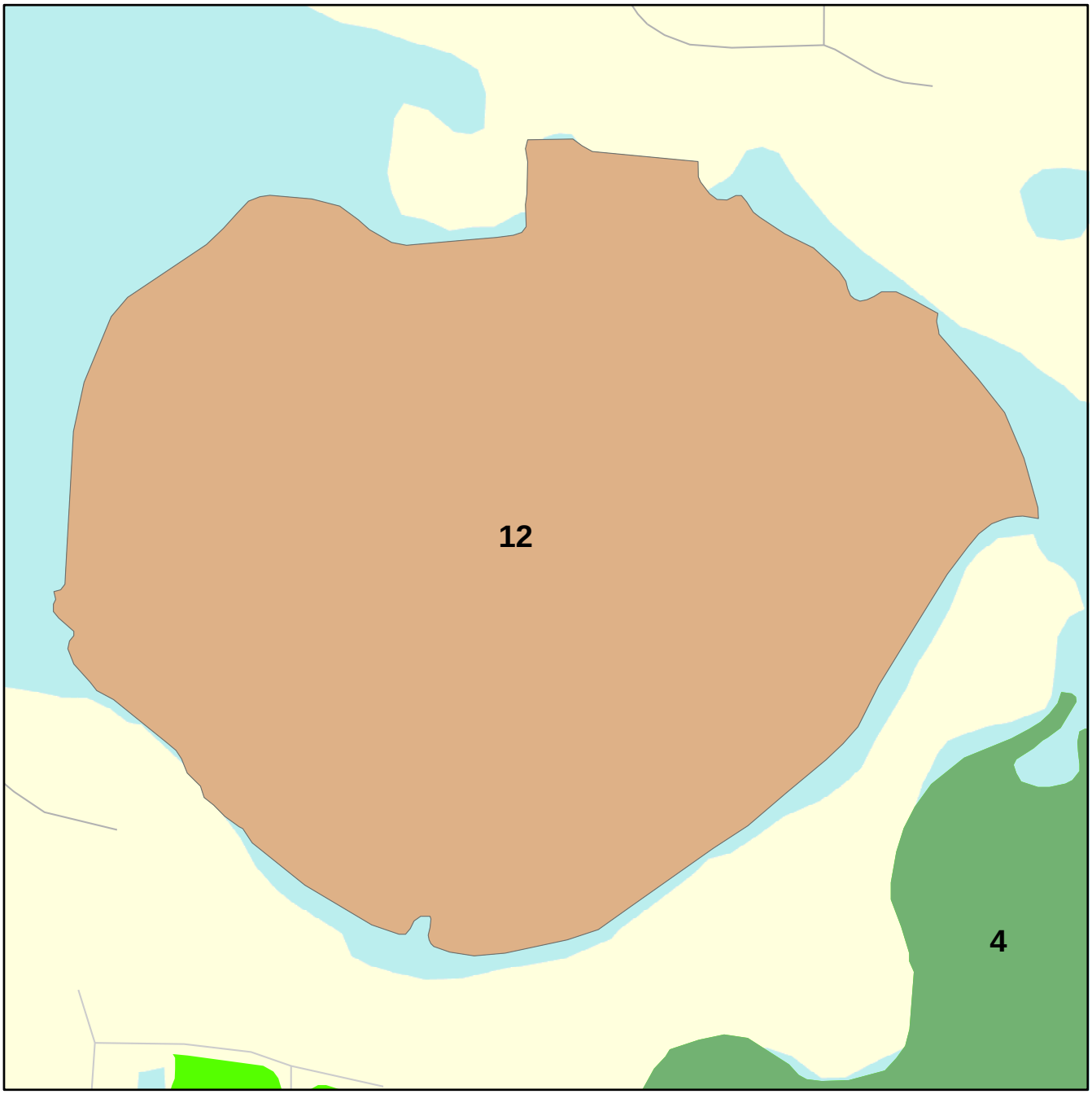
Other HQ Patches
- Other Ranked Clusters
- All Other Patches

Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 11
Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Lowland hardwood forest	not developed	4.4		Wetland	Temporarily flooded
Mixed hardwood swamp	partial	27.8	12.8	Wetland	Saturated
Mixed hardwood swamp	not developed	4.1		Wetland	Saturated
Oak forest mesic subtype	partial	18.3	2.2	Upland	Upland

Natural Resource Cluster #12
City of Ham Lake



1:3,985

Ecotypes of Featured Cluster

- Cattail marsh - semipermanently flooded

Lakes

Wetlands

Other HQ Patches

- Other Ranked Clusters
- All Other Patches

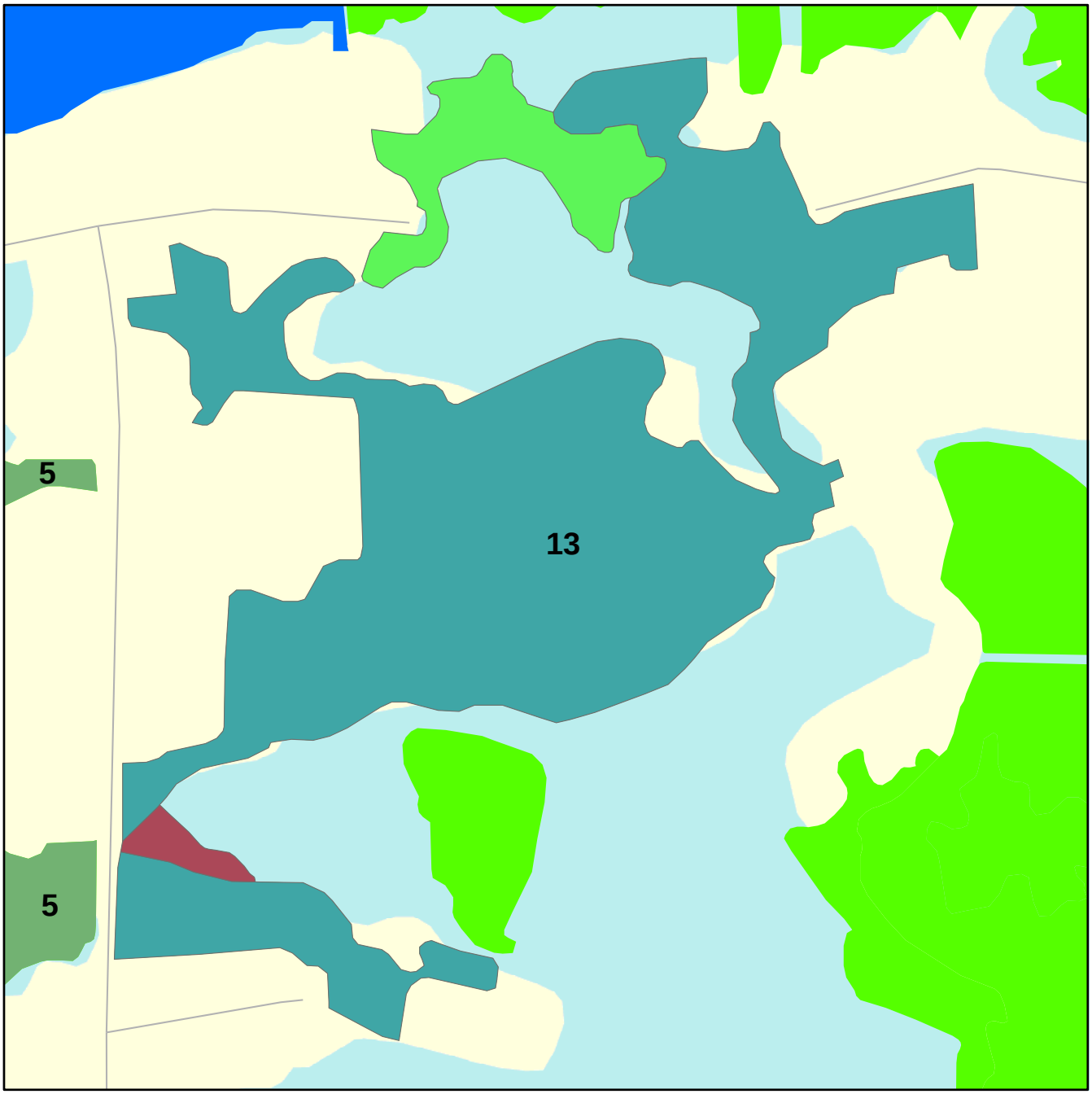
Roads

- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 12
Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Cattail marsh - semipermanently fl	partial	55.8	16.4	Wetland	Semi-permanently flooded

Natural Resource Cluster #13
City of Ham Lake



1:4,850

Ecotypes of Featured Cluster
- Cattail marsh - semipermanently fl
- Oak forest dry subtype
- Wet meadow - seasonally flooded

Lakes

Wetlands

Other HQ Patches
- Other Ranked Clusters
- All Other Patches

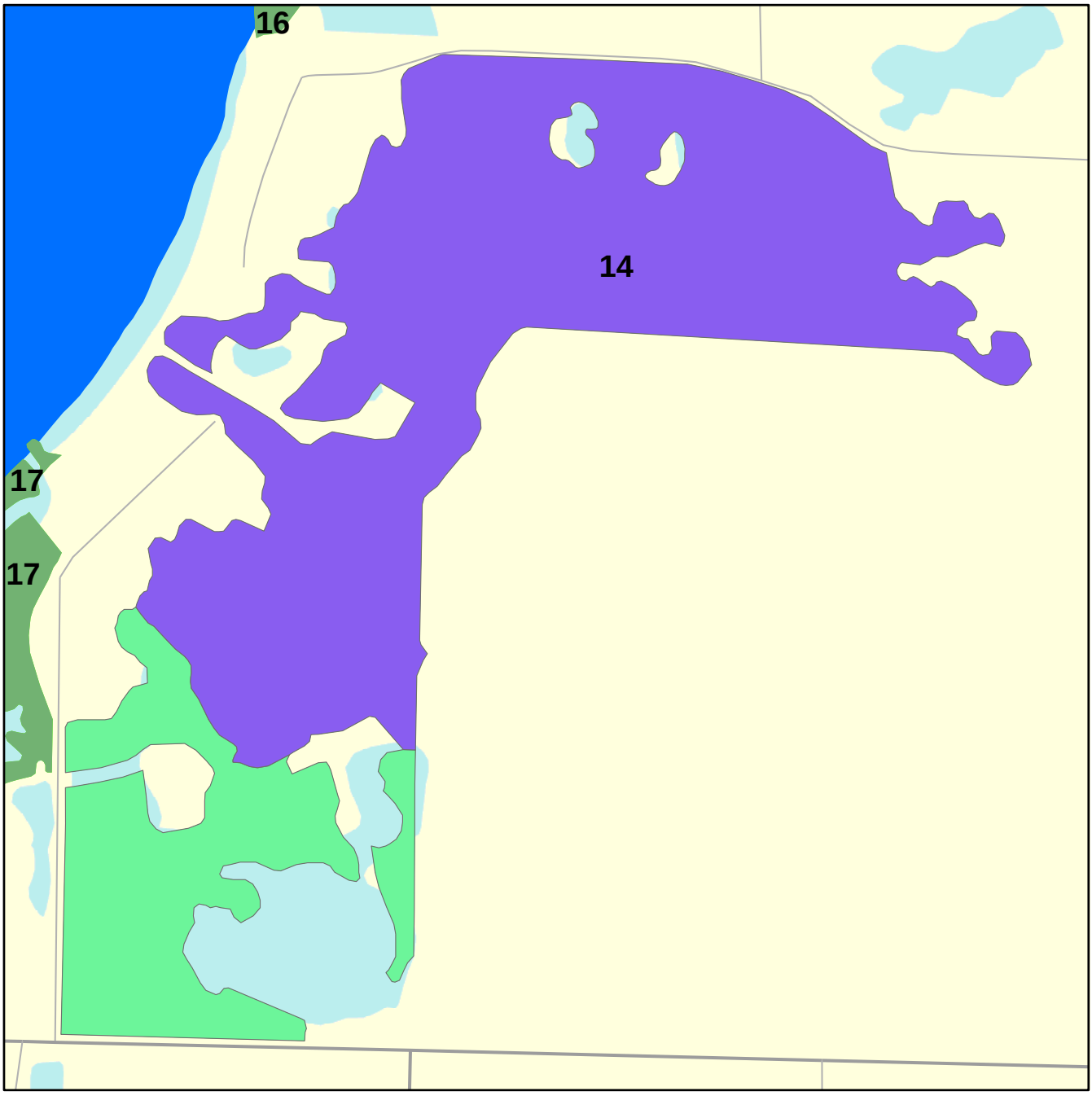
Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 13

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Cattail marsh - semipermanently fl	partial	4.0	0.2	Wetland	Semi-permanently flooded
Oak forest dry subtype	partial	34.6	2.0	Upland	Upland
Oak forest dry subtype	partial	4.1	2.1	Upland	Upland

Natural Resource Cluster #14
City of Ham Lake



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Ecotypes of Featured Cluster
- Mixed hardwood swamp
- Oak forest dry subtype

Lakes

Wetlands

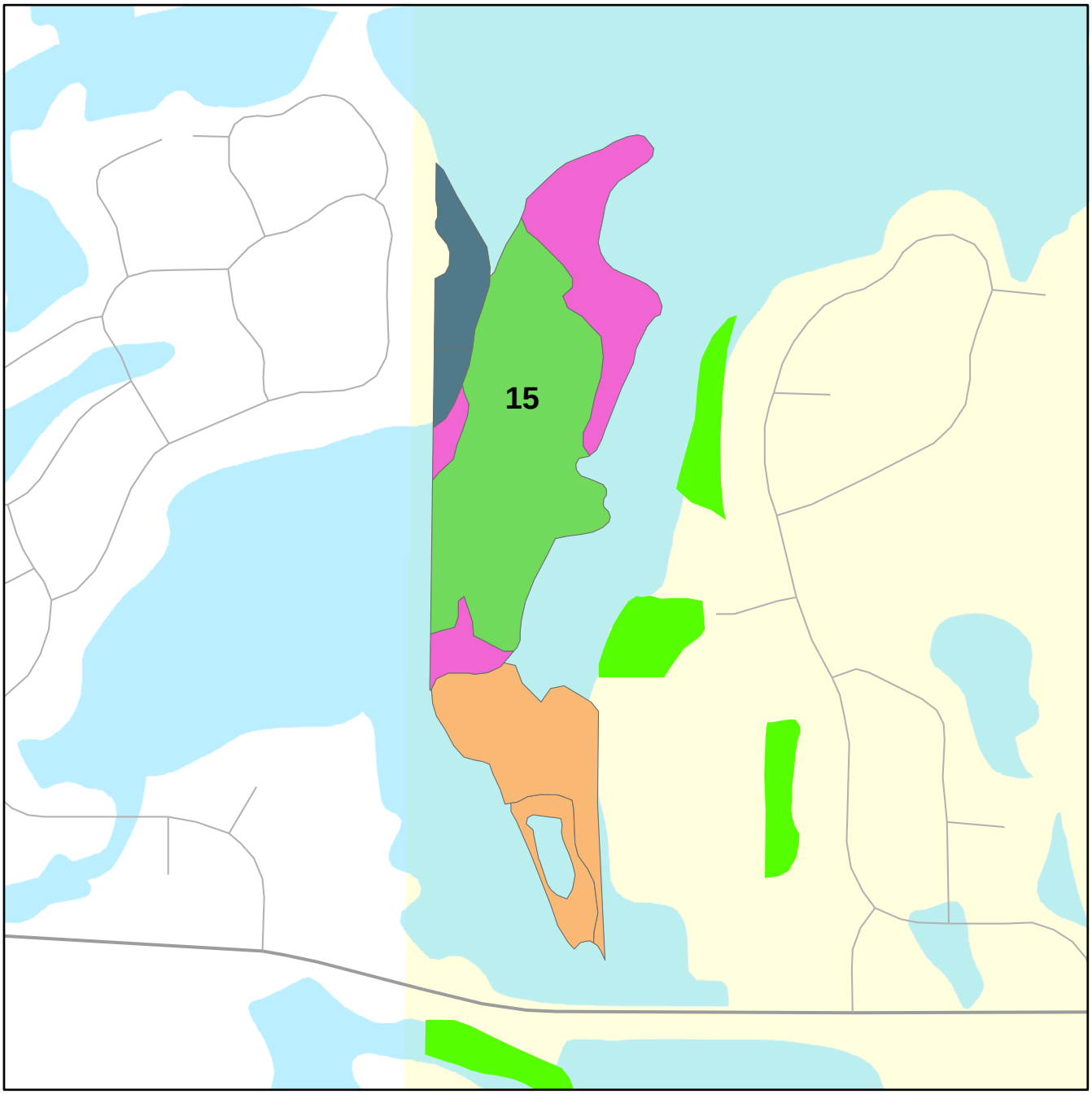
Other HQ Patches
- Other Ranked Clusters
- All Other Patches

Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 14
Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Mixed hardwood swamp	partial	20.3	3.5	Wetland	Saturated
Oak forest dry subtype	partial	77.9	60.9	Upland	Upland

Natural Resource Cluster #15
City of Ham Lake



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Ecotypes of Featured Cluster
- Cattail marsh - seasonally flooded
- Cattail marsh - semipermanently fl
- Oak forest
- Tamarack swamp

Lakes

Wetlands

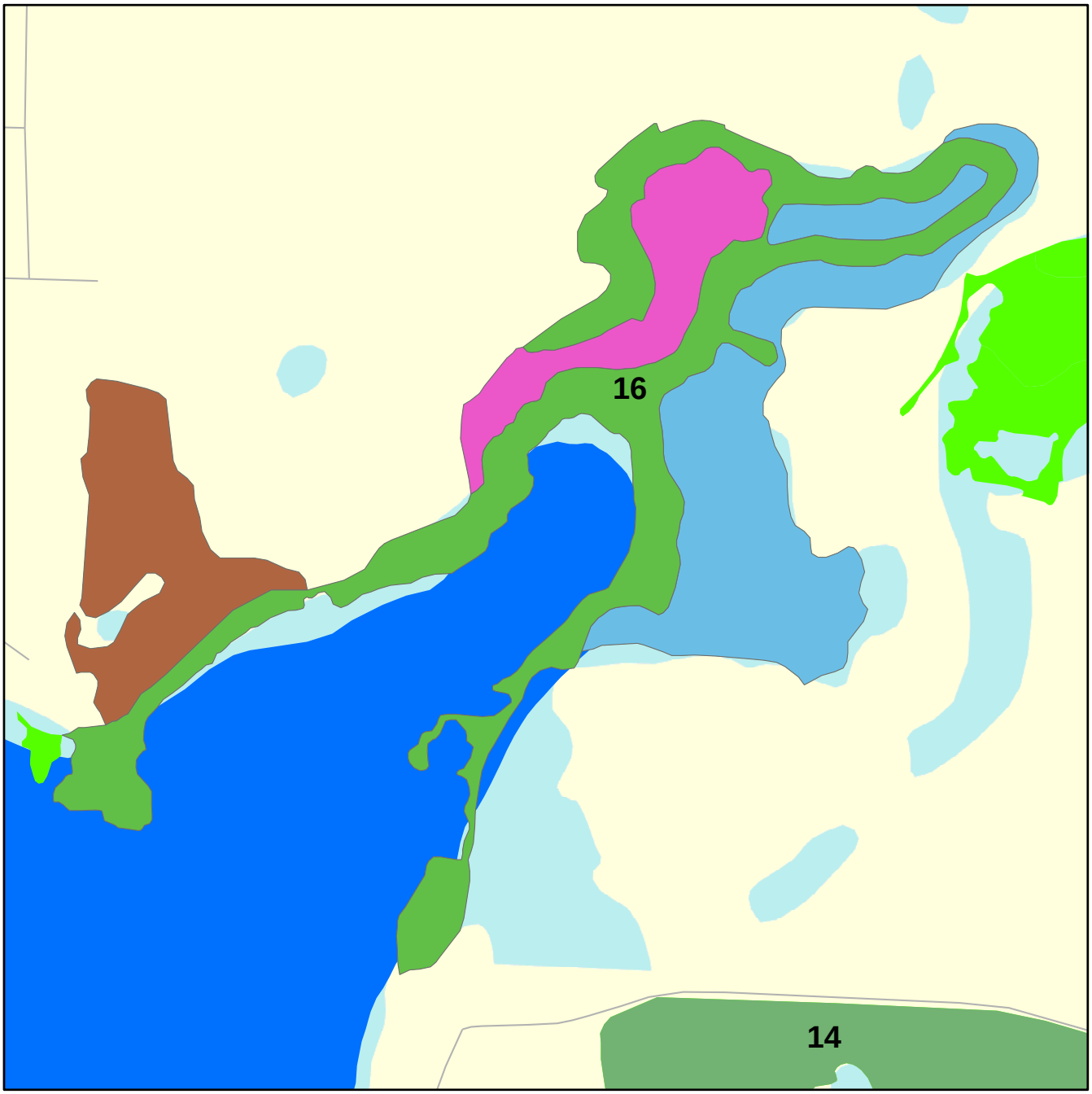
Other HQ Patches
- Other Ranked Clusters
- All Other Patches

Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 15
Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Cattail marsh - seasonally flooded	partial	6.1	0.9	Wetland	Seasonally flooded
Cattail marsh - semipermanently fl	partial	17.0	0.3	Wetland	Semi-permanently flooded
Oak forest	not developed	2.4		Upland	Upland
Tamarack swamp	not developed	6.7		Wetland	Saturated

Natural Resource Cluster #16
City of Ham Lake



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Ecotypes of Featured Cluster
- Cattail marsh - semipermanently fl
- Mixed hardwood swamp
- Oak forest dry subtype
- Tamarack swamp sphagnum subtype

Lakes

Wetlands

Other HQ Patches
- Other Ranked Clusters
- All Other Patches

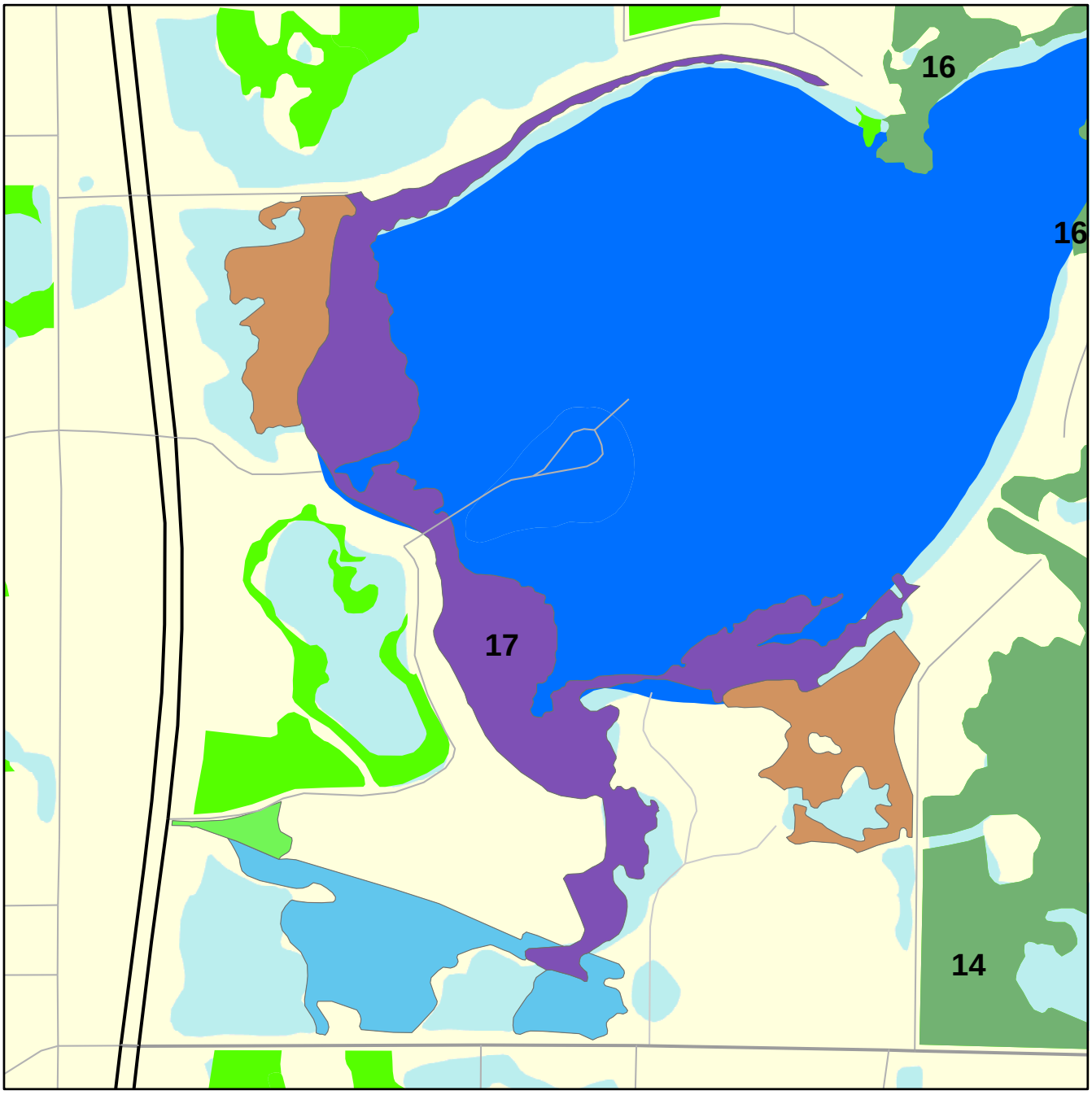
Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 16

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Cattail marsh - semipermanently fl	partial	14.8	0.5	Wetland	Semi-permanently flooded
Mixed hardwood swamp	not developed	9.8		Wetland	Saturated
Oak forest dry subtype	partial	5.8	1.4	Upland	Upland
Tamarack swamp sphagnum subtype	partial	4.1	0.1	Wetland	Saturated

Natural Resource Cluster #17
City of Ham Lake



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Ecotypes of Featured Cluster
- Cattail marsh - semipermanently fl
- Dry prairie barrens subtype
- Mixed hardwood swamp
- Oak forest dry subtype

Lakes

Wetlands

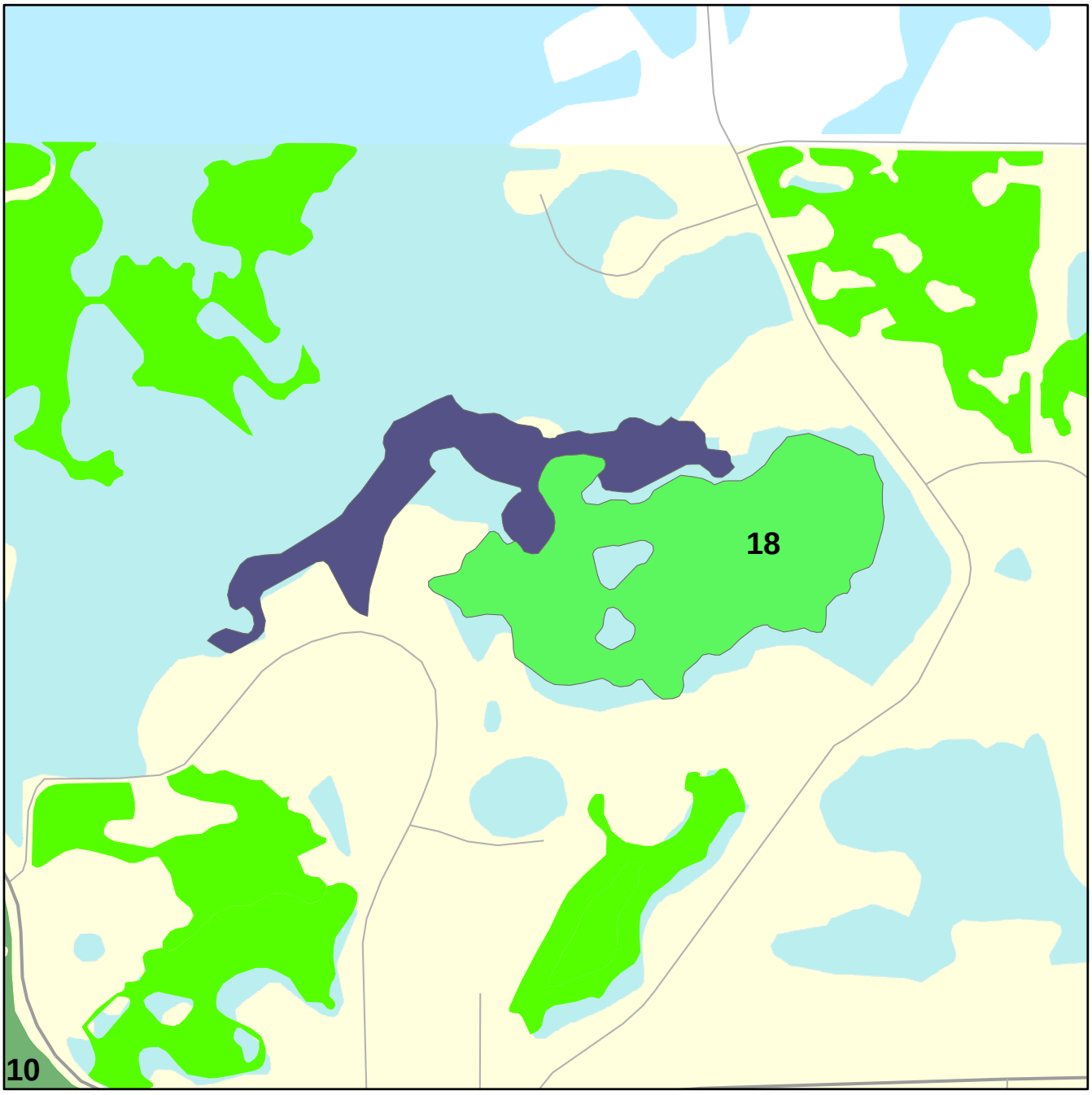
Other HQ Patches
- Other Ranked Clusters
- All Other Patches

Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 17
Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Cattail marsh - semipermanently fl	partial	37.4	10.8	Wetland	Semi-permanently flooded
Mixed hardwood swamp	partial	9.7	8.9	Wetland	Saturated
Mixed hardwood swamp	partial	8.2	8.1	Wetland	Saturated
Oak forest dry subtype	partial	12.1	10.4	Upland	Upland
Oak forest dry subtype	not developed	3.1		Upland	Upland

Natural Resource Cluster #18
City of Ham Lake



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Ecotypes of Featured Cluster
- Oak forest dry subtype
- Poor fen

Lakes

Wetlands

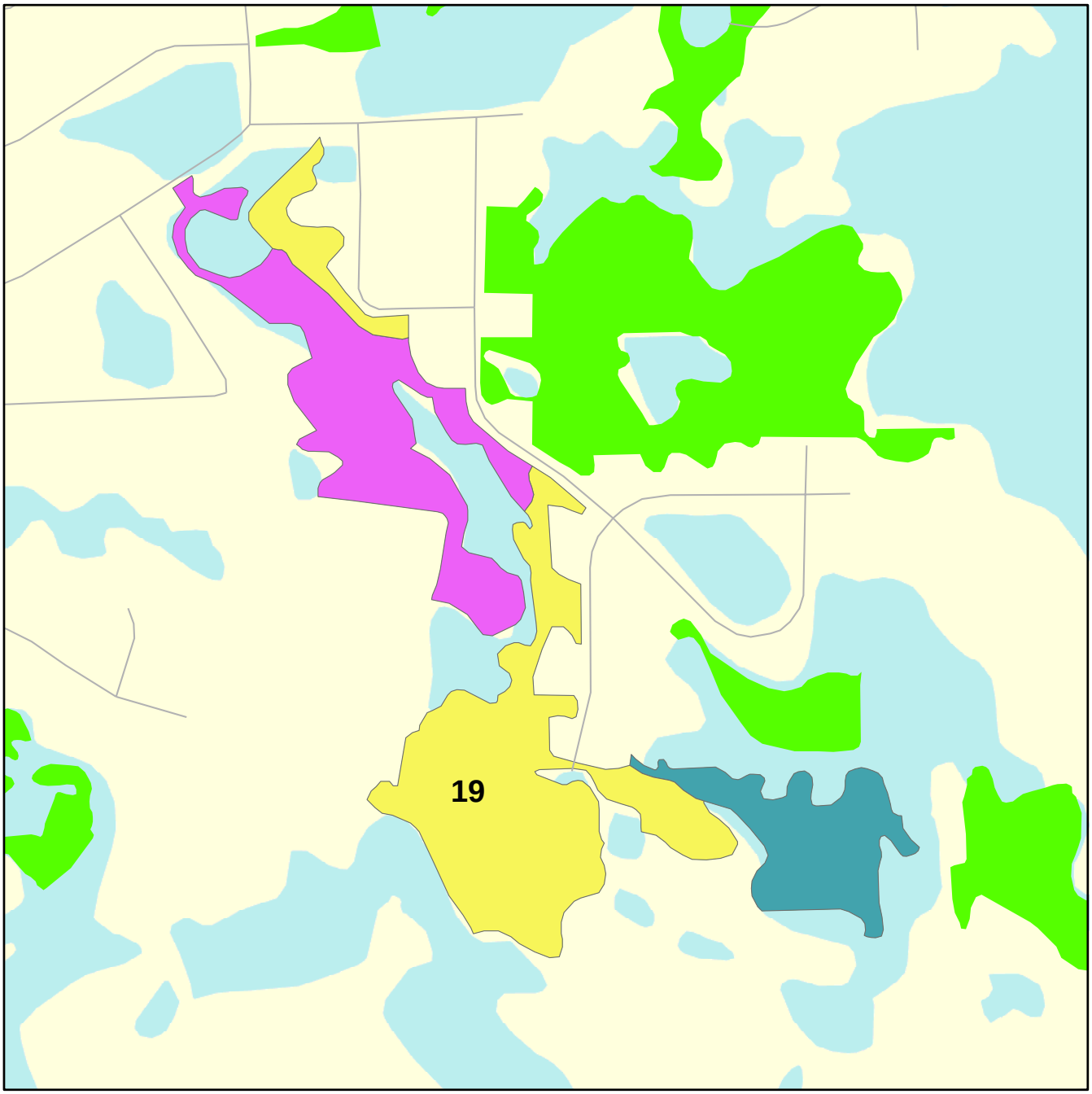
Other HQ Patches
- Other Ranked Clusters
- All Other Patches

Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 18
Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Oak forest dry subtype	partial	11.2	2.7	Upland	Upland
Poor fen	partial	24.3	2.6	Wetland	Saturated

Natural Resource Cluster #19
City of Ham Lake



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Ecotypes of Featured Cluster
- Birch bog, spiraea shrubland - sea
- Mixed hardwood swamp
- Oak forest dry subtype

Lakes

Wetlands

Other HQ Patches
- Other Ranked Clusters
- All Other Patches

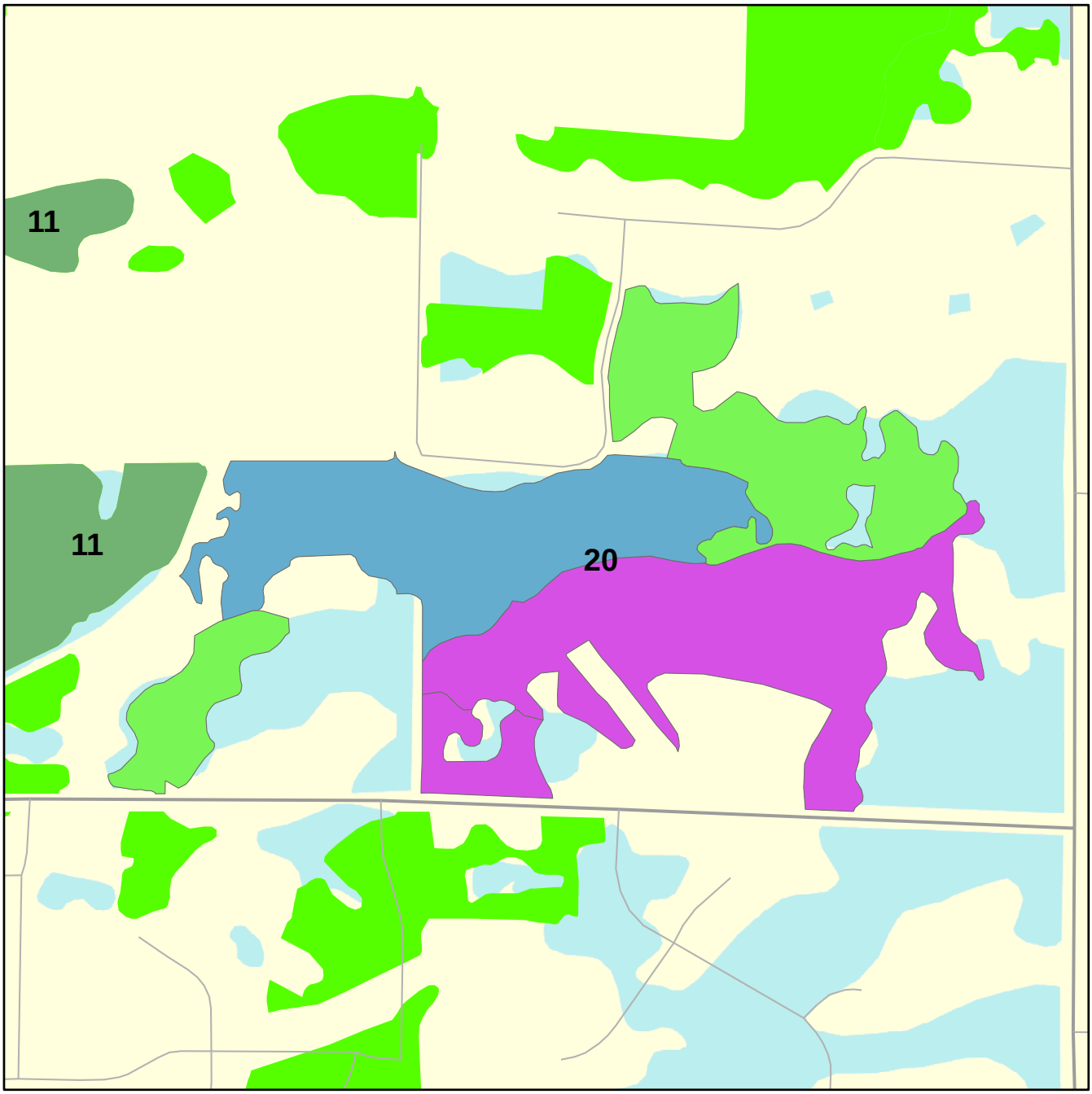
Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 19

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Birch bog, spiraea shrubland - sea	partial	7.4	0.1	Wetland	Seasonally flooded
Mixed hardwood swamp	partial	13.8	8.4	Wetland	Saturated
Oak forest dry subtype	partial	19.4	3.3	Upland	Upland
Oak forest dry subtype	partial	2.7	2.6	Upland	Upland

Natural Resource Cluster #20
City of Ham Lake



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Ecotypes of Featured Cluster
- Birch bog, spiraea shrubland - sea
- Mixed hardwood swamp
- Oak forest dry subtype

Lakes

Wetlands

Other HQ Patches
- Other Ranked Clusters
- All Other Patches

Roads
- Interstate Highways
- U.S. Highways
- State Highways
- County Roads/CSAHs
- Municipal Streets
- Misc. Other

Cluster 20

Component Patches

Patch Ecotype	Development Status	Total Patch Acres	Patch Developed Acres	Hydrology	Type
Birch bog, spiraea shrubland - sea	partial	22.1	7.3	Wetland	Seasonally flooded
Mixed hardwood swamp	partial	15.8	12.2	Wetland	Saturated
Mixed hardwood swamp	not developed	4.9		Wetland	Saturated
Oak forest dry subtype	partial	24.8	22.3	Upland	Upland
Oak forest dry subtype	partial	3.2	1.2	Upland	Upland

Appendix B
(Community/Eco-Type Descriptions)

Aspen Forest

Aspen Forest – Saturated Soils

Aspen Forest – Temporarily Flooded

Aspen forests usually develop on wet, poorly drained soils which are not sufficiently wet to have a peat accumulation. Aspen forest is an early-successional community often established on disturbed sites after total clearing such as clear cutting or wind throw. Older stands of aspen forest in Anoka County can be difficult to distinguish over time as the presence of other hardwood species such as oak, maple and basswod increases.

These forests are typically dominated by aspens, with 60% or more of the cover being aspens or balsam poplar, and less than 10% being paper birch, though other species, such as green ashes and oaks may be found as well. Shade tolerant grasses and sedges, such as wild sarsaparilla, Canada mayflower, false melic grass, and mountain rice-grass, may be found in the understory depending on the canopy density and the depth to the water table. Hazelnut is a common understory shub occuring on many sites throughout Anoka County.

Birch Bog/Spiraea Shrubland – Saturated Soils

Birch Bog/Spiraea Shrubland – Seasonally Flooded

Birch Bog/Spirea Shrublands have yet to be thoroughly examined and characterized in the ecological literature. They are likely somewhat impermanent in nature, arising on mucky or peaty soils where wetland drainage, ditching, or other changes to the natural hydrology have occurred. These communities are similar to the bogs found in the northern part of Minnesota, but are not true bogs. Many of the understory plants found in bogs—such as heath shrub, sphagnum moss, various sedges, leatherleaf, Labrador tea, and cranberry may be present.

Cattail Marsh – Intermittently Exposed

Cattail Marsh – Saturated Soils

Cattail Marsh – Seasonally Flooded

Cattail Marsh – Semipermanently Flooded

Cattail marshes are emergent marshes dominated by cattails, though they may have up to 30% tree cover, and up to 50% shrub cover. This community is very common and well known in our region and occurs along lakes within shallow basins and along the backwaters of many of our streams. Cattails grow in a muck bottom or a buoyant peat mat which does not actually touch the lake bottom. Associated plant species vary greatly, however sedges are common.

Natural cattail marshes often look like they ar composed solely of broad-leaved cattail, but in truth they have a variety of marsh species such as lake sedge, woolgrass, and softstem bulrush, as well as some rich fen species such as St. John's-wort. Other common sedges may include jewel-weed, broad-leaved arrowhead, mad-dog skullcap, marsh skullcap, and blue vervain.

Though this type of ecosystem is very common and among the more well-known, it is likely less common that it was in the late 19th century. In addition, many of the recently developed cattail communities are not considered natural or true cattail marshes because they are dominated by narrow-leaved cattails, a hybrid species, and do not have the species diversity that broad-leaved cattail marshes, or natural cattail marshes, have. However, to most people the difference between the natural and unnatural cattail marshes is barely discernable, if at all.

Dry Prairie

Dry Prairie – Barrens Subtype

Dry Prairie – Sand/Gravel Subtype

Dry prairies are grasslands which are dominated by prairie species with less than 10% tree cover and less than 50% shrub cover. Dry prairies occur on sandy or gravelly substrates, except for steep slopes where they can have any type of substrate, and commonly have patches of exposed soil. This ecosystem is a type of Upland Prairie, and occurs primarily around other types of prairies, though some patches may occur in the deciduous forest-woodland zone of Minnesota.

The dry prairie is dominated primarily by grasses, which are often short and usually consist of little bluestem, prairie dropseed, porcupine grass and side-oats grama. Taller grasses may include big bluestem and Indiangrass. However, dry prairies can have a diverse composition of flowers and vary between different areas. Common forbes in Anoka include rough blazing-star, stiff goldenrod, purple prairie clover, yarrow, thimbleweed and several others. Dry prairies are often subject to blowouts, which are areas which, by wind erosion, have been shaped into bowl-like hollows.

Dry prairies historically occurred in patches across the Anoka Sandplain, though they were commonly mistaken for oak woodlands by land surveyors. Today, these ecosystems occur in many of the same places, though in much smaller sizes. In Anoka County, only a few remnant patches remain and larger sand gravel types exist in Cedar Creek Natural History area and Helen Allison Savanna Natural Area. This increasingly rare community is home to several rare species including the loggerhead shrike, eastern spotted skunk, bullsnake and the western hognose snake.

Floodplain Forest

Floodplain forests are deciduous forests which exist in seasonally wet areas, most commonly on the active floodplains along major rivers and streams. The canopy and diversity can vary based on the amount of disturbance the site typically faces, especially soil and debris deposition along with erosion, which can consistently inhibit plant growth. Based on these variables, species composition may be dominated by a single species, or composed of a variety.

In the 1800s, prior to settlement, floodplain forests covered approximately 1% of the landscape. In fact, these ecosystems were so prevalent that humans as well as plants and animals have used them for migration corridors for quite some time. However, in the past century and a half, human activities, such as land clearing, wetland filling and dredging, have drastically reduced the acreage of this ecosystem. Still, floodplain forests have not been cleared as completely as other forest systems in the state, which has provided much needed refuge for wildlife losing other habitat.

The most dominant tree species are silver maple, cottonwood, and black willow, although boxelder, green ash, America elm and slippery elm can contribute to the canopy as well. The understory, if vegetated at all, is dominated by herbaceous plants which have adapted to flooding, erosion and depositional patterns. These plants include annuals such as wood nettle, clearweed, beggar-ticks, and smartweed, as well as perennials such as rice cut-grass, goldenglow, Ontario aster, and Virgina wild-rye. In addition to these herbaceous species, woody vines, such as wild grape, and Virginia creeper are also extremely common in this ecosystem.

Lowland Hardwood Forest

Lowland hardwood forests are present just above active floodplains or wetland basins. This forest occurs in wet mineral soils where the water table seasonally rises to the trees' roots. Lowland hardwood forests continually change over time, as a result of neighboring forest types, water levels and flooding patterns, which affect soil type, soil saturation, and species composition. Complete stands may be killed by extended periods of flooding.

Also, due to the high water table, root systems are often shallow and provide little support during windstorms, making the stands vulnerable and thus causing large gaps in the canopy.

Tree species composition varies widely based on the period of time the soil is wet, as well as neighboring forest communities, and topography of the area. Common canopy species include black ashes, American elms, basswoods, hackberries, green ashes, quaking aspens, yellow birches, paper birches and slippery elms. The shrub layer is variable and can be a mix of upland and wetland species.

Maple/Basswood Forest

Maple-basswood forests, called the "Big Woods" to early Minnesotans, have not been as prevalent in Anoka County as neighboring counties, though these ecosystems have historically existed in larger protected stands in the northwestern and southeastern parts of the county. Currently stands are rare in the region and exist in small patches less than 40 acres.

This forest type consists of dense, continuous canopies of sugar maples, basswood and American elm. Maple-basswood forests often have an open or sparsely layered understory with tall straight trees forming a dense canopy. These forests have a beautiful layer of perennial spring flowers, called spring ephemerals, that bloom before the dense canopy fills out on the trees above. These include species such as Dutchman's breeches, white trout lily, and false rue-anemone. Maple-basswood forest will often succeed mesic oak forests and maintain their form without fire.

These forests, if left undisturbed, can achieve "old-growth" status due to the life span of the species, which can be in excess of 250 years. If left untouched, these forests can also evolve into pure stands of sugar maple. These pure stands are exceptionally rare, though, as stands have historically been cleared to farm the nutrient rich soils. Many stands were initially altered by selective harvesting during European settlement. Further, Minnesotans have also historically utilized these forests for maple syrup production. However, other factors have been involved in the disturbance of these stands, including the spread of Dutch elm disease.

Mixed Emergent Marsh

Mixed emergent marshes are a broad category of marsh ecosystems which have a heterogeneous species composition and occur on flooded soils with wetland vegetation. These ecosystems typically occur in semipermanently flooded areas, such as river

backwaters, the edges of ponds and lakes, or the deepest areas of shallow wetland basins. These marshes are similar to cattail marshes, though forbs common in cattail marshes are less likely to colonize and the river and lake bottoms of cattail marshes are generally softer and muckier. However, given that this is such a broad category of marshes, there are few other all-encompassing qualities of this ecosystem, and it is likely that further definition and resulting division of subtypes will occur.

Unlike cattail marshes, in mixed emergent marshes, cattails, shrubs and trees are NOT the dominant vegetation. Vegetation is often very diverse and includes many different rushes, common reed grass, prairie cordgrass, broad-leaved arrowhead and others. In addition to these species, mixed emergent marshes often have plants which are highly resilliant and can survive flooding and other harsh conditions as seeds, tubers, rhizome fragments, and dormant parts of the plant. Opportunistic species, such as monkey-flower, spike rushes, umbrella sedges, and others germinate quickly on exposed or eroded soils.

This community is very susceptable to damage via fertilizer runoff or drainage. Due to its relation to the upland ecosystems surrounding it, a mixed emergent marsh can be fundamentally changed by a change in nutrient availability. If disturbed, the community is very susceptible to invasives and other opportunistic species, such as reed canary grass, or may evolve into an unnatural cattail marsh.

Mixed Hardwood Swamp

Mixed Hardwood Swamp – Seasonally Flooded

Hardwood swamps are forested wetlands, but unlike a lowland hardwood forest, hardwood swamps exist in saturated peat soils and muck. This community exists in Anoka County on old lake bottoms and floodplains. Since hardwood swamp sites are very wet they are often left untouched from disturbance. This allows some stands to reach "old-growth" stage and provides conditions favorable for extremely rare plant species, such as the halberd leaved tearthumb and the yellow bartonia.

Common tree species in this ecosystem are black ash, poison sumac, yellow birches, red maples, American elms, green ashes, quaking aspens and may include tamaracks. Of these, the most dominant are black ash, though it never forms more than half of the canopy, as well as tamarack and white pine. The understory can include a wide variey of species, including interrupted fern, mad-dog skullcap, marsh marigold, and mosses. This dynamic community is considered by the Minnesota Department of Natural Resources to be "perhaps the most species rich-community in east-central Minnesota."

Oak Forest

Oak Forest Dry Subtype

Oak Forest Mesic Subtype

Dry oak forests are common throughout the Anoka Sandplain. This forest type is characterized by an open canopy of multi-stemmed, 50 to 60 foot oak hybrids with a denser network of lower branches. In these forests, the subcanopy is more dense than the canopy, with patchy shrub and ground layers of vegetation. In most cases, these forests are relatively young, and were once either oak savannas, which were predominantly grasses with intermittent oaks, or woodlands, which typically had 25-60% tree cover.

Northern pin oaks, white oaks and bur oaks dominate the drier stands of oak forest. However, the canopy of this ecosystem may also include species such as black cherry, paper birch, quaking aspen, or big-toothed aspen. The subcanopy may often include red maple, as well as bitternut, though not on the Anoka sandplain, and oaks, which occur along forest edges. The lower, denser shrub layer is most often American hazelnut, though blackberry, gray dogwood, chokecherry and Juneberry are also common shrubs in dry stands. The ground layer often has a variety of forest herbs, such as bracken fern, sweet cicely, pog-peanut, blueberry, and shoots of Virginia creeper. The oaks have a poor regeneration rate in undisturbed stands, and disturbance often introduces a ground cover of Pennsylvania sedge and a dense subcanopy of prickly ash, common blackberry, and red raspberry, as well as exotic species including common buckthorn and Tartarian honeysuckle.

These dry oak forests are often very young and have gradually converted from savannas and woodlands, often due to the absence of fire. This absence, due to human development and strict controls, has allowed small tree and shrub regeneration, which has then allowed an influx of invasive species. This regeneration can also succeed because of a fairly open canopy, which results in a denser middle layer. In addition, mature trees on nutrient-poor sandy soils are typically shorter and smaller in diameter than those found in the more nutrient rich mesic stands.

Poor Fen

Poor Fen Sedge Subtype

Poor fens are nutrient poor and slightly acidic wetlands which most often occur in the conifer-hardwood forest zone, though they sometimes occur in the deciduous forest-woodland zone. Poor fens are often mistaken for bogs, but unlike bogs which are highly acidic and nutrient-poor, poor fens only have mildly acidic surface water and a higher concentration of nutrients than bogs. Poor fens occur on deep peat which is more than 3

feet deep, and receive little nutrient input from the surrounding uplands. Most commonly, Minnesota poor fens occur when they are adjacent to raised bogs, though they can also occur in any basins which are isolated from runoff or other nutrient input. Typically, this community is transitional between rich fen and open bog communities and will often develop into one of these communities over time.

Vegetation in poor fens is composed of dominantly wiregrass sedge and leatherleaf, though other sedges such as mud sedge and beaked sedge are common. Poor fens are at least half covered by sphagnum moss, and may have up to 70% cover from shrubs such as bog birches and stunted tamaracks. Poor fens are also home to a few more unusual species, such as the pitcher-plant and round-leaved sundew, which are both carniverous, though they use different mechanisms.

Because of their transitional nature, poor fens are very delicate ecosystems which make take decades to recover from disturbances. Regardless of whether the disturbance is human or nature derived, evidence of disturbance may persist for years in poor fens. In addition to their fragility, poor fens are exceptionally reliant on the consistency of nutrient levels. Increased nutrient availability from runoff or or other intputs will fundamentally disrupt species composition and diversity, and species unique to poor fens are quickly crowded out by rich fen species.

Rich Fen

Rich Fen Sedge Subtype

Rich fens are wetlands which develop on generally level and poorly drained ground and may be mostly open communities or may be covered with grasses and sedges with a few woody species present. Rich fens with a woody component are usually classified as rich fen shrubs subtype, and will be composed of grasses and sedges, as well as shrubs such as bog birch, shrubby cinquefoils and willows. Rich fens generally have two distinct regions, a Transition Zone and a Boreal Zone. The Transition Zone has a relatively shallow layer of peat and sometimes even a wet mineral soil that has a significant amount of organic matter. The Boreal Zone typically has very deep peat and contains species such as bulrushes, pitcher-plants, and other northern species. Unlike poor fens, however, rich fens do not have a layer of sphagnum moss. If the soil in the Transition Zone is a wet mineral soil, it often can allow the presence of some wet prairie species.

Rich fens have a high species diversity which is variable based on the type of nutrients available and soil type. If it occurs in association with poor fens, common species including wiregrass will dominate. In rich fens that are closer to streams, a diverse composition of sedges, grasses and forbs will occur and often grade into wet meadows, where species such as marsh bellflower, northern marsh fern, blue-joint, and others can be found.

In the mid-1800's, original Anoka county surveyors referred to extensive "floating marshes," which are likely to have been rich fens or possibly cattail rafts. However, it is unclear exactly how extensive they were across the county. Historically, they have been found most commonly in large wetland systems, but today they are found only in small, isolated areas shaped like bowls or narrow bands. In Anoka County, the area with the most notable rich fen is the Carlos Avery Wildlife Management Area.

Shrub Swamp Seepage Subtype

Shrub swamps are wetland ecosystems which occur in areas which are too wet to become hardwood swamps, but too dry or shallow to become marshes. Therefore, shrub swamps are considered mid-successional between wet meadows or fens and conifer or hardwood swamps. Shrub swamps typically occur on organic soils, such as muck and shallow peat soils.

Commonly, these swamps are created after a catastrophic event in a forested swamp, such as a flood or windstorm. Also, drained meadows and fens often progress to shrub swamps, and then to forested swamps. In Anoka, these ecosystems are most commonly found in expansive wetlands along slow streams on the sandplain and in shallow wetland basins.

The vegetation in this community is often determined by the fluctuation in water level and the presence of fire. The canopy is variable from very dense thickets to having many gaps consisting of grasses and sedges. Shrubs are tall and usually consist of speckled alder, willows and red-osier dogwood.

Tamarack Swamp

Tamarack Swamp Sphagnum Subtype

Tamarack swamps, including Sphagnum Tamarack Swamps, Minerotrophic Tamarack Swamps, and Seepage Tamarack Swamps, form on organic, peat soils, because they often fare better on acidic, nutrient-poor soils than most other wetland trees do. Many stands in Anoka County occur in dense stands on shallow peat along lakes, floodplains and nutrient poor wetlands. In the absence of significant disturbance, Tamarack swamps often succeed shrub swamps, rich fens, poor fens, and sometimes Hardwood Swamps. Tamarack seeds and saplings thrive on open sunlight. Individual tamaracks are often seen in the middle of sedge meadows, fens and shrubs hummocky shrub swamps.

Tamarack Swamps contain a variety of different species, but by definition must have more than 50% cover being tamarack trees. In addition to the tamarack, species such as black spruce, paper birch, yellow birch, white pine, blace ash, American elm, or red

maple may be part of the canopy. The understory is largely defined by the variety of Tamarack Swamp, but all types of Tamarack Swamp have a mixture of shrubs, forbs and grasses in the understory.

Upland Mixed Coniferous-Deciduous Forest

Upland Deciduous Forest, Upland Mixed Coniferous-Deciduous Forest, and Saturated Deciduous Forest are not well-defined native ecotypes, but rather simply are descriptive terms for mixed stands of mature canopy trees and understory trees, shrubs, forbes, sedges, and grasses approximating the architecture of a forest stand. Species make-up varies widely from patch to patch and based on hydrologic conditions. Without management and/or restoration, it is not clear what the future conditions of such patches might be, although they are usually colonized by aggressive non-native and/or invasive species. These patches provide marginal habitat value, primarily for generalist species that adapt well to a variety of conditions, including crows, sparrows, squirrels, raccoons, and white-tail deer.

Wet Meadow

Wet Meadow – Seasonally Flooded

Wet Meadow Shrub Subtype

Wet Meadow Shrub Subtype – Saturated Soils

Wet meadows are shallow wetland communities that occur on peat, muck and wet mineral soils. The water table of wet meadows are typically below the soil surface for most of the growing season, but soils are saturated enough that standing water occurs during the spring and after heavy rains. This community often exists along stream corridors and on lake edges that provide a constant water level. Seasonal drawdowns of water levels oxidize organic matter that release nutrients for the vegetation.

Predominantly medium- or broad-leaved sedges occur in wet meadows with sedges such as lake sedge and wiregrass found less commonly. Forbs such as spotted joe-pye weed, common mint, and swamp milkweed are quite common, though they are not obvious in the landscape. Some more rare forbs can also be found, such as the turtlehead, marsh vetchling, and purple fringed orchid. However, mosses are rare and shrubs such as willows and pussy willows can vary from 0 to 70% of the tree cover. Species composition varies largely on based on soil saturation and nutrient availability.

Wet meadows, though still somewhat common in Anoka County, are not of the quality they once were. Many of these wetlands have become disturbed and degraded due to grazing, mowing, and other agricultural us. Often, when wet meadows are ditched,

damed upstream, or experience a long drought period, they often become shrub swamps. Wet meadows are very susceptible to alteration through unnatural flooding or draining, and once altered, this community recovers very slowly, if at all.

Sources:
"Minnesota Land Cover Classification System: User Manual." Version 5.3 Minnesota Department of Natural Resources, Central Region, 2004.

"Minnesota's Native Vegetation: A Key to Natural Communities" Version 1.5 Minnesota Department of Natural Resources, Natural Heritage Program, 1993.

Wovcha, D, Delaney, B, Nordquist, G. Minnesota's St. Croix River Valley and Anoka Sandplain: A Guide to Native Habitats Minneapolis: University of Minnesota, 1995.

APPENDIX T

Sunrise River Watershed Management Organization Wetland Standards

Sunrise River Watershed Management Organization

Wetland Standards

Background

The SRWMO finds that wetlands serve a variety of beneficial functions. Wetlands within the SRWMO maintain water quality, reduce flooding and erosion, are groundwater recharge areas, provide food and habitat for wildlife, provide open space, and contribute to the area's rural "feel." Therefore, wetlands are important to the health, safety, economy, and general welfare of the communities. Regulating wetlands and the land uses around them is therefore in the public interest.

The state Wetland Conservation Act (WCA) provides many protections of the public benefits of wetlands, but does not address all areas of concern. These areas are left to local control. Topics not addressed by state law but considered by the SRWMO include those addressed in these wetland standards. These standards were developed by a Technical Advisory Committee including representation from each SRWMO community, MN Department of Natural Resources, MN Pollution Control Agency, MN Board of Water and Soil Resources, Metropolitan Council, and the Anoka Conservation District.

Goal

The goal of the SRWMO wetland standards is to avoid direct or indirect impacts from activities that destroy or diminish the quantity, quality, and biological diversity of wetlands.

Administration

These wetland standards will be administered by the member communities of the SRWMO. Each community must adopt standards at least as protective as the SRWMO standards in their local water plan or ordinances, and implement them.

Applicability

The following standards apply to all parcels where any of the following activities are proposed:

- Subdivision creating three or more lots and creating impervious surfaces or structures.
- Any project with wetland impacts as defined by the Wetland Conservation Act (WCA, Minnesota Rules 8420) that do not quality for a WCA exemption.
- Wetland excavations >0.5 acres will be subject to the excavation provisions.

Wetland Definition

For the purpose of these standards, wetlands:

- are defined in MN Statutes section 103G.005, subdivision 19
- include public waters wetlands defined in MN Statutes section 103G.005, subdivision 15a.

Wetland Delineation and Classification

All wetlands do not have equal value. Some are healthier and provide more benefits to the community than others. The SRWMO seeks to identify these highly-valued wetlands and give them greater protections, and allow more flexibility in and around lower-valued wetlands. The SRWMO most highly values wetlands that provide (in order of preference):

1. Water quality treatment
2. Wildlife habitat
3. Groundwater recharge

The SRWMO allows more flexibility for wetlands that poorly provide these functions. Wetlands will be delineated and classified on a case-by-case basis for applicable project proposals.

Delineation and Classification Methodology

Proposers of applicable projects must perform a wetland delineation and wetland functional values assessment. The delineation shall follow methods allowed by WCA. The functional values assessment shall use MnRAM (the Minnesota Routine Assessment Method for Evaluating Wetland Functions) version 3.1 or newer, which is the method allowed by WCA. The results should be reported to the permitting authority, which will assign an appropriate wetland classification.

MnRAM scores 15 wetland functions. The SRWMO will use scores from five of these functions to classify wetlands, including:

Water Quality Treatment

1. Downstream water quality protection
2. Maintenance of wetland water quality

Wildlife Habitat

3. Vegetative diversity/integrity
4. Maintenance of characteristic wildlife habitat structure
5. Maintenance of characteristic amphibian habitat

Groundwater recharge functions will not be used in classifying wetlands because almost all SRWMO wetlands provide groundwater recharge functions and therefore the SRWMO will be protective of this function in all wetlands.

Classifications

Four wetland classes will be utilized:

1. High Priority Wetlands
2. Moderate Priority Wetlands
3. Low Priority Wetlands
4. Use Wetlands

The defining characteristics of each wetland class are summarized in Table 1.

TABLE 1. Wetland Classifications

	High Priority Wetlands	Moderate Priority Wetlands	Minor Priority Wetlands	Use Wetlands
Description →	High quality natural basins that serve both target wetland functions of water quality treatment and wildlife habitat.	Wetlands that highly perform one of the two target wetland functions (water quality treatment or wildlife habitat).	Wetlands that do not highly perform either of the two target wetland functions (water quality treatment or wildlife habitat).	Wetlands created for stormwater management. These wetlands usually need periodic maintenance.

Targeted Wetland Functions	MnRAM Category				
Water Quality Treatment	Downstream water quality protection	MnRAM Score is "high" for at least one of these two MnRAM categories	MnRAM Score is "high" for at least one of these two MnRAM categories	Does not score "exceptional" or "high" for any of these MnRAM categories	Wetlands created for stormwater management. MnRAM scores are irrelevant.
	Maintenance of wetland water quality				
		AND	**OR**		
Wildlife Habitat	Vegetative diversity/integrity	MNRAM Score is "exceptional" or "high" for one or more of these three MnRAM Categories	MNRAM Score is "exceptional" or "high" for one or more of these MnRAM Categories		
	Maintenance of characteristic wildlife habitat structure				
	Maintenance of characteristic amphibian habitat				

Almost all wetlands in the SRWMO serve a groundwater recharge function, so wetland standards were designed to be protective of this function in all wetlands.

Appeals of Wetland Classification

If an applicant disagrees with a wetland classification, s/he bears the burden of supplying detailed information supporting their assertion. This may include historical aerial photography, topographic, hydrologic, floristic, or soils data deemed necessary by the permitting authority. The municipality or other permitting authority will review the appeal.

Standards for Wetland Classes

Wetlands standards vary by wetland class. These standards are summarized in Table 2, and described in detail on the following pages.

TABLE 2. Summary of Wetland Standards

Wetland Class	Minimum Buffer (communities set buffer width equal or greater)	Structure Setbacks	Excavation	Stormwater Discharge to Wetlands
High Priority Wetlands	15 ft	At each community's discretion, but a minimum 20 ft setback is highly recommended	Excavations >0.5 acres must be denied for portions of wetlands that score high on the MnRAM vegetative diversity criteria.	Stormwater discharges to all wetlands must comply with the text
Moderate Priority Wetlands	15 ft			
Minor Priority Wetlands	15 ft		Only Wetland Conservation Act restrictions apply	
Use Wetlands	At each community's discretion			

Wetland Buffers

Wetland buffers are unmowed areas adjacent to wetlands that contain non-invasive vegetation, preferably dense native vegetation. Buffers filter pollutants before they can enter the wetland, reduce erosion, protect vegetation diversity and wildlife habitat, and minimize human impacts to the wetland. The SRWMO requires buffers on wetlands, with the width dependent upon wetland classification. The buffer widths were selected based upon research literature, experiences in other communities, practical limitations, and city staff input.

Buffer Widths

The SRWMO allows minimum buffer widths such that each community can choose a buffer width equal or greater that is most appropriate for their community based upon soil types, slopes, development rules, and other factors. Allowed minimum buffer widths are shown in Table 2.

Buffer Averaging

Buffers are encouraged to have a meandering shape for a more natural appearance and in order to make reasonable accommodations for nearby features of the development or landscape. The buffer width may vary around the wetland such that:

- it may be 10 feet less than the minimum allowable (see Table 2), but not less than 5 feet.
- the total acreage of buffer cannot be reduced.
- in areas of concentrated inflow to the wetland the buffer cannot be less than the minimum allowable buffer width in Table 2 or the minimum allowed by the community, whichever is greater.

Buffer Variances

Variances of buffer width may, at the community's discretion, be granted for the following reasons:

- Small wetlands where the entire wetland area is less than or equal to the area of wetland impact allowed without replacement as *de minimis* under WCA. It is acceptable to have no buffers in these cases.
- Part of the required buffer is outside of the wetland's watershed. Due to topography near the wetland, runoff flows away from and never enters the wetland through surface flows. Variances should only be for that portion of the buffer that would be outside of the wetland's watershed.
- If drainage is redirected to an area where a buffer is feasible.
- If the site is not generating stormwater or is using storm water minimizing techniques that also provide habitat value such as rain gardens, vegetated swales, and other Best Management Practices (BMP's) replace the functions of buffers.
- If the applicant is protecting additional upland, beyond that required by other ordinances or control measures, to connect existing wildlife habitat.
- Undue hardship, as defined in MN Statutes 462.357, subd. 6, subpart 2.
- Others as determined by the permitting authority.
- Roads and other linear projects, except those created as part of new residential or commercial developments.

Activities Prohibited within Buffers

Activities that disturb the roots or influence the growth of vegetation are prohibited, including:

- Mowing (except as part of municipality-approved wetland buffer management or for pedestrian trails)
- Structures
- Paving (except as allowed below in the "Activities Allowed within Buffers" section)

- Retaining walls
- Clearing and removal of vegetation (except selective clearing and pruning of individual trees and shrubs which are dead, diseased, hazards, or removal of noxious or invasive weeds)
- Introduction of non-native vegetation
- Filling, dumping, or yard waste disposal
- Fertilization
- Removal of buffer monuments
- Septic systems

Activities Allowed within Buffers

- Management needed to establish the buffer, such as mowing or burning.
- Activities consistent with municipal park management plans.
- Plantings that enhance the natural vegetation
- Selective clearing and pruning of individual trees and shrubs which are dead, diseased, or hazards
- Noxious or invasive vegetation removal
- Use and maintenance of an unimproved access strip not more than 10 ft wide for recreational access and the exercise of riparian rights
- Pedestrian trails, provided that at least 10 feet of buffer remains between the trail and wetland
- Placement, maintenance, or repair of utility and drainage systems that exist on creation of the buffer strip or are required by a permitting agency, as long as any adverse impacts have been avoided or minimized.
- Construction, maintenance, repair, or reconstruction of existing and future public roads as long as any adverse impacts have been avoided or minimized
- Others as approved by the municipality

Buffer Easements

Municipalities shall place a conservation easement (preferred), or functional equivalent such as a drainage and utility easement or outlot, on the wetland and buffer. If the project manager creates GPS files of buffer and easement locations, it is recommended that these be provided to the municipality.

Use of Existing Vegetation as the Buffer

The existing vegetation is acceptable for a buffer and must not be disturbed if:

- It is continuous, dense, deep-rooted perennials (can be trees and shrubs with 60% canopy cover), and
- <30% invasive plant species, and
- Topography does not channelize runoff

Buffer Establishment and Seed

All buffers (natural or created) must be protected during construction with erosion control.

When existing vegetation is not acceptable for use as the buffer, then a buffer must be established by planting. Planting must meet these criteria:

- Planting must be identified on the wetland replacement plan or grading plan.
- Planting must be done by a qualified contractor.
- Install in accordance most current BWSR guidance.
- Replant vegetation that is unsuccessful during the first two growing seasons.
- No fertilizer may be used unless prescribed by accredited soil testing lab.
- The seed planted must be:
    i. a 100% native BWSR seed mix or equivalent approved by permitting authorities, with the exception of a 1-time annual nurse or cover crop such as oats or rye.

ii. of local ecotype originating within 300 miles.

- Native trees/shrubs may substitute forbs at 60 per acre.

Buffer Monuments

Buffers shall be adequately marked with signage at a maximum 200 ft spacing or every other lot corner. Signs should be erected before occupation of new developments and before the completion of work for all other projects. Monument requirements can be waived where the permitting authority deems they would serve no practical purpose.

Buffer Maintenance

First two full growing seasons –

During first two full growing seasons the applicant must replant any vegetation that does not survive.

Municipalities are encouraged to consider buffer establishment and management in escrows.

After the first two full growing seasons-

After the first two full growing seasons the buffer must be reseeded if the buffer changes at any time through human intervention or activities.

Structure Setbacks

Each municipality may, at its own discretion, choose to establish structure setbacks from the wetland buffer, however a minimum of 20 feet is highly recommended by the SRWMO.

Excavations

Excavations >0.5 acres must be denied for portions of wetlands that score high on the MnRAM vegetative diversity criteria.

Stormwater Discharge to Wetlands

- Treatment of storm water to NURP (Nationwide Urban Runoff Program) guidelines is required prior to storm water discharge to a lake, stream, or wetland and prior to discharge from the site as part of development.
- The allowable bounce of wetland water levels and inundation period due to stormwater discharges shall follow "Stormwater and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands," Minnesota Pollution Control Agency 1997, or subsequent updates.

Letter of Credit

Municipalities are encouraged to require a letter of credit from applicants to ensure compliance with these standards (for example, buffer establishment and maintenance).

Disposition of Wetland Classification Records

State Rules 8410 require the SRWMO inventory the functions and values of wetlands. All member communities must maintain a file containing the functions and values and assigned classifications of wetlands inventoried as part of these standards.

APPENDIX L

Coon Creek Watershed District Rules

COON CREEK WATERSHED DISTRICT

RULES

BOARD APPROVED: OCTOBER 10, 2022

EFFECTIVE DATE: JANUARY 1, 2023

COON CREEK WATERSHED DISTRICT RULES

BOARD APPROVED: OCTOBER 10, 2022
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1 INTRODUCTION AND GENERAL PURPOSE

1.1 STATUTORY AUTHORIZATION

These rules are adopted pursuant to:

- Minnesota Statutes Section 103B.201
- Minnesota Statutes Section 103B.231
- Minnesota Statutes Section 103D.201
- Minnesota Statutes Section 103D.335
- Minnesota Statutes Section 103D.341
- MS4 General Permit MNR040000

1.2 FINDINGS

The Coon Creek Watershed District Board of Managers finds that:

1. The watershed's environment is determined by a set of existing natural resources and processes.
2. The primary determinant for management within the watershed is the hydrologic system.
3. The hydrologic cycle is the unifying factor of the natural resource components identified above.
4. Ditches and other watercourses, wetlands and other water bodies, floodplains and groundwater recharge are all integral parts of the hydrologic system of the watershed.
5. Water quality, soils, vegetation, and wildlife are related in that they are affected by or affect the hydrologic system.
6. Land development projects and associated increases in impervious cover alter the hydrologic response of local watersheds and can increase stormwater runoff rates and volumes, flooding, stream channel erosion, and sediment transport and deposition.
7. This stormwater runoff contributes to increased quantities of water-borne pollutants.
8. Stormwater runoff, soil erosion and nonpoint source pollution can be controlled and minimized through the regulation of stormwater runoff from development sites through a land management and development approach that minimizes impact on water resources.

The Coon Creek Watershed District has determined that the regulation of stormwater runoff discharges from land development projects and other construction activities is essential to control and minimize increases in stormwater runoff rates and volumes, soil erosion, stream channel erosion, and nonpoint source pollution associated with stormwater runoff, and that regulation is in the public interest and will prevent threats to public health and safety.

Therefore, the Coon Creek Watershed District (District) establishes this set of water quality and quantity policies applicable to all surface waters to provide reasonable guidance for the regulation and management of water for the purpose of protecting local water resources from degradation.

1.3 PURPOSE AND INTENT

Purpose. The Purpose of these rules is to enable the District to evaluate, permit and monitor activities affecting the water and related land resources of the District in an orderly and informed fashion.

Intent. The intent of these rules is to:

1. Manage the watershed's water and related land resources for water quality and biotic integrity and functionality.
2. Prevent public health and safety hazards.
3. Prevent property damage.
4. Promote beneficial uses.
5. Reduce the discharge of pollutants from stormwater to the maximum extent practicable (MEP).
6. Identify waterways, floodplains and wetlands in which land disturbance activity should be restricted, and, in appropriate cases, prohibited.
7. Give due consideration to alternatives and creative solutions in planning and using the water and related land resources of the watershed to encourage and pursue low impact development.

Where no feasible and prudent alternative exists, the use shall be accomplished in a manner which assures the protection and safety of persons and property, public and private and which as nearly as possible:

- Preserves and protects the natural environment; and
- Will not result in the degradation of waterways, floodplains, and wetlands

1.4 RELATION TO GROUNDWATER

The District does not have a section specifically addressing groundwater, but language addressing groundwater issues have been dispersed throughout the rules regarding other topics. For this reason, this section consolidates all the district rules concerning groundwater into one place.

The following bullets represent specific language within the District's rules pertaining to groundwater and details where each is located in the District's rules. These are categorized into groundwater appropriations, volume control, and groundwater quality.

1.4.1 GROUNDWATER APPROPRIATIONS

Groundwater appropriation is not specifically addressed in these rules, however, volume control standards help to maintain groundwater supply and protect groundwater quality.

1.4.2 VOLUME CONTROL

1. To assure control of the rate and volume of stormwater runoff so that surface water and groundwater quantity and quality is protected, soil erosion is minimized, and flooding potential is reduced. (Subsection 3.1.3, 3.3.3)
2. To maintain the present and natural rate of recharge to the surficial aquifer, and when possible, enhance the rate of surcharge. (Subsection 3.1.10, 3.3.3)

1.4.3 GROUNDWATER QUALITY

1. Improve the quality of the surface and subsurface discharges to the lakes and wetlands within the watershed by limiting sediment, nutrients, and other contaminants. (Subsection 3.1.3, 3.3.3.1.a, 3.3.3.2.b, 3.3.4)
2. To protect water and related land resources of the District from the adverse effects resulting from poor or incompatible land use activities. (Subsection 3.1.7)

2 PROCEDURAL REQUIREMENTS

2.1 PERMIT REQUIRED

Any person undertaking an activity for which a permit is required by these rules must obtain the required permit prior to commencing the activity that is subject to District regulation.

2.2 TREATMENT TO THE MAXIMUM EXTENT PRACTICABLE

The intent and requirements of this rule to reduce the discharge of pollutants from stormwater must be pursued to the maximum extent practicable (MEP).

A proposed plan/ permit application has reduced the discharge of pollutants to the MEP when the Board finds that the application has made a good faith effort in meeting all of the following requirements:

1. The proposed plan is capable of being done from an engineering point of view.
2. The proposed plan is in accordance with accepted current engineering standards and practices and the Minnesota Stormwater Manual.
3. The proposed plan is consistent with reasonable requirements of the public health safety and welfare.
4. The proposed plan is environmentally preferred based on a review of social, economic, and environmental impacts.
5. The proposed plan creates no unusual problems.

2.3 PRE-APPLICATION MEETING

Prior to applying for approval of a permit required under these rules, an applicant is encouraged to have the application reviewed by the District staff at a pre-application meeting.

2.4 APPLICATION

Any person undertaking any activity for which a permit is required by these rules shall, before commencing work, submit to the District a permit application, engineering design data and such other required information so that the District may determine whether the proposed activity complies with the criteria established by these rules. Application forms and guidance materials may be obtained from the District office or website at https://cooncreekwd.org. Required exhibits are specified for each rule below.

2.5 TIMING OF APPLICATIONS AND BOARD MEETINGS

Complete applications shall be submitted to the District's office in accordance with an annually established schedule prior to the regularly scheduled Board meeting date.

2.6 AUTHORIZATION TO ENTER AND INSPECT PROPERTY

The application for a permit shall be deemed authorization for District staff and representatives to enter and inspect the property that is subject to application.

2.7 FEES AND SECURITY ESCROWS

2.7.1 POLICY

The District finds that it is in the public interest to conserve the District's water resources by assuring compliance with its rules. Requiring applicants to pay fees for permit administration, review, project inspection and to provide a bond or other surety to secure performance of permit conditions, is an effective way to assure rule compliance and water resource conservation.

The Board of Managers by resolution will establish a schedule of fees and performance sureties that may be amended from time to time to reflect the costs of providing such services or covering potential liabilities to the District. The District will maintain an accounting of all deposits made under this rule. No interest will be paid to applicants for funds held in deposit.

2.7.2 FEES

The District will charge the following fees:

1. Application Fees: Fee charged for processing permit applications.
2. Review and Inspection Fee: Fee charged for the actual cost of review and inspection work performed by District staff and consultants on permit applications.

2.7.3 GOVERNMENT AGENCIES EXEMPT FROM FEES

The above fees will not be charged to the federal government, the State of Minnesota, or a political subdivision of the State of Minnesota.

2.7.4 ESCROWS

The District will collect the following escrows from the applicant before a permit is issued. Escrow amounts and procedures will be periodically reviewed and updated by the Board of Managers.

1. Performance Escrow: Escrow collected to ensure performance of permit requirements.
2. Wetland Escrow: Escrow collected to ensure replacement of mitigated wetlands.

2.8 PERMIT APPLICATION REVIEW PROCEDURE

2.8.1 POLICY

Permit applications shall be submitted by the Watershed District Staff to the Board of Managers for public review in accordance with the standards of these rules.

2.8.2 DETERMINATION OF APPLICATION COMPLETENESS

Within 15 days following receipt of any permit application, the District shall determine whether such application is complete. An application is complete if:

1. All of the information required on the permit application and by these rules has been submitted.
2. The required information is free of significant material errors or omissions such that a determination can be made regarding the application's compliance with the District rules.
3. The applicant or the applicant's agent has made a good faith effort to comply with the rules, regulations, and standards of the District.

If the District determines that the application is not complete, the applicant shall be notified in writing via a notice of application status specifying the deficiencies of the application. The Board, Administrator and staff may take no further action on the application until the deficiencies are remedied.

2.8.3 NOTICE OF APPLICATION STATUS

Pursuant to determination of an application's incompleteness or Board action the applicant shall be notified of the status of his or her permit application and the requirements for further action or review. The Notice of Permit Application Status shall contain:

1. The name and address of the owner or applicant.
2. The address of the owner or applicant as it appears on the permit application.
3. The Permit Application Number (PAN) given to the project by the District.
4. A statement specifying the action taken by the Board of Managers (Approve, Tabled, Denied) and the date on which that action was taken.
5. A listing of the issues or concerns that led to the Board action.
6. A statement specifying the information, material and or actions which the applicant must provide to the District to proceed with the permit review and potentially obtain a permit.

2.8.4 REMEDY OF DEFICIENCIES

Following receipt of the notice of application deficiencies from the administrator, the applicant shall have 60 days to submit the information requested by the District. The failure of the applicant to submit such information shall be deemed as a withdrawal of the permit application.

2.8.5 BOARD REVIEW AND BOARD ACTIONS

The Board may approve, deny, or table an application. An application will not be ready for Board consideration unless all substantial technical questions have been addressed and all substantial plan revisions resulting from staff review have been accomplished. Permit decisions will be made by the Board except as delegated to the Administrator by written resolution.

2.8.6 STAFF REPORT

Prior to the public review, the staff shall file a staff report with the Board of Managers and make a copy available to the applicant or applicant's contact. The staff report shall include findings and conclusions of the application's consistency with these rules.

2.8.7 PRESENTATION OF INFORMATION

At the public review of the permit application, the District staff shall present information concerning pertinent application considerations and the standards set out in the District's Comprehensive Management Plan, rules and regulations, and associated policy and guidance documents.

2.8.8 RECORD OF REVIEW

The District Administrator shall ensure that the proceedings of the review are recorded. A copy of the review record may be requested of any person upon application to the District and payment of a fee for transcription, or on order of the Board of Managers. The record shall consist of:

1. The portion of the minutes approved by the Board of Managers addressing the application.
2. All applications, exhibits and papers submitted.
3. All staff reports prepared.

2.9 PERMIT TERMS

All permits when issued shall be signed by the District Administrator, District Engineer or President of the Board.

2.9.1 SCOPE

A permit issued by the Coon Creek Watershed District shall be valid for a period of one year from the date of issuance unless otherwise suspended, revoked, or extended. Construction work authorized under this permit shall be completed on or before the permit's expiration date.

2.9.2 EXTENSIONS

A permit issued under these rules may be extended for a period of one year by the District Administrator, provided there has been no significant change in the policies, rules or laws of the State of Minnesota or the Coon Creek Watershed District.

To extend a permit as provided under this section, the permittee must apply to the District in writing prior to the permit expiration date, stating the reasons for extension.

Permit extensions beyond one year are subject to a review of project progress, reasons for the project being incomplete as well as significant changes in the policies, rules or laws of the State of Minnesota or the Coon Creek Watershed District. In such cases the applicant may be required to reapply for a permit.

2.9.3 ASSIGNMENT

A permittee may assign a District permit only upon consent of the Board of Managers to the assignment. Permit assignment does not extend the permit term.

The Board of Managers may grant the assignment of an issued permit if it finds the following conditions have been met:

1. The proposed assignee in writing agrees to assume all the terms, conditions and obligations of the permit as originally issued to the permittee.
2. The proposed assignee is not changing the project as originally issued.
3. There are no violations of the permit conditions as originally issued
4. The District has received from the proposed assignee any required surety to secure performance of the assigned permit.

2.9.4 APPLICABILITY

A permit from the Coon Creek Watershed District applies only to the project and the plans and calculations approved by the Board of Managers and cited on the permit. If the design, location, or purpose of the project changes applicant shall contact the District to make sure the changes would not violate District rules or applicable state law.

2.9.5 CONDITIONS AND STIPULATIONS

Approval of a permit application by the Board of Managers may include certain conditions to be fulfilled to receive a permit, or stipulations to be fulfilled prior to project closeout for the proposed project to be in compliance with these rules.

2.10 GENERAL PERMIT REQUIREMENTS

The following permit conditions are general and are required of land disturbing activities within the District that meet the permitting thresholds of these rules:

1. The permittee must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit.
2. The permittee shall grant access to the site at all reasonable times during and after construction to authorized representatives of the District for inspection of the work authorized hereunder.
3. The permittee shall use best management practices on the project site to minimize the potential for adverse impacts associated with erosion and sedimentation.
4. Permittee shall ensure that the contractor has received and thoroughly understands all conditions of this permit.
5. The District may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
    a. Permittee fails to comply with the terms and conditions of this permit.
    b. The information provided by the permittee or in support of the permit application proves to have been false, incomplete, or inaccurate.
    c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

2.11 PERMIT INSPECTIONS

2.11.1 REGULAR COMPLIANCE INSPECTIONS

Regular inspections of the project site may be conducted by District personnel and authorized representatives. Inspections may occur jointly with other agencies inspecting under other water resource, environmental or safety laws.

2.11.2 SCOPE OF INSPECTIONS

Inspections may include, but are not limited to:

1. Reviewing maintenance and repair records.
2. Sampling discharges.
3. Surface water.
4. Groundwater.
5. Material or water in sediment control practices.
6. Evaluating the condition of erosion and sediment control measures and other stormwater management practices.
7. Surveying elevations.

2.11.3 NOTICE OF INSPECTION

Pursuant to an inspection by District staff, the permittee shall be notified of the findings of the inspection. The Notice of Inspection contain the following information:

1. Date of the inspection.
2. Whether construction, or other land disturbing activities is in compliance with the issued permit, approved plan and/or District rules.
3. Variation from the approved plans or activities.
4. Any violations that exist.

2.11.4 VIOLATIONS FOUND DURING INSPECTION

If any violations of District rules are found, the permittee and contact shall be notified in writing of the nature of the violation and the required corrective actions. No additional work shall proceed until any violations are corrected and all work previously completed has received approval by the District and the appropriate municipality.

2.12 CLOSE OUT REQUIREMENTS

2.12.1 AS BUILTS

All permittees are required to submit actual "as built" plans for any stormwater management practices or ditch repairs or an improvement located on site after final construction is completed. This includes but is not limited to any changes to the course, current or cross section of a public ditch, wetland mitigation sites and structural stormwater management practices. The plan must show that the final constructed product match the approved project plans for all stormwater management practices and associated structures, wetland mitigation, modification of public ditches, and utility crossings within acceptable tolerance.

2.12.2 INFILTRATION TEST

A post-construction infiltration test must be performed on each infiltration practice in the presence of District staff and must demonstrate that the constructed infiltration rate meets the design infiltration rate standard prior to project acceptance by the District. The constructed infiltration rate may exceed the design infiltration rate but may not exceed 8.3 inches per hour.

2.12.3 FLOODPLAIN MITIGATION DOCUMENTATION

Any project resulting in greater than 50 cubic yards of fill is required to provide an as-built survey upon project completion which documents the location and volume of both fill and compensatory storage.

2.12.4 FINAL INSPECTION

A final inspection of the project by the District is required before release of any escrows can occur.

3 STORMWATER MANAGEMENT

3.1 POLICY

It is the policy of the District:

1. To promote, preserve and enhance the water and related land resources of the District.
2. To preserve and improve the quality of the lakes, wetlands, and watercourses within the watershed.
3. To assure control of the rate and volume of stormwater runoff so that surface water and groundwater quantity and quality is protected, soil erosion is minimized, and flooding potential is reduced.
4. Improve the quality of the surface and subsurface discharges to the lakes and wetlands within the watershed by limiting sediment, nutrients, and other contaminants.
5. To implement the nondegradation requirements of the National Pollutant Discharge Elimination Program (NPDES) using 1988 as the baseline year and load allocation reductions or management

practices noted in District adopted Total Maximum Daily Load (TMDL) and related implementation plans.
6. To implement applicable TMDLs.
7. To protect water and related land resources of the District from the adverse effects resulting from poor or incompatible land use activities.
8. To encourage compatibility between land use activities upstream and downstream and natural resource capacity.
9. To regulate land-disturbing activities affecting the course, current or cross section of ditches and water courses.
10. To regulate improvements by riparian property owners of the bed, banks, and shores of lakes, streams, and wetlands for preservation and beneficial use.
11. To maintain the present and natural rate of recharge to the surficial aquifer, and when possible, enhance the rate of surcharge.

3.2 SCOPE AND APPLICABILITY

This policy, regulation, and standards apply to:

1. Land disturbing activities (not including public linear projects) creating 10,000 sf or more of new or fully reconstructed impervious surface. This threshold is cumulative of all impervious surface created or fully reconstructed through single or multiple phases or connected actions on a single parcel or contiguous parcels of land under common ownership, development, or use.
2. Land disturbing activities (not including public linear projects) creating 5,000 square feet or more of new or fully reconstructed impervious surface for non-residential or multifamily residential development, and any part of the disturbance is within one mile of and draining to an impaired water.
3. Public linear projects where the sum of the new and the fully reconstructed impervious surface equals one or more acres.

3.2.1 COMPREHENSIVE STORMWATER MANAGEMENT PLAN

A municipality or public road authority may prepare a comprehensive stormwater management plan setting forth an alternative means of meeting these standards of sections within a defined subwatershed. Once approved by the District and subject to any stated conditions, the plan will apply in place of that section.

3.2.2 SIDEWALKS AND TRAILS

Rule 3 does not apply to sidewalks and trails 10 feet wide or less that are bordered by down-gradient open space or vegetated filter strip with a minimum of at least 5 feet.

3.3 STANDARDS

An applicant must demonstrate that the proposed land disturbance is designed to meet the standards of this subsection. Applicants should adhere to the design standards set forth in the Minnesota Stormwater Manual and further details maintained on the District's website.

3.3.1 MODELING REQUIREMENTS

A hydrograph method or computer program based on sound hydrologic theory shall be used to analyze runoff and water elevations for the proposed project.

1. The runoff from pervious and impervious areas within the model shall be modeled separately. Atlas 14 rainfall depths for the site location and the MSE3 rainfall distribution shall be used.
2. In determining Curve Numbers for the post-development condition, the Hydrologic Soil Group (HSG) of areas within construction limits shall be shifted down one classification for HSG C (Curve Number 80) and HSG B (Curve Number 74) and ½ classification for HSG A (Curve Number 49) to account for the impacts of grading on soil structure unless the project specifications incorporate soil amendments in accordance with District Soil Amendment Guidelines. This requirement only applies to that part of a site that is being mass graded as part of proposed project.
3. Model should analyze and show compliance with these requirements at each discharge point.

3.3.2 PEAK RUNOFF RATE

Peak stormwater flow rate at each point of site discharge may not increase from the pre-development condition for the 24-hour precipitation event with a return frequency of 2-, 10-, 100- years.

1. For projects that may impact Drainage-Sensitive Use Areas as identified and mapped by the District, the post-development 100-year peak flow rate shall not exceed predevelopment 25-year peak flow rate.
2. When an existing regional stormwater management practice is proposed to manage stormwater runoff, the applicant shall show that the regional stormwater management practice has capacity to manage the stormwater runoff from the project site using Atlas 14 precipitation modeling standards; the applicant has permission to utilize any remaining capacity in the stormwater management practice; the stormwater management practice is subject to maintenance obligations enforceable by the District; and it is being maintained to its original design.

3.3.3 STORMWATER VOLUME MANAGEMENT

1. For all land disturbances other than public linear projects, the water quality volume equal to 1.1 inch of runoff from new and fully reconstructed impervious surface must be captured and infiltrated or otherwise treated. If a project disturbs more than 50 percent of the site or reconstructs more than 50 percent of the existing impervious surface, these standards apply to all impervious surface on the site. Otherwise, the standards will only apply to new and fully reconstructed impervious surface. For public linear projects, the water quality volume equal to 1 inch from new impervious surfaces or 0.5 inches of runoff from the sum of new and fully reconstructed impervious area, whichever is greater, must be captured and infiltrated or otherwise treated. The allowable infiltration rates by soil type may be found in Appendix B.
2. Volume control stormwater management practices designed consistent with guidance in the MPCA Stormwater Manual or additional standards established by the District must be incorporated into the site design to minimize the creation of new impervious surface and reduce existing impervious surfaces, minimize the amount of directly connected impervious surface, preserve the infiltration capacity of the soil, provide treatment for water quality, and limit increases in runoff volume exiting the site to the extent feasible considering site-specific conditions.

    a. Pretreatment. An infiltration or filtration practice must be designed and maintained so that particulates settle before the stormwater discharges into the infiltration or filtration portion of the system. A pretreatment device such as a vegetated filter strip, small sedimentation basin, or water quality inlet (e.g., grit chamber) must be included in the design and sized according to MPCA Stormwater Manual guidance. The use of manufactured treatment devices must be supported by data sufficient to document that the device removes at least 80% TSS.
    b. Infiltration may not be used as a volume control practice when the system would be constructed in areas:

i. that receive discharges from vehicle fueling and maintenance areas.
ii. containing contaminated soil or groundwater.
iii. where soil infiltration rates are more than 8.3 inches per hour unless soils are amended to slow the infiltration rate below 8.3 inches per hour.
iv. with less than three feet of separation from the bottom of the infiltration system to the seasonally saturated soils or the top of bedrock.
v. of predominately Hydrologic Soil Group D (clay) soils.
vi. in an Emergency Response Area (ERA) within a Drinking Water Supply Management Area (DWSMA).
vii. outside of an ERA within a DWSMA classified as high or very high vulnerability.
viii. that receive stormwater runoff from: automobile salvage yards; scrap recycling and waste recycling facilities; hazardous waste treatment, storage, or disposal facilities; or air transportation facilities that conduct deicing activities.
ix. Within 1000 feet upgradient of 100 feet down gradient of active Karst features.

c. If a stormwater management practice depends on the hydrologic properties of soils (e.g., infiltration basins), then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soil types present at the location of the control measure.
d. If the volume standard is not fully met by a volume reduction practice, other stormwater management practices must be used to provide the remaining volume equivalent, using the volume conversion factors found in Appendix C. For alternative practices not found in the Appendix or to deviate from a volume conversion factor, the applicant may submit a volume conversion factor, expressed as annual percentage removal efficiency, with supporting technical data, for District approval.
e. If regulatory, hydrologic, topographic or landscape conditions (e.g. drainage sensitive uses, TMDL or nondegradation requirements) warrant greater control than that provided by the minimum control requirements, the District reserves the right to impose additional requirements deemed necessary to control the volume, timing and rate of runoff.

3. For single-family residential development, the runoff from impervious surface other than parking or driving surface that, in the District's judgment, cannot reasonably be routed to a stormwater management practice is considered effectively treated for water quality if:
    a. The length of the flow path across the impervious surface is less than the length of the flow path across the pervious surface to which it discharges; and
    b. The pervious surface is vegetated and has an average slope of five percent or less.

3.3.4 WATER QUALITY

The following water quality standards apply:

1. The water quality volume required by section 3.3.3 of these rules must be captured and treated for total phosphorus using a stormwater management practice listed in Appendix C.
2. Runoff from undisturbed impervious surface not being treated prior to the same receiving water or required by section 3.3.3 may be treated in-kind for new or fully reconstructed impervious surface. Except for Public Linear projects, the in-kind area may not exceed 15 percent of the proposed new or fully reconstructed impervious surface.
3. For all untreated surface subject to regulation under this rule, TSS must be removed to the maximum extent practicable.
4. Total water quality volume for the project must be provided in aggregate pursuant to subsection 3.3.3. For Public Linear Projects, water quality treatment volume for fully reconstructed impervious surface, if required by section 3.3.3, must be provided only to the extent feasible.

5. Provide stormwater treatment practices to remove 80% of the average annual post development total suspended solids (TSS) per discharge location unless otherwise specified by a TMDL or nondegradation requirement.
6. Stormwater discharges to critical areas with sensitive resources or where a TMDL is in place may be subject to additional performance standards or may need to utilize or restrict certain stormwater management practices.
7. For public linear projects, where the entire water quality volume cannot be treated within the existing right-of-way, a reasonable attempt to obtain additional right-of-way, easement, or other permission to treat the stormwater during the project planning process must be made. Volume reduction practices must be considered first. Volume reduction practices are not required if the practices cannot be provided cost effectively. If additional right-of-way, easements, or other permission cannot be obtained, the applicant must maximize the treatment of the water quality volume prior to discharge from the District.
8. For non-linear projects, where the full water quality volume cannot cost effectively be treated on the site of the original construction activity, the applicant must identify locations where off-site treatment projects can be completed. If the entire water quality volume is not addressed on site, the remaining water quality volume must be addressed through off-site treatment in accordance with the following:
    a. Off-site treatment areas are selected in the following order of preference:
        i. locations that yield benefits to the same receiving water that receives runoff from the original construction activity;
        ii. locations within the same Department of Natural Resource (DNR) catchment area as the original construction activity;
        iii. locations in the next adjacent DNR catchment area up-stream; or
        iv. locations anywhere within the District.
    b. Off-site treatment must involve the creation of new structural stormwater management practices or the retrofit of existing structural stormwater management practices, or the use of a properly designed structural stormwater management practice which has the capacity to treat the remaining water quality volume.
    c. Off-site treatment projects must be completed no later than 24 months after the start of the original construction activity.

3.3.5 DISCHARGES INTO WETLANDS

1. Discharges into wetlands should not cause extreme fluctuations of water levels. Discharges that exceed the standards below shall be considered and regulated as adverse impact. Mixed type wetlands must conform with the most restrictive standard. Wetland susceptibility classifications can be found in Appendix D.

Wetland Type Standard	**Highly Susceptible**	**Moderately Susceptible**	**Slightly Susceptible**	**Least Susceptible**
Storm Bounce (2- & 10-year event)	Existing	Existing + 0.5 ft	Existing + 1 ft	No limit
Discharge Rate	Existing	Existing	Existing or less	Existing or less
Inundation Period on 1- & 2-year event	Existing	Existing + 1 day	Existing + 2 days	Existing + 7 days
Inundation Period on 10-year event and greater	Existing	Existing + 7 days	Existing + 14 days	Existing + 21 days

Run out control	No change	No change	0'-1 ft above RO	0-4 ft above RO

2. Stormwater must be treated to achieve at least 80% annual removal efficiency for total suspended solids (TSS) prior to discharging into a wetland.

3.3.6 LANDLOCKED BASINS

If a drainage system is proposed to outlet to a landlocked basin, sufficient storage volume must be provided to retain back-to-back 100-year, twenty-four- hour rainfalls and runoff.

3.3.7 LOW FLOOR FREEBOARD

New development including buildings and habitable structures and stormwater management practices shall be constructed such that the lowest basement floor elevations are at least 2 feet above the 100-year high water level or 1 foot above the emergency overflow.

The freeboard criteria may be deemed met when the structure does not have the required vertical separation but is protected from surface flooding to the required elevation by a berm or other natural or constructed topographic feature capable of providing flood protection.

3.4 SUBMITTALS

The applicant must submit the following with its permit application:

1. A construction plan set referenced to the NAVD 1988 datum that includes:
    a. Existing site conditions.
    b. Proposed site conditions, including grading, structures, utilities, roads, and easements.
    c. Water features, including delineated wetland boundaries and floodplain where appropriate.
    d. Stormwater management practice design details.
    e. Preliminary plat of any proposed subdivision.
    f. Ditch easements.
2. Calculations: Hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in this rule at each discharge point from the project. Such calculations shall include:
    a. Description of the design storm frequency, intensity, and duration.
    b. Time of concentration.
    c. Soil Curve Numbers or runoff coefficients.
    d. Peak runoff rates and total runoff volumes for each discharge point.
    e. Infiltration rates.
    f. Culvert capacities.
    g. Flow velocities.
    h. Identification of existing and proposed drainage areas for each wetland basin, if applicable and the bounce and duration for all proposed stormwater discharges.
    i. Documentation of sources for all computation methods and field test results.
    j. Demonstrate concurrence with regional pond or subdivision drainage plans approved by the District, if applicable.
3. Soils Information: If a stormwater management practice depends on the hydrologic properties of soils (e.g., infiltration basins), then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on MPCA guidance, also provided in Appendix E. Boring

logs must be referenced to the NAVD 1988 datum. If contaminated soils are present, a contaminated soils assessment must also be submitted.

4. Maintenance Plan: A maintenance plan must be submitted for all stormwater practices and associated structures required under these rules, and subject to a Maintenance Agreement per section 3.5.2, to ensure their continued function. This plan must include at a minimum:
    a. The parts or components of a stormwater management practice that need to be maintained.
    b. Detailed maintenance and repair procedures to ensure continued function of the stormwater management practice.
    c. An inspection and maintenance schedule.
    d. Responsible parties for inspection and maintenance.
    e. Equipment and skills or training necessary.
    f. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program.
    g. Need for revisions or additional maintenance procedures.
5. Landscaping Plan: The applicant must present a detailed plan for management of vegetation at the site after construction is finished, including:
    a. The party(ies) responsible for the maintenance of vegetation at the site.
    b. The practices that will be employed to ensure that adequate vegetative cover is preserved.

3.5 MAINTENANCE REQUIREMENTS

3.5.1 MAINTENANCE EASEMENTS

1. The applicant must ensure access to all stormwater treatment practices at the site for the purpose of inspection and repair by securing all the maintenance easements needed on a permanent basis. These easements will be recorded with the plan and will remain in effect even with transfer of title to the property.
2. The applicant must dedicate maintenance easements on all new plats and developments on public ditches as follows:
    a. A 200-foot easement (100 feet either side of centerline) will be required on Coon Creek from the Mississippi River to Lexington Ave. (C.S.A.H. #17).
    b. A 200-foot easement (100 feet either side of centerline) on Sand Creek from Coon Creek to Central Ave. (T.H. #65).
    c. A 100-foot easement (50 feet either side of centerline) on designated county ditches within the watershed, including Coon Creek and Sand Creek upstream of the sections identified in a & b of this section, and Riverview, Pleasure, Springbrook, Stonybrook, and Oak Glen Creeks.

3.5.2 MAINTENANCE AGREEMENT

A maintenance agreement is required for all stormwater practices that will not be maintained as part of standard municipal public work activities. The maintenance agreement must include the elements required in the maintenance plan cited in section 3.4 of these rules.

The applicant must record the maintenance agreement with the county recorder/registrar before any land-altering activity occurs on the site. Applicant/permittee must then provide the District a copy of the recorded document.

If a responsible party fails or refuses to meet the requirements of the maintenance agreement, the District, after reasonable notice, may correct a violation of the design standards or maintenance needs by

performing necessary work to place the facility in proper working condition and charge the responsible party.

3.5.3 MAINTENANCE INSPECTIONS

For all stormwater practices that will not be maintained as part of standard municipal public work activities, the responsible parties for maintenance shall inspect all stormwater management practices under their jurisdiction by July 30 of each year. The purpose of the inspection will be to document maintenance and repair needs and ensure compliance with the requirements of this rule and accomplishment of its purposes.

These maintenance and repair needs may include removal of silt, litter and other debris from all catch basins, inlets and drainage pipes, grass cutting and vegetation removal, and necessary replacement of landscape vegetation. Any maintenance needs found must be addressed in a timely manner, as determined by the District, and the inspection and maintenance requirement may be increased as deemed necessary to ensure proper functioning of the stormwater management facility.

3.5.4 RECORDS OF INSTALLATION AND MAINTENANCE ACTIVITIES

Parties responsible for the operation and maintenance of a stormwater management practice shall make records of the installation and of all maintenance and repairs and shall retain the records for at least five years. These records shall be made available to the District during inspection of the facility and at other reasonable times upon request.

4 SOILS AND EROSION CONTROL

4.1 POLICY

It is the policy of the District:

1. To reduce the siltation into, and the pollution of water bodies and streams.
2. To guide, regulate and control the design, construction, use and maintenance of development to promote water quality and prevent pollution.
3. To control and minimize pollution caused by erosion and sedimentation.
4. To reduce siltation to, and the pollution of, water bodies and streams.

4.2 SCOPE AND APPLICABILITY

This policy, regulation and standards apply to:

1. Land disturbing activities or removal of vegetative cover on lands of 1 acre or more of cumulative disturbance.
2. Land disturbing activities or removal of vegetative cover on 10,000 square feet or more of cumulative disturbance, if any part of the disturbed area is within 300 feet of and drains to a waterbody.
3. Land disturbing activities or removal of vegetative cover on 5,000 square feet if any part of the disturbed area is within 50 feet of and drains to a waterbody.
4. Any other land disturbing activity that requires a permit under any other District rule.

4.2.1 EXCEPTIONS

The following land-disturbing activities are excepted from these requirements:

1. Any emergency activity that is immediately necessary for the protection of life, property, or natural resources.
2. Existing nursery or agricultural operations conducted as a permitted main or accessory use.

4.3 STANDARDS

An applicant for an erosion and sediment control permit must demonstrate compliance with the following standards:

1. The applicant must prepare and receive District approval of an Erosion and Sediment Control Plan that meets the following criteria:
    a. The erosion and sediment control practices shall be consistent with the specifications of the MPCA manual "Protecting Water Quality in Urban Areas," as amended, and the specifications of the NPDES/SDS Construction Stormwater General Permit, as amended.
    b. Erosion and sediment control practices shall be sufficient to retain sediment on site.
    c. Soils with a soil-erodibility factor of 0.15 or greater must be stabilized within 24 hours.
    d. Permanent or temporary stabilization of disturbed areas must be initiated immediately and be fully stabilized within 7 days after construction activity has permanently or temporarily ceased.
    e. The plan must include practices adequate to protect stormwater management practices to be used for post-construction stormwater infiltration or filtration.
2. All erosion and sediment controls proposed for compliance must be in place before any land-disturbing activity begins.

4.4 SUBMITTALS

The applicant must submit with its permit application the following:

1. A topographic map including existing and proposed grades, soils, forest cover, hydrologic features and other resources protected under other provisions of this rule, city rule or state statute, and clear identification of areas where grading will occur or soils will be exposed by removal of vegetative cover. This must also include a quantification of the total area of land disturbance.
2. A sequence of construction of the development site, including clearing and grubbing, rough grading, construction of utilities, infrastructure, and buildings; and final grading and landscaping. Sequencing shall identify the expected date on which clearing will begin and the duration of exposure of cleared areas, areas of clearing, installation of temporary erosion and sediment control measures, and establishment of permanent vegetation.
3. Clear identification of all temporary erosion and sediment control measures which will remain in place until permanent vegetation or other permanent stabilization is established.
4. Clear identification of all permanent erosion control measures such as outfall spillways and riprap.
5. Clear identification of staging areas, as applicable.
6. Identification and location of any floodplain or wetland area. A delineation may be required depending on the proximity of the proposed disturbance to a wetland.
7. Identification of proposed dewatering and basin-draining activities, and provisions for treating discharge for sediment, oil, and grease in accordance with the MPCA Construction Stormwater General Permit Dewatering and Basin Draining section.
8. Seeding mixtures and rates, types of sod, method of seed bed preparation, expected seeding dates, type and rate of fertilizer application, and kind and quantity of mulching for both temporary and permanent vegetative control measures.
9. Provisions for maintenance of control practices, including easements and estimates of the cost of maintenance. Identification of and contact information for the party responsible for the maintenance of all erosion and sediment control practices must be included.

10. Provisions for permanent stabilization of the site after construction, including identification of and contact information for the party responsible for the maintenance of vegetation at the site, and what practices will be employed to ensure that adequate vegetative cover is preserved.
11. Documentation that the project applicant has applied for the NPDES Permit from the Minnesota Pollution Control Agency (MPCA), when applicable.
12. A Stormwater Pollution Prevention Plan for projects that require an NPDES Permit.

5 WETLANDS

5.1 POLICY

It is the policy of the District:

1. To provide for the protection, preservation, proper maintenance and use of wetlands.
2. To minimize the disturbance to wetlands and to prevent damage from excessive sedimentation, eutrophication, or pollution.
3. To protect and enhance the ecological function of wetlands and the benefits and values they provide to society.

5.2 SCOPE AND APPLICABILITY

This policy, regulation and standards apply to:

1. Activities which result in the filling, draining, excavating, or otherwise altering the hydrology of a wetland.

5.3 STANDARDS

The Minnesota Wetland Conservation Act (WCA), as amended, and its implementing rules contained in Minnesota Rules Chapter 8420, as amended, are incorporated as part of this rule and govern all draining, filling, and excavating in wetlands.

Any person proposing to impact a wetland in the District is subject to and must establish compliance with the Wetland Conservation Act, as amended, standards and criteria, including but not limited to sequencing and replacement.

5.3.1 STORMWATER DISCHARGE

Stormwater drainage may be discharged to wetlands provided treatment of said discharge as noted in Section 3.3.5 is accomplished. Diversion of stormwater to wetlands shall be considered for existing or planned surface drainage provided such diversion is in compliance with state law and all necessary easements have been obtained.

5.3.2 PROHIBITED ACTIVITIES

Within area(s) delineated as wetland, the applicant and property owner shall not:

1. Fill or place materials, substances, or other objects, nor erect or construct any type of structure, temporary or permanent, except as specified in the Wetland Conservation Act.
2. Drain or cause to be drained through ditching pumping or alteration of the wetlands water source or actions which adversely change the wetlands hydroperiod such that the wetland can become non-wetland, except as specified in the Wetland Conservation Act.

3. Excavate or dig except as specified in the Wetland Conservation Act.
4. Clear vegetation, pond water or alter the landscape position in a manner that results in adverse environmental impact.

5.4 SUBMITTALS

The applicant must submit with its permit application the following:

1. A site plan showing property lines and delineation of lands in which the applicant has an ownership or legal interest; existing and proposed elevation contours, including existing runout elevation and flow capacity of the wetland outlet; and area of the wetland proposed to be filled, drained, or excavated.
2. A complete delineation of all existing wetland(s), including data sheets with complete and detailed information on field indicators (soils, vegetation, and hydrology) and summary report. Wetland delineations must be performed during the growing season. Wetland boundaries must be staked in the field and easily identifiable.
3. The total wetland acres, wetland types and number of jurisdictional wetland basins on the property.
4. The size and nature of proposed impact to each wetland and the reason the impact is unavoidable shall be identified.
5. The wetland dependence of each proposed impact of the project shall be determined.
6. The nature and scope of the appropriate Wetland Conservation Act exemption shall be noted if applicable.
7. Alternatives to avoid and minimize each proposed impact.

6 FLOODPLAIN

6.1 POLICY

It is the policy of the District:

1. To secure safety from floods.
2. To prevent loss of life, property damage, and the losses and risks associated with flood conditions.
3. To preserve the location, character, and extent of natural drainage courses.
4. To preserve the natural integrity of drainage patterns.
5. To provide a storm and surface water system capable of handling a 100-year storm.

6.2 SCOPE AND APPLICABILITY

This policy, regulation, and standards apply to:

1. Land disturbing activities within the floodplain as mapped and modeled by the District, as amended.

6.3 STANDARDS

1. The existence of floodplain on the property must be determined.
2. Proposed floodplain impacts must be identified and quantified.
3. Fill within the floodplain is prohibited unless compensatory storage volume is provided within the relevant reach and in the same permit term. Compensatory storage must be provided such that

the floodplain storage volume after encroachment is equal to or greater than the floodplain storage volume prior to encroachment.

4. Proposed projects that affect the conveyance capacity of channels or crossings shall document that equivalent hydraulic capacity is provided. When hydraulic equivalents are not desired or feasible for the proposed project, the District will review hydraulic information prepared by the applicant which details easement acquisition or permission for increased flood levels (upstream or downstream of the project), emergency overflow elevations, and assessment of the adequacy of the outlet as generally described in M.S. 103E.
5. Construction or development subject to flood damage must have a minimum floor elevation of at least 2 feet above the 100-year floodplain.
6. Any structures or embankments within the floodplain shall be capable of passing the 100-year flood without increasing the elevation of the floodplain or creating excessive velocities as determined by the District.
7. A one-time deposition of floodplain fill that is less than 50 cubic yards does not require compensatory storage. This standard applies per parcel, or on a per project, per floodplain basis for public linear projects.

6.4 SUBMITTALS

The applicant must submit the following with its permit application:

1. Site plan showing boundary lines, delineation and existing elevation contours of the work area, ordinary high water level, and floodplain. All elevations shall be referenced to NAVD (1988 datum).
2. Grading plan showing any proposed elevation changes.
3. Preliminary plat of any proposed subdivision.
4. Determination by a registered professional engineer of the floodplain elevation before and after the proposed activity, if required.
5. Computation of the change in flood storage capacity as a result of the proposed alteration or fill.
6. Erosion and sediment control plan which complies with these rules.
7. Soil boring logs and report if available or other data documenting the local groundwater elevation.

7 DRAINAGE, BRIDGES, CULVERTS, AND UTILITY CROSSINGS

7.1 POLICY

It is the policy of the District to:

1. Maintain ditch and conveyance systems within the watershed to fulfill the role identified within the District's Comprehensive Management Plan and Minnesota Statutes Chapter 103E.
2. Promote, preserve, and enhance the water and related land resources of the District.
3. Protect the water and related land resources of the District from the adverse effects resulting from poor or incompatible land use activities.
4. Encourage compatibility between land use activities upstream and downstream.
5. Regulate land-disturbing activities affecting the course, current, cross section and quality of ditches and water courses.
6. Regulate improvements by riparian property owners of the bed, banks, and shores of lakes, streams, and wetlands for preservation and beneficial use.
7. Protect stream channels from degradation.
8. Regulate crossings of ditches and watercourses in the District to maintain channel profile stability and conveyance capacity.

7.2 SCOPE AND APPLICABILITY

This permit requirement is in addition to any procedures that may be required for public ditches under Minnesota Statutes 103E or other applicable ditch law.

This policy, regulation and standards apply to:

1. All land disturbing activities which construct, improve, repair, or alter the hydraulic characteristics of a bridge profile control or culvert structure on a creek, public ditch, or major watercourse.
2. Land disturbing activities which involve a pipeline or utility crossing of a creek, public ditch, or major watercourse.
3. All land disturbing activities which construct, improve, repair or alter the hydraulic characteristics of a conveyance system that extends across two or more parcels of record not under common ownership and has a drainage area of 200 acres or greater, including by placing or altering a utility, bridge or culvert structure within such a system. No permit is required to repair or replace an element of a conveyance system owned by a government entity when the hydraulic capacity of the system will not change.

7.3 STANDARDS

1. Every person owning property through which a ditch or watercourse passes, or such person's lessee, shall keep and maintain that part of the ditch or watercourse within the property, free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, obstruct, or significantly retard the flow of water, or access for maintenance or repair of the ditch or other watercourse.
2. The owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.
3. The natural drainage system shall be used as far as is feasible for storage and flow of runoff. Stormwater drainage may be discharged to wetlands, retention basins or other treatment practices. Temporary storage areas or retention basins scattered throughout developed areas shall be encouraged to reduce peak flow, erosion damage, and construction cost.
4. The widths of a constructed waterway shall be sufficiently large to adequately channel runoff from a ten (10) year storm. Adequacy shall be determined by the expected runoff when full development of the drainage area is reached.
5. No fences or structures shall be constructed across the waterway that will reduce or restrict the flow of water.
6. The banks of the waterway shall be protected with permanent vegetation.
7. The gradient of the waterway bed should not exceed a grade that will result in a velocity that will cause erosion of the banks of the waterway.
8. Prior to realignment or repair, alternative measures to conserve, allocate and use the water should be considered (versus removing it from the area and watershed.) The need for repair of the ditch or watercourse shall be determined.
9. Water inlets, culvert openings and bridge approaches shall have adequate shoulder and bank protection to minimize soil erosion.
10. Bridge and culvert crossings must:
    a. Provide equivalent hydraulic capacity as existing condition.
    b. Retain existing navigational capacity.
    c. Not adversely affect water quality.
    d. Represent the minimal impact solution to a specific need with respect to all other alternatives.
    e. Be constructed to allow for future erosion, scour and sedimentation considerations.

   f. Provide for biota passage consistent with MnDOT's Minnesota Guide for Stream Connectivity and Aquatic Organism Passage Through Culverts.
11. All placement or replacement of pipelines or utility lines that cross ditches or waterways of the District shall be placed so that the top elevation is at least 4 feet below approved low elevation of ditch or waterway in order to avoid or minimize damage to the line during maintenance or repair of the ditch. This elevation is to be provided by the District.
12. Comply with all federal, state and District wetland protection rules and regulations.

7.4 SUBMITTALS

The applicant must submit the following with its permit application:

1. For construction, improvement, or repair of a public or private drainage system:
   a. Map showing section of the ditch or drainage system to be maintained.
   b. Depth, in feet, proposed to be dredged.
   c. Plan for placement of dredge material.
   d. Plan for final vegetative cover of dredge. Evidence that the affected property owners have been contacted and will allow access for maintenance purposes.
   e. Construction schedule.
   f. Narrative describing construction methods.
   g. An erosion control plan that complies with these rules.
2. For construction, improvement or repair of bridges, culverts and crossings:
   a. Plans and details showing:
      i. Existing and proposed flow line (invert) elevations.
      ii. End details with flared end sections, wingwalls and/or riprap (energy dissipators).
      iii. Size and description of structure.
      iv. Emergency overflow elevation and route.
      v. Separation of four (4) feet from bottom of approved low elevation of ditch or waterway to top of utility crossing.
   b. Construction schedule.
   c. Narrative describing construction methods.
   d. An erosion control plan that complies with these rules.
   e. Discussion of potential effects on water levels upstream and downstream of the project area and computations of watershed area, peak flow rates and elevations if required.

8 BUFFERS

8.1 POLICY

It is the policy of the District to:

1. Protect State water resources from erosion and runoff pollution.
2. Stabilize soils, shores, and banks.
3. Protect and provide riparian corridors.
4. Address management of the "Additional Waters" provision of M.S. 103F.48 and identified by the Anoka Conservation District criteria in 2017.
5. Address management of riparian lands of high or outstanding ecological value.

8.2 APPLICABILITY AND SCOPE

This policy, regulation, and standards apply to:

1. Any land disturbing activity that requires a permit under any other District rule and any part of the disturbed area is adjacent to one of the following water resources:
    a. Public Waters as defined under M.S. 103G
    b. Waters determined as "Additional" under M.S. 103F.48
    c. High or Outstanding Ecological Value Waters
    d. Public ditch proposed to be improved under M.S. 103E.215 by being deepened or widened from the constructed condition.
    e. Impaired waters or waters exceeding state water quality standards.

8.3 STANDARDS

1. Continuous vegetated buffers must be established and maintained in perennially rooted vegetation.
2. Buffer Width Requirements

Water Resource Type	Minimum Width (ft)	Average Width (ft)
Public Water (under M.S. 103G)	30	50
"Other" Waters (under M.S. 103F.48)	16.5	16.5
Public ditch improvement	16.5	16.5
High or Outstanding Ecological Value Waters and Impaired Or Exceeding Waters:		
Type 3, 4, or 5 wetlands; Lakes; Watercourses of stream order 3,4,5	15	25
Type 1, 2, 6, 7 or 8 wetlands; Watercourses of stream order 1, 2.	10	15

9. The buffer width must be measured from the top or crown of the bank. Where there is no defined bank, measurement must be from the edge of the normal water level. For wetlands, the measurement must be from an approved delineated boundary.
10. The buffer will be considered compliant if it, on average, meets the applicable average buffer width requirement, and is no less than the listed minimum width at any point. Only buffer up to 200 percent of the average width will be counted in determining average buffer.
11. When more than one water resource type is present, the most protective buffer will apply.
12. Buffers shall be identified within each parcel by permanent monumentation at each parcel line where it crosses a buffer strip and shall have a maximum spacing of 200 feet along the edge of the buffer. Buffer monuments shall be approved by the District.

8.4 SUBMITTALS

The applicant must submit the following with its permit application:

1. Plans and details showing:
    a. Applicable water resources.
    b. The proposed buffer area with averaging calculations if necessary.
    c. Placement of permanent buffer monuments.
    d. Proposed design and text for permanent buffer monuments.

9 ILLICIT DISCHARGE

9.1 ILLICIT DISCHARGE PROHIBITION

No person shall discharge or cause to be discharged into the drainage system, storm drain system or watercourses of the District any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater.

1. The following discharges are exempt from discharge prohibitions established by this rule:
    a. Water line flushing or other potable water sources.
    b. Landscape irrigation or lawn watering.
    c. Diverted stream flows.
    d. Rising ground water.
    e. Uncontaminated groundwater infiltration to storm drains.
    f. Uncontaminated pumped ground water.
    g. Foundation and footing drains.
    h. Firefighting activities.
    i. Air conditioning condensation.
    j. Springs.
    k. Water from crawl space pumps.
    l. Individual residential car washing.
    m. Flows from riparian habitats and wetlands.
    n. Dechlorinated swimming pool discharges.
    o. Street wash water.
    p. Other water sources not containing pollutants.
2. Discharges specified in writing by the District, or other federal, state, or local agency as being necessary to protect the public health and safety.
3. Dye testing is an allowable discharge but requires a verbal notification to the District prior to the time of the test.
4. The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the storm drain system.

9.2 ILLICIT CONNECTIONS PROHIBITED

1. The construction, use, maintenance, or continued existence of illicit connections to the public drainage system is prohibited.
2. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.
3. A person is considered to be in violation of this rule if the person connects a line conveying sewage to the public drainage system, or allows such a connection to continue.

10 WAIVERS AND VARIANCES

10.1 WAIVERS

The District Board or Administrator may grant a waiver from the District requirements of this rule in whole or in part upon written request of the applicant, provided that at least one of the following conditions applies:

1. It can be demonstrated that the proposed project is not likely to impair attainment of the purpose and intent of this rule.
2. Alternative minimum requirements for on-site management of water and related land resources have been established in a plan that has been approved by the District and the implementation of the plan is required by local ordinance.
3. Provisions are made to manage stormwater by an off-site facility, such as a regional pond or wetland bank. The off-site facility is required to:
    a. Be in place.
    b. Be designed and adequately sized to provide a level of control that is equal to or greater than that which would be afforded by on-site practices.
    c. Have a legally obligated entity responsible for long-term operation and maintenance of the stormwater practice.
4. The District finds that meeting the minimum on-site management requirements is not feasible due to the natural or existing physical characteristics of a site.

10.2 VARIANCES

The Board of Managers may grant a variance from the literal provisions of the District's rules, regulations, and policies where:

1. The strict enforcement of the rules would cause undue hardship because of circumstances unique to the property under consideration.
2. It is demonstrated that such action will be in keeping with the spirit and intent of the District rules, regulations, and policies.
3. The proposed activity for which the variance is sought will not adversely affect the public health, safety, or welfare.

10.2.1 TERM

A variance will expire on expiration of the District's approval or permit associated with the variance request.

10.2.2 VIOLATIONS

A violation of any condition set forth in a variance will be a violation of the District rules and will automatically terminate the variance.

10.2.3 CONDITIONS

The Board of Managers may require as a condition of the waiver, or variance:

1. Such dedication or construction, or agreement to dedicate or construct as may be necessary to adequately meet said standards and requirements.
2. An alternative analysis that clearly demonstrates that no other feasible alternatives exist, and that minimal impact will occur as a result of the project or development.
3. Site design, landscape planting, fencing, signs, and water quality best management practices to reduce adverse impacts on water quality, streams, wetlands, and floodplains.

11 ENFORCEMENT AND PENALTIES

11.1 VIOLATIONS

A violation of these rules is a misdemeanor subject to the penalties as provided by Minnesota law.

11.2 NOTICE OF VIOLATION

When the District determines that an activity is **not** being carried out in accordance with the requirements of these rules, the District shall issue a written 'Notice of Violation' to the owner of the property or permittee. The notice of violation shall contain:

1. The name and address of the owner or applicant.
2. The address when available or a description of the land upon which the violation is occurring.
3. A statement specifying the nature of the violation.
4. A description of the remedial measures necessary to bring the activity into compliance with this rule and a time schedule for the completion of such remedial action.
5. A statement of penalty that may be assessed.

11.3 REMEDIAL METHODS

Remedial measures required to bring an activity into compliance may require without limitation:

1. The performance of monitoring, analysis, and reporting.
2. The elimination of illicit connections and discharges.
3. That violating discharges, practices, or operations shall cease and desist.
4. The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property.
5. The implementation of source control or treatment BMPs.

11.4 APPEAL OF NOTICE OF VIOLATION

A Notice of Violation may be appealed to the District by filing a written notice of appeal within 15 days of service. Hearing of the appeal before the Board of Managers shall take place at the next regularly scheduled Board meeting that is at least 13 days from the date of receipt of the notice of appeal

11.5 STOP WORK ORDERS

The District may issue a Stop Work Order when it finds that a proposed or initiated activity or project presents a serious threat of soil erosion, sedimentation, or an adverse effect upon water quality or quantity, or violates any District rule or permit condition. Persons receiving such an order will be required to halt all construction activities. This "stop work order" will be in effect until the District confirms that the activity is in compliance and the violation has been satisfactorily addressed.

11.6 RESTORATION OF LANDS

Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the District may take necessary corrective actions, the cost of which shall be paid by the responsible party.

11.7 ATTORNEY FEES AND COSTS

In any civil action arising from or related to these rules, an order, agreement, permit issued or denied by the District, the court may award the prevailing party reasonable attorney fees and costs.

12 ADOPTION OF RULE

12.1 SEVERABILITY

If the provisions of any article, section, subsection, paragraph, subdivision, or clause of this rule shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any article, section, subsection, paragraph, subdivision, or clause of this rule.

Compatibility with Other Requirements

This rule is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or other provision of law. The requirements of this rule should be considered minimum requirements, and where any provision of this rule imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

12.2 PRIOR RULES AND REGULATIONS

All prior rules and parts of rules and amendments to rules in conflict with this rule are hereby repealed.

12.3 CERTIFICATION OF RULES

I, Dwight McCullough, Secretary of the Coon Creek Watershed District Board of Managers, certify that the attached is a true and correct copy of the rules of the Coon Creek Watershed District having been properly adopted by the Board of Managers of the Coon Creek Watershed District.

Dated: 10-26, 2022

Dwight C McCullough

Secretary of the Coon Creek Watershed District

APPENDIX A: DEFINITIONS

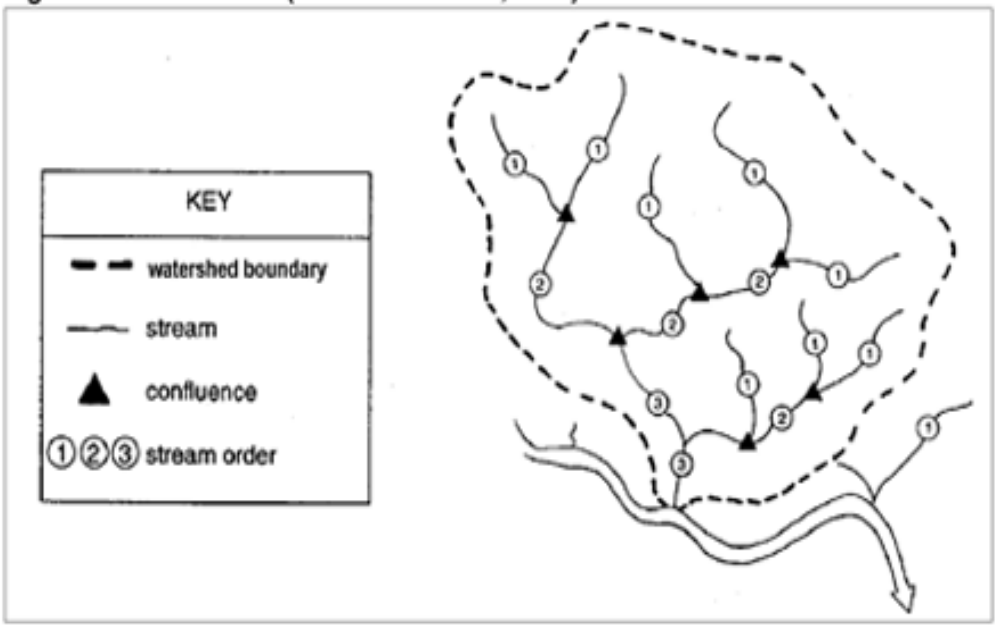
Term	Definition
Additional Waters	Waterbodies identified by the Anoka Conservation District that may benefit from perennially vegetated riparian buffers as a requirement under M.S. 103F.48 Subd. 4.
Adjacent	Joined by a continuous surface connection with obvious down-slope direction of flow, or within the 100-year floodplain of the waterbody in question.
Applicant	A property owner who has filed an application for a permit.
Atlas 14	The National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 8. A tool, published in 2013, that revises precipitation frequency estimates.
Best Management Practice (BMP)	Structural device, measure, facility, or activity that helps to achieve stormwater management control objectives at a designated site. Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.
Board	The Board of Managers of the Coon Creek Watershed District.
Buffer	A vegetated area bordering a lake, watercourse, or wetland that exists or is established to protect a waterbody. Alteration of this vegetated area is strictly limited. It consists of perennial rooted vegetation and protects the water resources of the state from runoff pollution; stabilizes soils, shores, and banks; and protects or provides riparian corridors.
Building	Any structure, either temporary or permanent, having walls and a roof, designed for the shelter of any person, animal, or property.
Channel	A natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.
Control Measure	A practice or combination of practices to control erosion and attendant pollution.
Conveyance System	Open channel, pipe, or tile that is not part of a public drainage system.
Dedication	The deliberate appropriation of property by its owner for general public use.
District	The Coon Creek Watershed District.
Drainage Sensitive uses	Those land uses dependent upon the subsurface lateral effect of drainage ditches.
Drinking Water Supply Management Area (DWSMA)	Areas containing a wellhead protection area but outlined by clear boundaries, like roads or property lines. The DWSMA is managed in a wellhead protection plan, usually by a city.

Term	Definition
Emergency Response Area (ERA)	Areas surrounding public water supply wells where water has a one-year travel time to the well. ERAs are used to prioritize and manage potential contamination sources in the DWSMA.
Erosion and Sediment Control Plan	A plan that is designed to minimize the accelerated erosion and sediment runoff at a site during construction activities.
Extreme Fluctuations	Changes in the volume, elevation or timing of the discharge or storage of water that can result in adverse impact to the biogeochemical character of the receiving resource.
Floodplain	The elevation of water resulting from the critical duration flood event, as mapped by the Coon Creek Watershed District district-wide model and as the Coon Creek Watershed District may refine on the basis of site-specific data.
Flow Velocities	A condition where the rate of volume of water flowing exceeds the design capability of the conveyance system.
Fully Reconstructed Impervious Surface	An area where impervious surface is removed down to the underlying native soil, and the underlying native soil (as distinguished from roadway subbase material) is disturbed. The following are among those actions that do not constitute impervious surface reconstruction: structure renovation; impervious surface mill, reclamation and overlay; paving of an existing gravel road that will remain rural-section road; hard surface removal and replacement associated with an isolated maintenance activity (as opposed to broader-scale replacement) such as repair of a catch basin or pipe section or replacement at the same hydraulic capacity; and pedestrian ramp installation.
Function	The biogeochemical processes that sustain the wetland at the site and landscape levels. Specifically, the geomorphic setting, water source and hydrodynamics that contribute to sustaining wetlands.
Growing Season	The part of the year during which rainfall and temperature allow plants to grow. This can be determined by observable indicators on site such as soil temperatures of 41°F at 12 inches below the soil surface or aboveground growth development of vascular plants.
High Ecological Value Water	Waters identified by the Minnesota County Biological Survey as High Ecological Value Waters.
Hydric Soil	Soils that are saturated, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.
Hydrologic Soil Group (HSG)	A Natural Resource Conservation Service classification system in which soils are categorized into four runoff potential groups. The groups range from A soils, with high permeability and little runoff production, to D soils, which have low permeability rates and produce much more runoff.
Illicit Connections	Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency or, Any drain or conveyance connected from a commercial or

Term	Definition
	industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.
Illicit Discharge	Any direct or indirect non-storm water discharge to the storm drain system, except as exempted. Illicit discharges may include discharges from illicit connections with measurable flow during dry weather containing pollutants or pathogens.
Impaired Water	A waterbody that fails to meet one or more water quality standards, which protect waterbodies by defining how much of a pollutant can be in the water before it is no longer drinkable, fishable, swimmable, or useable in other designated ways (beneficial uses).
Impervious Surface	A compacted surface, or a surface covered with material that increases the depth of runoff compared to natural soils and land cover. Including but not limited to roads, driveways, parking areas, sidewalks and trails, patios, sport courts, swimming pools, building roofs, covered decks, and other structures.
Improvement or Ditch Improvement	Any activity which deepens straightens or increases the "as constructed" capacity of a ditch. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, and substantial removal of vegetation.
Infiltration	The process of percolating stormwater into the subsoil.
Infiltration Practice	Any structure or device designed to infiltrate retained water to the subsurface. These practices may be above grade or below grade.
Inundation Period	The period of time from the high water level within the wetland from additional stormwater discharged during a storm event to the existing normal water level.
Land Disturbing Activity	Any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface or has the potential to cause detrimental offsite impacts from erosion and sedimentation. This may be due to wind or water erosive forces. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation, or any activity which bares soil or rock or involves the maintenance, repair, improvement, diversion or piping of any natural or man-made watercourse. In-kind replacement or repair of surfaces that do not expose the underlying soils is not considered land disturbance provided rates and volumes of discharge are unchanged. The term does not include normal farming practices as part of an ongoing farming operation.
Landlocked Basin	A basin lacking an outlet at an elevation at or below the water level produced by the 24 hour, 100-year storm event.
Landowner	The legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.
Maintenance Agreements	A legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance of stormwater management practices.
Major Watercourse	Any watercourse with a contributing drainage area of 200 acres or more.
Managers	The Board of Managers of the Coon Creek Watershed District.

Term	Definition
Maximum Extent Practicable (MEP)	Within the limits of available technology and the practical and technical limits of a site and project, an applicant has reduced discharge of pollutants from stormwater to the maximum extent practicable (MEP) when the Board finds that he/she has made a good faith effort in meeting the following requirements: 1. The proposed plan is capable of being done from an engineering point of view. 2. The proposed plan is in accordance with accepted engineering standards and practices. 3. The proposed plan is consistent with reasonable requirements of the public health safety and welfare. 4. The proposed plan is environmentally preferred based on a review of social, economic, and environmental impacts, and 5. It would create no unusual problems.
MSE 3	A specific precipitation distribution developed by the United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), using precipitation data from Atlas 14.
Municipality	City or township wholly or partly within the watershed.
Nonpoint Source Pollution	Pollution from any source other than from any discernible, confined, and discrete conveyances, and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal, and urban runoff sources.
One Year Event	A storm event that has a 99% chance of occurring in any given year.
Ordinary High Water Level	The highest water level elevation that has been maintained for a sufficiently long period of time to leave evidence upon the landscape. The OHW is commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. If an OHW has been established for a waterbody by the Minnesota Department of Natural Resources, it will constitute the OHW under this definition.
Outstanding Ecological Value Water	Waters identified by the Minnesota County Biological Survey as Outstanding Ecological Value Waters.
Person	Any individual, firm, corporation, partnership, franchisee, association, or governmental entity.
Pollutant	Anything which causes or contributes to pollution including nonpoint source pollution and discharges from illicit connections. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, rules, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.
Public Waters	Waters of the state as defined in Minnesota statutes, section 103G.005, subdivision 15.
Pre-development Condition	The average conditions of a site over the 20 years prior to the time that the plans for development are approved by the Coon Creek Watershed District.

Term	Definition
Public Linear Project	A project involving a roadway, sidewalk, trail or utility not part of an industrial, commercial, institutional or residential development.
Recharge	The replenishment of underground water reserves.
Redevelopment	The rebuilding, repair, or alteration of a land surface for which over 50% of the parcel involved is disturbed by a land-disturbing activity.
Relevant Reach	That portion of the stream course and floodplain that would experience an increase in stage as a result of floodplain fill.
Repair or Ditch Repair	Any activity which returns a ditch or conveyance system to its "as constructed" elevation or slope. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, or substantial removal of vegetation.
Seasonally Saturated Soils	The highest known elevation of saturated soils as indicated by redoximorphic features within the soil profile.
Sediment	Solid matter carried by water, sewage, or other liquids.
Shall	Is mandatory and not permissive.
Significant Material Change	Changes to grading, drainage, erosion control or other plans reviewed by the Watershed District that exhibit an identifiable or measurable change or difference from prior reviewed or submitted plans. The material change is significant if it results or can result in an adverse impact to property or resources not previously identified.
Stop Work Order	An order issued which requires that all construction activity on a site be stopped.
Stormwater	Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.
Stormwater Management	The use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, and/or peak flow discharge rates.
Stormwater Pollution Prevention Plan (SWPPP)	A document which describes the Best Management Practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to Stormwater, Stormwater Conveyance Systems, and/or Receiving Waters to the Maximum Extent Practicable.
Stormwater Runoff	Flow on the surface of the ground, resulting from precipitation.
Stormwater Management Practice	Measures, either structural or nonstructural, that are determined to be the most effective, practical means of preventing or reducing point source or nonpoint source pollution inputs to stormwater runoff and water bodies.
Streams	Perennial and intermittent watercourses identified through site inspection and US Geological Survey (USGS) maps. Perennial streams are those which are depicted on a USGS map with a solid blue line. Intermittent streams are those which are depicted on a USGS map with a dotted blue line.

Term	Definition
Stream Order	A classification system for streams based on stream hierarchy. The smaller the stream, the lower its numerical classification. For example, a first-order stream does not have tributaries and normally originates from springs and/or seeps. The approach consists of systematically ordering the branches and tributary streams. The extent of branching is an indication of the size and extent of the drainage network of the watershed. It influences the timing of peaks at a given point in the watershed as well as water quality. **Figure 1: Stream Order (Source: Schueler, 1995)** 
Structure	Anything manufactured, constructed or erected which is normally attached to or positioned on the land, including portable structures, earthen structures, roads, parking lots and paved storage areas.
Total Maximum Daily Load (TMDL)	A Total Maximum Daily Load, or TMDL, is a regulation designed to improve water quality by controlling the amount of a pollutant entering a water body.
Undue hardship	The owner cannot make reasonable use of their property.
Water Quality Volume (WQv)	The storage needed to capture and treat 90% of the average annual stormwater runoff volume. Numerically (WQv) will vary as a function of long-term rainfall statistical data.
Waterbasin	An enclosed natural depression with definable banks capable of containing water.
Waterbody	A waterbasin, watercourse, or wetland as defined in these rules.
Watercourse	A channel with definable beds and banks, either natural or man-made, which is capable of conducting surface water runoff from adjacent land.
Watershed	An area of common drainage.
Welfare	An act or thing that tends to improve, benefit, or contribute to the safety or well-being of the general public, or benefit the inhabitants of the watershed district.

Term	Definition
Wellhead Protection Areas	Areas surrounding public water supply wells that contribute groundwater to the well. In these areas, contamination on the land surface or in water can affect the drinking water supply.
Wetland Functions	The biogeochemical processes that sustain the wetland at the site and landscape levels.
Wetland	An area identified as wetland under Minnesota Statutes section 103G.005, subdivision 19.

APPENDIX B: INFILTATION RATES

ALLOWABLE INFILTRATION RATES BY SOIL SERIES

Soil Series	Soil Texture	Hydrologic Soil Group	Infiltration Rate (in/hr)
*Alluvial	Loamy fine sand	D	<0.2
*Anoka	Loamy fine sand	A	0.8 / 1.63
*Becker	Very fine sandy loam	B	0.3 / 0.6
*Blomford	Loamy fine sand	D/B	<0.2 / 0.6
*Braham	Loamy fine sand	B	0.3 / 0.6
*Cathro	Muck (Sapric)	D/A	<0.2 / 1.63
*Dickman	Sandy loam	B	0.3 / 0.6
Duelm	Loamy coarse sand	A	0.8 / 1.63
*Hayden	Fine sandy loam	B	0.3 / 0.6
Hubbard	Coarse sand	A	0.8 / 1.63
Isan	Sandy loam	D/B	<0.2 / 0.6
Isanti	Fine sandy loam	D/B	<0.2 / 0.6
*Kratka	Loamy fine sand	D/B	<0.2 / 0.6
Lino	Loamy fine sand	A	0.8 / 1.63
Markey	Muck (Sapric)	D/A	<0.2 / 1.63
Marsh		D/A	<0.2 / 1.63
*Meehan	Sand	A	0.8 / 1.63
Millerville	Muck (Hemic)	D/A	<0.2 / 1.63
Nymore	Loamy sand	A	1.63
Rifle	Muck (Hemic)	D/A	<0.2 / 1.63
*Rondeau	Muck (Sapric)	D/A	<0.2 / 1.63
Sartell	Fine sand	A	0.8 / 1.63
Seelyeville	Muck (Sapric)	D/A	<0.2 / 1.63
Soderville	Fine sand	A	0.8 / 1.63
Zimmerman	Fine sand	A	0.8 / 1.63

APPENDIX C: CONVERSION FACTORS

TP REMOVAL FACTORS FOR PROPERLY DESIGNED STORMWATER MANAGEMENT PRACTICES

Stormwater Management inf	Design Type	TP Removal Factor [1]
Infiltration [2]	Infiltration Feature	1.00
Water Reuse [2]	Irrigation	1.00
Biofiltration	Underdrain	0.65
Filtration	Sand or Rock Filter	0.50
Stormwater Wetlands	Shallow Wetland Pond/Wetland	0.40 0.55
Stormwater Ponds [3]	Wet Pond Multiple Pond	0.50 0.60

Adapted from Table 7.4 from the Minnesota Stormwater Manual, MPCA

[1] Refer to the Minnesota Stormwater Manual for additional information on BMP design and performance. Removal factors shown are for average annual TP removal efficiencies for intended to be used solely for comparing the performance equivalence of various BMPs.

[2] These BMPs reduce volume.

3 Stormwater ponds must be designed in accordance with the Minnesota Stormwater Manual.

Volume Calculations:

The water quality volume is calculated as follows:

- If the project will disturb greater 50% or greater of the existing site:
    - Required treatment volume (cubic feet) = Entire site impervious surface (square feet) × 1.1 (in) ÷ TP Removal Factor ÷ 12 (in/ft)

- If the project will disturb less than 50% of the existing site:
    - Required treatment volume (cubic feet) = New and fully reconstructed impervious surface (square feet) × 1.1 (in) ÷ TP Removal Factor ÷ 12 (in/ft)

APPENDIX D: WETLAND CLASSIFICATIONS

WETLAND SUSCEPTIBILITY BY TYPE

Highly Susceptible[1]	**Moderately Susceptible**	**Slightly Susceptible**	**Least Susceptible**
Sedge Meadows	Shrub-Carrs	Floodplain Forests	Sand/Gravel Pit
Open Bogs	Alder Thickets	Fresh (Wet) Meadows[2]	Cultivated Hydric Soil
Coniferous Bogs	Fresh (Wet) Meadows	Shallow Marshes[3]	Dredged/Fill Material Disposal Sites
Calcareous Fens	Shallow Marshes	Deep Marshes[3]	
Low Prairies	Deep Marshes		
Coniferous Swamps			
Lowland Hardwood Swamps			
Seasonally Flooded Basins			

1. All Scientific and Natural Areas and pristine wetlands should be considered in this category regardless of wetland type.
2. Dominated by *Phalaris arundinacea* (Reed Canary Grass).
3. Dominated by *Phalaris arundinacea* (Reed Canary Grass), *Typha sp.* (Cattail), *Phragmites australis* (Giant Reed), or *Lythrum salicaria* (Purple Loosestrife).

APPENDIX E: NUMBER OF SOIL BORINGS OR PITS

Surface Area of Stormwater Management Practice (sqft)	# of Borings or Pits
<1,000	1
1,000 to 5,000	2
5,000 to 10,000	3
>10,000	4[1]

[1]An additional soil boring or pit should be completed for each additional 2,500 sqft above 12,500 sqft

APPENDIX M

Sunrise River Watershed Management Organization
Stormwater Standards

SUNRISE RIVER

WATERSHED MANAGEMENT ORGANIZATION

FOURTH GENERATION

WATERSHED MANAGEMENT PLAN

DRAFT 10/10/2019 for final SRWMO Board consideration

Adopted by SRWMO Board *DATE*

Prepared by the SRWMO Board of Managers
with assistance from the
Anoka Conservation District

Maps

Figures

Tables

List of Appendices

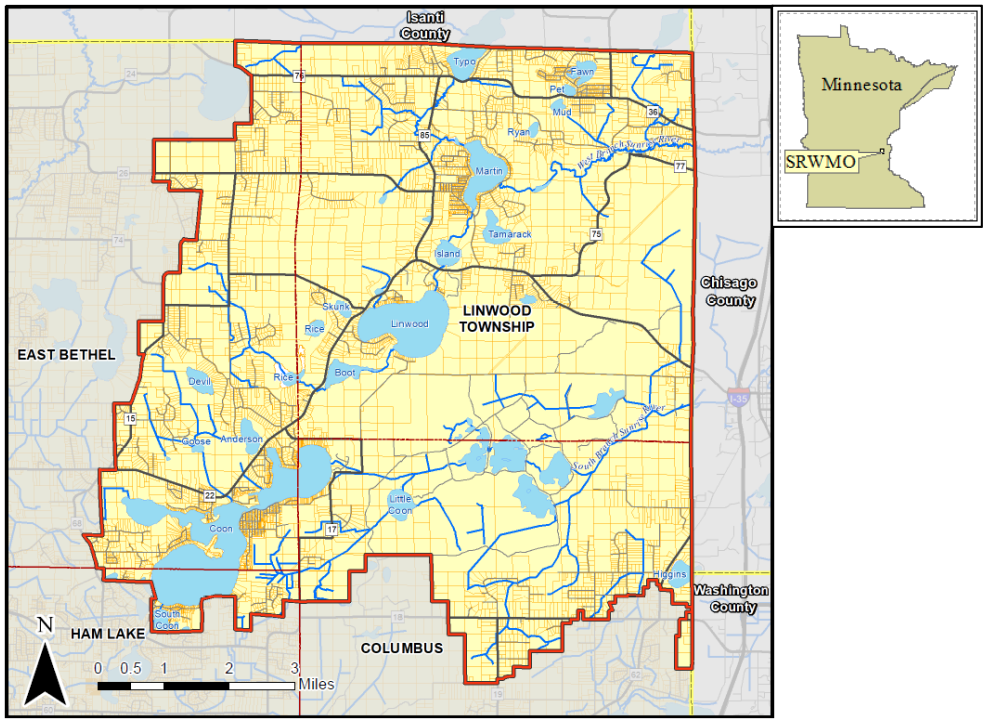
1 EXECUTIVE SUMMARY

This Watershed Management Plan guides the actions of the Sunrise River Watershed Management Organization (SRWMO) from 2020-2029. It was prepared with thoughtful input from constituents, professional water managers, municipal staff, municipal elected officials and the SRWMO Board. It includes water monitoring, water quality improvement projects, minimum standards for community ordinances and public outreach. The plan also sets financial goals, recognizing that water management need is greater than available funds. The plan seeks to be prioritized, targeted and aimed at producing measurable results.

The Metropolitan Surface Water Management Act requires a watershed management organization and watershed management plan in all areas of the seven county Twin Cities metropolitan area. The Sunrise River Watershed Management Organization (SRWMO) was originally formed in 1985 when the Cities of East Bethel and Columbus, and Linwood Township, entered into a Joint Powers Agreement to establish a Watershed Management Organization (WMO). The current Joint Powers Agreement includes the City of Ham Lake. The agreement was drafted with the authority of Minnesota Statutes, Section 471.59. The Joint Powers Agreement provides for the preparation of a Watershed Management Plan (hereinafter called Plan) in accordance with Minnesota Statutes, Sections 103B.231.

The portion of the Sunrise River Watershed covered by this plan is located in the northeast corner of Anoka County (Figure 1). This portion of the watershed is approximately 45,300 acres in size. The Sunrise River watershed does extend outside of Anoka County, but those areas are not part of the SRWMO. The SRWMO does participate in a Lower St. Croix One Watershed One Plan in order to achieve true watershed-scale management.

Figure 1 – SRWMO location map



Philosophies considered in this plan's development included:

- Water-related problems are community problems and not individual problems.
- Water resource management is a vital matter that cannot be effectively addressed by individual communities because watersheds cover multiple communities.
- Water resources should be managed on a watershed basis.
- Aquatic and terrestrial areas are integrally linked and cannot be effectively managed separately.

The WMO will serve the community by:

- Providing a forum to consider inter-community water problems.
- Collecting data and conducting resource monitoring to guide management.
- Facilitating water quality improvement projects, which often will be cooperative endeavors with others.
- Setting minimum standards for member community ordinances that consider local water resources issues. The SRWMO will not have its own permitting program.
- Providing a linkage between natural resources and land use planning decisions.
- Educating the public about water resources, and enabling or incentivizing individual action.
- Informing and engaging local elected officials about water problems, projects and the SRWMO.
- Ensuring expenditures result in corresponding benefits to the public.
- Avoiding duplication among government agencies and communities.

This plan contains goals, policies, and an action plan for each of these priority topics.

<u>High Priority Issues</u>

1. Lake and stream water quality
2. Water monitoring
3. Funding
4. Communications with member communities
5. Outreach and education

<u>Medium Priority Issues</u>

6. Aquatic invasive species (AIS)
7. Septic systems
8. Development
9. Multi-partner coordination
10. Stormwater management
11. Groundwater
12. Administrative efficiencies
13. Chlorides

<u>Lower Priority Issues</u>

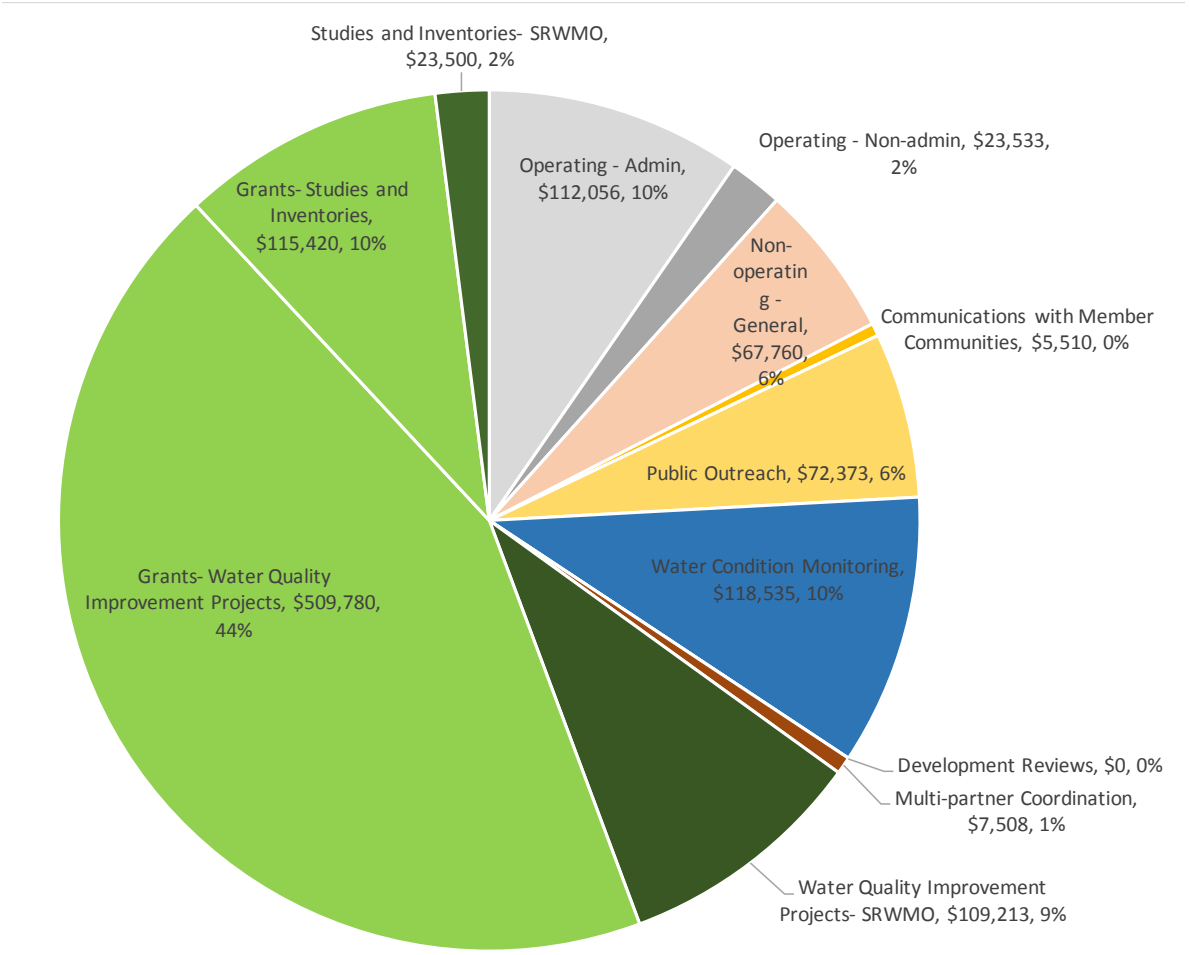
14. Ditching/Drainage
15. Climate change
16. Water quantity
17. Fisheries
18. Wildlife habitat

The SRWMO intends to run a financially lean, focused, transparent and effective program. This will be done by:

- Minimizing overhead (no staff, office or vehicles),
- Setting budgetary limits ($50,000/yr until 2026 at which time an inflationary increase to $60,000/yr will take place),
- Securing grants for 50% of anticipated expenditures in this plan (budget local funds required to match grants, have a strong plan that identifies priorities),
- Purposefully engaging with stakeholders (especially lake associations, many of whom are able to provide small but meaningful financial contributions),
- Keeping constituents, member community city councils and town board informed and part of the decision-making process.

The 10-year expenditures in this plan are shown in Figure 2.

Figure 2 - SRWMO 10-year planned expenditures. Note that grants are not yet secured.



Some notable work within this plan includes:

- **Grant searches** - Annual efforts to secure grants.
- **Monitoring** - Monitor lakes and streams at a frequency adequate to detect changes.
- **Carp management** - Reach carp removal goals at Martin and Typo Lakes for water quality and habitat improvement.
- **Stormwater treatment** - Complete stormwater retrofit treatment projects already identified and ranked at Martin and Coon Lakes.
- **Grants to residents through lake associations** - Start a new grant program, run through lake associations, to incentivize lakeshore stewardship projects.
- **Targeted lakeshore outreach** – Approach residents with eroding shorelines to offer technical and financial assistance.
- **Alum studies** - Complete alum feasibility studies at impaired lakes. Implement treatments where supported.
- **Development reviews** - Begin reviewing sketch plans of new developments. Non-binding comments will be provided to the community.
- **1W1P** - Participate in the Lower St. Croix One Watershed One Plan. Participation includes both planning and implementation. Access to State Watershed Based Funding for implementation is anticipated.
- **Outreach coordinator** - Support a new-in-2018 Anoka County Water Resources Outreach Coordinator housed at the Anoka Conservation District. This position increases efficiency and consistency by having one person produce materials/programs that are used by many watershed organizations and cities.

While this plan strives to identify prioritized and targeted work that will achieve measurable results, it also anticipates annual fine-tuning. The plan incorporates by reference several guidance documents. These are studies or plans that contain science, professional judgement and stakeholder input regarding local water resources. These include a regional One Watershed One Plan, total maximum daily load studies, watershed restoration and protection strategies, and local studies. While today's favored projects are shown in the implementation section of this plan, the SRWMO may in time modify or replace these projects with others in the guidance documents. New science, social considerations or other factors might prompt a change.

In addition to serving as a guide to the SRWMO, this plan is also a guide for the member communities. Each member community must adopt a Local Water Plan consistent with Minnesota Statutes 130B.235 and this plan. Communities will also need to update portions of their ordinances for septic systems, wetlands and stormwater to be consistent with SRWMO standards.

This plan directs the SRWMO until approximately January 1, 2030. The actual expiration date will be 10 years after MN Board of Water and Soil Resources approval.

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3 INTRODUCTION

3.1 SRWMO'S ORIGIN AND DIRECTION

In 1982 the State approved the Metropolitan Surface Water Act, Minnesota Statutes 103B. This act requires all metropolitan area local governments to address surface water management through participation in a water management organization (WMO). A WMO can be organized as a watershed district, a joint powers agreement (JPA) among cities, or as a function of county government. The SRWMO was formed in 1985 through a Joint Powers Agreement ratified by Columbus, East Bethel, and Linwood Township (see Maps 1 & 2) in order to cooperatively develop a Watershed Management Plan and form the Sunrise River Watershed Management Organization (SRWMO). The joint powers agreement is available on the SRWMO website.

While most watershed organization's boundaries are based on hydrological watershed boundaries, this is not entirely the case for the SRWMO. Because watershed organizations are only required in the seven-county metropolitan area, the SRWMO's east and north boundaries are the Anoka County boundaries. To the north, portions of Isanti County drain into the SRWMO jurisdiction. To the east, the SRWMO outlets into Chisago County.

Through its history the SRWMO has gone through several generalized phases. These might be outlined as follows:

Inception – 1990's	Organizing and orienting
1990's – 2000	Baseline data collection through water monitoring
2000 – 2010	Diagnostic monitoring and impaired waters studies
2010 – present	Water quality projects plus water quality monitoring

In the years to come, we anticipate increased emphasis on regional collaboration. This is occurring through the Lower St. Croix One Watershed One Plan, in which the SRWMO is participating. We also anticipate increasing collaboration with Isanti County and Isanti Soil and Water Conservation District, as our collective capacity for action is increasing.

3.2 THE SRWMO'S LANDSCAPE

The Sunrise River Watershed is on the fringe of the Twin Cities metropolitan area. It has relatively flat topography and contains extensive lake and wetland areas. The area also has large areas of high quality natural communities, including large areas of public lands. Scattered rural residential occurs throughout. Water management is important in this water-rich area.

Historically, residential development has tended to occur primarily around lakes, first as cabins and then converted to year-round homes. While close to the Twin Cities Metropolitan Area, future expected growth is light and mostly residential. Agriculture has been a significant land use in the watershed in the past, but is diminishing as landowners offer their land for development. Future development in the watershed will be primarily rural residential and limited by the availability of buildable land.

The abundant lakes, wetlands, and slow-moving streams in the SRWMO range widely in quality. For example, Fawn Lake is one of the clearest lakes in east-central Minnesota, while Typo Lake is one of the most turbid. Most of the waterbodies are shallow. Most of the waterbodies, particularly the lakes, are used for recreation.

3.3 SRWMO Philosophical Approach

Legal Responsibilities - The philosophy of the SRWMO Managers is based foremost on their responsibilities under the Metropolitan Surface Water Management Act Chapter 103B and MN Rules 8410. Philosophical beliefs include:

- Water-related problems are community problems and not individual problems.
- Water resource management is a vital matter that cannot be effectively addressed by individual communities because watersheds cover multiple communities.
- Water resources should be managed on a watershed basis.
- Aquatic and terrestrial areas are integrally linked and cannot be effectively managed separately.

Disproportionately More Water Needs than Funding - A foundational reality is that the SRWMO's water resources are disproportionately large compared to its financial resources. The area is water rich with both high value and highly degraded waters. According to the National Wetland Inventory, the SRWMO has over 25,000 acres of lakes, streams and wetlands comprising >55% of the SRWMO's land area. Large areas are public lands, including the Carlos Avery Wildlife Management Area, and comprise approximately 38% of the SRWMO. What's not wet or publicly owned is rural residential, and even these homes tend to be scattered due to wetlands. There is no industrial or commercial center. Therefore, tax base is relatively small compared to the extent of water resources.

The need for water management can be expressed numerically. The area has three impaired lakes and three impaired stream reaches (excludes mercury in fish impairments). Nutrient reductions needed to achieve water quality standards in the three impaired lakes are 23%, 41% and 81%. Fixing these lakes will improve recreation and property values, and help address other impairments such as excess nutrients in the Sunrise River and Lake St. Croix. Two of the stream impairments (two reaches of the W Branch Sunrise River) are caused by upstream lake impairments and should be corrected through lake management. The other impaired stream (S Branch Sunrise R) is has low oxygen that is understood to be caused by upstream wetlands in the Carlos Avery WMA and is not a management priority for State or local government. Overall, a 20% phosphorus reduction is sought for Lake St. Croix, to which all SRWMO waters drain.

Fixing the impaired waters will require persistent partnerships and grant funds. Collectively, 10,355 lbs of phosphorus reduction are needed to achieve State water quality standards. Costs for reducing phosphorus vary widely, but $1,000/lb/yr is commonplace. Using this figure, nearly $10.5 million dollars are needed, excluding management of waters that are not impaired and collateral costs such as administration. Due to these factors, prioritization with short- and long-term goals is an important part of the SRWMO's operational philosophy.

Grant Dependence - While financial support from its member communities are sufficient for a number of basic operations, including water monitoring, most projects happen only if a grant is secured. Therefore, the SRWMO strives to provide the 25% match required by most grants in addition to funding the many operations that grants won't typically pay for (administration, water monitoring, outreach and education, etc). Grants were approximately 57% of SRWMO expenditures under its 3rd Generation Watershed Management Plan. The SRWMO has a goal of at least 50% of its expenditures being from grants under this new 4th Generation Plan.

Minimize Overhead - This is an organization which seeks to minimize administration and overhead while maximizing dollars spent on projects. Toward that end, it has no office, no vehicles and no staff. It does contract for services from the Anoka Conservation District or consultants. General operating expenses including secretarial, insurance, mandatory reporting, and administrative assistance were approximately 12% of SRWMO expenditures under its previous (3rd Generation) watershed management plan.

Collaboration Emphasized - The SRWMO Managers seek the cooperation and assistance of governmental agencies, municipalities, and citizens within the SRWMO. Developing the active and affirmative support of these groups is essential. Two especially important groups are lake associations and city councils. Support, including financial support, from these groups have been essential to many past SRMWO successes.

Avoid Duplication - While the SRWMO places a high importance on partnerships and coordination, avoiding duplication is equally important. Water resources in Minnesota are managed through a complex network of agencies. This plan is intentionally focused upon those issues that are not already handled by other entities, are best handled by a local entity or through a partnership that includes the local entity, and are most directly in the SRWMO's jurisdiction.

No Regulatory Program - The SRWMO has neither intention nor desire to develop a regulatory permitting program. It is the Managers' intention that any standards required by the SRWMO will be integrated into existing regulatory programs implemented by member communities. The SRWMO will provide input when requested related to SRWMO standards.

3.4 Development of this Plan

The development and content of the plan follow Minnesota Rules 8410. This plan builds upon the work completed under previous plans. Planning occurred through a process that involved citizens, local public officials, and other agencies.

The plan development process began with a concerted effort to gather input from the public and agencies. It included four different venues for gathering input before planning began, plus utilizing citizens and technical advisory committees throughout the planning process. Additionally, planning materials and drafts were posted on the SRWMO website. These stakeholder engagement efforts are documented in Appendix A. The development of this plan culminated with the 60- and 90-day review periods and public hearing that are required by MN Statutes 103B.231 subparts 7-10.

3.5 DURATION OF THIS PLAN

This plan will expire 10 years after approval by the MN Board of Water and Soil Resources. The plan is generally expected to serve the SRWMO for the ten year period of 2020 through 2029.

4 RESOURCE INVENTORY AND ASSESSMENT

4.1 PURPOSE OF THE INVENTORY

The Metropolitan Surface Water Management Act and Minnesota Rules 8410.0060 requires that a watershed management plan include an inventory of the existing and future conditions of its watershed, with emphasis on water resources and physical factors affecting water resources. The purpose of this inventory is to provide sufficient information for basic understanding of this plan.

4.2 LOCATION AND WATERSHED BOUNDARIES

The actual physical watershed boundaries of the Sunrise River (meaning land area with surface water draining to the Sunrise River) includes portions of Anoka, Washington, Isanti and Chisago Counties. For the purpose of this plan, the terms Sunrise River Watershed or watershed shall imply the watershed boundaries of the Sunrise River Watershed Management Organization, as described below:

The Sunrise River Watershed is located in the northeast corner of Anoka County (see Map 1). The watershed is approximately 45,300 acres in size, comprised of parts of the Cities of East Bethel, Ham Lake, and Columbus, along with Linwood Township (Map 2). Linwood Township is entirely within the watershed. The north and east boundaries of the watershed are the Anoka County boundaries with Isanti County (north) and Chisago and Washington Counties (east). The Sunrise River Watershed is bound on the west by the Upper Rum River Watershed, and on the south by Coon Creek and Rice Creek Watersheds. The Sunrise River Watershed is part of the Lower St. Croix River Watershed (USGS Hydrological Code 07030005).

4.3 GEOLOGY, SOILS AND TOPOGRAPHY

The landscape of the Sunrise River Watershed was shaped by several ice advances into east central Minnesota during the last glaciation, which occurred about 10,000 years ago. In the Sunrise River Watershed a large glacial outwash deposit, called the Anoka Sand Plain is the dominant geomorphic feature. It was formed largely by glacial drainage (melt-water) from the receding Grantsburg sub-lobe of the Des Moines glacier. The surface of the Anoka Sand Plain is flat to moderately undulating. Low regions of upland represent areas of till left from previous ice movements that were not buried by the outwash sand. Other features of positive relief are patches of sand dunes, formed by southwesterly winds after the outwash streams left the sand plain. Landscape features of negative relief include numerous lakes and marshes, which formed as ice blocks, originally buried by the outwash sand that melted to create the depressions, and are now filled with water or organic soils. As a result of the above-mentioned glacial actions, glacial outwash is the predominant surficial geologic formation in the watershed, about one-third of which is covered by organic soils.

The Anoka Sand Plain is also characterized by a shallow water table. Often the water table is within 6 feet of the surface. The numerous wetlands and lakes in the watershed can be thought of as visible exposures of the water table. The area is generally

considered a groundwater recharge area, which is of importance given the nearby metropolitan area which draws heavily upon groundwater.

More detailed information about the hydrogeology of the area is available in the Minnesota Geological Survey's "Anoka Sand Plain Regional Hydrogeologic Assessment" (1993) and the Anoka County Geologic Atlas Part A – Geology (2013) available on the University of MN website and Part B- Hydrology (2016) available on the MN DNR website.

There are two different general soil associations within the watershed as determined by the "Soil Survey of Anoka County, Minnesota" (1977; see Map 3):

1. Zimmerman-Isanti-Lino Association
   The topography of these soils is level to undulating. Drainage is excessive to very poorly drained. These soils are dominated by fine sands throughout.
2. Rifle-Isanti Association
   The topography of these soils is nearly level. They are very poorly drained soils formed in organic material and fine sand.

A detailed map showing all the soil types of Anoka County is provided in the United States Department of Agriculture Soil Conservation Service publication entitled *Soil Survey of Anoka County, Minnesota*, published in 1977. A complete digital representation of the soils survey data is also available on the US Department of Agriculture Web Soil Survey website.

Maps in this plan depict soil survey information that is most relevant for watershed managers. These include:

Map 3 Soil Associations
Map 4 Hydrologic Soil Group
Map 5 Soil Drainage Classifications
Map 6 Soil Slopes
Map 7 Septic Drainfield Limitations
Map 8 Basement Limitations

4.4 Natural Land Cover

The Sunrise River Watershed contains a variety of natural communities, sites of biodiversity significance, and regionally significant natural areas. Several inventories of important natural areas and are described below.

Native Plant Communities – Native plant communities are, according the MN DNR, a group of native plants that interact with each other and their environment in a way that is not greatly altered by modern human activity. 19% (8,642 acres) of the watershed area is identified native plant communities (Map 9). Many of these areas exist within public natural areas or lie within a matrix of wetlands which made development or farming difficult.

Sites of Biodiversity Significance - The Minnesota Biological Survey (MBS) has identified Sites of Biodiversity Significance. Sites of Biodiversity Significance are

ranked based upon presence of rare species, size and condition of native plant communities and landscape context or position. These areas are shown in Map 9.

Threatened and Endangered Species - The MN DNR Division of Ecological Resources tracks and inventories qualified sightings of rare plant, animal and insect species. The location of the sightings is kept confidential to reduce the likelihood of intentional disturbance. Map 10 shows their general location.

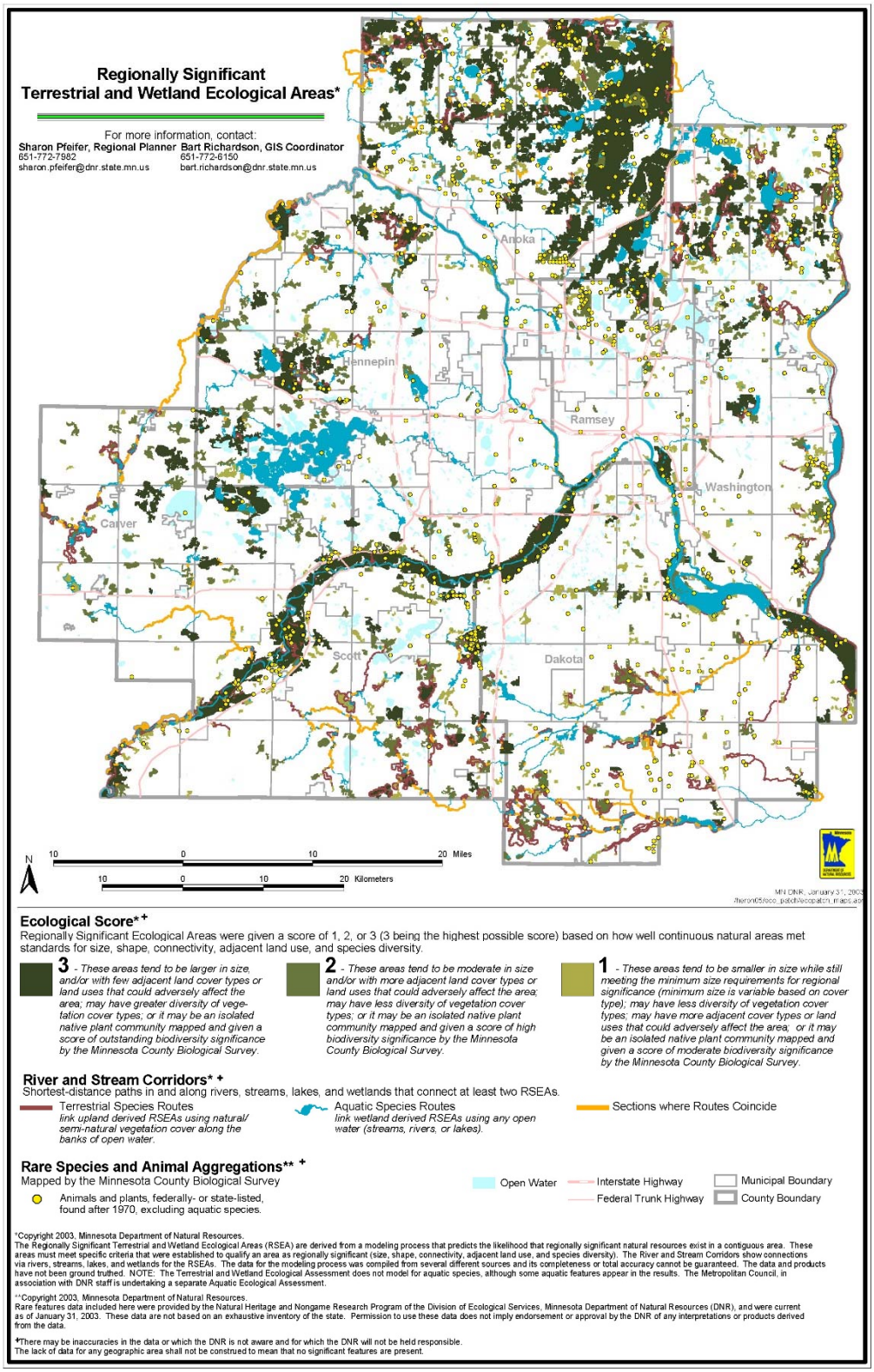
Regionally Significant Ecological Areas (RSEA) - The SRWMO contains several Regionally Significant Ecological Areas (RSEA; Figure 3). The DNR's Central Region (in partnership with the Metropolitan Council in the seven-county metropolitan area) identified these ecologically significant terrestrial and wetland areas by conducting a landscape-scale assessment based on the size and shape of the ecological area, land cover within the ecological area, adjacent land cover/use, and connectivity to other ecological areas. The purpose of the data is to inform regional scale land use decisions, especially as it relates to balancing development and natural resource protection.

Lake Phosphorus Sensitivity – The MN DNR has identified lakes state-wide that are of Phosphorus Sensitivity Significance. SRWMO lakes with this designation include:

Highest	Coon Lake
Higher	Island and Fawn Lakes
High	Linwood, Martin and Typo Lakes

Waterbodies - Another significant ecological feature of the watershed is the extensive wetland areas (see Maps 11 and 12). Wetlands or lakes cover 50% of the watershed. There are 9,441 acres of DNR public waters wetlands and 10,342 acres of other wetlands. Additionally, there are 19 lakes, eight of which have a managed fishery. Wild rice is found in several waterbodies, including Boot, Mud, Rice, and Tamarack Lakes.

Figure 3 – Regionally Significant Ecological Areas (source: MN DNR)



4.5 Land Use

Development in the watershed is limited by water, wetlands, and an abundance of public lands. Scattered rural residential development is present throughout the watershed. Lot sizes are commonly 2.5 acres or greater, though smaller lots are present in some areas. The most concentrated development is around the lakes. Lakeshore development began as seasonal cabins, but in the last 20-30 years many have been converted to year-round homes. Agriculture is also scattered in the watershed, consisting primarily of sod, corn, soybeans, and some small grains.

Future development in the watershed is expected to be light (<2%) in the next 10 years. Growth forecasts are available for each community from the Metropolitan Council (Table 1). Keep in mind that of these communities only Linwood Township is entirely within the SRWMO. For other communities, the focus of growth will likely be outside of the SRWMO along Highway 65 in East Bethel and along I-35 in Columbus. Metropolitan urban sewer area (MUSA) services are not planned to enter the SRWMO during the planning period.

Table 1 - Population growth forecasts for SRWMO communities (source: Metropolitan Council Jan. 1, 2019).

	Population				% Population Change	
	2010	2020	2030	2040	2020-2030	2010-2040
East Bethel	11,626	12,400	15,400	18,400	24.2%	48.4%
Ham Lake	15,296	16,200	17,700	18,700	9.3%	15.4%
Linwood	5,123	5,100	4,930	4,820	-3.3%	-5.5%
Columbus	3,914	4,220	4,950	5,500	17.3%	30.3%

4.6 Carlos Avery Wildlife Management Area

The Carlos Avery Wildlife Management Area (WMA) is the largest WMA in the Twin Cities metro and a notable feature within the SRWMO. It was established in 1933 for wildlife production, public hunting, trapping, and other recreation compatible with wildlife management. About 10,000 acres of the WMA's 24,000 acres are located in the Sunrise River WMO.

History

The extensive marshes which form much of the WMA were largely untouched by the settlement of Minnesota until the early 1900s. Then, the Crex Carpet Company began managing the marshes for wiregrass used in manufacturing woven rugs. A system of dikes and ditches allowed water level manipulation, prescribed burning, and mowing. Wiregrass production declined after 1925 due to increased competition from synthetic materials and changes in marsh vegetation caused by lowered water levels, repeated mowing, and heavy equipment use. The carpet company was bankrupt by 1930, and much of the land became tax delinquent.

The Minnesota Conservation Commission recognized the area's potential for wildlife, and land acquisition began in 1933 with the Anoka and Chisago County Commissions' approval. Initially, the WMA was managed by a Federal Emergency Conservation Work Camp, and many buildings and wildlife projects were constructed under the Federal Works Progress Administration during the Great Depression. State resident managers have been assigned to the WMA since 1936. Limited land acquisition for the management area continues, focusing on parcels contiguous with the WMA with high wildlife and biodiversity values and low development potential.

Management

Before settlement of the area, the WMA was a mosaic of oak savanna, tall grass prairie, marsh, and tamarack bog. Presently, the area is a mixture of forests, marshes and old fields. Oaks dominate the forests, but they are associated with other hardwood species. Small tracts of oak savanna exists on the WMA. Old fields are planted to grassy cover or food plots for wildlife. Marshes range from dense stands of cattail growing in wet soils to open-water wetlands with emergent bulrushes and sedges.

Fourteen of the 22 wetland pools maintained by the Carlos Avery Wildlife Management Area (WMA) are located in the Sunrise River WMO. Water levels in the pools are managed to favor the growth of desirable aquatic vegetation such as wild rice for wildlife habitat. The pools also provide public recreation, groundwater recharge and flood control to downstream areas.

Managers of the Carlos Avery WMA Units continue to improve managed wetlands, dikes, and water control structures. Funding is sought annually to rehab or replace aging control structures and periodically to request feasibility studies to investigate new and improved ways to manage water for all compatible uses.

4.7 Drainage System Summary

The Sunrise River Watershed has little topographic relief, vast areas of wetlands and only a few natural drainage ways (streams or rivers). Numerous man-made ditches have been constructed to provide drainage for surface water runoff in addition to natural waterways (see Maps section). The two main drainage ways of the watershed are the West Branch of the Sunrise River and the South Branch of the Sunrise River. After leaving the watershed, these two rivers join the Main Branch of the Sunrise River which outlets to the St. Croix River near the town of Sunrise, Minnesota.

The West Branch of the Sunrise River provides drainage for the northern half of the SRWMO. It begins as Isanti County Ditches 13 and 20, which join to form Data Creek and flow into Typo Lake. Typo Lake straddles the Anoka-Isanti County boundary. From Typo Lake, the West Branch of the Sunrise River flows into Martin Lake. Martin Lake also receives discharge from the following chain of lakes – Rice Lake to Boot Lake to Linwood Lake to Island Lake to Martin Lake. The West Branch of the Sunrise River discharges from Martin Lake via a dam on the east side of the lake. From Martin Lake, the West Branch of the Sunrise River flows east for approximately three miles until it exits the watershed through the east boundary.

The South Branch of the Sunrise River starts with Coon Lake located in the southwest corner of the watershed. A v-notch weir on the northeast end of the lake regulates discharge from the lake. From Coon Lake, the South Branch of the Sunrise River flows east into Pool 1 of the Carlos Avery WMA. Flow through the WMA is regulated by a series of dikes and control dams, which create pools for wildlife habitat and public recreation. The river (also referred to as County Ditch No. 12) then flows east until it exits through the east boundary of the watershed at a point approximately ¾ of a mile northwest of the town of Wyoming, Minnesota.

Numerous public and private ditches exist in the watershed. The ditch authority for public ditches (see Maps section) is the Anoka County Highway Department. Ditch maintenance projects are infrequent.

4.8 Wetlands

The DNR Public Waters (Map 11) and National Wetland Inventory (NWI; Map 12) provide inventories of most wetlands in the watershed. These datasets can be readily downloaded from the MN Geospatial Commons website. However these datasets have known limitations, such as limited accuracy of wetland boundaries. More detailed information about individual wetlands must be compiled when projects affecting those wetlands are proposed. Delineation requirements of the Minnesota Wetland Conservation Act provide some assurances that data will be gathered on a case-by-case basis.

4.9 Stream Monitoring and Condition

Streams and ditches are shown in Map 16. Streams where water quality or quantity monitoring has occurred in the last three years are shown in Map 18, and all streams monitored are listed in Table 2. Because most streams and ditches are small and of limited recreational value stream the SRWMO has focused upon larger streams discharging to recreational lakes.

Stream monitoring has included water quality sampling during base flow and storms, continuous water level recording, and rating curve development at some sites. All water quality data has been submitted to the MN Pollution Control Agency's EQuIS database, which is available through the MPCA website. The Anoka Conservation District also maintains a database of this water quality and quantity data; data is available upon request.

Three SRWMO streams are on the State impaired waters list – West Branch Sunrise River up and downstream of Martin Lake, and the South Branch of the Sunrise River (Map 20). The West Branch impairments are for pH, turbidity and aquatic life that are related to conditions in lakes immediately upstream. Corrective actions aimed at Martin and Typo Lakes should correct these impairments.

The South Branch of the Sunrise River is not a focus of management action for the State or SRWMO. It has low dissolved oxygen. No Total Maximum Daily Load (TMDL) study is complete or planned. The MPCA and ACD have concluded that low oxygen is due to natural wetland conditions upstream in the Carlos Avery WMA.

Table 2. Stream sites monitored by the SRWMO 2001-2019.

Water Body	SiteID	STORET_Station_ID	Chemistry	Hydrology	Municipality	Lat UTM	Long UTM
Boot Lake Inlet	BootLakeInlet	S003-215	Yes	Yes	Linwood	5020391.3	489236.7
Data Creek	DataCreek_TypoCreekDr	S003-220	Yes	Yes	Isanti Co	5029427.9	492434
Ditch 13	Ditch13_Hwy20	S003-573	Yes	Yes	Isanti Co	5030260.3	491227.4
Ditch 13	Ditch13_StraightFork	S003-192	Yes	Yes	Isanti Co	5030407.9	490732.1
Ditch 20	Ditch20_Mattsson	S003-210	Yes	Yes	Isanti Co	5029326.1	490986.2
Ditch 56	Ditch56_Hwy22	S003-214	Yes	Yes	East Bethel	5017849.3	487000.2
Dog Fork of Ditch 13	DogFork_Ditch13	S003-190	Yes	Yes	Isanti Co	5030379	491138.8
Hoffman Creek	HoffmanCreek_Hwy20	S003-209	Yes	No	Isanti Co	5030318.3	494396.2
Island Lake Inlet	IslandLakeInlet	S003-221	Yes	No	Linwood	5023411.8	492301.7
Linwood Lake Inlet	LinwoodLakeInlet	S003-216	Yes	No	Linwood	5021291.1	491056.6
Linwood Lake Outlet	LinwoodLakeOutlet	S003-218	Yes	No	Linwood	5022940.2	492196.1
Ditch 2	Mickelson_TypoCreekDr	S003-223	Yes	Yes	Linwood	5026027.5	492032.3
South Branch Sunrise River	SouthBranchSunriseRiver_HornsbySt	S005-640	No	Yes	Linwood	5019935.9	498034.8
South Martin Lake Inlet	SouthMartinLakeInlet	S003-212	Yes	Yes	Linwood	5024758.1	493061.8
Straight Fork of Ditch 13	StraightFork_Ditch13	S003-213	Yes	Yes	Isanti Co	5030456.2	490752.7
W. Branch Sunrise River	SunriseRiver_Hwy77	S001-424	Yes	Yes	Linwood	5026410	498530.2
Martin Lake Outlet	SunriseRiver_MartinLakeOutlet	S003-222	Yes	No	Linwood	5025453.3	493791.5
Typo Creek	TypoCreek_FawnLakeDr	S003-217	Yes	No	Linwood	5028048.6	492632.7
Martin Lake Inlet	TypoCreek_MartinLake	S003-219	Yes	No	Linwood	5026518.3	492632.1
Typo Creek	TypoCreek_TypoCreekDr	S003-188	Yes	Yes	Linwood	5026542.2	491816
Typo Creek	TypoCreek_TypoCreekDrN	S003-225	Yes	No	Linwood	5027370.9	492146.1
Typo Creek Tributary Ditch	TypoCreekTributary_FawnLakeDr	S004-170	Yes	No	Linwood	5028098.6	492089.3
Typo Lake South East Inlet	TypoLakeSouthEastInlet	S003-224	Yes	No	Linwood	5028065.5	492959.4

4.10 STORMWATER SYSTEM

Natural streams and ditches serve as storm water conveyances for most of the SRWMO, however some areas are served by municipal storm sewer conveyances. These areas are primarily in the shoreland districts of Coon and Martin Lakes. Other rural residential neighborhoods throughout the SRWMO do have some stormwater conveyance or treatment features.

Detailed maps of the municipal stormwater conveyance systems are available from the communities. The maps are periodically updated. Columbus, East Bethel and Ham Lake have maps of collection pipes, ponds, 100-year flood elevations for ponds, sizing and elevations of all control structures. Linwood Township is creating a similar inventory.

4.11 100-YEAR FLOOD BOUNDARY

The National Flood Insurance Program has mapped the Sunrise River Watershed's flood boundaries as part of the Flood Insurance Studies completed in 1979 and 1980. These studies were based on the conditions and data available at that time. While still in use, the maps have known shortcomings.

As part of the Flood Insurance Study, detailed water surface profiles for the West Branch of the Sunrise River were computed through the use of the Corps of Engineers HEC-2 step-backwater computer program. Flood boundaries for the rest of the watershed were determined in the Flood Insurance Study by approximate methods using engineering judgment, together with field inspection, aerial photographs, and United States Geological Survey (USGS) topographic maps. Map 19 depicts the floodway and fringe areas that would be inundated as a result of a 100-year flood.

Flood Insurance Study maps are useful tools but have considerable limitations. In this relatively flat watershed, the Flood Insurance Rate Maps, generated from the USGS topographic maps with 10 foot contour intervals, are not very precise. Moreover, some flood areas counterintuitively cross contours indicating higher elevations (i.e. flood boundaries cut across hills). It is not uncommon to find non-floodplain areas mapped as flood hazard areas and flood prone areas that are not included on the map. Furthermore, base flood elevations are not available in many areas; many proposers of land use change are required to calculate or survey these elevations on their own.

Map 19 is for general reference. The Minnesota Department of Natural Resources maintains copies of the Flood Insurance Studies (FIS) for the State of Minnesota. Any determination of whether a property is eligible for the National Flood Insurance Program or located within a floodplain should be accomplished using the FIS for that community.

Three flood insurance studies are available that cover the entire area of the Sunrise River Watershed. They are available for review at each member community's municipal office or at the Anoka Conservation District, and are listed as follows:

1. Anoka County FIS, July 1979, Community ID 270005 (includes Columbus and Linwood Townships).
2. City of East Bethel FIS, November 1979 Community ID 270012.
3. City of Ham Lake FIS, January 1980, Community ID 270674.

Flooding along SRWMO watercourses is uncommon. No flooding problems were identified during preparation of this Watershed Management Plan. Most of the flood-prone lands are undeveloped. In order to keep damages from future floods at a minimum, development in flood-prone areas will be discouraged by the SRWMO.

4.12 WATERSHED MODELS

A Soil and Water Assessment Tool (SWAT) model has been developed by the St. Croix Watershed Research Station. The model includes the SRWMO area. It includes land cover, precipitation, soils and other considerations to model watershed pollutant generation and hydrology. While a valuable tool, the model is best used by the staff at the St. Croix Watershed Research Station or others with SWAT expertise. The model has been used by the SRWMO when doing regional One Watershed, One Plan preparation with other water managers in the region.

4.13 LAKES

There are 19 lakes all or partially located within the Sunrise River Watershed (

Table 3, Map 16). Most could be described as small lakes or large open water wetlands. Eight have actively managed fisheries. Four are major recreational lakes (Coon, Linwood, Martin, and Typo). Three do not meet state water quality standards (Table 4). The recreational lakes are an important resource to the community and management priority.

Four SRWMO lakes fall under the 1837 Treaty establishing tribal fishing and hunting rights (Fawn, Island, Martin, and Typo). This treaty allows the designated tribal bands to harvest fish from lakes within the treaty territory. The MN DNR approves tribal harvesting proposals annually. Currently, no tribal harvesting is occurring on these lakes.

Water quality and levels in the major recreational lakes have been monitored regularly. Water quality has been monitored every 1-3 years at each lake. Lake levels have been monitored every year on these same lakes, with readings taken weekly.

Data is stored in publically accessible locations. All water quality data has been submitted to the MN Pollution Control Agency's (MPCA) EQuIS database, available on the MPCA website through their electronic data access tool. The Anoka Conservation District also maintains a database of this water quality data. Lake level data is on the MN DNR LakeFinder website.

In this plan, we provide a short summary of the characteristics of each lake. This includes a water quality trend analysis where available. More detailed data is readily accessible through the sources mentioned above.

4.13.1 Lake Classifications

The MN DNR has developed a lake classification system so that appropriate development standards could be applied to lakes. Classifications for SRWMO lakes are found in

Table 3. This lake classification system includes the following classes:

Natural Environment Lakes (NE) usually have less than 150 total acres, less than 60 acres per mile of shoreline, and less than three dwellings per mile of shoreline. They may have some winterkill of fish; may have shallow, swampy shoreline; and are less than 15 feet deep.

Recreational Development Lakes (RD) usually have between 60 and 225 acres of water per mile of shoreline, between 3 and 25 dwellings per mile of shoreline, and are more than 15 feet deep.

General Development Lake (GD) usually have more than 225 acres of water per mile of shoreline and 25 dwellings per mile of shoreline, and are more than 15 feet deep.

Table 3. Lake classifications and ordinary high water (OHW) elevations.

Lake	ID #	Size (acres)	Ordinary High Water Level	MN DNR Shoreland Lake Class
Anderson	2-63P	84	NA	NE
Boot	2-28P	130	NA	NE
Coon	2-42P	1498	904.75	GD
Devil	2-58P	103	NA	NE
Fawn	2-35W	57	902.2	NE
Goose	2-62P	257	NA	NE
Higgins	2-2P	103	NA	NE
Island	2-22P	66.7	895.4	NE
Linwood	2-26P	559	900	RD
Little Coon	2-32P	107	NA	NE
Martin	2-34P	234	892.7	GD
Mud	2-37W	31	898.7	NOTSL
Pet	2-36W	19	901.0	NOTSL
Rice	2-43P	255	NA	NE
Ryan	2-40W	30	NA	NOTSL
South Coon	2-48W	48	NA	NE
Tamarack	2-21P	120	NA	NE
Typo	30-9P	273	894.5	RD
Unnamed	2-23W	10	NA	NOTSL

GD = General Development, RD = Recreational Development, NE = Natural Environment, NOTSL = Not regulated by shoreland rules.

Table 4. Impaired lakes in the SRWMO.

Lake	Assessment Unit #	Affected Use	Pollutant/Stressor
Coon	02-0042-00	Aquatic Consumption	Mercury Fish Consumption Advisory
Linwood	02-0026-00	Aquatic Recreation	Excess Nutrients
Martin	02-0034-00	Aquatic Recreation	Excess Nutrients
Typo	30-0009-00	Aquatic Recreation	Excess Nutrients

4.13.2 Parameters and Indices for Evaluating Lake Water Quality

The following are the main parameters used to evaluate lake water quality.

Total Phosphorus – Phosphorus is an essential nutrient. Elevated phosphorus levels result in increased algae populations, which reduce water clarity, deplete dissolved oxygen levels from algae decay, and degrade aesthetics for recreation. Sources of

phosphorus include runoff from agricultural land, runoff from lakeshore and upland properties carrying fertilizer and untreated human waste from failing septic systems, pet wastes, stormwater runoff, and in-lake sources that re-suspend phosphorus stored in the lake bed (example - rough fish).

Chlorophyll-a – This parameter represents the concentration of algae in the water column. Chlorophyll-a is an organic portion of all green plants that absorb the light needed for photosynthesis. Higher concentrations of algae result in reduced water clarity and reduced recreational suitability.

Secchi Transparency – The Secchi disk is an instrument that measures the transparency or clarity of the lake. Transparency is directly related to the amount of algae and suspended solids in the water column. Shallow measurements indicate high algae and/or suspended solids concentrations.

The MN Pollution Control Agency sets water quality standards. Lakes exceeding these standards are deemed impaired. Eutrophication standards for lakes in the SRWMO are in Table 5.

Table 5. Minnesota lake water quality standards.

Waterbody type	Waterbody Specifications	Total phosphorus (µg/L)	Chlorophyll-a (µg/L)	Secchi transparency (m)
Class 2B deeper lakes	Typically >15 ft deep, <80% littoral, >10 acres.	≤40	≤14	>1.4 (4.6 ft)
Class 2B shallow lakes	Typically <15 ft deep, >80% littoral, >10 acres.	≤60	≤20	>1.0 (3.3 ft)

4.13.3 Overview of Lake Conditions

Condition of SRWMO lakes varies. Monitored lakes and the most recent water quality conditions are provided in Table 6.

Table 6. Water quality summary for monitored SRWMO lakes. Data shown are for the most recent year. Trends are based on a MANOVA with response variables of TP, chlorophyll-a and Secchi transparency.

Lake	Letter Grade	Total phosphorus summer average (µg/L)	Chlorophyll-a summer average (µg/L)	Secchi transparency summer average (ft)	Year of most recent data	# years of monitored	Trend
Coon – East Bay	A	19.4	6.7	8.0	2018	22	Improving
Coon – West Bay	A	21.8	6.9	7.3	2018	13 (5 with TP and chlorophyll)	Insufficient data. No evidence of decline.
Boot	C	35.0	11.5	6.5	2018	1	Insufficient data
Linwood	C	34.4	20.2	4.2	2018	18	Stable
Typo	F	160	61.5	1.0	2018	18	Improving
Martin	C	53.1	27.6	3.0	2018	18	Improving
Fawn	A	17.1	4.0	13.7	2018	14	Stable
Island	C	33.9	10.6	4.6	2011	9	NA

4.13.4 Lake Descriptions

Summaries of lakes are found below. Additional information is available through the MN DNR's LakeFinder website (http://www.dnr.state.mn.us/lakefind/index.html). The larger recreational lakes are described first, followed by the smaller waterbodies in alphabetical order.

COON LAKE *Cities of E. Bethel, Ham Lake & Columbus, Lake ID # 02-0042*

General Information

Coon Lake is the county's largest lake. It has a surface area of 1498 acres and a maximum depth of 27 feet (9 m). The majority of the lake (80%) is shallower than 15 feet. Public access is available at two locations with boat ramps including one park with a swimming beach. The lake is used extensively by recreational boaters and anglers. Most of the lake is surrounded by private residences. The watershed of 6,616 acres is mostly rural residential.

Coon Lake has a long history of water level control issues, both due to high and low water. Beginning in 1934 (dust bowl era) there were low water concerns. In 1948, the MN DNR constructed a dam at the outlet of Coon Lake. This dam consists of a semi-circular weir, with a crest elevation of 903.28 feet to 903.46 feet. Water discharges over the weir and into 30" RCP arch culverts. In 1996 the ditch upstream and downstream of the weir was cleaned. Low water level complaints followed. In 1999 the State Legislature directed the MN DNR to conduct a feasibility study of raising lake water levels (available at http://files.dnr.state.mn.us/waters/surfacewater_section/tech/coonlkfeasrep25.pdf). As a result of that process, in 2001 a steel v-notch weir was added at the top the existing concrete weir. The bottom of the v-notch is at the same elevation as the original weir.

Two recent issues for Coon Lake are the exotic, invasive plant Eurasian Watermilfoil (EWM) and the idea of adding municipal sanitary sewer and water services around the lake. EWM was confirmed in the lake in 2003 and has expanded rapidly. In 2008 a Coon Lake Improvement District was formed, with EWM management as a core of its function.

Around 2010 cities considered expanding sanitary sewer and water service to around the lake. One reason for adding this service is that there are suspected to be failing septic systems around the lake, especially in the Coon Lake Beach and Interlachen neighborhoods. Ultimately, the idea to expand municipal sewer and water was not supported and dropped.

While Coon Lake is not listed as "impaired" by the MN Pollution Control Agency, it has been close to their criteria of 40 µg/L phosphorus in the past. In 2006 summer average total phosphorus was 42 µg/L and in 2008 was 37 µg/L. Improved water quality in more recent years may be due to water quality improvement projects, aquatic invasive species, other factors or a combination.

Aquatic Invasive Species Present

Curly-leaf pondweed

Eurasian watermilfoil (confirmed in 2003)
Both species are managed by the Coon Lake Improvement District.

Fisheries

The most recent DNR fish survey occurred in June 2015. Walleye and Northern Pike are the two primary management species. Walleye yearlings are currently stocked annually at a rate of 0.5lbs fish per littoral acre (549lbs of fish) in collaboration with a lake group. A 17-inch minimum length limit on Walleye was implemented in 2009 to improve walleye size structure. An aeration system is present on the lake to prevent winter kills.

Organized Stakeholder Groups

Coon Lake Improvement Association
Coon Lake Improvement District (formed in 2008)

Studies Completed

- **Coon Lake Stormwater Retrofit Analysis**. 2014. By the Anoka Conservation District.
  This study identifies water quality improvement projects within the direct drainage area to Coon Lake. 30 projects are ranked by cost effectiveness at pollutant reduction.
- **Coon Lake Vegetation Management Plan**. 2010 and amended in 2016. MN DNR and Coon Lake Improvement District.
  This document informs aquatic invasive species management.
- **Vegetation Surveys** by the point-intercept method. Multiple years. Coon Lake Improvement District.
  These exercises mapped the extent of aquatic invasive species to inform herbicide applications.

Recent SRWMO Projects

2015 Three lakeshore restorations, one curb-cut rain garden
2016 One curb cut rain garden

Management Notes

- Protecting good water quality should be a priority.
- Failing septic systems in the shoreland area is a concern, particularly in the Interlachen and Coon Lake Beach neighborhoods with more dense, older housing.
- Aquatic invasive species management is led by the lake improvement district.
- Some projects identified in the 2014 stormwater retrofit study are candidates for future installation. This includes lakeshore buffers, which are recommended.

FAWN LAKE Linwood Township, Lake ID # 02-0035

General Information

Fawn Lake is classified as a natural environment lake by the MN DNR, but is listed here with larger recreational lakes because it is surrounded by homes and there is a significant amount of water quality and other data available.

Fawn Lake has a surface area of 57 acres and a maximum depth of 30 feet (10 m). There is no public access to this lake and no public boat landing. A neighborhood

association has established a small park and swimming beach for the homeowners, and a private boat access. Most of the lake is surrounded by private residences, with the densest housing on the southern and western shores. The watershed for this lake is quite small, consisting mostly of the area within less than ¼ mile of the basin.

Groundwater probably feeds this lake to a large extent. The lake has no significant incoming or outflowing streams. The groundwater contributions to this lake and its small watershed probably contribute to its exceptionally good water clarity.

Aquatic Invasive Species Present
Curly-leaf pondweed

Fisheries
The most recent DNR fish survey occurred in July 1998. It found Fawn Lake was dominated by bluegill. Northern pike were abundant with some larger individuals. Largemouth bass appeared moderately abundant.

Organized Stakeholder Groups
Paradise Point Property Owners Association

Studies Completed
None

Recent SRWMO Projects
None

Management Notes
- Protect good water quality.
- Shoreland management, including minimizing vegetative disturbance and encouraging shoreline buffers, is particularly important to lake health due to the small watershed.
- Anecdotally, curly-leaf pond weed does not appear to be expanding.

ISLAND LAKE Linwood Township, Lake ID #02-0022

General Information

Located between Linwood and Martin Lake, Island Lake has a lake area of 66.7 acres, maximum depth of 22 feet. The lake receives water from Linwood Lake through a 64" culvert. Island Lake then discharges through a creek to Martin Lake. County parklands boarder much of the lake. A small public swimming beach is provided on the east shore. A dirt boat launch is on the south shore, but it can only accommodate small boats and canoes. There are no homes on Island Lakeshore.

Aquatic Invasive Species Present
None known, but searches have not been conducted.

Fisheries
The most recent DNR fish survey occurred in July 2000. The lake has a mix of fish species. Bluegill and crappie were present in average numbers for this type of lake. Northern pike, walleye, largemouth bass and bullhead were low in numbers. Bowfin, carp and white sucker had average numbers.

In 2014 a metal grate style carp barrier was added to the culvert on Martin Lake Drive where water from Island Lake comes into Martin Lake. The purpose of that barrier is to prevent carp from moving between the lakes for spawning or overwintering. The 1.5" spacing between grates allows only small fish to pass.

Organized Stakeholder Groups
None

Studies Completed
None

Recent SRWMO Projects
None

Management Notes
- Protect acceptable water quality.
- Undeveloped shoreline, mostly county parkland, and limited access for boats helps insulate this lake from negative effects.

LINWOOD LAKE Linwood Township, Lake ID # 02-0026

General Information

Linwood Lake has a surface area of 559 acres and maximum depth of 42 feet (12.8 m). Public access is available on the north side of the lake at Martin-Island-Linwood Regional Park, and includes a boat landing and fishing areas. The lake's shoreline is about 1/3 developed and 2/3 undeveloped. Most of the undeveloped shoreline is on the eastern shore and is part of a regional park. The lake's watershed is primarily vacant with scattered residential.

Linwood Lake is on the Minnesota Pollution Control Agency's 303(d) list of impaired waters for excess nutrients. There have been discussions that this designation should be reconsidered because (a) the lake only exceeds the 40 µg/L water quality standard in some years and (b) the lake probably meets the MPCA's definition of a "shallow lake" and does not exceed water quality standards for shallow lakes. Despite this, the impairment designation has stuck. There is general agreement amongst natural resources professionals and lake residents that water quality improvement is warranted.

Linwood Lake receives inlet flow from Boot Lake and outlets to Island Lake. A weir controls the outlet from Linwood Lake. The weir, which was built in 1924, is in disrepair. Some residents have expressed concern that the weir elevation has been modified to the detriment of lake levels, but an MN DNR review has not found evidence that this is the case.

Fisheries
The most recent DNR fish survey occurred in July 2015. The lake is primarily managed for walleye, with bluegill as a secondary management species. The lake is stocked with walleye fingerlings on even years. Walleyes found during the 2015 survey were below the 1st quartile (<25th percentile) for similar lakes and northern

pike were between the 1st and second quartiles (25-50th percentile). Bluegill abundance was between the 1st and 2nd quartiles. Crappie were similar.

Organized Stakeholder Groups
Linwood Lake Improvement Association

Studies Completed

- **Carp Management Feasibility Study**. 2018-2019. Sunrise River WMO, Anoka Conservation District and Carp Solutions, LLC.
  This study is estimating carp abundance, recruitment history, seasonal spawning and overwintering movements. Management recommendations are included.
- **Boot Lake Water Quality Monitoring**. 2018. Sunrise River WMO, Anoka Conservation District.
  For the first time Boot Lake, which drains to Linwood Lake, was monitored to determine if projects in the Boot Lake subwatershed are warranted to improve Linwood Lake. Boot Lake had water quality similar to Linwood Lake, but with less algae and more macrophytes. An additional two years of monitoring are planned by the SRWMO. Results are in annual reports on the SRWMO website.
- **Sunrise River Watershed Total Maximum Daily Load.** 2014. MN Pollution Control Agency and Chisago Soil and Water Conservation District. This study estimated pollutant reductions needed at Linwood Lake.
- **Sunrise River Watershed Restoration and Protection Strategies (WRAPS).** 2014. MN Pollution Control Agency and Chisago Soil and Water Conservation District. This study provides management recommendations by subwatershed. Specific Linwood Lake management recommendations are in Table 7.

Recent SRWMO Projects

2012 Demonstration lakeshore restoration at lake association annual picnic.

2018 Targeted outreach to lakeshore residents that records suggested failing or to fail septics. Technical and financial assistance was offered, but the response was practically zero.

Management Notes

- Phosphorus reductions needed are 341 lbs (23%) according to the TMDL study.
- Correcting failing shoreland septic systems is a priority. In 2017-18 review of permits, maintenance notes, system ages and landowner feedback found 21 shoreland septic systems that have "red flags" indicating they are at risk for failure. Owner responsiveness to offers for technical and financial help was low. Yet the lake association and township lobbied for the outreach due to perceived problems. Financial assistance to fix problem septics is inadequate.
- Undeveloped shoreline, mostly county parkland, helps insulate this lake from negative effects and should be a priority to maintain.
- A significant concern for lake residents is aquatic vegetation. The lake has both curly-leaf pondweed and Eurasian watermilfoil. Coontail has become matted to the surface in some large areas in recent years. Aside from this, a lush community of native plants exists. Management at this lake will likely be a

struggle between desires for clearer water and fewer plants, which conflict with each other.

- The WRAPS recommended management activities as shown in Table 7.

Table 7. Potential Linwood Lake restoration projects from the Sunrise River WRAPS.

LINWOOD LAKE IMPLEMENTATION ACTIVITES CURRENT TP = 44 µg/L		Treated Area [ac]	Treated Area [% Watershed]	Estimated TP Load Reduction [lb P/yr]	Estimated TP Load Reduction [% Total Needed]	Potential Granting Organization	Project Partners	Estimated 30-year Costs
IN-LAKE	Load Reduction Needed:			29				
	Load Reduction Achieved:			29	8.5%			
Trophic state alteration	Including, but not limited to, carp management and/or curly-leaf pondweed management.			29	8.5%			
WATERSHED	Load Reduction Needed:			312				
	Load Reduction Achieved:			313	91.7%			
Biofilters	Buffer strips (9,415 feet total)	22	0.3%	2	0.6%	NRCS; CWF	NRCS; LID; SWCD; LA; LO	$-$$
Lawn management	Maintaining turfgrass and preventing transport of leaves and clippings on 25% of all parcels	118	1.7%	4	1.2%	Existing programs	City; SWCD; LA	$$
Septic system upgrades	Convert all failing to conforming	N/A	N/A	114	33.6%	CWF	County; Cities; LO	$
	Convert all ITPHSS to conforming (completed)	N/A	N/A	0	0.0%		County, LO	
Bioretention & Infiltration	Infiltration basins and large bioretention facilities (equivalent to one individual rain gardens on 36% of all parcels, or 336)	N/A	N/A	168	49.2%	CWF; LID	SWCD; LID; LA; LO	$$-$$$
Sedimentation	Sedimentation ponds (13)	130	1.9%	14	4.0%	NRCS; CWF; City; LID	NRCS; SWCD; LID; City; LO	$$
Agricultural BMPs	Collection, storage, and treatment of manure (assumes 75% reduction of load)	N/A	N/A	2	0.5%	NRCS; Ag BMP; CWF	NRCS; SWCD; LO	$-$$
	10% of cropland with conservation tillage	102	1.5%	9	2.6%	NRCS; Ag BMP	NRCS; SWCD; LO	Variable
TOTAL	Load Reduction Needed:			341				
	Load Reduction Achieved:			342	100%			

Symbol key

Ag BMP	MDA Agricultural BMP Loan Program	LID	Lake Improvement District	$ < $500/lb TP removed/yr
CWF	Clean Water Fund	LO	Landowners	$$ = $500-$1500/lb TP removed/yr
CWP	Clean Water Partnerships/ 319 Grants	NRCS	Natural Resources Conservation Service	$$$ > $1500 lb TP removed/yr
LA	Lake Associations	SWCD	Soil and Water Conservation District	

The greatest load reductions recommended are from septic system upgrades and bioretention projects. It estimates these two project types, if fully implemented would achieve >80% of needed phosphorus reductions. Septic system upgrades also had the lowest cost of all management options recommended. Lakeshore buffer strips, while popular, would achieve only 0.6% of the needed reductions.

- The lake association has become more active beginning around 2016. They have been successful at fundraising for aquatic invasive species treatments and water quality improvement projects. They should be including in lake management decisions.

MARTIN LAKE Linwood Township, Lake ID # 02-0034

General Information

Martin Lake is located in the northeast portion of Anoka County. Martin Lake has a surface area of 223 acres and maximum depth of 20 ft (6.1 m). Public access, including a concrete boat launch, is available on the southern end of the lake. The lake is used moderately by recreational boaters and fishers, and would likely be used more if water quality were improved. Martin Lake is almost entirely surrounded by private residences. The 5402 acre watershed is 18% developed, with the remainder

being vacant, agricultural, or wetlands. Martin is on the Minnesota Pollution Control Agency's (MPCA) list of impaired waters for excess nutrients.

Martin Lake is located between Typo and Island Lakes. Martin Lake receives water from Typo Lake through Typo Creek at its north inlet. Water entering the south inlet comes from Island, Linwood, and Boot Lakes (downstream to upstream order of the chain of lakes). Martin Lake discharges from the east side of the lake to the West Branch of the Sunrise River via a concrete dam constructed in 1938 and rehabilitated to include a carp barrier in 2016.

Fisheries

The most recent DNR fish survey occurred in June 2015. Walleye fry are stocked annually. The most recent found the lowest walleye catches since 1984 and no walleyes smaller than 13 inches. Northern pike were between the 25th and 50th percentile for this lake type. Bluegill abundance was between the 50th and 75th percentile. Crappies and yellow perch were also sampled in notable quantities. An aeration system was installed in 1993 to prevent winterkills.

Organized Stakeholder Groups

Martin Lakers Association

Studies Completed

- **Ditch 20 Wetland Restoration Feasibility Study to Benefit Downstream Water Quality**. 2018. Anoka Conservation District.
- **Martin and Typo Lake Total Maximum Daily Load (TMDL)**. 2012. MN Pollution Control Agency and Anoka Conservation District.
  This study estimated pollutant reductions needed at Martin Lake.
- **Martin Lake Stormwater Retrofit Assessment.** 2011. Anoka Conservation District.
  This study identifies water quality improvement projects within the direct drainage area to Coon Lake. 15 projects are ranked by cost effectiveness at pollutant reduction.
- **Sunrise River Watershed Restoration and Protection Strategies (WRAPS).** 2014. MN Pollution Control Agency and Chisago Soil and Water Conservation District.
  This study provides management recommendations by subwatershed.

Recent SRWMO Projects

2018	Carp removals
2016	Carp barriers at north inlet and outlet
2014	Carp barrier at south inlet
2011	Three curb-cut rain gardens

Management Notes

- TMDL recommended management actions include Ditch 20 management, rough fish control, lakeshore septic system upgrades, stormwater retrofits and others.
- Carp barriers and removals have yielded a trend of improving water quality. Bringing carp levels to management goals of 100 kg/ha, and maintaining that level, is a priority.
- Aquatic vegetation and related habitat is currently low but should increase with water quality improvements. Tracking this change is a priority. The MN DNR

has been asked to provide this vegetative management, but is unable due to staffing limitations.
- Additional stormwater retrofit projects identified in a 2011 study are candidates for installation.
- Martin Lakers Association maintains a small water quality fund that can help match grants for lake management that they support.
- Projects at Typo Lake upstream are needed to achieve Martin Lake goals.
- Linwood Township owns and operates the carp barriers. The SRWMO and Anoka Conservation District provide assistance.

TYPO LAKE Linwood Township and Isanti County, Lake ID # 03-0009

General Characteristics

Typo Lake is located in the northeast portion of Anoka County and the southeast portion of Isanti County. It has a surface area of 290 acres and maximum depth of 6 feet (1.82 m), though most of the lake is about 3 feet deep. The lake has a mucky, loose, and unconsolidated bottom in some areas, while other areas have a sandy bottom. Public access is at the south end of the lake along Fawn Lake Drive. The lake is used very little for fishing or recreation because of the shallow depth and extremely poor water quality. The lake's shoreline is mostly undeveloped, with only 21 homes within 300 feet of the lakeshore. The lake's watershed of 11,520 acres is 3% residential, 33% agricultural, 28% wetlands, with the remainder being forested or grassland. Typo Lake is on the Minnesota Pollution Control Agency's (MPCA) list of impaired waters for excess nutrients.

Typo Lake outlets to Typo Creek through a double culvert under Fawn Lake Drive. Some resident complaints of low water levels have been received, and at times there have been attempts to illegally block the outlet to create higher water levels.

Fisheries

The most recent DNR fish survey occurred in June 2016. Walleye are the primary management species in the lake and are stocked as fry in odd years. That survey noted walleye, black and white crappie and northern pike were near or above the levels found in that lake during previous surveys. Black crappie and bluegill were the most abundant species in this recent survey.

Organized Stakeholder Groups

None

Studies Completed

- **Ditch 20 Wetland Restoration Feasibility Study to Benefit Downstream Water Quality**. 2018. Anoka Conservation District.
- **Carp Management Feasibility Study.** 2017-2019. Anoka Conservation District, SRWMO and Carp Solutions LLC.
  This study estimated carp abundance, recruitment history, seasonal spawning and overwintering movements and is producing management recommendations. Carp removals are included.

- **Martin and Typo Lake Total Maximum Daily Load (TMDL)**. 2012. MN Pollution Control Agency and Anoka Conservation District.
  This study estimated pollutant reductions needed at Martin Lake.
- **Sunrise River Watershed Restoration and Protection Strategies (WRAPS).** 2014. MN Pollution Control Agency and Chisago Soil and Water Conservation District.
  This study provides management recommendations by subwatershed. Specific Linwood Lake management recommendations are in Table 21.

Recent SRWMO Projects

2018 Carp removals
2017 Carp removals
2016 Carp barrier at outlet

Management Notes

- Carp barriers and removals have yielded a trend of improving water quality. Bringing carp levels to management goals of 100 kg/ha, and maintaining that level, is a priority.
- Study of Ditch 20, which discharges into Typo Lake, in 2018 identified wetland restoration projects to benefit lake water quality. Landowners were not ready to implement projects. Water monitoring during study found much lower phosphorus levels in the ditch than previously observed, causing managers to re-think whether Ditch 20 projects were the most cost-effective way to improve Typo Lake.
- Aquatic vegetation and related habitat is currently low but should increase with water quality improvements. Tracking this change is a priority. The MN DNR has been asked to provide this vegetative management, but is unable due to staffing limitations.
- Martin Lakers Association invites Typo Lake residents to join.
- Projects at Typo Lake are needed to achieve goals in downstream waters.
- Linwood Township owns and operates the carp barrier. The SRWMO and Anoka Conservation District provide assistance.

BOOT LAKE Linwood Township, Lake ID #02-0028

General Information

Boot Lake is located south of Linwood Lake in the Boot Lake Scientific and Natural Area (SNA). Boot Lake is a flow through lake, which receives water from Rice Lake through a 48" culvert then discharges to Linwood Lake. Because it is part of the SNA, no boating or fishing activity is allowed. There is no public access on the lake. Boot Lake is 134 acres with a maximum depth of 19 feet. The MN DNR classified Boot Lake as a natural environment lake. Large numbers of migrating waterfowl use the lake.

Fisheries

The most recent DNR fish survey occurred in 1959. At that time fish present included brown bullhead (most numerous), perch, and panfish. Small number of other species including carp, northern pike, and bowfin were observed.

In 2018 a carp management feasibility study did box netting at Boot Lake to screen for young carp. The purpose was to determine if Boot Lake was a spawning area for carp from Linwood Lake. Those nets caught no carp. The only species they captured in Boot Lake were pumpkinseed at a rate of 2.7 individuals per trap net.

Anoka Conservation District monitored Boot Lake water quality in 2018 with a special permit. During monitoring the staff noted that while most of the lake is less than 5 feet deep, there is a small area of nearly 20 feet deep. Staff observed one dead carp.

Organized Stakeholder Groups
None

Studies Completed

- **Carp Management Feasibility Study**. 2018-2019. Sunrise River WMO, Anoka Conservation District and Carp Solutions, LLC.
  This study focused on Linwood Lake, but did touch Boot Lake. It included box netting in Boot Lake to screen for juvenile carp (none found) and radio tracking at Boot Lake. 20 carp were radio tagged in Linwood Lake and radio tracking will occur at Boot Lake to determine if carp move from Linwood to Boot Lake.
- **Boot Lake Water Quality Monitoring**. 2018. Sunrise River WMO, Anoka Conservation District.
  For the first time Boot Lake, was monitored to determine if projects in the Boot Lake subwatershed are warranted to improve Linwood Lake. Boot Lake had water quality similar to Linwood Lake, but with less algae and more macrophytes. An additional two years of monitoring are planned by the SRWMO. Results are in annual reports on the SRWMO website.

Recent SRWMO Projects
None

Management Notes

- Lake water quality monitoring is planned for two additional years after 2018 in order to gain a baseline understanding of lake conditions. Management implications for Linwood Lake are a focus.

ANDERSON LAKE City of East Bethel, Lake ID #02-0063

Anderson Lake is 84 acres and discharges to Coon Lake through County Ditch 56. The MN DNR has classified Anderson Lake as a natural environment lake. No other information regarding water quality conditions or fish populations is available.

DEVIL LAKE City of East Bethel, Lake ID #02-0058

Devil Lake is 115 acres with a maximum depth of four feet. Devil Lake discharges to Goose Lake through a County Ditch 56. The MN DNR has classified Devil Lake as a natural environment lake. No other information regarding water quality conditions or fish populations is available.

GOOSE LAKE City of East Bethel, Lake ID#02-0062

Goose Lake is located east of Coon Lake and has a surface area of 257 acres, though much of the basin would more correctly be described as wetland. The lake is affected by

County Ditch No. 56, which runs through the lake and outlets to Coon Lake. The MN DNR has classified Goose Lake as a natural environment lake. No other information regarding water quality conditions or fish populations is available.

HIGGINS LAKE City of Columbus, Lake ID #02-0002

Higgins Lake is located on the southeast boundary of the Sunrise River WMO. The lake has a surface area of 103 acres but only 62 acres are located within the watershed. The MN DNR has classified Higgins Lake as a natural environment lake. No other information is available regarding water quality conditions or fish population.

LITTLE COON LAKE City of Columbus, Lake ID #02-0032

Little Coon Lake is located within the Wildlife Sanctuary of Carlos Avery WMA. There is no public access. Part of County Ditch 12 flows through the lake, eventually outletting to the South Branch of the Sunrise River. Little Coon Lake is 107 acres with a maximum depth of four feet. It is an important brooding and staging area for waterfowl. In the 1980's Little Coon Lake supported an extensive crop of wild rice. By 2015 the entire surface was covered in white water lily and very little wild rice was present. An Outdoor Heritage Fund grant was received through the Anoka Sandplain Partnership. The NW half of the lake was treated with an aquatic herbicide in 2016. Wild rice was seeded in 2016, 2017, and 2018. Post treatment monitoring has shown a large decrease in water lily and a moderate increase in wild rice in the treated portion. Monitoring of the project continues. The lake is subject to freeze-out and does not support game fish. The MN DNR has classified Little Coon Lake as a natural environment lake.

MUD LAKE Linwood Township, Lake ID#02-0037

Mud Lake is located south of Pet and Fawn Lakes. Mud Lake is landlocked except for a wetland on the southeast end of the lake, which is drained by a ditch to the West Branch of the Sunrise River. Wild rice is known to occur in this waterbody. The MN DNR has classified Mud Lake as a natural environment lake. No other information or water quality data is currently available for Mud Lake.

PET LAKE Linwood Township, Lake ID#02-0036

Pet Lake is located between Fawn and Mud Lakes. Pet Lake is 19 acres and shallow (< 5 feet). There is no public access to this lake, which is more than 50% surrounded by homes. Despite the fact that Pet Lake is no more than 200 feet from Fawn Lake, the two lakes appear to have somewhat independent hydrology. Fawn Lake's elevation is often over a foot higher than Pet Lake's. Pet Lake does not have a managed fishery. The MN DNR has classified Pet Lake as a natural environment lake. No other information or water quality data is currently available for Pet Lake.

RICE LAKE Linwood Township, Lake ID #02-0043

Rice Lake is located west of Boot Lake. The lake is affected by County Ditch No. 16 which inlets to the lake from the northwest. Rice Lake then outlets through a ditch/creek to Boot Lake. Rice Lake has a surface area of 262 acres. The MN DNR has classified Rice Lake as a natural environment lake. No other information or water quality data are currently available for Rice Lake.

RYAN LAKE Linwood Township, Lake ID#02-0040

Ryan Lake is a small lake (30 acres, maximum depth < 5 ft.) located northeast of Martin Lake. Ryan Lake is landlocked except for a wetland on the south end of the lake that may provide an outlet to the west branch of the Sunrise River. The MN DNR has classified Ryan Lake as a natural environment lake. No other information or water quality data are available for Ryan Lake.

SKUNK LAKE Linwood Township, Lake ID#02-2500

South Coon Lake is a small lake (44 acres) located northwest of Linwood Lake. It has no apparent surface water inlet or outlet. There is no public access. The MN DNR classified South Coon as a natural environment lake. No other information is available regarding water quality conditions or fish population.

SOUTH COON City of Ham Lake, Lake ID#02-0048

South Coon Lake is a small lake (48 acres) located immediately south of Coon Lake. This lake has also been known as Little Coon Lake. It is connected to Coon Lake by a culvert that is large enough to accommodate moderately-sized boats. There are a moderate number of lakeshore homes. There is no public access except by water from Coon Lake. During the summer this waterbody is mostly covered by floating leaf vegetation. The MN DNR classified South Coon as a natural environment lake. No other information is available regarding water quality conditions or fish population.

TAMARACK LAKE Linwood Township, Lake ID #02-0021

Tamarack Lake is located south of Martin Lake. It discharges to the West Branch of the Sunrise River marshland. The lake is landlocked, other than this discharge. The lake is 86 acres in size with a maximum depth of 3 feet. The MN DNR has classified Tamarack Lake as a natural environment lake. No other information regarding water quality or fish population is currently available.

UNNAMED Linwood Township, ID #02-0023

Located on the northwest side of Linwood Lake, north of Viking Blvd, this small (10 acres) lake is managed by the MN DNR as a northern pike spawning area. It is within the Linwood Lake Aquatic Management Area. There is a small stream channel connecting it to Linwood Lake.

4.14 GROUNDWATER

Groundwater quality is important to residents of the watershed because there are almost no municipally provided sanitary sewer or water supply systems. Additionally, many lakes, wetland and streams are connected to groundwater. Regionally, the SRWMO area provides some recharge of deeper aquifers that serve the greater Twin Cities Metro. Protecting both the surficial and deeper aquifers is important to the SRWMO. At the same time, the SRWMO relies upon State and regional agencies to largely manage this complex resource that extends beyond SRWMO boundaries.

Specific concerns about groundwater heard during SRWMO Watershed Management Plan preparation included:

- Pollution of ground and surface waters by non-compliant septic systems and need to fix them.
- Impact of construction dewatering on nearby private wells.
- Residents are responsible for testing their own private well water, but few do.
- Maintaining water levels in deep and shallow aquifers that are subject to appropriations (permitted pumping). These water levels can, among other things, affect water levels in lakes, streams and wetlands.
- Groundwater monitoring is sparse. Currently there are two MN DNR observation wells in the SRWMO. Both are deep (>200 ft).

An Anoka County Geologic Atlas is complete. Utilizing this data to inform management decisions is important.

5 ASSESSMENT OF REGULATORY FRAMEWORK

5.1 REGULATORY STANDARDS ASSESSMENT

To complement the issue identification process for this Plan, an assessment of regulatory standards, ordinances and rules was conducted. The process included:

1. Compiling a comparison of standards, rules and ordinances for the member communities.
2. Technical Advisory Committee (TAC) review of a summary of member community local controls and SRWMO standards for stormwater and wetlands. The TAC considered updates that might be appropriate.
3. SRWMO Board review of TAC input.

We acknowledge that the scope of our review excluded many federal and state regulations. This process focused on stormwater and wetland protection rules that may be locally warranted but may not be fully addressed in existing rules.

Conclusions of our regulatory assessment were:

- Regulatory simplification is desired. Three of the four SRWMO communities have >1 watershed organization, each with different standards.
- Member community rules and requirements, particularly for stormwater, are difficult to find in their entirety. They are found in ordinances, local surface water management plans, engineering guidance documents or others. These sources sometimes cross-reference each other. Consolidation and clean-up is needed by the cities/township.
- Member community staff are sometimes unaware of their community's rules or how they are implemented. This appears due to the volume of rules they handle about for many topics and because the rules may be in multiple documents.
- Review of SRWMO standards under the 3rd Generation SRWMO Watershed Management Plan resulted in the following conclusions:
    - Wetland standards:
        - The SRWMO standards have been too complex and as a result often not being implemented as intended.
        - SRWMO wetland standards should be updated to:
            - Exclude the currently-required wetland functions and values assessments and wetland classifying. These appear to be an impediment to widespread implementation. Most requirements are the same regardless of wetland classification.
            - Replace current detailed requirements for vegetated buffers within a permanent easement with simpler requirements requiring an undisturbed buffer during construction. This approach ensures all new development start with a buffer, but does not require more detailed long term tracking of these buffers in perpetuity that simply wasn't being done.
            - Delete or replace limitations on excavation in wetlands that are based upon wetland class. Excavations of 0.5 acres or more are so large they are scrutinized through municipal mining permit processes.
    - Stormwater standards:

- SRWMO stormwater standards should be updated to:
  - Reference the newest and most widely accepted precipitation data: Atlas 14.
  - Increase stormwater retention (usually accomplished by infiltration) requirement from 0.5 inches from new impervious surfaces to 1 inch. One inch is required of MS4 communities already, is scientifically supported (see State Minimum Impact Development Standards background information) and is usually reasonable to achieve in the local sandy soils.

Updated SRWMO standards are provided as appendices to this plan. In addition to updated wetland and stormwater standards, the SRWMO has added septic system standards and a provision allowing SRWMO review of subdivision sketch plans. These updated standards are consistent with the findings of the regulatory review above.

6 PRIORITIZATION OF ISSUES

6.1 ISSUE IDENTIFICATION PROCESS

An assessment of issues, and prioritization of those issues, was completed through several steps including:

1. A formal 60-day comment period before planning began. Comments were invited from 6 State agencies, Metropolitan Council, four member communities, eight neighboring watershed organizations and soil and water conservation districts, Anoka County, Anoka Conservation District, and four lake groups. Comments were accepted through March 30, 2018.
2. A public officials tour which was attended by 17 local officials and had 10 presenters at four sites. The event was May 24, 2018.
3. A public input kickoff meeting attended by 22 individuals. The event was May 24, 2018.
4. An online survey done as part of the Lower St. Croix One Watershed One Plan was done in summer 2018. It yielded 27 responses from individuals living within the SRWMO.
5. Review of the current SRWMO Plan by the SRWMO Board, during which progress and remaining issues were examined.
6. Review of member community local water management plans and their priorities, as well as priorities in neighboring watershed organizations.
7. Issue selection and prioritization by the SRWMO Board.

Additional documentation of these processes is provided in Appendix A.

Below we have described issues identified by others and the final issues prioritization by the SRWMO Board.

6.2 ISSUES ASSESSMENT BY OTHER AGENCIES AND STAKEHOLDERS

As described above, a number of forums were used to collect input and issues from agencies and stakeholders. Summaries of each are provided in the appendices to this Plan. On the following pages is a summary of all the issues identified, which forums mentioned that priority, and relatively how high that issue ranked as a priority.

Table 8 Issues identified by others and their relative ranking, along with the SRWMO's prioritization

Issue (bulleted points below each issue are notes from stakeholder input, not necessarily the SRWMO board)	**Stakeholders at planning kickoff meeting and public officials tour**	**Up-front planning comments from agencies**	**SRWMO Board review of its current watershed plan**	**Neighboring watershed organizations**	**SRWMO city local water plans**	**SRWMO Board Priority**
Lake and stream water quality o WRAPS, impaired waters studies o Water quality improvement projects needed o Protect near-impairment waters like Coon Lake o Wetland restoration o Lakeshore management	H	H	H	H	H	H
Water monitoring	H	H	L			H
Funding	H		H			H
Communications with member communities						H
Outreach and education o Public o City staff and elected officials o Water quality issues and behavioral changes o Awareness and support of the WMO	H	M	H	H	M	H
Aquatic invasive species o Prevent new infestations o Control existing infestations o Native plants viewed as beneficial	H	H	H	H		M
Septic systems	H	H	H	L		M
Development	M	H		M	M	M

Issue (bulleted points below each issue are notes from stakeholder input, not necessarily the SRWMO board)	**Stakeholders at planning kickoff meeting and public officials tour**	**Up-front planning comments from agencies**	**SRWMO Board review of its current watershed plan**	**Neighboring watershed organizations**	**SRWMO city local water plans**	**SRWMO Board Priority**
o Natural communities and land use conversion o Stormwater management during development o Shoreline development affects fisheries and water quality o Engage public landowners like DNR and county parks						
Multi-partner coordination o Partnerships with lake groups o Partnerships with up- and downstream entities o Regional planning, 1W1P		M	H	M		M
Stormwater management o Regulated stormwater cities – E Bethel and Ham Lk. o Stormwater treatment and minimize runoff	M			L	M	M
Groundwater	M			L	L	M
Administrative efficiencies o Regulatory consistency and simplification						M
Chlorides	H					M
Ditching/drainage	L	M			L	L

Issue (bulleted points below each issue are notes from stakeholder input, not necessarily the SRWMO board)	**Stakeholders at planning kickoff meeting and public officials tour**	**Up-front planning comments from agencies**	**SRWMO Board review of its current watershed plan**	**Neighboring watershed organizations**	**SRWMO city local water plans**	**SRWMO Board Priority**
o Ditch maintenance may negatively impact water quality o Drainage for properties						
Climate change o Managing for changing precipitation				M		L
Water quantity, flooding, floodplain mgmt				M	M	L
Fisheries	M					
Wildlife habitat				L		L

6.3 ISSUES PRIORITIZATION BY THE SRWMO BOARD

Table 8 includes the SRWMO prioritization of issues in comparison to stakeholder input. The SRWMO's prioritization is provided below including additional descriptions.

Some criteria the SRWMO considered when selecting priorities included:

- Whether the issue was supported by stakeholder and agency comments.
- Whether the SRWMO can solve the issue.
- Whether others are already addressing the issue.

Please note that even the "low priority" items are priorities. These are items that are less urgent, being addressed by others, or for other reasons will receive less energy from the SRWMO. It should not be interpreted to mean that these topics deserve no work.

6.3.1 HIGH PRIORITY ISSUES FOR THE SRWMO

Lake and stream water quality

- Good quality, near-impairment lakes and streams need to be maintained or improved to avoid more costly future restoration. Recreational waters are a top protection priority. Coon Lake is a noted priority for protection efforts.
- Impaired waters do not fully support swimming, fishing and other uses. Recreational waters are a top restoration priority. Linwood, Martin and Typo Lakes are noted priorities for restoration.
- Non-recreational waters that drain to recreational waters affect the water quality in those recreational waters, and are a management priority.
- Some tributary ditches or wetlands, such as Ditch 20, contribute high nutrient loading to downstream lakes.
- Landlocked non-recreational waters, particularly those without public access are lower priority, but the SRWMO still recognizes some responsibility.
- Implement recommendations in the Sunrise Watershed Restoration and Protection Strategies (WRAPS), impaired waters studies, and One Watershed One Plan.
- Lakeshore stewardship should be improved for water quality and habitat.

Water monitoring

- Monitoring is needed at recreational waterbodies to provide trend analysis and inform management.
- No monitoring is currently done at non-recreational waters or those without public access. Basic monitoring of transparency or other parameters by volunteers would help guide future management.

Funding

- The amount of water resources and problems in the watershed are not commensurate with local funding. >55% of the watershed is wetland,

lake, or stream, approximately 38% is public lands, and development is relatively light so tax base is small. Yet water resources are abundant and some are in poor condition. The cost to bring all SRWMO impaired waters into compliance with State water quality standards exceeds $10.5 million (assumes $1,000/lb phosphorus reduced and 10,355 lbs of phosphorus reductions needed per completed TMDL studies; excludes mercury fish tissue impairments).

- Grants are available to funds projects, but require planning, local matching funds and active pursuit to secure the funds.
- Communicating work outcomes to funding sources, including the general public, is needed to continue or increase funding.

Communications with member communities

- The SRWMO is not well known by some local elected officials. Communication of SRWMO roles, collaboration opportunities and accomplishments need to be better communicated.
- SRWMO Board members are critical liaisons between the city and SRWMO.
- Ham Lake is the one SRWMO community that does not have a city council representative assigned to the SRWMO.
- Member community staff are a valuable resource for SRWMO projects and collaboration, and interaction should be more frequent.
- Community projects are only eligible for State Watershed Based Funding if they are included in the SRWMO Plan.
- Cost savings and efficiencies can be achieved when city and SRWMO projects are "piggybacked" on each other.

Outreach and education

- Behavioral change is needed to address some water quality issues, such as lakeshore stewardship benefitting water quality and habitat.
- Resident awareness of the SRWMO and projects is needed to garner community support, including funding support from member communities.

6.3.2 MEDIUM PRIORITY ISSUES FOR THE SRWMO

Aquatic invasive species

- Prevent new infestations.
- Control of existing infestation is important and led by lake groups with minimal SRWMO involvement.
- Native plants should viewed as beneficial.

Septic systems

- Failing septic systems have been identified as a contributor to impaired waterbodies and may also impact non-impaired waters that the SRWMO has prioritized protecting.

- Member communities have septic system regulatory programs however educational outreach and financial assistance to fix septic systems is low.

Development

- Stormwater runoff and discharge can increase during development, affecting downstream water quality and quantity.
- New development or land use conversion could fragment or remove high quality natural communities, the loss of which has incremental negative impacts on water quality and community character.
- Shoreline development affects fisheries and water quality.
- Public landowners like DNR and county parks are potential partners for managing lands for water quality and habitat.

Multi-partner coordination

- The SRWMO jurisdictional area does not follow watershed boundaries to the north and east. Watershed-level management requires working with upstream and downstream neighbors.
- The Lower St. Croix One Watershed One Plan includes the SRWMO and provides a new opportunity for regional management through partnerships.
- Many projects require multiple partners for full funding or community support. Partnerships with lake groups.

Stormwater management

- Stormwater runoff contributes pollutants to priority waterbodies. Waterbody degradation would be expected if stormwater is not minimized and treated.
- Untreated storm water discharges to some lakes are known. Stormwater retrofitting projects have been identified and ranked around Martin Lake and Coon Lake.
- Predominantly sandy soils provide good opportunities for stormwater infiltration practices.

Groundwater

- Due to soils and geology, drinking water in the SRMWO is vulnerable to contamination. Protecting clean drinking water is a priority for the SRWMO.
- Water pumping, including construction dewatering, can interfere with nearby wells.
- Groundwater management, particularly of quantities, requires regional management often beyond the scope of a single WMO, but the WMO can be a collaborator.

Administrative efficiencies

- The SRWMO has no staff except part time contracted help, so simple and efficient administration is desired. Member community staff can

sometimes offer expert assistance with finance and other topics, but their available time is limited. Board members have limited time to administer the WMO.
- The SRWMO needs to ensure minimum standards it sets are being implemented by communities without creating administrative burdens.
- Regulatory consistency across the SRWMO is desired.

Chlorides
- Chlorides in lakes and streams from road deicing, water softeners and other sources is a regional concern for aquatic life. As a regional issue, the SRWMO will provide support in addressing it, but not be a lead.
- SRWMO waterbodies have not been monitored for chloride to assess the problem fully.

6.3.3 LOWER PRIORITY ISSUES FOR THE SRWMO

Ditching/drainage
- Some ditches in the watershed have been infrequently cleaned, which can generate complaints. The SRWMO's role in this topic is limited because the county is the public ditch authority and ditch maintenance programs require expenditures well beyond the SRMWO's capacity.
- The SRMWO is concerned that cleaning of ditches that have been long-neglected could unintentionally degrade water quality.

Climate change
- Stormwater facilities should be designed to accommodate storm frequencies and intensities in a changed climate.

Water quantity
- Flooding problems are not known in the SRWMO, but should be examined if they develop.

Fisheries
- Game fisheries are important and managed by the MN DNR.
- At Coon Lake the walleye program agreement between the lake group and DNR expires in 2018.

Wildlife habitat
- Wildlife habitat is important and managed by multiple authorities including the MN DNR and private landowners.

7 GOALS, POLICIES AND ACTIONS

The SRWMO has prioritized issues, then set goals for each priority issue and developed policies and an action plan to reach those goals. The goals, policies, and actions are categorized by the priority topics (determined in previous chapter). The order of topics addressed on the following pages is:

High Priority Issues

1. Lake and stream water quality
2. Water monitoring
3. Funding
4. Communications with member communities
5. Outreach and education

Medium Priority Issues

6. Aquatic invasive species (AIS)
7. Septic systems
8. Development
9. Multi-partner coordination
10. Stormwater management
11. Groundwater
12. Administrative efficiencies
13. Chlorides

Lower Priority Issues

14. Ditching/Drainage
15. Climate change
16. Water quantity
17. Fisheries
18. Wildlife habitat

The following definitions are useful to consider when reading the following section:

Vision - A broad-level statement of preferred future conditions or accomplishments.

Goals - A desired, preferably measurable, end toward which water management efforts are directed. Goals might be achieved through policies, actions, and/or standards.

Policies - A governing principle that guides decision-making to achieve goals in the plan.

Actions - A program, procedure, or task that achieves goals in the plan.

Standards - Extensions of policies that provide specific, detailed guidance regarding water management practices. Standards are included are appendices in this plan.

HIGH PRIORITY ISSUES

7.1 LAKE AND STREAM WATER QUALITY HIGH PRIORITY

Vision:

- Water quality will be maintained, despite increasing pressures, in waterbodies that are not impaired.
- Linwood and Martin Lakes will be removed from the State impaired waters list within 20 years.
- Severely impaired Typo Lake will improve to a condition that allows vegetative growth in the lake and allows downstream Martin Lake to achieve water quality standards.
- The social norm and expectation for lakeshore landowners to have a vegetated buffer and aquatic plants.
- Lake associations will lead or co-lead water quality programs funded by the SRWMO.
- Lakes' overall ecological health, including fisheries and wildlife benefits, will be improved through a variety of mechanisms including rough fish control, AIS prevention and management, lakeshore stewardship by private landowners, and others.
- The SRWMO will begin implementing projects with agricultural producers, which were not previously a target audience due to their relatively small number and operational size.
- Chlorides in streams and lakes will not reach high levels as they have in other areas closer to the metro.

Goals:

G1. **Complete eight conservation plans** by 2022 for landowners. Highest priority properties are those with livestock/horses and sites within impaired waters' watershed. Work to be done by the BWSR/NRCS funded Watershed Conservation Planner housed at Chisago SWCD.

G2. **Implement projects in five conservation plans** produced by the BWSR/NRCS funded Watershed Conservation Planner housed at Chisago SWCD. Funding sources may include federal agriculture programs or other existing programs.

G3. **Create a new BMP incentives program to benefit lake water quality** that increases participation by increasing available funding and operating the program jointly with lake associations. The SRWMO will provide primary funding while the lake associations will, where willing, provide most promotion & outreach. Where lake associations do not participate the SRWMO will continue to directly offer cost share grants to homeowners.

G4. **20% or less of lakeshore will be mowed turf to the water's edge or retaining walls.** When most recently inventoried in 2004 lakes had 20% (Linwood Lake), 24% (Coon Lake), 27% (Martin Lake), 37% (Fawn Lake), 4% (Typo Lake). **Install at least two lakeshore buffer or stewardship projects per year** to work toward this goal.

G5. **Manage carp in Typo, Martin, Linwood and Coon Lakes to 100 kg per hectare** or other lake-specific threshold above which they are detrimental to lake health. 100 kg/hectare is equivalent to 89 lbs/acre.

G6. **Road deicing salt will be minimized** through training on effective, science-based deicing techniques.

G7. **Work toward 20% phosphorus reduction within the SRWMO** to help meet the multi-agency St. Croix Basin TMDL 20% reduction goal for the entire Sunrise River watershed.

G8. **Achieve, within this plan's life, pollutant reductions needed to get Martin and Linwood Lakes off the impaired waters list and work toward the reductions needed for other waterbodies,** including:

Impaired waterbody	Pollutant	Reductions needed	Management targets
Linwood Lake	Phosphorus	23% 341.3 lbs/yr	Internal sediments, shoreline mgmt., shoreline septic systems, watershed runoff, ag practices, curly leaf pondweed, common carp.
Typo Lake	Phosphorus	81%, 7,041 lbs/yr	Common carp, internal sediments, ditched wetlands.
Martin Lake	Phosphorus	41% 2,973 lbs/yr	Typo Lake outflow, common carp, internal sediments, stormwater direct drainage, shoreland restorations, shoreland septic systems.
West Branch Sunrise River	pH, turbidity	74%	Work in upstream Martin and Typo Lakes.
South Branch Sunrise River	Low oxygen	NA	Unclear. May be natural background or related to wetland management upstream. Wetland restoration.

Martin and Linwood Lakes are the priority due to their recreational use, feasibility, and benefits to multiple waterbodies. Even for these, the goal is ambitious – the 3,314 lbs of phosphorus reduction would cost $3,314,000 at a typical $1000/lb rate. Considering this cost, even with $1M in grants and local funding every 10 years (nearly double the funding secured during 2009-2018), the goals may take over 30 years to achieve.

G9. **Maintain Coon Lake water quality** through projects that offset landscape pressures that might cause eutrophication, resulting in a flat or improving water quality trend.

SRWMO Actions:

Agricultural Practices

A1. **Assist with identification, prioritization and outreach to parcels where conservation plans can be done** by the BWSR/NRCS funded Watershed Conservation Planner housed at Chisago SWCD or which could be enrolled in the MN Ag Water Quality Certification Program.

A2. **Open the SRWMO cost share grant program to funding agricultural practices** or others identified in conservation plans. It currently funds lakeshore restorations and stormwater retrofits.

In-Lake and Near-Lake Management

A3. **Screen carp population levels in Linwood and Coon Lakes** to determine biomass per acre. Electrofishing surveys using standardized techniques are anticipated.

A4. **Complete carp removals to achieve 100 kg/hectare**, or a level recommended in professional assessments of the carp population. This work is needed at Martin and Typo Lakes. Study at Linwood Lake is underway to determine work needed. Study at Coon Lake is proposed.

A5. **Support Linwood Township's maintenance of the Martin and Typo Lake carp barriers** by sending spring and fall reminders of screen installation and removal, based on date and water temperature.

A6. **Fill funding gaps for curly leaf pondweed control** when the treatment will achieve water quality benefits and lake groups or others are major funders. Lake groups may apply through the SRWMO cost share grant program. (See aquatic invasive species control section of this Plan for more info)

A7. **Conduct studies to determine the feasibility of alum treatments** in impaired lakes. Alum chemical addition binds phosphorus. Any study will include an assessment of the social acceptability, costs and benefits. Due to high costs, this study and any subsequent alum treatments are contingent upon grant funding.

A8. **Complete georeferenced photo inventory of lakeshore** at Coon, Linwood, Martin, Typo and Fawn Lakes. This will be uploaded to Google Street View for public access. It will be used to update existing maps of priority parcels for lakeshore restoration, inventory how much shoreline is mowed to the edge or retaining wall, and to support any DNR enforcement actions for lakeshore alterations.

A9. **Start a new BMP incentives program to improve lake water quality** that is operated jointly with lake associations who are willing to promote and administer grants to residents at their lake.

A10. **Maintain the SRWMO cost share grant program for lakeshore** restoration funding directly to homeowners where there is not a cooperating lake association.

Stormwater Practices

A11. **Build projects identified and ranked by cost-effectiveness in completed subwatershed analyses**, and any subsequent additional studies. Studies are completed for Martin and Coon Lake direct drainages.

A12. **Conduct a subwatershed analysis for Linwood Lake** that identifies and ranks by cost effectiveness projects for water quality improvement. It is based upon Watershed Restoration and Protection Strategies (WRAPS) recommendations. This study is dependent upon grant funding.

Wetland Restoration

A13. **Sustain outreach to landowners along Ditch 20** where the SRWMO previously identified wetland restoration projects to benefit water quality. One contact

should be made every two years or whenever new wetland restoration funding opportunities are known.

Other

A14. **Implement outreach and education activities listed elsewhere** in this plan that are largely focused on lake and stream water quality.

A15. **Model pollutant reductions for each SRWMO project and report** the achievements to the St. Croix Basin Partnership Team. This partnership creates an annual report of progress toward TMDL goals.

Member Community Actions:

MC1. **Linwood Township will continue to own and maintain the Martin and Typo Lake carp barriers**, including maintenance cleaning and installing/removing the screens seasonally.

Policies:

P1. The SRWMO will not pay for maintenance treatments of aquatic invasive species unless those treatments will achieve a water quality benefit. Maintenance treatments are treatments expected to recur regularly over many years to maintain AIS density for recreational purposes. Water quality benefits are reductions in water borne nutrients.

P2. The SRWMO may lead or assist with water quality projects upstream of its jurisdiction in Isanti County when Isanti County entities are assisting with funding.

P3. The SRWMO supports the 2015 Minnesota buffer law that requires 50 ft wide buffers of perennial vegetation on public waters and 16.5 ft wide buffers on public ditches.

P4. The SRWMO supports a member community efforts to purchase or implement equipment for precision application of road deicing salts.

P5. The SRWMO discourages the use of driveway culverts that allow water that would otherwise infiltrate quickly in the roadside ditch to reach downstream lakes and streams.

P6. The SRWMO discourages creating outlets within landlocked basins. This action can exacerbate downstream flood events or water quality problems.

P7. The SRWMO discourages maintenance cleaning of long-neglected ditches as this activity will likely result in increases in nutrient and volume discharge to downstream recreational waters. Identification of "needed" ditches for current land use versus "legacy" ditches that are no longer needed is encouraged.

P8. The SRWMO will actively seek enforcement of applicable water quality standards through the appropriate governmental agencies when violations are suspected.

P9. Impairments for mercury impacting fish consumption will not be addressed by the SRWMO. State or national action is needed to correct these problems.

P10. The SRWMO strongly supports use of winter aeration in lakes where carp removals are occurring, or carp have created water quality problems in the past. Aeration results in improved game fish survival, and game fish can control carp recruitment.

P11. The SRWMO supports development of a voluntary conservation easement program to help preserve high quality natural areas, particularly where easements will protect or improve water quality.

P12. The guidance documents listed within this Plan are incorporated into this Plan by reference.

7.2 WATER MONITORING HIGH PRIORITY

Vision:

- Water problems will be identified with sound science and addressed with effective management.

Goals: (in priority order)

G10. Monitor the effectiveness of installed water quality projects (effectiveness monitoring).
G11. Diagnose water quality problems to inform management (diagnostic monitoring).
G12. Detect changes or trends (surveillance monitoring).

SRWMO Actions:

A16. **Implement an annual monitoring program** consistent with Table 9 and the SRWMO actions listed below.
A17. **Determine effectiveness of major water quality improvement projects through pre- and post- project monitoring**. The schedule is dependent upon the project and water body.
A18. **Begin monitoring Island Lake**. It was last monitored in 2003-2011 by Met Council but is important due to its connections to Linwood and Martin Lake, and its recreational use.
A19. **Begin monitoring for chlorides in streams** two of ten years.
A20. **Determine how Boot Lake affects water quality in Linwood Lake**.
A21. **Understand basic conditions in smaller public waters** with limited or no public access through a volunteer Secchi transparency monitoring program. These include Fawn, Pet, Rice, Tamarack, Rice, and Skunk Lakes.
A22. **Collect basic lake conditions of all four recreational lakes with public access every year and more detailed condition every third year.** This will be accomplished with an annual citizen secchi transparency monitoring and every-third-year water sample analysis by professionals or the Metropolitan Council Volunteer Assisted Monitoring Program.
A23. **Analyze water quality trends** each year water quality monitoring is completed for a waterbody. The focus will be on phosphorus, total suspended solids, clarity and chlorides.

Table 9. SRWMO water monitoring actions.

		Lakes									Streams			Reference Wetlands	Precipitation	Other	Reason
Type	**Description**	**Coon W Bay**	**Coon E Bay**	**Linwood**	**Martin**	**Typo**	**Fawn**	**Island**	**Boot**	**Small lakes w/o public access***	**W Branch Sunrise R at Co Rd 77**	**Data Cr at Typo Cr Dr**	**Typo Cr at Typo Cr Dr**				
Effectiveness Monitoring																	
Water quality sampling	Professional monitoring of TP, chl-a & trans (lakes) or TP, pH and TSS (streams) every 1-4 yrs.				X	X							X			X – TBD as projects planned/ installed	To track effectiveness of carp management, stormwater treatment, etc.
Diagnostic Monitoring																	
Water quality sampling	Professional monitoring of TP, chl-a & trans for 3 yrs (2018 done) at **Boot Lake**. TP and TSS at **Data Cr** for one of every 10 yrs.								X			X					To inform Linwood Lake (impaired) management planning. To determine priority of wetland restorations along Data Cr.**
Depth profiles	Professional dissolved oxygen and temp measurements twice at 1 m depth intervals once every 10 yrs.	X	X	X	X												To determine stratification as needed for alum & other treatments.
Surveillance Monitoring																	
Lake levels	Volunteer-recorded water levels in all years.	X	X	X	X	X	X										Outlet management and dispute resolution.
Secchi transparency	Volunteer-recorded transparency in all years.	X	X	X	X	X	IVF	X		IVF							Trend analysis.
Water quality sampling	Professional monitoring of TP, chl-a & trans every 3rd year.	X	X	X	X	X		IVF			X						Trend analysis.
Chloride sampling	Professional monitoring of chloride and conductivity in 2 of 10 yrs for streams. None for lakes planned.										X						Screening for problems. Baseline data collection. Trend analysis.
Wetland Levels	Datalogged water levels at edge of long-term wetland monitoring sites													3 reference wetlands			Ensure accurate regulatory wetland determinations.
Preciptiation	Volunteer-recorded precipitation for MN State Climatology's volunteer network.														3 existing sites + recruit 4 more volunteers		For water quality problem diagnosis, hydrological modeling, flood studies, etc.

TP = total phosphorus; TSS = total suspended solids; chl-a = chlorophyll-a; trans = secchi transparency; CAMP = Metropolitan Council Citizen Assisted Monitoring; IVF – If volunteer found.

* Small lakes without public access include Pet, Rice, South Coon, Skunk, Tamarack (volunteer is Dan Babineau). ** Financial contribution from Isanti Co to be requested.

Policies:

P13. Water condition monitoring will be done for the following prioritized reasons:
   1. Effectiveness monitoring of installed water quality projects
   2. Diagnosis of problems that will inform management
   3. Surveillance and trend analysis

P14. SRWMO will adjust its monitoring schedules to consider monitoring done by the MN Pollution Control Agency for watershed assessments in 2019-2020 and at 10 year intervals thereafter. MPCA monitoring counts toward SRWMO goals and planned actions.

P15. Water quality data shall be submitted annually to the MPCA's EQuIS database to ensure consistency and comparability of data.

P16. The SRWMO will not monitor nor conduct at TMDL study for the South Branch of the Sunrise River which is impaired for low oxygen. The MPCA has indicated they will not monitor this site because low oxygen levels are driven by large upstream wetlands. The SRWMO will seek to have this stream reach removed from the impaired waters list because the cause appears to be natural background.

7.3 FUNDING HIGH PRIORITY

Vision:

- SRWMO continues to secure the grants needed for effective management.
- SRWMO is a predictable and transparent financial partner for member communities.

Goals:

G13. **SRWMO continues to have approximately 50% of its budget grant funded**. It was at 57% during the 3rd Generation Plan period.

G14. **Maintain average annual budgets of local funds from member communities <$50,000 from 2020-2025 and <$60,000 from 2026-2030.** The average budget 2014-2018 was $41,869 and ranged from $32,705 to $48,464. The $10,000 increase between the first and last years of this Plan's term is to account for estimated 4% inflation.

G15. **Minimize budget variations amongst years**. This requires carrying a balance forward from lower expenditure years to pay for future higher expenditure years.

G16. **Always have the 10% match required to secure non-competitive Watershed Based Funding** from the State Clean Water Legacy Fund.

G17. **Never ask member communities for additional funding** above an approved annual budget, except in emergency or extenuating circumstances. The SRWMO should have its own modest reserve fund to cover most unforeseen circumstances.

G18. **Solicit quotes for professional services** every two years.

SRWMO Actions:

A24. **Request the same funding amount from member communities each year,** to the greatest extent practical. Target amounts shall be <$50,000 for 2020-2025 and <$60,000 for 2026-2030. This will avoid occasional high budget years that are difficult for communities levying the tax. It does require budgeting more than will be expended in some years, and carrying those funds forward. The implementation

table in this Plan shows both the annual anticipated expenditures and budget amount.

A25. **Track funds for major SRWMO activity categories.** In this way the SRWMO can clearly differentiate funds being accumulated for upcoming work and undesignated reserve.

A26. **Build and maintain an undesignated reserve** of local funds of at least 15% and not more than 30% of average annual expenditures for unforeseen circumstances.

A27. **Update member community's financial contributions to the SRWMO in 2020 and 2025** with new tax base data. The revised contribution amounts will be used in the 2021 and 2026 budgets, respectively.

A28. **Obtain a financial audit** by the State Auditor or public accountant once every five years as required by MN Statutes 6.756. If the annual revenue of the SRWMO exceeds the threshold amount in MN Statutes 412.591 an audit is required for that year. The 2017 threshold amount was $216,000. Future thresholds are published on the State Auditor's website – see the frequently asked questions section. Any grants deposited to SRWMO accounts count toward this threshold.

Member Community Actions:

MC2. **Provide projects for State Watershed Based Funding consideration** to the SRWMO. This non-competitive grant is available to projects in the WMO plan with water quality benefits that do not supplant existing funding.

Policies:

P17. The SRWMO may request supporting match funds from a lake association to help secure grants for projects benefitting that lake. However, such support is not required except for treatment of curly-leaf pondweed to benefit lake water quality.

P18. To be eligible for State Watershed Based Funding projects should be identified in the SRWMO Watershed Management Plan or clearly linked to Plan priorities. Member communities are encouraged to submit projects for consideration. Selection of funded projects shall be through a collaborative effort led by the SRWMO and including the member communities, lake associations, lake improvement districts and other stakeholders selected by the SRWMO. In the event that this policy differs from State policy, State policy shall prevail.

7.4 Communications with Member Communities High Priority

Vision:

- City councils will be familiar with the SRWMO.
- SRWMO operates in concert with the member communities.
- Lake association leaders and the SRWMO board know each other.

Goals:

G19. **City councils know about SRWMO projects.**

G20. **Annually deliver a written and in person report** to city councils and town board.

G21. **SRWMO board meetings are posted** on each member community's calendar.

SRWMO Actions:

A29. **Send SRWMO meeting agendas and minutes to each member community**.

A30. **The SRWMO will email project milestone accomplishments** to member communities, including city councils. Photos should be included whenever possible.

A31. **The SRWMO's contracted administrator will prepare a brief annual written communication piece** that summarizes SRWMO work, finances, leveraged funds and current events. It will be used as a visual aid during in-person reporting to city councils. Content should emphasize photos, infographics, figures and similar visual summaries.

A32. **Annually SRWMO board members will report in-person** to their city council or town board. Council work sessions are the preferred venue. Preferred timing is during or in advance of budgeting that begins in January or February.

A33. **Provide project tours** to city elected officials and staff when major projects are initiated and/or completed.

Member Community Actions:

MC3. **Provide time annually during a city council or town board work session** to hear a SRWMO update.

MC4. **Annually report to the SRWMO** accomplishments towards work in this Plan. The reports provide assurance to the SRWMO that planned work is getting done and will be used in SRWMO required reporting to the State.

Policies:

P19. SRWMO Board members are expected to be a liaison between their community and the SRWMO. Annual reporting to each city council or town board is expected.

7.5 Outreach and Education — High Priority

Vision:

- Consistent messaging.
- Messaging at a frequency sufficient to have an impact.
- Lakeshore landscaping social norms shift to create an expectation of lake-friendly approaches including buffers and reduced vegetative clearing.

Goals:

G22. **Personal, relevant communications** for the following key messages in order of priority:

Message	Target Audience(s)	Frequency of Outreach
High Priority		
Promote lakeshore restorations and stewardship practices	Lakeshore owners	1-3x per year
SRWMO's existence and programs	Community-wide Lake associations Elected officials	1-2x per year
Financial assistance to fix a failing septic system	Shoreland district homes	1x per year
Medium Priority		
Aquatic plants have value, don't tear them out	Lakeshore owners	1-3x per year
Stop aquatic hitchhikers	Lake users	Continuous on SRWMO website, plus other venues 1x/yr in 5 of 10 yrs

Message	Target Audience(s)	Frequency of Outreach
Lower Priority		
How to maintain your septic system	Homeowners	1x per yr in 2 of 10 yrs
Conserve groundwater	Community-wide	3x per yr in 1 of 10 yrs
Use phosphorus-free fertilizer, it's the law	Community-wide	occasional
Use less deicing salt	Municipal staff*	occasional

The "Frequency of Outreach Per Year" column of this table was developed using the range of frequencies that SRWMO Board members felt was needed to be effective, while considering stakeholder input.

G23. **Diversify outreach methods, using three different methods each year.** Outreach methods shall be prioritized as follows:
Highest priority and frequency: member community and lake association newsletters, SRWMO website, workshops, displays and personal interactions.
Lower priority and frequency: signage in public places (especially for AIS prevention), direct mailings (for neighborhood-specific issues), social media (for current events items).

G24. **Consistent messaging across time and space,** including consistency with neighboring jurisdictions.

G25. **SRWMO becomes a regular contributor to lake association newsletters.**

G26. **Promote every completed project** in the lake associations' newsletters, website, Facebook or similar.

SRWMO Actions:

Written Communications

A34. **Provide an article or other content for newsletters each lake association, 1-3 times per year**. The target lake associations are Martin, Linwood and Coon. Content will focus on lakeshore stewardship, water monitoring results, project results and others. Both infographics and paragraph-style articles may be used.

A35. **Provide a brief article or other content for member communities' newsletters 1-2 times per year.** Because this does not reach a targeted audience, the content may often just include the SRWMO logo, website, and brief statement of purpose. This content is intended to meet State requirements for an annual communication piece.

A36. **Submit press releases to the Forest Lake Times newspaper** to promote completed projects.

A37. **Create, or use already available, lakeshore stewardship and lakeshore restoration guidance materials**. This may be used by the SRWMO and lake associations for promoting cost share grants.

A38. **Create a new display about shoreland stewardship**. The target audience is lakeshore landowners. The display should be designed to be used at community and lake association events.

In-Person Communications

A39. **Host staffed displays at one community event annually** at a minimum. Priority events are lake association events. Broader community events such as Linwood Family Fun Day, East Bethel Booster Day and Ham Lake Snow Bowl are secondary.

A40. **Offer a workshop through Community Ed, Anoka County Extension or the county-wide Outreach Coordinator** on a trial basis by 2022. A local septic system maintenance workshop by Anoka County Extension is a first choice. Lakeshore stewardship is a second choice. The SRWMO will promote workshops to its target audiences.

A41. **Seek Eagle Scouts, Master Gardeners, Master Naturalists** or similar to promote and lead SRWMO projects such as lakeshore restorations in public places, displays and staffing at community events, project maintenance, etc. The SRWMO will annually identify projects which might be suitable and reach out to these groups for assistance as appropriate.

Digital Communications

A42. **Maintain the SRWMO website**. The focus of the website will be to convey information about the SRWMO and its efforts, financial and technical assistance and State-required reporting.

A43. **Prepare postings for the Anoka County Know The Flow website**. The website contains information about water management projects county-wide including watershed organization meeting dates, workshops, grants, and water stewardship.

A44. **Provide links amongst the websites** of the SRWMO, member communities and lake associations.

Other

A45. **Support the county-wide outreach coordinator position** housed at the Anoka Conservation District. The program aims to provide consistent messaging across time and space, and offer efficiency by serving multiple organizations at once. The program is fully funded through mid-2020 and the SRWMO will participate. The SRWMO will consider financial contributions to the program beginning in 2020 if needed to keep the program going. Any financial contribution will be reviewed annually based on program performance toward SRWMO goals.

A46. **Begin a youth coloring contest** to increase awareness of water quality topics. Preferably the program can be coordinated through the county-wide outreach coordinator. If not, the SRWMO will implement the program with no expected cost. Prize donations will be requested, free online coloring templates will be used, and the SRWMO board will manage the program.

Member Community Actions:

MC5. **Provide a link on the community's website to the SRWMO website**.

MC6. **Provide space in community newsletters for ¼ page minimum SRWMO articles**.

Policies:

P20. SRWMO outreach communications should always include the SRWMO logo and website address, or "sponsored by the SRWMO" as appropriate.

P21. The SRWMO supports the county-wide Outreach Coordinator position housed at the Anoka Conservation District. In 2018-2020 support will be by collaboration/participation only, not financial contribution. Thereafter the program may evolve such that SRWMO financial support is required and provided at a levels the SRWMO Board deems acceptable.

P22. The SRWMO supports digital media platforms that serve multiple watershed organizations, such as the Anoka County "Know the Flow" website or shared social media accounts.

MEDIUM PRIORITY ISSUES

7.6 AQUATIC INVASIVE SPECIES (AIS) MEDIUM PRIORITY

Vision:

- Few new aquatic invasive species infestations.
- New AIS infestations are identified early.
- Whenever there is a significant chance of eliminating a new, small infestation, a quick emergency response occurs.
- Compliance with AIS prevention laws nears 100%.

Goals:

G27. Identify new infestations early.

G28. Contain or eradicate any small scale, newly discovered infestations.

SRWMO Actions:

A47. **Education lakeshore homeowners** as described in the Outreach and Education section of this Plan. Target messages are Stop Aquatic Hitchhikers and differentiating between problem plants and healthy native plants.

A48. **Annually help recruit AIS early detection surveys with volunteers, if requested.** Efforts will be modeled after, or directly participate in, the Starry Trek events organized by the Minnesota Aquatic Invasive Species Research Center and University of Minnesota Extension. Collaboration with the Anoka County Aquatic Invasive Species Prevention Program is strongly preferred. During events volunteers are trained, sent out to search for AIS, and bring back suspect plants to professional hosts for identification confirmation.

A49. **Fill funding gaps for curly leaf pondweed control by lake groups** when the treatment will achieve water quality benefits and lake groups or others are major funders.

A50. **Manage common carp populations** as described in the Lake and Stream Water Quality section of this Plan.

Policies:

P23. The SRWMO will not fund AIS control treatments or related plant surveys except in emergency situations such as attempted elimination of a new infestation, or when the control will achieve water quality benefits.

P24. The SRWMO will not fund boat inspectors, as this work is done by the DNR and Anoka County.

P25. The SRWMO may help lake groups fund AIS treatment planning such as lake management plans.
P26. The SRWMO supports the Anoka County Aquatic Invasive Species Prevention Program hosted by Anoka County Parks.

7.7 SEPTIC SYSTEMS MEDIUM PRIORITY

Vision:

- Financial assistance programs for septic system fixes continue to be offered by the Anoka Conservation District and Anoka County.
- Member community programs to track maintenance will identify failing systems, and lead to corrective action.

Goals:

G29. Locate and fix non-functioning septic systems.
G30. Annually promote to financial assistance available through Anoka County and Anoka Conservation District for fixing non-compliant septic systems. The SRWMO's target audience is shoreland residents. Support any efforts to increase available funding, which is far less than need.
G31. Secure grant funds to (a) develop, and set up implementation of, point of sale septic system inspection requirements. These requirements currently do not exist in Ham Lake or Linwood; (b) inspect shoreland septic systems older than 10 years or without a certificate of compliance in the last 10 years; and (c) assist East Bethel with developing an automated SSTS maintenance tracking and reminder system.

SRWMO Actions:

A51. **In five of 10 years promote financial assistance** available from Anoka County and Anoka Conservation District for fixing non-compliant septic systems to shoreland residents.
A52. **See actions in the Outreach and Education** section of this plan.

Member Community Actions:

MC7. Implement SRWMO septic system standards (see Appendix B).
MC8. Adopt and enforce a septic system ordinance consistent MN Rules 7080-7082 and Statues 115.55-56. This includes measures to ensure :

- all septic systems are pumped every three years unless an inspection finds pumping is not necessary at that time,
- failing systems are identified through the pumping and/or inspections process that is required every three years, and these systems are corrected,
- in cases where owners are not providing proper maintenance or correcting non-compliant systems, the member communities perform the necessary actions and assess the costs to the owner,
- non-compliant systems are repaired or replaced swiftly, especially in shoreland areas and in cases where the system is an imminent threat to public health.
- septic system options available to landowners include non-traditional or performance systems, particularly in difficult situations such as properties without space for a replacement drainfield.

Policies:

P27. The SRWMO supports the three septic system repair loan programs offered by Anoka County.
P28. The SRWMO supports the Anoka Conservation District's low-income septic system fix up loans, which are funded by the MN Pollution Control Agency. More funding from the State for this program is needed.
P29. The design, installation and inspection of individual sewage treatment systems (ISTS) shall be in conformance with MN Rules Chapter 7080.

7.8 DEVELOPMENT MEDIUM PRIORITY

Vision:

- New development will not degrade the condition of water resources nor existing high quality natural communities and habitat corridors.
- Redevelopment, including street reconstruction, will improve stormwater treatment to meet or exceed present day requirements.

Goals:

G32. **Identify any undesirable natural resource impacts of proposed developments** and recommended alternatives early in the planning process.

SRWMO Actions:

A53. **Review sketch plans for development creating 3 lots or more.** Areas of emphasis for SRWMO review will be water quality, stormwater treatment, keeping post-development runoff rates and volumes the same as pre-development and high quality natural communities. Comments are generally needed within 30 days of receipt. The SRWMO will authorize a contracted staff person with expertise in natural and water resources to perform and submit these reviews. The SRWMO Board will be copied on all related correspondence but may not deliberate together on these comments unless a regularly scheduled SRWMO meeting is within the allowable comment period.
A54. **Review the benefit of SRWMO development reviews no less than every 5 years.** Consider changes or discontinuing the activity.

Member Community Actions:

MC9. **Add the SRWMO onto distribution lists for development sketch plan reviews**. Pay for SRWMO development reviews in an amount not to exceed $500 per project (communities may invoice the project proposer to recoup this cost). Consider, but not be bound by, SRWMO comments on development proposals.
MC10. **Serve as the Local Governmental Units (LGU) administering MN Wetland Conservation Act** in SRWMO.

Policies:

P30. The SRWMO does not have permitting or approval authorities for development projects, but may provide comments for consideration by member communities.
P31. When reviewing development sketch plans, the SRWMO will consider:
    - Stormwater
        - SRWMO stormwater standards must be followed.
        - Keeping water on the landscape is strongly preferred.

- Stormwater treatment practices in order of preference are: development designs that minimize stormwater generation, infiltration and others.
- Excluding or elevating driveway culverts to encouraging infiltration in the road right of way swale is preferred.
- Isolated basins should not be given an outlet that may result in wetland drainage or increased volume discharge.
- Redevelopment projects should decrease suspended solids and total phosphorus export to downstream waters.
- New development should not increase suspended solids and total phosphorus.
- Treatment of stormwater before discharge to wetlands.
- Legally binding and enforceable maintenance plans clarifying responsibilities should be completed for all stormwater treatment practices.

- Habitat and community character
  - Planned Unit Developments (PUD's), Minimum Impact Development Standards (MIDS) and conservation development designs are encouraged for parcels containing or adjacent to waterbodies, high quality wetlands, and natural communities.
- Groundwater
  - Landscaping and/or stormwater reuse may be ways to reduce the impacts of future irrigation on aquifers.
- Wetlands
  - SRWMO wetland standards must be followed.
  - Wetland filling, draining or excavation may require permits from the local governmental unit administering the MN Wetland Conservation Act, or others.
  - The SRWMO encourages WCA LGUs to require replacement wetlands to be of similar or higher ecological quality than the wetland they are replacing based on MN RAM or professional judgements, and within the same watershed.

7.9 Multi-Partner Coordination Medium Priority

Vision:

- Most SRWMO projects are collaborative with stakeholders from within and areas draining to its jurisdiction.

Goals:

G33. **Every SRWMO water quality improvement project has support from affected stakeholders** including member communities, lake groups, adjacent water management entities, or others.

G34. **Attend at least two stakeholder/partner events per year**. The most common example is lake association meetings.

G35. **Partner with Anoka County Parks** on shoreline or stormwater demonstration projects.

SRWMO Actions:

A55. **Participate in Lower St. Croix One Watershed, One Plan (1W1P)** during 2018-2020. A SRWMO board member serves on the 1W1P Policy Committee.

A56. **Consider adopting the Lower St. Croix One Watershed, One Plan (1W1P)** in 2020. The process for adoption will follow a process to be determined by the State.

A57. **Attend two stakeholder/partner events per year.**

A58. **Seek to implement** shoreline or stormwater management demonstration projects or educational outreach with Anoka County Parks, particularly at Coon, Linwood and Island Lakes.

Policies:

P32. The SRWMO gives higher priority to projects with financial support from affected stakeholders.

P33. The SRWMO gives higher priority to shoreline or stormwater management demonstration projects with Anoka County Parks, particularly at Coon, Linwood and Island Lakes.

7.10 Stormwater Management — Medium Priority

Vision:

- Water quality in lakes and streams will be maintained (or improved, for impaired waters) despite land use pressures.
- Older neighborhoods with insufficient stormwater treatment will have retrofit projects installed to increase stormwater treatment.

Goals:

G36. **City stormwater regulations are consistent with SRWMO Stormwater Standards**.

G37. **City Stormwater regulations are all found in a single place**. Currently some may be distributed amongst local water plans, storm water pollution prevention plans, ordinances making it difficult for permitting staff and permittees to properly implement.

SRWMO Actions:

A59. **Review development sketch plans** as described in the Development section of this Plan.

A60. **Install stormwater treatment practices** as described in the Lake and Stream Water Quality section of this plan.

A61. **Review member community ordinances and standards** for consistency with this plan.

Member Community Actions:

MC11. **Fulfill stormwater maintenance duties.** Among these duties the SRWMO's priorities are: (1) inspection and maintenance of existing stormwater treatment no less than every five years, (2) map stormwater conveyance and treatment systems, and (3) ensure new development and redevelopment has the required stormwater treatment (4) sweep streets with curb and gutter once annually in all areas, and twice annually in priority areas. Priority areas shall be areas that drain directly to water bodies and/or natural wetlands without pretreatment of storm water runoff.

These duties are met by compliance with State MS4 permit requirements for communities permitted by that program.

MC12. **Update city ordinances, if necessary**, for consistency with the SRWMO Stormwater Standards (Appendix B).

MC13. **Condense all municipal stormwater standards or rules** that are currently in local water plans, storm water pollution prevention plans, ordinances or other documents and place them all (or links to them) in a single location.

Policies:

P34. Preferred stormwater treatment approaches in the SRWMO are: (1) site designs which reduce stormwater generation, (2) infiltration, due to sandy soils, except within sensitive water supply areas or areas that may generate pollutants concerning for groundwater contamination, and (3) other techniques.

P35. Discharge of waters from dewatering projects should be through some form of treatment that removes solids and other pollutants, and in a manner that maximizes groundwater recharge without causing damage to public or private properties.

7.11 GROUNDWATER MEDIUM PRIORITY

Vision:

- Sustainable amounts of groundwater free of contamination in drinking water aquifers.
- Maintain surficial aquifers in a way that maintains baseflow in streams and water levels in lakes.

Goals:

G38. **Residents are advised to test private wells regularly** for contaminants.

G39. **All irrigation systems will be "smart" by 2040**, providing water when needed based upon soil moisture and forecasted rain.

G40. **Five residential or one larger "smart" irrigation systems** will be installed during the 10-years of this Plan, partially using SRWMO incentive grants. Larger irrigation systems include sporting fields, homeowner associations, schools, or other campuses.

G41. **Prevent improper household hazardous waste disposal.**

SRWMO Actions:

A62. **Provide Anoka County Well Water Wise private well testing program** on the SRWMO website.

A63. **Promote "smart" irrigation controllers** and make this practice eligible for SRWMO cost share grants to landowners. "Smart" controllers consider soil moisture and forecasted rain when scheduling irrigation. Promotion will be on the schedule specified in the Outreach and Education section of this Plan. Grants are also offered by the Anoka Conservation District or others.

A64. **Partner with regional entities**, on a case by case basis, on projects for groundwater quality or quantity.

A65. **Require infiltration of 1"** of runoff from impervious surfaces in SRWMO stormwater standards for new development.

Member Community Actions:

MC14. **Provide household hazardous waste disposal information on community websites**, ultimately directing residents to the Anoka County Household Hazardous Waste Facility.
MC15. **Provide Anoka County Well Water Wise private well testing program** on community websites.
MC16. **Adopt and enforce an ordinance** at least as protective as the stormwater standards in this plan, which emphasizes infiltration including requiring infiltration of 1" of runoff from impervious surfaces.

7.12 ADMINISTRATIVE EFFICIENCIES MEDIUM PRIORITY

Vision:

- The SRWMO continues to operate successful programs and projects without staff, an office or other overhead.

Goals:

G42. **SRWMO continues to spend <20% of its local funds on administration** on average across years. Administration, for this purpose, includes the following items for which the SRWMO has some control over costs: recording secretary, reporting, and administrative assistance.
G43. **SRWMO will have a key contact person** that can be reached by the public or agencies.
G44. **SRWMO meetings are efficient and occur no more than eight times per year**.
G45. **Board members include representatives from key stakeholder groups** including lake residents and local elected officials.
G46. **Correct the SRWMO boundary.** Presently eight parcels that are part of the SRWMO are in an area that is discontinuous with the rest of the SRWMO. Corrections are needed with the Rice Creek Watershed District (RCWD) boundary. Starting in 2019 the RCWD is systematically examining hydrologic and political boundaries with the SRWMO. A petition to the state for boundary amendment is anticipated.

SRWMO Actions:

A66. **Contract for administrative and secretarial services.**
A67. **Utilize technical and citizen advisory committees** on an occasional, issue-specific basis.

Member Community Actions:

MC17. **Preferentially consider applicants for SRWMO Board appointments who are members of stakeholder groups** such as lake associations or local elected officials. Final appointment decisions are always at the discretion of the appointing body.
MC18. **East Bethel's Finance Director will continue to provide SRWMO assistance** including preparing checks, keeping a financial ledger, invoicing and third-party oversight. The city does not plan to charge a fee for this service if the amount of work remains the same as in the past.
MC19. **Support a joint powers agreement update** by the member communities to clarify section 3.6 that is supposed to address budget dispute resolution and how any community's failure to update its local water plan will be addressed.
MC20. **Operate permitting programs**. Each member community will adopt, implement, and enforce ordinances that meet or exceed the standards in this Plan. If this plan

does not list specific standards an ordinance must meet any State minimums. Required ordinances include:

- Septic system ordinance
- Stormwater ordinance
- Wetland ordinance

Policies:

P36. Administration costs associated with grant-funded projects should be paid by the grant funds or grant matching funds.

7.13 CHLORIDES MEDIUM PRIORITY

Vision:

- No long term increase in chlorides, which are currently low, in SRWMO waters.

Goals:

G47. **Increase municipal snow plow drivers with level 1 MPCA Smart Salting Certification** from one to 100% of member community plow drivers.

G48. **Increase the number of member communities with level 2 MPCA Smart Salting Certification** from zero to four (100%). This is an organizational certification that requires completing an organizational salt saving assessment using the online Winter Maintenance Assessment tool.

G49. **Member communities' will have technology on board plow trucks** that helps ensure only the amount of deicing agent required to achieve safe roads.

SRWMO Actions:

A68. **Periodic monitoring** for chlorides, as described in the Monitoring section of this Plan. The plan currently includes only stream monitoring, but lake monitoring at depth is a medium priority if funds allow.

Member Community Actions:

MC20. **Obtain level 1 MPCA Smart Salting Certification for all snow plow drivers** within two years of adoption of this plan or their hire date.

MC21. **Obtain level 2 MPCA Smart Salting Certification** (one certification per municipality) within two years of adoption of this plan. **Maintain level 2 MPCA Smart Salting Certification** by annually submitting Best Management Practices and Salt Savings report through the MPCA Winter Maintenance Assessment tool.

Policies:

P37. The SRWMO will support member communities when seeking grant funding for "smart" salt application technologies on member communities' plow trucks and other equipment, particularly when equipment replacement is needed. These technologies are aimed at ensuring only the amounts of deicing or traction agents needed to achieve safe roads are applied, saving money and natural resources.

LOWER PRIORITY ISSUES

7.14 DITCHING/DRAINAGE — LOWER PRIORITY

Vision:

- Management authorities for drainage ditches, most of which were dug in in the early 1900's to drain wetland and have since filled in to varying degrees, will consider drainage and possible water quality impacts when making decisions about maintenance cleaning. Cleaning of long-neglected ditches can result in increased flow volumes, sediment and nutrients downstream where they have negative effects.

Goals:

G50. **Ditch maintenance activities, if any, will not have a negative water quality impact** on downstream streams and lakes.

G51. **Replace the deteriorating Linwood Lake outlet weir,** which is owned by the MN DNR. The structure is important to maintain lake levels.

SRWMO Actions:

A69. **Request that the MN DNR consider placing the deteriorating Linwood Lake outlet weir on its list of weir replacement projects**.

Policies:

P38. Inspection, maintenance or repairs on County Ditches is the responsibility of the Anoka County Highway Department.

P39. Private ditches are the responsibility of the owner.

P40. Stormwater conveyance systems owned or operated by the member communities are the responsibility of the respective community.

P41. The SRWMO supports restoration or maintenance of wetlands through ditch abandonment, lack of ditch maintenance, or other techniques where such projects enhance habitat and provide downstream water quality benefits.

P42. When ditch maintenance cleaning is conducted, the SRWMO strongly favors adding water quality treatment such as settling ponds (preferably off-line) or increased stability through two-stage ditch design. The SRWMO will take a leadership role in pursing grant funding for this work in collaboration with the ditch authority.

7.15 CLIMATE CHANGE — LOWER PRIORITY

Vision:

- SRWMO manages water resources in a manner that adapts to the best available climatological data.

Goals:

G52. **Stormwater facilities should be designed to accommodate storm frequencies and intensities in the most up-to-date climatological data**: Atlas 14.

SRWMO Actions:

Member Community Actions:

MC22. **Utilize Atlas 14 precipitation data** when implementing stormwater or development ordinances.

Policies:

P43. Stormwater and drainage facilities should be designed to accommodate storm frequencies and intensities in the most up-to-date climatological data.

7.16 WATER QUANTITY — LOWER PRIORITY

Vision:

- Flooding problems will continue to be absent from the SRWMO. are not known in the SRWMO, but should be examined if they develop

Goals:

G53. **Hydrological systems will be managed to keep current discharge rates and volumes**.

SRWMO Actions:

A70. **Implement stormwater standards** that maintain current discharge rates and volumes for new development and redevelopment.

Member Community Actions:

MC23. **Adopt ordinances or other control measures** consistent with SRWMO Stormwater Standards and Wetland Standards (Appendix B), and a floodplain ordinance that is at least as protective as Minnesota Rules Chapter 6120.5000 to 6120.6200.

MC24. **Perform maintenance measures** to assure proper function of public drainage system, with the exception of County ditches which are managed by the Anoka County Highway Department.

Policies:

P44. Existing culvert sizing and elevations generally should not be changed, as this can result in increased or decreased flow rates and volumes that adversely affect upstream or downstream parties.

P45. New stormwater culverts and conveyances should be sized using Atlas 14 precipitation records for at least 10-year storms.

P46. The SRWMO requires stormwater discharge rates and volume control in new developments and redevelopment to be the same or less than pre-development in order to be protective against future flooding problems.

7.17 FISHERIES — LOWER PRIORITY

Vision:

- SRWMO waters will offer strong recreational fishing opportunities that reflect good water quality and the desires of anglers.

Goals:

G54. **Reduce rough fish** when they negatively affect water quality.

G55. **Maintain strong pan fish populations** that will control spawning success of common carp.

G56. **Winter aeration systems will be used** where winterkills of game fish may occur. Loss of game fish affects recreational opportunities and lake water quality.

SRWMO Actions:

Policies:

P47. Fisheries are managed by the MN DNR.

P48. The SRWMO supports walleye stocking at Coon Lake through a cooperative agreement between the MN DNR and lake groups.

P49. The SRWMO encourages the MN DNR to increase game fish stocking immediately following rough fish removal to encourage a lasting change in the fish community structure.

P50. Winter aeration systems are owned and operated by other entities. The SRWMO will consider, on a case by case basis, any requests for assistance needed to keep these systems operational.

7.18 WILDLIFE HABITAT — LOWER PRIORITY

Vision:

- Enhanced or restored habitat will be a secondary benefit of most other activities in this Plan.
- Protection, restoration, and enhancement activities to create diverse and resilient habitat core and corridors.
- Areas identified in the Minnesota Biological Survey as "outstanding" or "high" significance, have documented native plant communities, or threatened and endangered species present will be protected and managed.
- Where all hydrologically affected landowners agree, drained or degraded wetlands will be restored to benefit water quality and habitat.
- Aquatic habitats will be valued and managed as much as upland habitats.

Goals:

G57. **Private and public owners of biologically significant areas will protect, enhance and/or maintain** ecological integrity.

G58. **Restore at least one wetland** in the SRWMO that benefits water quality and habitat.

SRWMO Actions:

A71. **Connect landowners with habitat programs** at the Anoka Conservation District (ACD) or other agencies to protect, restore, and enhance biologically significant areas. Means to achieve this include a link from the SRWMO website to the ACD website and outreach through a Watershed Conservation Planner housed at Chisago SWCD in 2019-2022.

A72. **Sustain outreach to landowners along Ditch 20** where the SRWMO previously identified wetland restoration projects to benefit water quality. One contact should be made every two years or whenever new wetland restoration funding opportunities are known.

A73. **Review and comment upon development sketch plans**, as described in the Development section of this Plan.

A74. **Promote the values of aquatic habitat to shoreland owners** as described in the Outreach and Education section of this Plan.

Policies:

P51. The SRWMO supports long term protection of areas of high or outstanding biological significance through easement or fee title acquisition by others with a willing landowner. The SRWMO is most strongly supportive when public hunting and fishing access is provided and the area adds to existing networks of adjacent protected habitat.

P52. The SRWMO supports wetland restoration for habitat and water quality enhancement. Such efforts are likely to be primarily carried out by the Anoka Conservation District or other agencies.

P53. The SRWMO supports habitat enhancement projects on private or public projects. The SRWMO is most strongly supportive when activities occur in or adjacent to areas of outstanding or high biological significance as defined by the MN Biological Survey.
P54. The SRWMO requires that shoreland projects that include planting and using utilize SRWMO funds will use at least 75% native plants in shoreland areas.
P55. The SRWMO funds grants for natural resources improvement using local funds. Habitat projects are among the lowest priority use of these funds.

8 IMPLEMENTATION PLAN

This section describes SRWMO implementation actions, cost share grant program to incentivize projects by others, maintenance and regulation.

8.1 SRWMO IMPLEMENTATION PLAN

Tables on the following pages list the SRWMO planned tasks, timing and estimated costs. The SRWMO will make every effort to adhere to this plan, though it may be necessary to deviate due to environmental, staffing, financial, or logistical reasons, or because new information leads the SRWMO Board to believe that a change is appropriate.

Table 10. Implementation plan task descriptions. Timing and estimated costs are in Table 11.

#	Plan Action Reference	Task	Task Description (see text for full description)	Likely Funding*	Likely Partners
Operating Tasks (as defined by JPA)					
1	A65	Recording Secretary services - contractual	Recording Secretary will create and distribute meeting agendas and minutes and help with record keeping.	SRWMO	
2	A65	Administrator services - contractual	Administrator will lead budgeting, preparing agendas and meeting packets, facilitating meeting discussions, administering cost share grants, correspondence, fielding questions or requests from agencies or residents and other miscellaneous administration.	SRWMO	
3	A25	Fiscal mgmt assistance - E Bethel Finance Director & Treasurer	East Bethel's Finance Director assists with general fiscal management including receiving bills, preparing checks and invoices and keeping an account ledger. The Treasurer provides financial reports at each SRWMO meeting, tracks funds for major SRWMO activity categories, and oversees finances.	SRWMO	East Bethel Finance Director, Treasurer
4	A27	Financial contributions calculation update	Update member community's financial contributions to the SRWMO in 2020 and 2025 with new tax base data. The revised contribution amounts will be used in the 2021 and 2026 budgets, respectively.	SRWMO	Member communities
5	A28	Financial audits	Obtain a financial audit by the state auditor or public accountant once every five years as required by MN Statutes 6.756 or when SRWMO revenues exceed the threshold amount in MN Statutes 412.591.	SRWMO	
6		Liability Insurance	Liability insurance, purchased through League of Minnesota Cities Insurance Trust in the past.	SRWMO	
7		Reports to BWSR, State Auditor	Annual reporting to the MN Board of Water and Soil Resources required by MN Rules 8410.0150 and the State Auditor through the SAFES website.	SRWMO	
8	A31	Annual written communication to member communities	SRWMO's on-call administrator will prepare a brief annual written communication piece that summarizes SRWMO work, finances, leveraged funds and current events. It will be used during annual board member reporting to member communities.	SRWMO	
9	A60	Community ordinance reviews	Review member community ordinances and standards for consistency with SRWMO requirements. Communities have 180 after adoption of this plan to update ordinances (MN Statutes 103B.235 subd. 4).	SRWMO	
10		Review/approve community local water plans	SRWMO will review, comment upon and have approval authority over community local water management plans. Communities have 2 yrs after adoption of this plan to update ordinances (MN Statutes 103B.235 subd. 3).	SRWMO	
11		Seek bids for professional services	A WMO shall at least every two years solicit interest proposals for legal, professional, or technical consultant services before retaining the services of an attorney or consultant or extending an annual services agreement (MN Statutes 103B.227, sub. 5). Process led by SRWMO board members. Seek bids for the following year. Expenses are for any public notices.	SRWMO	
Non-operating General					
12		Grant search and applications	The SRWMO will annually review grant opportunities and prepare applications. Important grant sources include the MN DNR, MPCA, and BWSR.	SRWMO	ACD
13	A26	Undesignated reserve	Build and maintain an undesignated reserve of local funds capped at 15% of annual average expenditures for unforeseen circumstances.	SRWMO	
14		Update Watershed Plan	Approximately 1-2 years before expiration of this plan, the WMO will begin the update process. 5th Generation plan is due approx Dec. 31, 2029.	SRWMO	Planning consultant
Communications with Member Communities					
15	A30	Project reporting to member communities	Email project milestone accomplishments to member communities as they occur.	SRWMO	
16	A32	Annual board member reporting to member communities	Annually, SRWMO board members will report in-person to their city council or town board.	SRWMO	
17	A33	Project tours	Provide project tours to city elected officials and staff when major projects are initiated and/or completed.	SRWMO	
Public Outreach					
18	A34, A35, A46, A50, A73	Lake association and community newsletter content	Provide content for newsletters at each lake association following the Newsletters Schedule (separate table in this implementation plan).	SRWMO	Lake assocs, member communities, Anoka Co Water Resource Outreach Collaborative (WROC)
19	A36	Newspaper press releases	Press releases to the Forest Lake Times newspaper to promote completed projects.	SRWMO	WROC
20	A37	Lakeshore restoration guidance materials	Create, or use already available, lakeshore stewardship and lakeshore restoration guidance materials. This will be used by the SRWMO and lake associations for promoting cost share grants.	SRWMO	WROC
21	A38	Shoreland stewardship display	Create a new display about shoreland stewardship to be used at community events.	SRWMO	WROC
22	A38	Community event displays	Host staffed displays at one community event annually. SRWMO board members shall be the primary "staffers" of the displays.	SRWMO	WROC
23	A56	Stakeholder event attendance	SRWMO board member(s) will attend two stakeholder/partner events per year. May include lake association or community events, partner meetings,	SRWMO	
24	A40, A51	Workshops promotion	Promote workshops led by others such as septic system maintenance or lakeshore stewardship. Promote one workshop by 2022 on a trial basis.	SRWMO	U of M Extension, ACD
25	A41-A43	Engage citizen leaders	Seek Eagle Scouts, Master Gardeners, Master Naturalists or similar to promote and lead SRWMO projects such as lakeshore restorations in public places, displays and staffing at community events, project maintenance, etc. The SRWMO will annually identify projects which might be suitable and reach out to these groups for assistance as appropriate.	SRWMO	Community groups
26	A42-A44	Websites	Maintain SRWMO website. Post SRWMO news, meeting dates, etc to Anoka Co Know the Flow website. Provide links amongst websites of SRWMO, member communities and lake associations. Overhaul SRWMO website in 2027 (9 yrs since last overhaul).	SRWMO	ACD, Anoka Co, member communities
27	A45	Anoka Co Outreach Coordinator position	Support a county-wide position housed at the Anoka Conservation District to assist the SRWMO and others with consistent, effective environmental outreach. Support dependent on program performance. Need may exceed SRWMO ability to fund so other partners and grants are important.	SRWMO	WROC
28	A36	Coloring contest	Begin a youth coloring contest to increase awareness of water quality topics. Preferably the program can be coordinated through the county-wide outreach coordinator.	SRWMO	WROC
29	A66	Advisory committees	Utilize technical and citizen advisory committees on an occasional, issue-specific basis.	SRWMO	Stakeholders
30	A61	Promote Well Water Wise	Provide Anoka Co Well Water Wise private well testing program on the SRWMO website.	SRWMO	Anoka Co

#	Plan Action Reference	Task	Task Description (see text for full description)	Likely Funding*	Likely Partners
Water Condition Monitoring					
31	A16-A23, A67	Water condition monitoring	Monitoring of water quality and quantity. See separate monitoring schedule table in this implementation plan.	SRWMO	Lake groups, volunteers, ACD
Development Reviews					
32	A52, A58, A72	Development reviews	Review and provide non-binding comments to member communities on development sketch plans. Costs are billed to the member community where the project occurs.	SRWMO	Member communities
Multi-partner Coordination					
33	A55, A63	Participate in 1W1P	Participate in One Watershed, One Plan (1W1P) for the Lower St. Croix Watershed during 2018-2019. Consider adopting 1W1P in 2019-2020. In subsequent years participate in implementation and funding discussions.	SRWMO	Watershed orgs & counties of the Lower St. Croix watershed
Water Improvement Projects					
34	A1, A70	Ag conservation planning outreach	Assist with identification, prioritization and outreach to parcels where conservation plans can be done by the BWSR/NRCS funded Watershed Conservation Planner housed at Chisago SWCD. May include helping landowners find funding options. Goals of completing 10 plans and implementing five through federal or other existing programs.	SRWMO	Watershed Conservation Planner at Chisago SWCD, ACD
34	A2, A7, A9, A10, A49, A62	Cost share grant program- open to the public	Fund cost share grants for water quality improvement projects including shoreland, stormwater, agricultural and smart irrigation controllers. Lake groups may also apply to fill funding gaps for curly leaf pondweed treatment if the treatment will achieve water quality benefits. Grants will be administered through the Anoka Conservation District.	SRWMO	ACD
35	A6, A9, A49	Cost share grant program - through lake associations	Start a new lakeshore restorations program that provides project funding to be promoted through lake associations who are willing. The program purpose is to increase citizen BMP installations by running the incentives through neighborhood-level groups rather than directly from government. Lake associations will be part of the program and a first point of contact, but not run it solo. Allocated funds include both program setup and pass thru grants. Plan to request, but not require, a small supporting contribution from lake associations.	SRWMO, grants	Lake groups, ACD
36	A4, A50	Carp removals	Complete carp removals to achieve 100 lbs/hectare, or a level recommended in professional assessments of the carp population. This work is needed at Martin and Typo Lakes. Studies at Linwood, Martin and Typo Lakes are underway to determine removals needed. Removal projects should include tracking carp populations and lake vegetative response.	SRWMO, grants	Lake groups, ACD, Carp Solutions LLC
37	A11, A59	Stormwater retrofits	Build projects identified and ranked by cost-effectiveness in completed subwatershed analyses, and any subsequent additional studies. Studies are completed for Martin and Coon Lake direct drainages.	SRWMO, grants	Lake groups
38	A13, A71	Ditch 20 wetland restoration outreach	Sustain outreach to landowners along Ditch 20 where the SRWMO previously identified wetland restoration projects to benefit water quality. One contact should be made every two years or whenever new wetland restoration funding opportunities are known.	SRWMO	BWSR (wetland banking), USFWS
39	A57	Demonstration projects on public lands	Seek to implement shoreline or stormwater management demonstration projects, or educational outreach projects with Anoka County Parks, particularly at Coon, Linwood and Island Lakes, or lands owned by Coon Lake Beach Improvement Assoc. Candidate projects at Anoka Co Parks include outreach at a $50K new Island Lake fishing pier, outreach at the $500K boardwalk and trail replacement at Camp Salie Island Lake, and adding a stormwater treatment demonstration at a $515K Camp Salie improvements that incldue road and parking re-paving.	SRWMO, grants	Anoka Co Parks
40	A5	Support carp barrier annual maintenance	Send spring and fall reminders of screen installation and removal, based on date and water temperature.	SRWMO	Linwood Township
41	A15	Model projects' pollutant reductions	Model pollutant reductions for SRWMO projects and report achievements to the St. Croix Basin Partnership Team. Done as part of project reporting.	Project's funding source	ACD
42	A68	Linwood Lake weir repair request	Request that the MN DNR consider placing the deteriorating Linwood Lake outlet weir on its list of weir replacement projects.	SRWMO	DNR
43		Point of Sale SSTS inspections	Develop ordinances and processes for point of sale subsurface sewage treatment systems (SSTS; septic systems) in Ham Lake and Linwood Township, and consider any options to improve efficiency or effectiveness in Columbus and East Bethel. This task is dependent upon securing a grant; member communities whose ordinance or process will benefit are to provide grant match.	SRWMO, Member community, grants	Member communities
44	Multiple	Projects identified in adopted guidance documents	Projects that are prioritized, targeted and measurable; vetted through scientific and stakeholder processes, and in adopted guidance documents.	SRWMO, grants	
Studies and Inventories					
45	A3	Carp management feasibility and effectiveness studies	Screen carp population levels in Linwood (2018-2019) and possibly Coon Lake (2025) to determine biomass per acre and carp management feasibility. In other years carp and vegetation studies will be done at lakes where carp removals have been done to determine effectiveness and future management. Notes: Vegetation surveys already being done at Coon Lake for AIS treatment. Whether work occurs at Coon Lake is dependent upon further discussion with stakeholders, DNR Fisheries. Substitute projects, based on guidance documents in this plan, may occur at Coon Lake instead.	SRWMO, grants	Carp Solutions LLC
46	A8	Lakeshore photo inventories	Complete georeferenced photo inventory of lakeshore at Coon, Linwood, Martin, Typo and Fawn Lakes. Use to map target audiences for shoreland BMP outreach. Repeat in 2026 and track changes.	SRWMO and/or ACD	ACD
47	A7	Alum feasibility studies	Conduct studies to determine the feasibility of alum treatments in impaired lakes. Alum chemical addition binds phosphorus. Any study will include an assessment of the social acceptability, costs and benefits. Before pursuing grant funding the SRWMO will discuss the concept with lake residents to gauge support considering effects of clearer water on macrophytes. In the event that an alum feasiblity study is not pursued, a subwatershed stormwater retrofitting study for lands draining to Linwood Lake will receive strong consideration as the "backup priority."	SRWMO, grants will be essential	ACD, Consultant
48	A12	Linwood Lake subwatershed retrofitting study	A study to identify and rank by cost effectiveness water quality improvement projects on lands draining to Linwood Lake. A specific subwatershed may be chosen based on land uses and professional and resident input.	SRWMO, grants	ACD

* Where "grants" are listed as a likely funding source the activity may not occur without a grant. The SRWMO & partners could provide grant matching funds.

Table 11. Implementation plan timeline and estimated costs.

			Estimated Expenditure										
#	Plan Action	Funding*	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	TOTAL
Operating Tasks (as defined by JPA)													
1	Recording Secretary services - contractual	SRWMO	$1,400	$1,449	$1,500	$1,552	$1,607	$1,663	$1,721	$1,781	$1,844	$1,908	$16,424
2	Administrator services - contractual	SRWMO	$6,000	$6,210	$6,427	$6,652	$6,885	$7,126	$7,376	$7,634	$7,901	$8,177	$70,388
3	Fiscal mgmt assistance - E Bethel Finance Director & Treasurer	SRWMO	Provided by East Bethel, no cost to SRWMO										$0
4	Financial contributions calculation update	SRWMO	$320					$320					$640
5	Financial audits	SRWMO	$3,000					$3,563					$6,563
6	Liability Insurance	SRWMO	$1,850	$1,550	$1,581	$1,613	$1,645	$1,678	$1,711	$1,746	$1,780	$1,816	$16,970
7	Reports to BWSR, State Auditor	SRWMO	$1,100	$1,139	$1,178	$1,220	$1,262	$1,306	$1,352	$1,400	$1,448	$1,499	$12,905
8	Annual written communication to member communities	SRWMO	$600	$621	$643	$665	$689	$713	$738	$763	$790	$818	$7,039
9	Community ordinance reviews	SRWMO	$1,920										$1,920
10	Review/approve community local water plans	SRWMO		$2,240									$2,240
11	Seek bids for professional services	SRWMO		$100		$100		$100		$100		$100	$500
Non-operating General													
12	Grant search and applications	SRWMO	$1,000	$1,035	$1,071	$1,109	$1,148	$1,188	$1,229	$1,272	$1,317	$1,363	$11,731
13	Undesignated reserve	SRWMO	$2,029										$2,029
14	Update Watershed Plan	SRWMO									$27,000	$27,000	$54,000
Communications with Member Communities													
15	Project reporting to member communities	SRWMO	Included in project costs and project manager duties										$0
16	Annual board member reporting to member communities	SRWMO	Provided by SRWMO board members										$0
17	Project tours	SRWMO	$1,660					$1,850				$2,000	$5,510
Public Outreach													
18	Lake association and community newsletter content	SRWMO	$920	$2,190	$1,168	$938	$2,184	$1,000	$820	$1,050	$860	$1,100	$12,230
19	Newspaper press releases	SRWMO	Included in project costs and project manager duties										$0
20	Lakeshore restoration guidance materials	SRWMO			$3,300								$3,300
21	Shoreland stewardship display	SRWMO	$2,520										$2,520
22	Community event displays	SRWMO	Provided by SRWMO board members										$0
23	Stakeholder event attendance	SRWMO	Provided by SRWMO board members										$0
24	Workshops promotion	SRWMO			$815								$815
25	Engage citizen leaders	SRWMO	Included in administrator duties										$0
26	Websites	SRWMO	$700	$725	$750	$776	$803	$831	$860	$2,891	$921	$953	$10,210
27	Anoka Co Outreach Coordinator position	SRWMO		$2,500	$4,450	$4,606	$4,767	$4,934	$5,106	$5,285	$5,470	$5,662	$42,780
29	Advisory committees	SRWMO	Included in administrator duties										$0
30	Promote Well Water Wise	SRWMO		$50	$52	$54	$55	$57	$59	$61	$64	$66	$518
Water Condition Monitoring													
31	Water condition monitoring	SRWMO	$8,541	$16,446	$10,369	$9,125	$18,535	$9,775	$8,114	$17,780	$8,632	$11,217	$118,535
Development Reviews													
32	Development reviews	MC**	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$10,000
Multi-partner Coordination													
33	Participate in 1W1P	SRWMO	$640	$662	$686	$710	$734	$760	$787	$814	$843	$872	$7,508

#	Plan Action	Funding*	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	TOTAL
Water Improvement Projects													
34	Ag conservation planning outreach	SRWMO		$1,120	$1,120								$2,240
		Grants											$0
35	Cost share grant program- open to the public	SRWMO	$2,000	$2,500	$1,500	$1,500	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$13,500
		Grants											$0
36	Cost share grant program - through lake associations	SRWMO			$7,500	$6,250		$3,500	$3,500	$3,500			$24,250
		Grants			$30,000	$25,000		$14,000	$14,000	$14,000			$97,000
37	Carp removals	SRWMO	$10,000	$7,500	$7,500								$25,000
		Grants	$40,000	$30,000	$30,000								$100,000
38	Stormwater retrofits	SRWMO	***										$0
		Grants	$133,580										$133,580
39	Ditch 20 wetland restoration outreach	SRWMO		$320		$343		$367		$393			$1,423
		Grants											$0
40	Demonstration projects on public lands	SRWMO						$6,750	$6,750				$13,500
		Grants						$27,000	$27,000				$54,000
41	Support carp barrier annual maintenance	SRWMO	Included in administrator duties										$0
		Grants											$0
42	Model projects' pollutant reductions	SRWMO	Included in project costs and project manager duties										$0
		Grants											$0
43	Linwood Lake weir repair request	SRWMO	$0										$0
		Grants											$0
44	Point of Sale SSTS inspections	SRWMO											$0
		Communities			$2,000								$2,000
		Grants			$8,000								$8,000
45	Projects identified in adopted guidance documents	SRWMO	$3,800	$0	$0	$0	$0	$0	$11,000	$14,500	$0	$0	$29,300
		Other****					$6,000						
		Grants	$15,200				$24,000		$44,000	$58,000			$141,200
Studies and Inventories													
46	Carp management feasibility and effectiveness studies	SRWMO	***			$2,000		$4,500					$6,500
		Grants	$21,420			$8,000		$18,000					$47,420
47	Lakeshore photo inventories	SRWMO	Provided by ACD in 2020						$2,000				$2,000
		Grants							$8,000				$8,000
48	Alum feasibility studies	SRWMO				$5,500	$5,500						$11,000
		Grants				$22,000	$22,000						$44,000
49	Linwood Lake subwatershed retrofitting study	SRWMO				$2,000	$2,000						$4,000
		Grants				$8,000	$8,000						$16,000

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	TOTAL
SRWMO Total	**$50,000**	**$48,356**	**$51,609**	**$46,711**	**$48,814**	**$52,981**	**$54,124**	**$61,970**	**$59,869**	**$65,551**	**$539,987**
SRWMO grant match	**$13,800**	**$8,620**	**$16,120**	**$10,250**	**$2,000**	**$14,750**	**$21,250**	**$18,000**	**$0**	**$0**	**$104,790**
Grants	$210,200	$30,000	$60,000	$63,000	$54,000	$59,000	$93,000	$72,000	$0	$0	$641,200
Communities	$1,000	$1,000	$3,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$12,000
TOTAL	$275,000	$87,976	$130,729	$120,961	$105,814	$127,731	$169,374	$152,970	$60,869	$66,551	$1,297,977

*When both SRWMO and grants may fund a project, SRWMO are anticipated match for a grant, if secured.

** MC= member community where the development is occurring.

*** SRWMO grant matching dollars provided in 2018-19. Watershed Based Funding grant secured in 2018, to be spent through 2021.

**** Other sources are most likely lake groups.

Grants are assumed to have a 25% match requirement. However, some grants require only 10% and the SRWMO expenditure may therefore be less.

The actual timing of water quality improvement projects and studies/inventories may differ from that shown above due to dependence on grant funding.

Table 12. Water monitoring plan. This table provides a breakout of water monitoring listed in Tables 11 and 12.

Type	Sites	2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		Notes
Effectiveness Monitoring																						
Lake water quality	Martin Lake	✓	$1,850	✓	$1,982	✓	$2,051	✓	$2,123	✓	$2,197	✓	$2,274			✓	$2,436			✓	$2,610	Professional monitoring of TP, chl-a & trans every 1-2 yrs.
	Typo Lake	✓	$1,850	✓	$1,982	✓	$2,051	✓	$2,123	✓	$2,197	✓	$2,274			✓	$2,436			✓	$2,610	
Stream water quality	Typo Cr at Typo Cr Dr					✓	$1,552			✓	$1,663							✓	$1,844			TP, pH and TSS (streams) every 1-2+ yrs.
Diagnostic Monitoring																						
Lake water quality	Boot Lake			✓	$1,982																	Pro monitoring of TP, chl-a & trans for 3 yrs (2018, 2019 done).
Stream water quality	Data Cr at Typo Cr Dr													✓	$1,721							TP and TSS at Data Cr for one of every 10 yrs
Lake depth profiles	Coon Lake W Bay													✓	$246							Pro DO and temp measurements twice at 1 m intervals once every 10 yrs. Must be done separate from volunteer monitoring by professionals.
	Coon Lake E Bay													✓	$246							
	Linwood Lake													✓	$246							
	Martin lake													✓	$246							
Surveillance Monitoring																						
Lake levels	Coon Lake	✓	$315	✓	$326	✓	$337	✓	$349	✓	$361	✓	$374	✓	$387	✓	$401	✓	$415	✓	$429	Volunteer-recorded water levels in all years. Fee is for volunteer coordination.
	Linwood Lake	✓	$315	✓	$326	✓	$337	✓	$349	✓	$361	✓	$374	✓	$387	✓	$401	✓	$415	✓	$429	
	Martin Lake	✓	$315	✓	$326	✓	$337	✓	$349	✓	$361	✓	$374	✓	$387	✓	$401	✓	$415	✓	$429	
	Typo Lake	✓	$315	✓	$326	✓	$337	✓	$349	✓	$361	✓	$374	✓	$387	✓	$401	✓	$415	✓	$429	
	Fawn Lake	✓	$315	✓	$326	✓	$337	✓	$349	✓	$361	✓	$374	✓	$387	✓	$401	✓	$415	✓	$429	
Lake secchi transparency - volunteer coordination	Coon Lake W Bay	✓	$73	✓	$76	✓	$78	✓	$81	✓	$84	✓	$87	✓	$90	✓	$93	✓	$96	✓	$99	Volunteer-recorded transparency in all years. Fee is for volunteer coordination.
	Coon Lake E Bay	✓	$73	✓	$76	✓	$78	✓	$81	✓	$84	✓	$87	✓	$90	✓	$93	✓	$96	✓	$99	
	Linwood Lake	✓	$73	✓	$76	✓	$78	✓	$81	✓	$84	✓	$87	✓	$90	✓	$93	✓	$96	✓	$99	
	Martin Lake	✓	$73	✓	$76	✓	$78	✓	$81	✓	$84	✓	$87	✓	$90	✓	$93	✓	$96	✓	$99	
	Typo Lake	✓	$73	✓	$76	✓	$78	✓	$81	✓	$84	✓	$87	✓	$90	✓	$93	✓	$96	✓	$99	
	Fawn Lake*	✓	$73	✓	$76	✓	$78	✓	$81	✓	$84	✓	$87	✓	$90	✓	$93	✓	$96	✓	$99	
	Island Lake	✓	$73	✓	$76	✓	$78	✓	$81	✓	$84	✓	$87	✓	$90	✓	$93	✓	$96	✓	$99	
	5 small lakes w/o public	✓	$365	✓	$378	✓	$391	✓	$405	✓	$419	✓	$433.51	✓	$448.68	✓	$464.38	✓	$480.64	✓	$497.46	
Lake water quality	Coon Lake W Bay			✓	$1,982					✓	$2,197					✓	$2,436					ACD professional monitoring TP, chl-a & trans every 3 yrs. Samples every 2 wks May-Sept.
	Coon Lake E Bay			✓	$1,982					✓	$2,197					✓	$2,436					
	Linwood Lake			✓	$1,982					✓	$2,197					✓	$2,436					
	Island Lake*																					
Chloride sampling - streams	W Branch Sunrise R at Co Rd 77									✓	$836							✓	$993			Professional monitoring of chloride and conductivity in 2 of 10 yrs for streams. 8 samples/yr. Combine with lake sampling trips.
Wetland levels	3 reference wetlands	✓	$1,950	✓	$2,018.25	✓	$2,088.89	✓	$2,162.00	✓	$2,237.67	✓	$2,315.99	✓	$2,397.05	✓	$2,480.94	✓	$2,567.78	✓	$2,657.65	Datalogged water levels at edge of long-term wetland monitoring sites
Precipitation	Recruit 4 volunteers	✓	$440																			Expand MN State Climatology volunteer network in SRWMO from 3 to 7 sites. Fees are for volunteer recruitment.
	TOTAL		**$8,541**		**$16,446**		**$10,369**		**$9,125**		**$18,535**		**$9,775**		**$8,114**		**$17,780**		**$8,632**		**$11,217**	

Fees are Anoka Conservation District fees plus 3.5% inflationary increase per year.

* Monitoring to occur only by volunteers and/or if funds become available.

** Five small lakes without public access are Pet, Rice, South Coon, Skunk and Tamarack

Table 13. Newsletters plan. This table provides a breakout of lake association and community newsletters listed in Tables 11 and 12.

Message	Target Audience(s)	Frequency of Outreach	2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		Notes
High Priority			Lake	City	Lake	City	Lake	City	Lake	City	Lake	City	Lake	City	Lake	City	Lake	City	Lake	City	Lake	City	
Promote lakeshore restorations and stewardship practices	Lakeshore owners	1-3x per year	1		1*		1		1		1		1		1		1		1		1		Additional outreach in years of organized project promo.
SRWMO's existence and programs	Community-wide Lake associations Elected officials	1-2x per year		1		1*		1		1		1		1		1		1		1		1	
Financial assistance to fix a failing septic system	Shoreland district homes	1x per year		1	1*			1	1			1	1			1	1			1	1		
Medium Priority																							
Aquatic plants have value, don't tear them out	Lakeshore owners	1-3x per year	1		1*		1		1		1		1		1		1		1		1		
Stop aquatic hitchhikers	Lake users	Continuous on SRWMO website + 1x/yr in 5 of 10 yrs				1*				1				1				1				1	Existing "Stop Aquatic Hitchhikers" images shall be 90%+ of the content.
Lower Priority																							
How to maintain your septic system	Homeowners	1x per yr in 2 of 10 yrs						1*															
Conserve groundwater	Community-wide	3x per yr in 1 of 10 yrs									3*	3											Promote smart irrigation controllers.
Use phosphorus-free fertilizer, it's the law	Community-wide	occasional																					
Use less deicing salt	Municipal staff*	occasional																					Use emails to municipal staff.
		TOTAL	2	2	3	2	2	3	3	2	5	5	3	2	2	2	3	2	2	2	3	2	
		Estimated cost	$920		$2,190		$1,168		$938		$2,184		$1,000		$820		$1,050		$860		$1,100		

"Lake" = provide content to lake association newsletters.
"City" = provide content to member community newsletters.
* In years marked with an asterisk new unique content will be developed that will largely be reused in future years. This reusable content will be largely infographics or imagery with a small amount of impactful text. Use of already prepared materials, particularly those created by the Anoka County Outreach program, is encouraged.

Table 14. Funding carried forward by year.

The SRWMO wishes to budget a consistent amount to keep community tax levies flat, except for an adjustment in 2026. To accomplish this, any unspent funds from years with lower expense will be carried forward to future years with more expense. The 10-year carryover funds balance will be at or near $0. In other words, while revenues may not equal expenditures in each year, but will over 10 years.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Planned Budget	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$60,000	$60,000	$60,000	$60,000
Planned Expenses	$50,000	$48,356	$51,609	$46,711	$48,814	$52,981	$54,124	$61,970	$59,869	$65,551
Budget minus Expenses	$0	$1,644	-$1,609	$3,289	$1,186	-$2,981	$5,876	-$1,970	$131	-$5,551
Carryover Funds Balance	$0	$1,644	$34	$3,323	$4,509	$1,528	$7,403	$5,433	$5,564	$13

8.2 GUIDANCE DOCUMENTS

Numerous studies and reports have been produced that should guide the SRWMO. These guidance documents, shown in Appendix D, are hereby incorporated into this Sunrise River Watershed Management Plan by reference. The contents, and especially the management recommendations, in these guidance documents will be used the by SRWMO in year-to-year decision-making. The guidance documents will be a source of projects, alternate projects or project reasoning for the SRWMO. The SRWMO reserves the right to modify or replace planned projects with those in the guidance documents.

This list of guidance documents may be updated from time to time by minor amendment of the SRWMO Watershed Management Plan. New guidance documents will be incorporated into the SRWMO Plan by minor amendment. For subwatershed studies or similar project ranking studies done by the SRWMO, the SRWMO will follow methodologies consistent with previous studies that result in a list of projects that are ranked by cost effectiveness at pollution reduction. These studies typically include advisory assistance from the member community where the study occurs, as well as the Anoka Conservation District and others the SRWMO deems appropriate such as lake associations. A SRWMO Advisory Committee will review proposed guidance documents and make a recommendation to the SRWMO Board on their incorporation into the plan.

8.3 Cost Share Grant Program

The SRWMO will maintain a cost share grant program to incentivize natural resource improvement projects. At the beginning of the plan period this program is funded with only local dollars. Later, the program is likely to use state grant dollars too. As the program changes, its policies are also likely to change. Therefore, grant policies are kept on the SRWMO website where they can be periodically updated.

Important policies include:

- Allowable project types.
- Priority locations, including specific waterbodies.
- Limits on financial support.
- Application and approvals process.
- Requirements for ownership and maintenance.

As of 2019, and likely in the future, the grants are administered through the Anoka Conservation District (ACD). By having SRWMO grants and many other grants administered through ACD we create a "one stop shop" for our constituents. The SRWMO has policies in writing with ACD specifying the approval process and a process for involving the SRWMO board in deliberations for any application if they wish.

8.4 Administrative and Operational Assistance

The SRWMO anticipates contracting for administrative and project management services throughout implementation of this plan. There are two contracted positions: recording secretary and administrator.

The recording secretary position takes meeting minutes, distributes meeting materials, prepares checks and handles the mail.

The administrator position is contracted annually. The administrator is expected to carry out day-to-day operations following the annual contract and following board policies. The extent of the administrator's responsibilities and authorities are specified in the contract and may vary by year or selected administrator.

It is worth noting that the City of East Bethel's Finance Director also provides administrative services but charges no fee. This person keeps the SRWMO checkbook, financial ledger and related documents and generally assists the board Treasurer.

8.5 Operation and Maintenance

8.5.1 SRWMO Project Operation and Maintenance

The SRWMO ensures operations and maintenance of its projects are formalized through a contract or similar means. In the past, these responsibilities have been accepted by a member community, landowner or cooperating agency such as the Anoka Conservation District. The SRWMO does not anticipate taking such a role

for future projects because it lacks staff, but the SRWMO may consider these roles on a case by case basis before new project construction.

8.5.2 Water System Operation and Maintenance

Maintenance to water conveyance systems is the responsibility of member communities or other agencies. The Anoka County Highway Department has jurisdiction over county ditches. Most structures within public waters, such as lake outlets, are under MN DNR jurisdiction. Storm water conveyance systems are the responsibility of the respective community.

8.5.3 Required community regulations

The SRWMO does not have a permitting or regulatory program, but does require that each member community have certain regulatory controls and performance standards in place (Table 15). The SRWMO has chosen this approach because these and other regulatory controls are already administered by the communities, because this allows communities the opportunity to customize their approaches to their individual circumstances, and in order to minimize SRWMO operating expenses.

Table 15. Regulatory controls and performance standards required in each SRWMO community.

Regulatory Control	Required Content
Septic system ordinance	Consistent with Minnesota Rules 7080-7082, Statues 115.55-56 and SRWMO standards (Appendix B).
Stormwater ordinance	Consistent with SRWMO storm water standards (Appendix B).
Wetland ordinance	Consistent with SRWMO wetland standards (Appendix B). Additionally, the community shall serve as the local governmental unit administering the state Wetland Conservation Act.

Note that communities are also expected to implement erosion control and shoreland ordinances. These do not have SRWMO-required content because State rules already provide minimum required content. Erosion and sediment control must be consistent with the MPCA Construction General permit and Shoreland ordinances must be compliant with Minnesota Rules, Chapter 6120.2500 through 6120.3900.

8.5.4 Variances

The members may grant variances from SRWMO standards only if extraordinary or unnecessary hardship will result from strict compliance. However, these variances should not subvert the intent and purpose of the standards or the SRWMO's management plan, and should not grant special convenience or rights to any person or group. In accordance with these provisions, variances may be granted only if all of the following circumstances exist:

1. The purpose of the variance is to alleviate unique non-economic conditions or circumstances that are not the result of any action by the applicant.

2. The exceptional or unusual circumstances for which the variance is requested do not apply generally to other properties adjacent to the same water resource and are the result of topography or other natural circumstances over which the property owners have no control.
3. Granting the variance will not confer special privileges to the applicant that are otherwise denied to the owners of other lands adjacent to the water resources or to public users of the resource.
4. The variance will not result in conditions that do not meet standards set by state law or by regulations of other governmental bodies, and it will not permit a lower degree of flood protection than that provided to other lands adjacent to the water resource.
5. The variance is the minimum variance that will alleviate the hardship.
6. The variance will not violate the spirit and intent of the SRWMO's management plan.
7. The variance will not adversely affect the use of other properties not controlled by the applicant and will not unduly limit the way in which other properties not under the applicant's control may be used or developed.
8. Hardship means the proposed use of the property and associated structures in question cannot be established under the conditions allowed by the ordinance or its amendments and no other reasonable alternate use exists; however, the plight of the landowner must be due to physical conditions unique to the land, structure or building involved and are not applicable to other lands, structures or buildings in the same zoning district. These unique conditions of the site cannot be caused or accepted by the landowner after the effective date of the ordinance, its amendments or previous like ordinances.
9. Economic considerations alone shall not constitute a hardship.

8.5.5 SRWMO Regulatory Oversight

The SRWMO will retain the right to monitor or become engaged in the local governments' permitting activity with regard to enforcement and consistency with the approved SRWMO Watershed Management Plan. If the SRWMO finds that a member community fails to implement its regulatory program consistent with the SRWMO Watershed Management Plan, the SRWMO shall take actions necessary to ensure SRWMO standards are implemented. The SRWMO's first step will be to communicate concerns to the community, first via the SRWMO Board member from that community, second through a letter, and third by meeting with the city council or town board. If inadequacies cannot be remedied by other means, the SRWMO Joint Powers Agreement and Minnesota Statutes, Section 103B.211 provides that the WMO has:

> "the authority of a watershed district under chapter 103D to regulate the use and development of land in the watershed when one or more of the following conditions exists:

(i) the local government unit exercising planning and zoning authority over the land under sections 366.10 to 366.19, 394.21 to 394.37, or 462.351 to 462.364, does not have a local water management plan approved and adopted in accordance with the requirements of section 103B.235 or has not adopted the implementation program described in the plan;

(ii) an application to the local government unit for a permit for the use and development of land requires an amendment to or variance from the adopted local water management plan or implementation program of the local unit;

(iii) the local government unit has authorized the organization to require permits for the use and development of land;"

9 IMPACT ON LOCAL GOVERNMENT

9.1 LOCAL CONTROLS

Member communities must have local controls, such as ordinances, consistent with SRWMO standards in Appendix B. The status of member communities' local controls/ordinances is listed in Table 16. Communities will be asked through annual reporting to confirm that required ordinances are in place. The SRWMO may perform spot checks during review of local water management plans.

Table 16. Status of required regulatory controls in SRWMO communities (March 2019). Updates needed to be consistent with SRWMO standards are listed. This table is meant as a brief summary and may not include all updates needed. In-depth ordinance review, and any updates needed, must occur by each community within two years of SRWMO plan adoption or revision of SRWMO standards.

Regulatory Control	Columbus	East Bethel	Ham Lake	Linwood
Septic system ordinance	Ok	Add point of sale inspections, if a grant can be secured to fund the process. Send maintenance reminder letters at 3-yr anniversary of last pumping.	Add point of sale inspections, if a grant can be secured to fund the process	Add point of sale inspections, if a grant can be secured to fund the process.
Stormwater ordinance	Reference Atlas 14. Update to reference new SRWMO standards.	Reference Atlas 14. Add pre-and post development pollutants and rates must be equal.	OK	Reference Atlas 14. Update retention requirement from 0.5" to 1" from new impervious surfaces. Add pre-and post development pollutants and rates must be equal. Add provisions for when infiltration is not wise or possible. All maintenance agreement requirement for infiltration practices.
Wetland ordinance	Add that buffer areas must be protected during the construction process. Add that buffers shall be perennial unmowed vegetation within drainage and utility easement. Add that stormwater	Add that buffers shall be perennial unmowed vegetation within drainage and utility easement. Add that stormwater dischared to wetland must be treated to SRWMO standards and water level	Add that buffers shall be perennial unmowed vegetation within drainage and utility easement. Add that stormwater dischared to wetland must be treated to SRWMO standards and water level	OK

Regulatory Control	Columbus	East Bethel	Ham Lake	Linwood
	dischared to wetland must be treated to SRWMO standards and water level bounce in wetlands should follow MPCA guidance document.	bounce in wetlands should follow MPCA guidance document.	bounce in wetlands should follow MPCA guidance document.	
Local Water Plan	Update for consistency with SRWMO Plan. Adopting the SRWMO plan by reference is allowed.			
Consolidation	Need to work to consolidate local rules, particularly for stormwater and wetlands, into a single location. Some rules spread throughout ordinance, local water plans, storm water pollution prevention plans and engineering guidance.			OK

The fact that staff or elected officials from all four member communities participated in the formulation of SRWMO standards gives assurances that the standards will be successfully implemented. The technical advisory committee that formulated the performance standards did so with a consensus-minded approach. All of the SRWMO standards have been examined and accepted by staff or elected officials from each member community before inclusion in this plan.

9.2 Maintenance Responsibilities

Maintenance to water conveyance systems is the responsibility of member communities or other agencies. The Anoka County Highway Department has jurisdiction over county ditches. Most structures within public waters, such as lake outlets, are under MN DNR jurisdiction. Storm water conveyance systems are the responsibility of the respective community. Member communities must carry out tasks listed in the Impact On Local Government chapter of this Plan, which is the same as the tasks listed in the Goals, Policies and Actions chapter of this Plan for stormwater.

Table 17. Maintenance of the storm water conveyance system to be carried out by communities.

Maintenance	Specifications	Status
Map stormwater system	Each community must have maps of their storm water conveyance system for proper maintenance. These maps should include the location, size, elevation, and condition of all stormwater conveyances, water quality or quantity treatment features, outfalls, and culverts. This was to be completed by 2014 per the 3rd Generation SRWMO Watershed Management Plan. **Linwood Township has not yet completed this task and needs to do so.**	Done in: East Bethel Ham Lake Need to do in: Linwood Columbus (partially complete)
Street sweeping	The SRWMO requires sweeping of streets with curb and gutter once annually in all areas, and twice annually in priority areas. Priority areas shall be areas that drain directly to water bodies and/or natural wetlands without pretreatment of storm water runoff. Roadside ditches in rural areas will constitute treatment.	Done in: All communities, ongoing
Inspections	The SRWMO requires that member communities inspect storm water treatment basins least every 5 years. Sump catch basins/manholes shall be inspected every year. Maintenance shall be conducted as necessary.	Done in: All communities, ongoing

9.3 Financial Impact

The SRWMO is financed by the member communities, and additional financial capacity is achieved through partnerships and grants. The SRWMO joint powers agreement specifies how SRWMO financing is divided amongst member communities. As of spring 2019 operating (basic administrative) expenses are split equally amongst the communities and other expenses are split by a formula that considers market value and land of each community in the SRWMO. Estimated financial impact to member communities of implementing this watershed management plan are shown in Table 18.

Table 18. Estimated financial contributions from each member community each year.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Operating expenses (split equally)	$13,531	$13,531	$13,531	$13,531	$13,531	$13,531	$13,601	$13,601	$13,601	$13,601
Non-Operating expenses (split by unique percentages)	$36,469	$36,469	$36,469	$36,469	$36,469	$36,469	$46,399	$46,399	$46,399	$46,399
Total expenses	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$60,000	$60,000	$60,000	$60,000
Columbus 25% operating expenses + 16.72% other	$9,480	$9,480	$9,480	$9,480	$9,480	$9,480	$11,158	$11,158	$11,158	$11,158
East Bethel 25% operating expenses + 32.93% other	$15,392	$15,392	$15,392	$15,392	$15,392	$15,392	$18,679	$18,679	$18,679	$18,679
Ham Lake 25% operating expenses + 3.95% other	$4,823	$4,823	$4,823	$4,823	$4,823	$4,823	$5,233	$5,233	$5,233	$5,233
Linwood 25% operating expenses + 46.40% other	$20,305	$20,305	$20,305	$20,305	$20,305	$20,305	$24,929	$24,929	$24,929	$24,929
Total community contributions	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$60,000	$60,000	$60,000	$60,000

Notes:

This table is based on anticipated SRWMO budget amounts of $50,000/yr for 2020-2025 and $60,000/yr for 2026-2029. Average annual operating and non-operating expenses during these periods are used to calculate community contributions each year. The percentage contribution for non-operating expenses is based on land area and market valuation. Periodic updates to the percentages are planned.

Additional costs include work conducted by the individual members that improve or protect water quality, including completing member community tasks in this Plan. This includes administering the Wetland Conservation Act, street sweeping, regulation and others. This work has been ongoing for many years, is included in this plan, and illustrates the high commitment of resources by the members to maintaining and improving water resources.

This plan does not prescribe the means by which to fund the plan, rather, that is left to the discretion of the member communities. The Metropolitan Surface Water Management Act gives local governments within the WMO the authority to levy taxes without regard to existing levy limitations to pay for water resource planning and management activities required under the Act. A local government can also apply a local levy over part of its jurisdiction by creating a local drainage district for tax and planning purposes.

The SRWMO recognizes that implementing some projects in this Plan will require funding aside from that provided by the member communities. The implementation plan in this document lists estimated amounts of other funding needed, as well as possible sources including grants, lake associations, and other units of government such as the Anoka Conservation District or adjacent counties. It is anticipated that grants utilizing the State Clean Water Land and Legacy Amendment dollars will be the largest among these funding sources.

10 EVALUATION AND REPORTING

10.1 SRWMO

The SRWMO is responsible for evaluating its progress in achieving its goals and reporting annually to the BWSR, per Minnesota Rules 8410.0150. As specified earlier in this plan, the SRWMO will:

- **Prepare an annual report** to the State consistent with MN Rules 8410.0150 within 120 days of the end of each calendar year.
- **Prepare an annual financial report** to the State Auditor consistent with MN Rules 8410.0150 within 180 days of the end of the organization's fiscal year.
- **Undergo a financial audit** annually unless the organization's revenue is below the threshold amount specified in MN Statutes sections 6.756 and 412.591, in which case an audit is required once every five years.
- **Maintain the SRWMO website**. Minimum contents are specified in MN Rules 8410.00150 subp 3a to provide operational transparency.
- **Biennial Evaluation of Progress**. A minimum of every two years the SRWMO must evaluate progress on goals and the implementation actions. This required activity will be accomplished during annual report preparation.

To facilitate annual reporting and self-evaluation the SRWMO has prepared a template for self-evaluation of goals and implementation activities. The template will be populated annually and used within annual reports to BWSR.

10.2 MEMBER COMMUNITIES

Each year each community will submit an annual report to the SRWMO using Appendix C as a template. It is a "to do" list for the communities and a way for the SRWMO to ensure that this work is being completed. The SRWMO will set a due date for these annual reports before the SRWMO's annual report to BWSR is due so community accomplishments can be included in the report to BWSR.

If a member community is failing to implement their local water plan or SRWMO Plan, the SRWMO will:

- Notify the community of the concern and request a response within 60 days.
- If the matter remains unresolved, a SRWMO manager will notify the city council or town board in-person.
- If the matter remains unresolved, notify the MN Board of Water and Soil Resources and all the member communities of the concern and request a meeting to discuss the matter.
- If the matter remains unresolved, the SRWMO will seek legal advice specific to the issue and consider amending its plan to take over responsibility for the task that is not being implemented.

11 AMENDMENTS TO PLAN

This plan is intended to be valid for 10 years after the date of approval by the MN Board of Soil and Water Resources. Amendments to the SRWMO Watershed Management Plan must follow MN Rules 8410.0140. Amendments must adhere to the review process provided in MN Statutes 103B.231, subdivision 11, except when the proposed amendments are determined to be minor amendments. Minor amendments are defined in MN Rules 8410.0140, subp. 2. Changes not requiring an amendment are defined in MN Rules 8410.0140 subp 1a.

12 LOCAL WATER PLANS

12.1 Requirements Overview

In order to satisfy Minnesota Rules Chapter 8410 Metropolitan Area Local Water Management, each SRWMO member community shall prepare a local water management plan in conformance with the goals, policies, and standards of this plan. The local water plan must be a chapter of each community's local comprehensive plan. Local water plans must be updated not more than two years before the local comprehensive plan is due (MN Rules 8410.0160 Subp 6). Local water plans for SRWMO communities are being updated in 2019 during finalization of the SRWMO 4th Generation Watershed Management Plan. The SRWMO will review and approve these local water plans to ensure they are consistent with the 4th Generation SRWMO Plan. If at any time the SRWMO discovers a significant inconsistency between a local water plan and the SRWMO plan, it may require an amendment of the local water plan to address it.

12.2 Local Water Plan Content Requirements

Each local government's water resource management plan shall include elements required in Minnesota Statutes 103B.235, MN Rules 8410.0160 and this SRWMO Watershed Management Plan.

12.3 Review Process for Local Water Plans

After consideration but before adoption by the governing body, each local unit shall submit its water management plan to the watershed management organization for review for consistency with the WMO Plan (see MN Statutes 103B.235 Subd. 3). Once a plan is received, the SRWMO shall have 60 days to review the document and to approve or reject it (in whole or in part) based on its compliance with the SRWMO's Watershed Management Plan. If the SRWMO fails to complete its review within 60 days, and if the local government has not agreed to an extension, the plan will be deemed approved. The plan must also be submitted to the Metropolitan Council, who has a 45 day review period that runs concurrent with the WMO review (see MN Statutes 103B.235 Subd. 3a). Local governments are encouraged to solicit informal SRWMO Board input and review before they submit their plans for formal review.

The SRWMO will primarily, but not exclusively, use the following as a checklist when reviewing draft local water plans:

- Goals consistent with those in the SRWMO Plan.
- Policies consistent with those in the SRWMO Plan.
- All member community actions listed in the SRWMO plan are addressed. Appendix C summarized required member community actions. This list should be submitted with the draft local water plan and include the page on which this item is found in the local water plan.
- A table comparing of SRWMO Stormwater and Wetland Standards to city/township regulatory controls. Any updates to regulatory controls needed for consistency with SRMWO Standards should be clearly identified in the table.

After the SRWMO approves a local water resource management plan, the local government shall adopt and implement the plan within 120 days and shall amend its official controls accordingly within 180 days.

If a local government should later wish to amend its plan, it must submit the proposed amendment to the SRWMO Board of Managers for review of consistency with the SRWMO's management plan. Changes should be clearly identified. The WMO must approve or disapprove of the amendment (in whole or in part) within 60 days of its submittal.

12.4 Adoption by Reference

Member communities may adopt the SRWMO plan or portion of it by reference, through a resolution, to satisfy the intent of local water management planning. The resolution must summarize tasks that the community is responsible to implement and be pre-approved by the SRWMO.

The SRWMO feels that member communities adopting the SRWMO Plan as their local water plan is reasonable because most of the actions demanded of communities in this plan must be formalized in other ways, such as through ordinances. For other tasks, such as storm water system maintenance, this plan contains a required schedule for completion. The SRWMO will ensure tasks are completed on schedule by requiring annual reporting from all communities. The SRWMO will create a reporting template see Appendix C) that includes all tasks required of communities in this plan.

13 ACRONYMS

ACD	Anoka Conservation District
BMP	Best Management Practice
CAC	Citizen Advisory Committee
DO	Dissolved Oxygen
BWSR	Board of Water and Soil Resources
MN DNR	Minnesota Department of Natural Resources
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
GIS	Geographical Information System
GPS	Global Positioning System
LGU	Local Government Unit
MPCA	Minnesota Pollution Control Agency
MDH	Minnesota Department of Health
MC	Metropolitan Council
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWL	Ordinary High Water Level
SRWMO	Sunrise River Watershed Management Organization
SWPPP	Storm Water Pollution Prevention Plan
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
WCA	Wetland Conservation Act
WMA	Wildlife Management Area
WMO	Watershed Management Organization
1W1P	One Watershed, One Plan

14 Maps

APPENDIX A:

INPUT RECEIVED DURING PLAN DEVELOPMENT

Overview of Stakeholder Input During Plan Development

a. Planning initiation notice and invitation for up-front comments
This notice was sent January 19, 2018 to SRWMO member communities, Metropolitan Council, State review agencies, Anoka County, and all adjacent entities with comprehensive local water management plans. Comment letters were received from the Anoka Conservation District, MN DNR, BWSR, Isanti County, Metropolitan Council.

b. Public officials tour of water resources, issues and projects
Tour of four stops each with presentations from one of the lake associations in the SRWMO. Invitees includes state and local elected officials. The planning kick-off meeting, where input was collected immediately followed the tour.

c. Planning kick-off meeting with public issues identification
A facilitated exercise guided participants as they provided input on priority issues and ranking those issues. Invitees included elected officials, lake associations and the public.

d. Online public survey
This survey to identify priority issues was done for the Lower St. Croix One Watershed One Plan. Because participants identified their county of residence we were able to filter 27 responses from just SRWMO residents.

e. SRWMO Board Evaluation of the 3rd Generation Watershed Management Plan
As a reflection and self-evaluation process, in July 2018 the SRWMO Board evaluated their implementation of their 3rd Generation Watershed Management Plan. This process identified strengths to continue doing and weaknesses upon which to improve.

f. Citizen advisory committee
Attendees of the kickoff event were used as the SRWMO's citizen advisory committee (CAC) for the purposes of watershed plan development. CAC members were invited to SRWMO planning meetings in fall 2018 and early winter 2019. The CAC received drafts of the watershed plan for review by email.

g. Technical advisory committee
The SRWMO Board compiled a list of member city staff, the Metropolitan Council and State review agency staff to serve as the technical advisory committee (TAC). The TAC met periodically to discuss draft priority issues, SRWMO financing, administration, and SRWMO wetland and Stormwater standards. Meeting dates included August 22 and December 19, 2018. The TAC also engaged dozens of emails, especially communications between the planner and city staff for development of SRWMO standard.

h. Public Hearing
A public hearing during final processes for plan approval will occur per MN Statutes.

Supporting information is provided on the following pages.

Sunrise River WMO
2241 – 221st Ave
Cedar, MN 55011

Summary of up-front watershed plan update comments for the SRWMO

For comment period ending March 30, 2018
Compiled by Jamie Schurbon

MN Board of Water and Soil Resources

- Provided "Metro Watershed Management Plan Update Guide."
- Summarizes applicable state statute and rules.
- Emphasizes strong board member involvement during planning.
- Notes that key elements of the new plan are identifying and prioritizing issues, measurable goals and a prioritized implementation plan.
- Stakeholder involvement, including forming advisory committees, is required during plan development.
- WMO should do a gaps analysis of activities and regulations that are done or not done throughout the watershed.
- A self-assessment of the WMO's past performance is required.
- Make use of the Sunrise River Watershed Restoration and Protection Strategies (WRAPS) and completed TMDLs for impaired waters.
- Activities in the plan must use positive action verbs like "can, shall and will" not passive verbs like "encourage, promote, support and recommend."
- Implementation plan should include activities the WMO will do plus a list of activities it will do contingent upon grant funding.

Metropolitan Council

- Provides the priorities in the Met Council's Water Resources Policy Plan, and requests that SRWMO plan include policies keep these regional strategies in mind.
- SRWMO must set quantifiable and measurable goals.
- Provides a list of 14 minimum topics the SRWMO should address, such as stormwater rate control, impact of land use practices, long term maintenance and capital improvement plan.

MN Pollution Control Agency

- Incorporate the Sunrise River Watershed Restoration and Protection Strategies (WRAPS).
- Quantitative accounting of pollutant reductions are wanted.

- Would like to see geographic areas prioritized for management actions and monitoring.

Isanti County

- Collaborative discussion about ditch maintenance and wetland restoration is suggested.
- Maintenance cleaning of ditches, especially those that have not been cleaned for many years, may result in increases in nutrient export to downstream lakes and rivers.
- Consider abandonment or no maintenance on headwaters ditches for water quality benefits.
- Wetland restoration is encouraged.
- Encourages educational outreach to landowners and elected officials.
- The region is an important groundwater recharge area for aquifers serving the metro.

Anoka Conservation District

- Suggests the following priority issues (in order of importance) for SRWMO planning. Suggested goals are provided for the SRWMO to consider.
    1. Impaired lakes and streams (Linwood, Martin and Typo lakes, W Branch Sunrise River)
    2. Near impairment lakes (Coon Lake)
    3. Natural communities and land use conversion
    4. Multi-county coordination
    5. Water monitoring
    6. Outreach and education
    7. Septic systems
    8. Regulatory consistency
    9. Road deicing salts

MN Department of Natural Resources

- Encourages managing holistically for a healthy watershed. SRWMO goals should be addressed as strategic, integrated activities, not independent prescriptions.
- Recommended activities include keeping water where it falls, vegetated buffers, reducing flow volumes, retain floodplain functions, land use planning, perennial vegetation, promote conservation practices and water use conservation.
- Draw from the Sunrise River Watershed Restoration and Protection Strategies (WRAPS).
- Recommends the SRWMO support land acquisition by the DNR to protect high quality natural resources.
- Recommends developing a model land use ordinance for all municipalities similar to East Bethel's "Significant Natural Environmental Areas" ordinance. It provides incentives and flexibility for land developers to deviate from some zoning standards in exchange for preserving and buffering high quality areas.
- Edits are provided to the current SRWMO plan's information about the Carlos Avery WMA.
- Focus on shoreline development for fisheries protection and improvement.
- Forested riparian areas are of high value and should be maintained, but that does not preclude management.

- Suggests the SRWMO play a stronger role in groundwater conservation.
- Suggests the SRWMO include actions to prevent the spread of aquatic invasive species.
- Would like to see riverbank stabilization using toe wood techniques.
- Suggests alternatives to perpetual ditch maintenance using natural channel design principles in priority areas. Benefits include water quality, habitat, and long term maintenance savings.
- The SRWMO area has exceptional amounts of high quality natural areas. Management and protection is recommended.
- Emerald ash borer is likely to impact SRWMO communities in the next 10 years. The SRWMO is on the border of a "generally infested area" and within a quarantine county. Communities should start planning. Large amounts of dead ash trees can be expected within about 6 years of an infestation being noticed.

SRWMO Public Officials Tour	**NOTES**	**Thurs, May 24, 2018** **4:20 PM to 6 PM** **Coon Lake Community Center 182 Forest Rd, Wyoming, MN 55092**

Attendees:

Name	Affiliation
Dan Fabian	MN Board of Water and Soil Resources staff
Jen Kostrzewski	Metropolitan Council staff
Jamie Schurbon	Anoka Conservation District staff
Eric Alms	MN Pollution Control Agency
Al Beck	Coon Lake Improvement District
Bruce McEachran	Coon Lake Improvement Association
Leon Mager	SRWMO board
Matt Downing	SRWMO board
Sandy Flaherty	SRWMO board
Paul Enestvedt	SRWMO board
Dan Babineau	SRWMO board
Tim Harrington	SRWMO Board/EB Council
Denny Peterson	SRWMO Board/Columbus Council
Tim Peterson	SRWMO Board/Linwood Township board
Bob Millerbernd	Linwood Township board
Ed Kramer	Linwood Township board
Mary Jo Truchon	Anoka Conservation District supervisor

Tour Speakers:

Name	Affiliation
Mike Smith	Martin Lakers Association
John Matilla	Martin Lakers Association
Al Beck	Coon Lake Improvement District Chair
Bruce McEachran	Coon Lake Improvement Association
Elizabeth Kiserow	Linwood Lake Assoc Fundraising Chair
Bob Minar	Linwood Lake Improvement Assoc
Harvey Glowaski	Linwood Lake Improvement Assoc
Steve Voss	Coon Lake project site owner, East Bethel Mayor
Jared Wagner	Anoka Conservation District staff
Jamie Schurbon	Anoka Conservation District staff

The purpose of this event was to connect local elected officials, local and state staff, and the SRWMO board with the people, projects and priorities of the SRWMO. The tour included visits to three large lakes where lake association members provided a brief presentation and recent water quality projects were seen and discussed. This tour was conducted immediately before the SRWMO Watershed Planning Kickoff and Public Input meeting. Nearly all tour attendees stayed for that meeting and provided valuable input on future SRWMO directions.

Tour stops included:

1. **Voss residence, Coon Lake**

At this location we were hosted by Steve and Lisa Voss who have installed three rain gardens treating a 4 acre drainage area of the neighborhood and are considering lakeshore landscaping with native plants. Steve is the Mayor of East Bethel and added insights into collaboration, incentive programs and the importance of Coon Lake.
During this tour stop Al Beck of the Coon Lake Improvement District and Bruce McEachran of the Coon Lake Improvement Association spoke about the roles of their groups in managing invasive species and improving the lake.

2. **Linwood Lake Public Access**

At this tour stop we were hosted by a group of Linwood Lake Association members. Lake association fundraising leader Elizabeth Kiserow spoke about their recent fundraising successes, collaboration with the SRWMO and ACD on an upcoming carp feasibility study, water monitoring and a vision for improving water quality. Anoka Conservation District staff Jared Wagner provided a dockside demonstration of lake water quality monitoring techniques.

3. **Martin Lake Public Access**

The Martin Lake Association hosted this tour stop. We viewed a carp barrier and discussed water quality improvement efforts including stormwater treatment, carp management and lakeshore restorations. John Matilla and Mike Smith from the lake association discussed their fundraising efforts and their collaboration on these projects.

Notes prepared by Jamie Schurbon

SRWMO Watershed Planning Kickoff and Public Input Meeting	**NOTES**	**Thurs, May 24, 2018** **6:30 PM to 8 PM** **Coon Lake Community Center 182 Forest Rd, Wyoming, MN 55092**

Attendees:

Name	Affiliation	Name	Affiliation
Dan Fabian	MN Board of Water and Soil Resources staff	Russ Wyandt	Linwood Lake Improvement Assoc.
Jen Kostrzewski	Metropolitan Council staff	Betheny Wyandt	Linwood Lake Improvement Assoc.
Eric Alms	MN Pollution Control Agency	Gloria Heinz	Linwood Lake Improvement Assoc.
Al Beck	Coon Lake Improvement District	Robert Nygaard	Linwood Lake Improvement Assoc.
Leon Mager	SRWMO board	Corinne Nygren	Linwood Lake Improvement Assoc.
Matt Downing	SRWMO board	Paul Nygren	Linwood Lake Improvement Assoc.
Sandy Flaherty	SRWMO board	Mary Jo Truchon	Anoka Conservation District supervisor
Paul Enestvedt	SRWMO board	Sharon LeMay	Anoka Conservation District supervisor
Dan Babineau	SRWMO board	Bob Millerbernd	Linwood Township board
Tim Harrington	SRWMO Board/EB Council	Ed Kramer	Linwood Township board
Aaron Diehl	Anoka Conservation District staff	Jamie Schurbon	Anoka Conservation District staff

The purpose of this meeting was to kick-off an update to the Sunrise River Watershed Management Organization (SRWMO) Watershed Management Plan, and get public input on priorities. The meeting was immediately preceded by a public officials' bus tour. The meeting began with a brief presentation about the SRWMO, current priorities and recent projects. Thereafter, a poster exercise was used to get input on priorities from all attendees. The meeting concluded with an open discussion of other watershed topics. All of this input will be considered by the SRWMO throughout preparation of its Watershed Management Plan update, and participants will be called upon periodically during the planning process as a Citizen Advisory Committee.

Meeting components

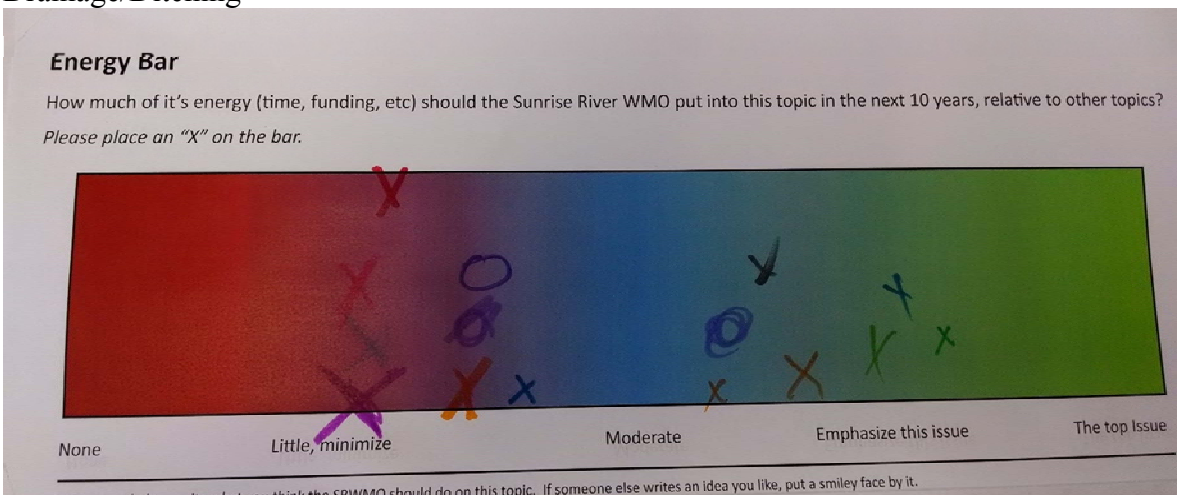
1. **Sunrise River WMO Presentation**
   Jamie Schurbon informed attendees about the SRWMO and its recent projects.
2. **Poster activity**
   Participants visited posters, each of which contained a priority topic that had been previously selected by the SRWMO board. On the poster participants ranked the amount of energy (time, funds, etc) that the SRWMO should put into that topic. Then, they listed things they believe the SRWMO should do on that topic over the next 10 years. Blank posters were available for adding additional topics. SRWMO board members did not participate and state review agency staff included their agency acronym with any comments so they could be separated from constituent input. Results are below.
3. **Open discussion**
   The group engaged in open discussion about watershed projects. Discussion focused on management of carp, local fundraising to match grants, outreach and social change and other topics.

At the conclusion, Schurbon described that the SRWMO would go through the input gathered and incorporate it into their planning process. Meeting attendees are considered part of the SRWMO's Citizen Advisory Committee for watershed planning unless they opt out (none did). Member city or state review agency staff will comprise the SRWMO's Technical Advisory Committee.

Poster activity topics and input received

Notes:
"x3" (or similar notations) following a comment indicates that one person wrote that comment and two people indicated support by adding a smiley face to that comment."
On the energy bar, constituents placed and "X" while state review agency staff placed an "O."

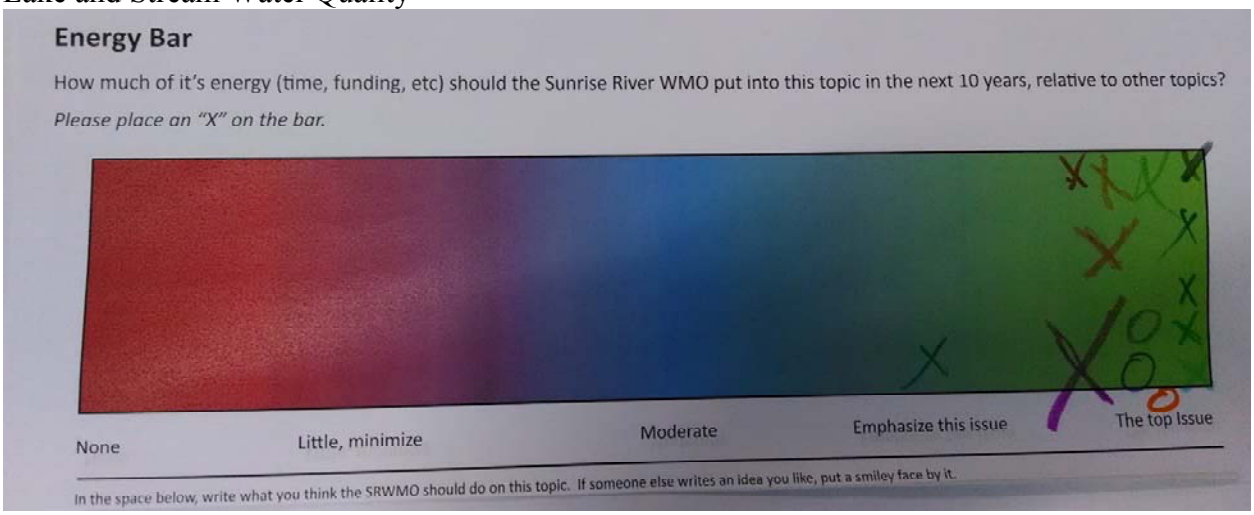
- Drainage/Ditching



  - Use more plant based systems for managing storm water (x3).
  - Shoreline drainage control (x2).
  - Sediment ponds would be a big help (x2).
  - Control water flow.
  - Need to filter for lakes that rely on them.

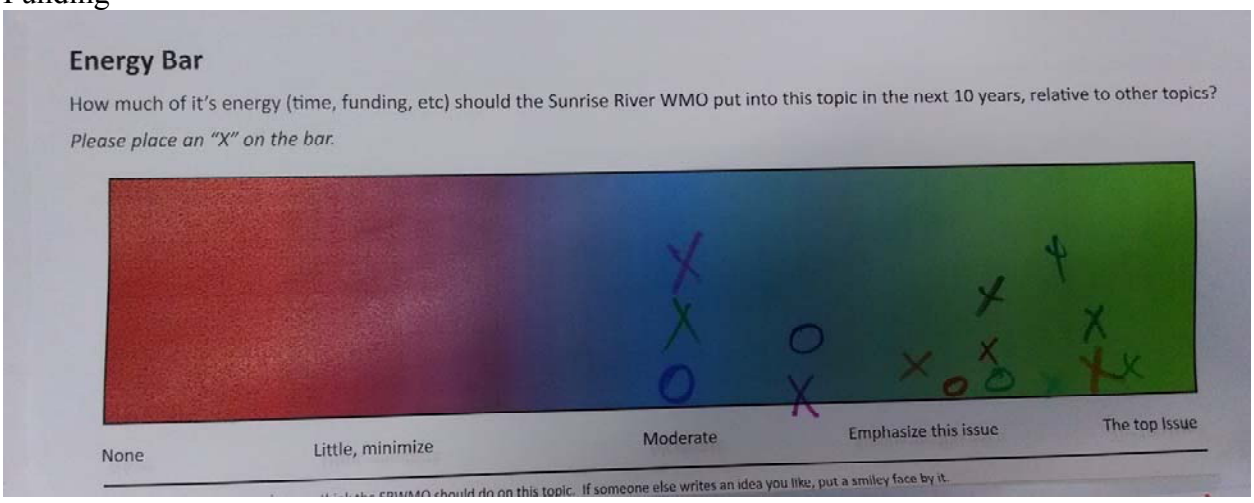
- BWSR – Figure out function/purpose and who is responsible for maintaining them. Also, do they have positive or negative impact on the resources?
- Met Council - Flood control is an expected responsibility of WMOs and is a priority for the council.

- Lake and Stream Water Quality



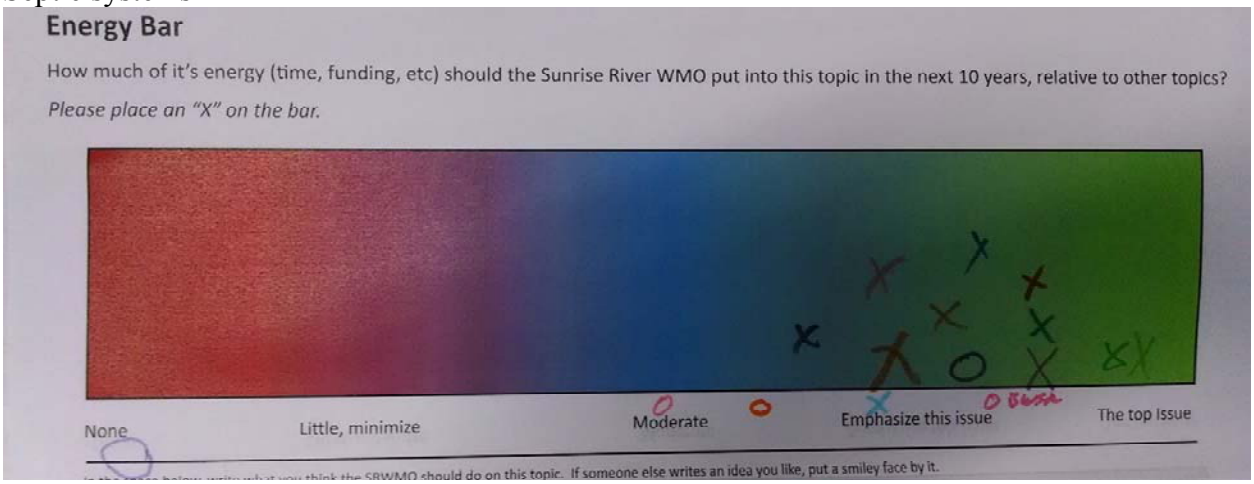
- Biodiversity needs excellent water quality to survive (x6).
- If the water quality is good, it will reduce the other issues such as invasive species, clarity, etc (x5).
- Carp monitoring study has been informative. Do commercial carp harvest (more bang for buck). Look to extend current three year study on Martin Lake.
- Have events so people can enjoy the high quality recreation possible with high water quality.
- If water is good all others will be good i.e. all septics working.
- This stinks.
- BWSR - Important for property values also and enjoyment of property and resources.

- Funding



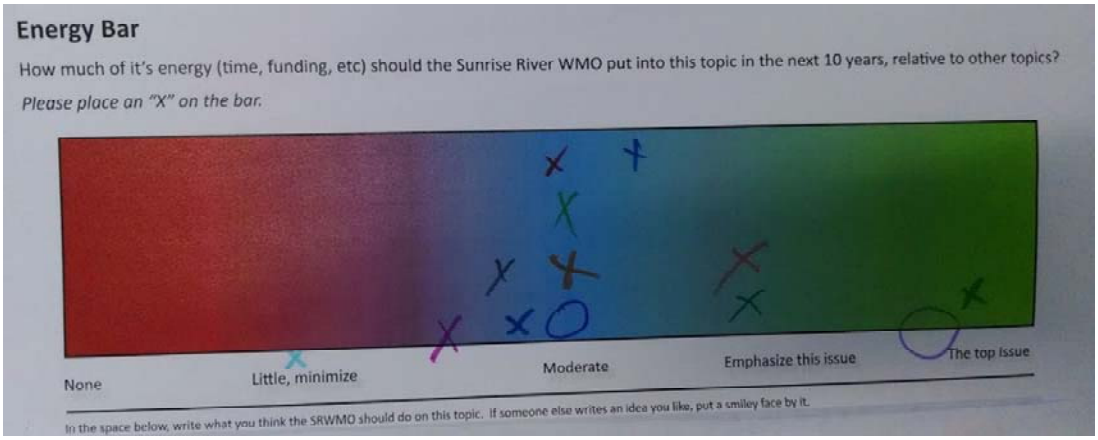
- Identify funding capacity. Factor in all the public non-tax-paying lands. Also high value resources. WMO is responsible for and limits on local funds. Also average income. (x5 plus BWSR and Met Councils supported this comment).
- Funding and prioritizing projects is a huge part of this process. We encourage optimizing this by finding partnerships and outreach emc(?) (x2).
- Key in any projects. ID sources (lake assoc, etc).
- We value what we pay for – have "fun"raisers. Also help out with grant writing efforts when "real people" are asking – grants will come!
- Government exists to help its citizens. We ought to demand funding and work towards securing it.
- Consistency in funding sources can be helpful for long term planning projects.
- Community input.

- Septic systems

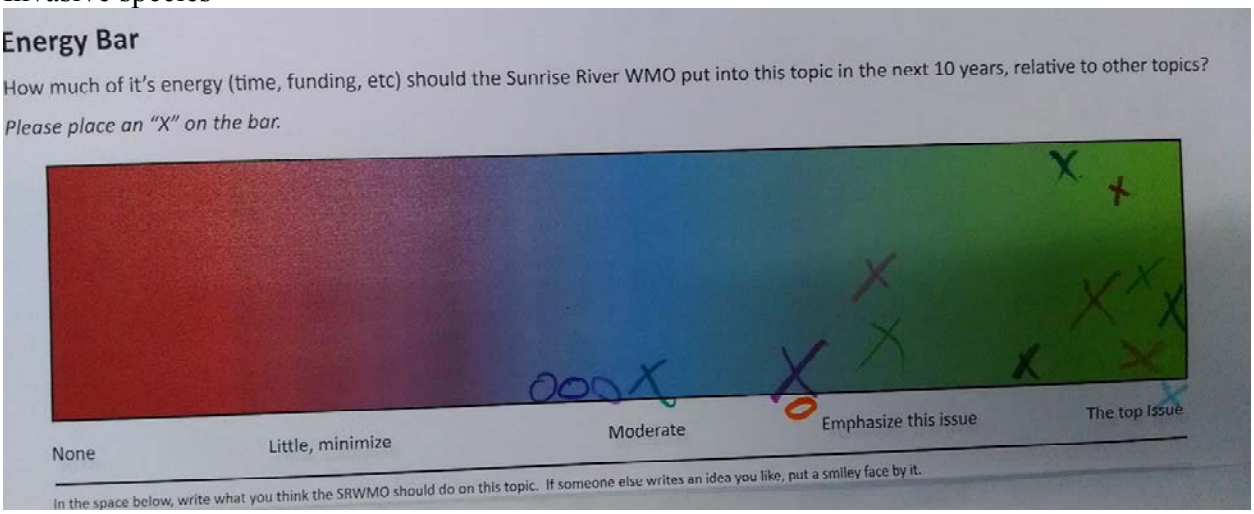


  - MPCA - Ensuring septic systems are compliant and operating properly is an effective means of reducing leaching of phosphorus and bacterian, especially if they are located proximally to lakeshores (x5).
  - More monitoring of problem systems (x4).
  - Work with townships and city officials to ensure they are <u>enforcing</u> the regulations and compliance. BE the liaison for locating grants (x3).
  - Add Martin Lake for grant septic help (x3).
  - BWSR – Should at least figure out if it is a major issue (x2).
  - More help for people unable to afford fixes (x2).
  - Low land cabin create central septic system.
  - 10% of homes polluting.

- Groundwater



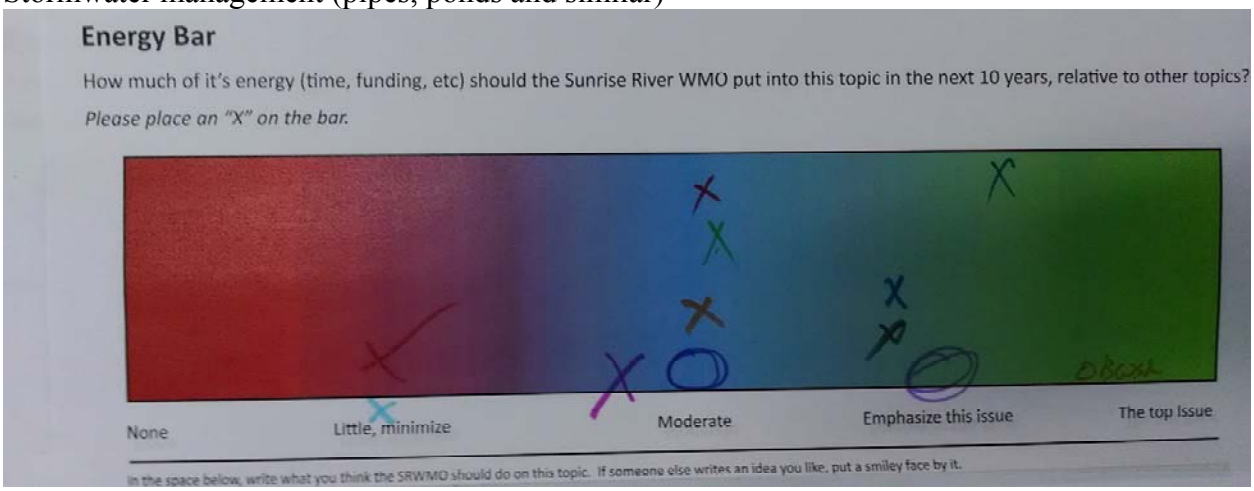
  - I am unaware of the issues facing groundwater (recharge, contamination, etc) in the Sunrise River watershed (x5).
  - Important to allow recharge of aquifer, maintain quality so is safe to drink (x3).
  - Cannot do much with improvement.
  - Protect wetlands from being used as stormwater "dumps." All water is connected. Outreach needed.
  - Met Council - Groundwater/surface water interaction is important to Met Council.
- Invasive species



  - MPCA – Carp management can have an impact on reducing internal loading of phosphorus and water quality can improve (x3).
  - Immediate attention (x2).
  - Bigger fines for people who fail to comply (x2).
  - This has a direct effect on aquatic life (x2).
  - Public access check/monitoring/testing currently going. Better to head off than try to correct (x2).
  - Need continued monitoring to catch invasions quickly when may be treatable.
  - I think there are other agencies that focus on aquatic invasive species, so I'm not certain this is a role of the SRWMO to offer funding on a regular basis or increase funding available.

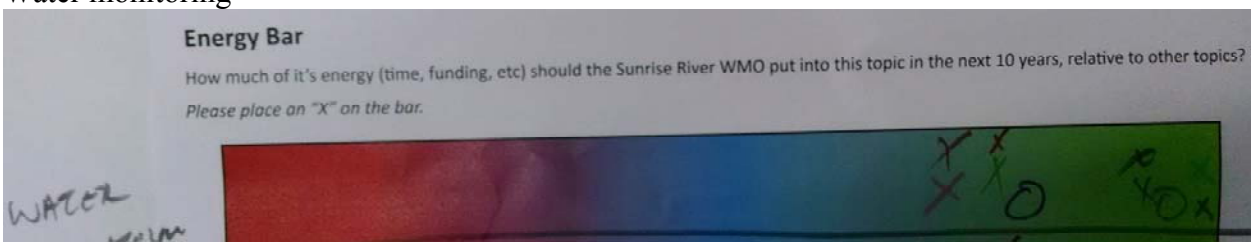
- Outreach with lake groups and school kids, 4-H, etc.
- BWSR and Met Council – Tie to water quality impacts.

- Stormwater management (pipes, ponds and similar)



  - BWSR – Determine if existing rules are sufficient to prevent additional problems. Also need effective operations and maintenance. (x4)
  - MPCA - Although the level of impervious surfaces may not be as concentrated as other metro area watersheds, stormwater can be a significant source of phosphorus loading (x3).
  - Rain gardens seem to be helping (x3).
  - Believe rain gardens are scheduled on Martin Lake.
  - Too hard for people to get involved.
  - Use more rain gardens and lakeshore plantings for stormwater and wildlife.
  - Met Council – The next funding cycle may allow the Met Council to offer stormwater grants to WMO's to help put projects in the ground.

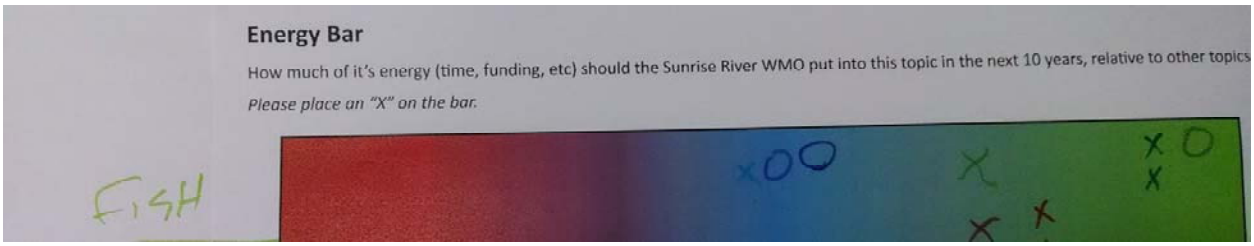
- Water monitoring



  - Boot Lake effect on downstream (Linwood Lake) (x5).
  - Necessary to track progress (or lack thereof) (x2).
  - The more we know the better we are (x2).
  - Monitoring is an effective way of understanding how implementation of BMPs are affecting water quality. Beyond a data/science driven approach, it also tells a story for stakeholders (x2).
  - Already much as been done – but always need more help.
  - BWSR – Use to target projects.
  - Water quality high.
  - Met Council - Water quality is a huge part of who we are in the metro area.

- Chlorides (salt)

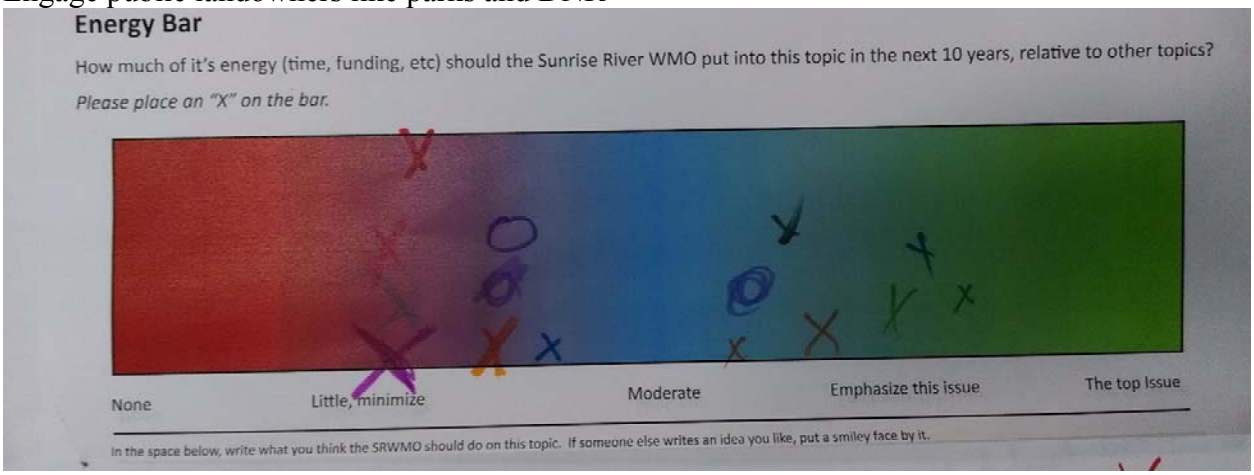
  - As time goes by salt will impact our lakes more and more (x4).
  - Met Council – This is a huge water quality for the region (x2).
  - Cities and townships should try different ways to clear roads.
  - Huge issue – salt never leaves the environment once deposited.
  - BWSR – Also consider water softeners if it is an issue. Do you monitor for it?
  - MCPA - A priority initiative for the MPCA is chloride reduction as a statewide issue. Review of the Twin Cities Chloride Management Plan and using the winter maintenance assessment tools available on the agency website are good places to start.
  - A number of attendees were not familiar with this issue.
- Fisheries



  - Met Council - Fisheries are important when tied to water quality (x3).
  - More fish in a lake means people will take pride in their lake (x2).
  - Also include all forms of wildlife (x2).
- Development, and how it occurs

  - Will be progressively more important as population increases – controls are needed, we should buffer important resources (x3).
  - New development needs to be sustainable (x2).
  - Cities must plan better for a good quality of life for us. Start with citizen committees, there will be "buy in."
  - Not much we can do – much is controlled by Met Council.
  - Met Council – The Met Council is the regional agency that helps guide development in the metro.
  - BWSR – Imp of exist rules, is it effective?

- Engage public landowners like parks and DNR



  - Note: this topic was added per constituent request at the public input meeting. They noted that much of Linwood Lakeshore and other waters are managed by the DNR or Anoka County Parks, and future management will affect these lakes.
  - These should be involved at the very <u>start</u> of any plans (x4).
  - Anoka County would be a natural partner for lakes and trails, invite them! (x4).
  - Met Council - Partnerships help share the land at watershed level issues (x3).
  - BWSR – Also include farm organization, non-governmental organizations, in general implement partnerships for implementation (x3).
- Other
  - Maintain lake levels by repairing dams (x4).
  - On Linwood Lake – dam is in disrepair. Effects water levels. DNR denies this is an issue (x2).
  - Educate lakeshore owner on buffers at lake level shoreline.
  - Provide pet waste disposal options in parks and along trails.

Other Discussion Points

Substantial discussion occurred about the need for carp management to improve water quality, particularly at Martin and Linwood Lakes. The inability to get the permitted area commercial fisherman to remove these fish, even when paid to do so, is a major obstacle.

Notes prepared by Aaron Diehl and Jamie Schurbon

Online Survey to Identify Priority Issues	**SURVEY RESULTS**	**Thurs, May 24, 2018** **6:30 PM to 8 PM** **Coon Lake Community Center 182 Forest Rd, Wyoming, MN 55092**

An online survey for residents was created and promoted in summer 2018 for the Lower St. Croix One Watershed, One Plan (1W1P) process which included the Sunrise River WMO area. While the survey was designed for the broader geography of 1W1P, the responses did also inform the SRWMO planning process. Respondents were asked their county of residence, allowing us to examine only the 27 responses coming from SRWMO residents for some questions. Lake associations distributing this survey are responsible for many of the responses. Survey questions and responses we know are from SRWMO residents included:

Number of responses by county:

Anoka-27	Chisago-15	Isanti-5
Pine-0	Washington-22	Other-2

1. **Please share 3-5 local water resources that are most important to you.** *(answers shown are for all respondents; unable to separate those from only the SRWMO)*

Answers referring to resources outside the SRWMO

Lakes

Big Marine Lake	Bone Lake (12)	Center Lake (2)
Chisago Lake (2)	Comfort Lake (2)	Elin Lake
Fannie Lake	Fish Lake	Florence Lake
Forest Lake (2)	Green Lake	Long Lake–Grandy
Moody Lake (6)	Otter Lake	Paul's Lake
Rush Lake (2)	Second Lake	Skogman Lake (2)
Square Lake (3)	Third Lake	Twin Lakes
White Bear Lake		

Rivers/Streams

Brown's Creek	Cedar Creek	Kettle River
St. Croix tributaries	Mississippi River	Namekagon River
N Branch Sunrise River (3)	Rum River (5)	Valley Creek

Answers referring to resources outside the SRWMO

Lakes

Coon Lake (4)	Island Lake	Linwood Lake (7)
Martin Lake (21)	Typo Lake (7)	

Rivers/Streams

Data Creek (2)	Sunrise River (13)	Typo Creek (5)

Other

Drinking water (4)	Groundwater (8)	Wetlands (2)
Wildlife habitat		

2. **Please share 3-5 water issues in the Lower St. Croix watershed that you think are most important to address.** *(only answers from the SRWMO are shown)*

AIS (6)	Algae (6)	Carp (6)
Water quality (5)	Septic systems (3)	Nutrients (3)
Fertilizer (2)	Water clarity (2)	Shoreline erosion
Waterfowl/hunting habitat (2)	Contaminants	Lake levels
Education	Litter	Cattails
Copper sulfate	Street runoff	Pollution

3. **What is the most important thing regional partners should do to protect water in the Lower St. Croix Watershed?** *(only answers from the SRWMO are shown)*
   Educate and engage the public (8)
   Work together, implement watershed plan, get state funding, set clear goals and measure progress (3)
   Control water pollution (4)
   Reduce runoff / nutrient pollution (3)
   Monitor / control /prevent spread of AIS (3)
   Control carp in lakes (2)

4. **What is one action YOU have taken to protect water in your community?** *(only answers from the SRWMO are shown)*
   Restored / maintained native shoreline or modified landscaping practices (9)
   Don't dump / pick up litter / leave no trace (3)
   Participate in lake association or watershed citizen's advisory committee (2)
   Participate in community events (carp harvest, lake clean-up) (2)
   Helped with AIS monitoring (2)
   Follow rules for shoreline development and boat cleaning (1)
   No longer use 2-cycle outboard (1)

5. **What best describes your home or property**? *(answers shown are for all respondents; unable to separate those from only the SRWMO)*
   Lakeshore, streambank or riverfont property (43)
   Residential lot in the country (15)
   Residential lot in town (11)
   Large acreage, non-agricultural (5)
   Apartment or condo (1)
   Agricultural (1)

6. **Are you affiliated with the following organizations?** *(answers shown are for all respondents; unable to separate those from only the SRWMO)*
   Local lake association (31)
   City or county government (14)
   Non-profit or community environmental group (12)
   Soil and Water Conservation District or Watershed Management Organization (9)
   Hunting or fishing group (6)
   St. Croix River Association (3)
   State or federal agency administering land, water, environment or ag programs (2)

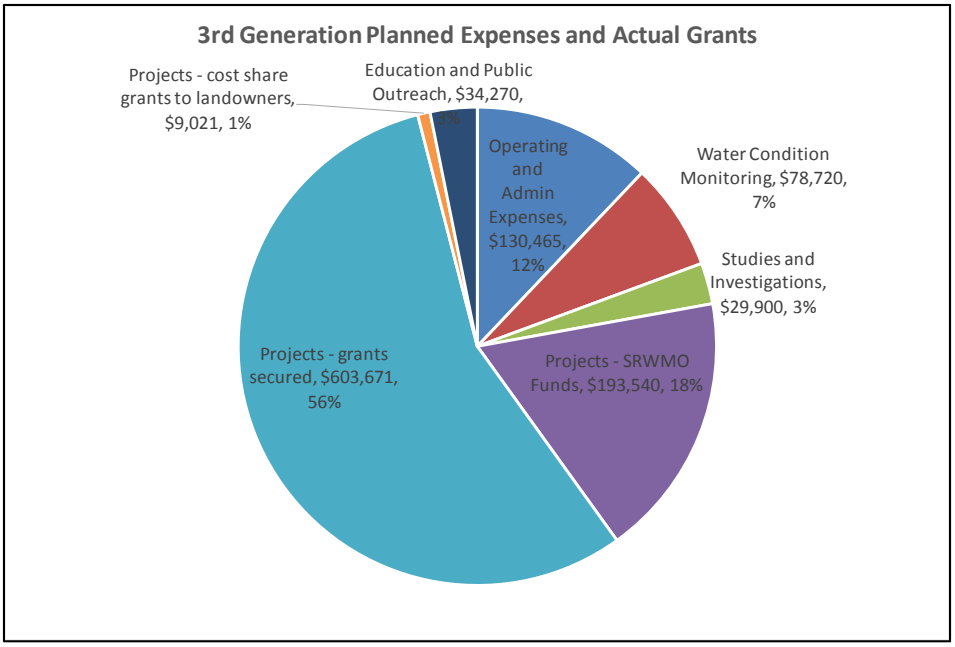
SRWMO Board Evaluation of the 3rd Generation Watershed Management Plan

In July 2018 the SRWMO Board completed an exercise to evaluate implementation of its 3rd Generation Watershed Management Plan. This process focused upon identifying strengths to keep doing and weaknesses upon which to improve. Below are two questionnaires completed during this process. Italics text is a summary of responses from SRWMO Board members. Each ✓ indicates one board member response.

1. **What parts of the plan have you used** at least once (circle all that apply):
    a. Natural resources inventory and assessment ✓✓
    b. Assessment of problems ✓✓
    c. Goals, policies and actions ✓✓✓
    d. Implementation plan (projects, timelines and budgets) ✓✓
    e. Impact on local government
    f. Plan amendment process and local water plan requirements

2. **Was the money spent** on each of the following too much, too little, or about right?

Spending Category	Too Little Spent	About Right	Too Much Spent
Projects	✓	✓✓✓✓✓	
Studies and investigations	✓	✓✓✓✓✓	
Water condition monitoring	✓	✓✓✓✓✓	
Operating and Admin		✓✓✓✓✓	✓
Education and outreach	✓	✓✓✓✓✓	
Projects - Cost share grants to landowners, etc	✓✓✓✓✓	✓	
How did we do securing grants?			
	Not good enough, more effort needed	**About right**	**Too much**
		✓✓✓✓✓	



3. **Did the SRWMO accomplish these goals** set in the current plan? (Place and "X" in the applicable box)

Goal	No, or minimal, progress	Made Progress	Accomp-lished	Uncertain	In the future, is more work needed?	
					Yes	No
20% phosphorus reduction watershed wide (long term goal)	✓	✓✓		✓✓	✓	
Martin and Typo Lake water quality improvement	✓✓✓✓	✓✓		✓	✓✓ ✓	
Maintain good water quality where it exists (Coon, Fawn Lakes, for example)		✓✓✓	✓✓	✓	✓✓	
Citizen monitoring of all lakes		✓✓✓	✓	✓✓		
Partner with lake associations and lakeshore residents		✓✓		✓	✓✓	
All septic systems compliant	✓✓✓✓	✓✓			✓✓	
Everyone in the SRWMO receives and annual watershed education message		✓✓	✓✓	✓✓	✓	
Residents understand what the WMO is and does	✓	✓✓✓✓			✓✓	
No new infestations of invasive plants in SRWMO lakes	✓✓	✓✓	✓	✓	✓	
Existing aquatic invasive plant infestations controlled	✓✓✓	✓	✓	✓	✓✓	

Aquatic native plants viewed as beneficial		✓✓✓		✓✓	✓✓	

4. What about this plan was a flop that we should <u>abandon</u>?

5. What about this plan was a flop that we should <u>fix</u>?
   - *Administrative expenses*

6. What about this plans was notably good that we should <u>keep</u>?
   - *Monitoring and reporting*
   - *Everything should be kept on the current plans.*

Other Discussion:

- *The plan length is about right.*
- *Expenditures to various expense categories were about right but more project cost share grants to landowners are desired, particularly for shoreline restorations.*
- *More outreach and education is needed and it should be on a more personal level to be effective.*
- *Outreach should be structured to promote project installations.*
- *More DNR enforcement of illegal shoreline alterations is needed.*
- *Septic system failures continue to be a problem. Detection of problem systems and offering assistance to fix them is important.*

QUESTIONAIRE

Your Vision for the Next SRWMO Plan

Brown text is a summary of responses from SRWMO Board members in July 2018. Each ✓ indicates one board member response.

1. **Length of the next plan** should be:
   - ✓✓ Shorter than the current plan
   - ✓✓✓✓ About the same
   - Longer to add detail
   - Any length, as long as it includes 10 or less key pages with project lists, budgets, and the other stuff we really use.
   - Other:

2. **Scope of the plan** should be:
   - ✓✓ Broad - Set holistic goals for the WMO, cities and others for the long term. We may have many goals.
   - Narrow - Focus on short term tasks the WMO will do. We should have few goals and focus.
   - ✓✓✓✓Medium - A mix of broad long term goals and short term tasks. Focus mostly on the WMO and member cities.
   - Other:

3. **The amount of work**, compared to the current watershed plan, should:
   - Shrink.
   - ✓ Stay the same.
   - ✓✓✓ Increase or spread into new areas to address unmet needs.
   - ✓✓✓ Depends. We need to assess the need first.
   - Other:

4. **Expenditures**, compared to the current watershed plan, should:
   - Shrink.
   - ✓ Stay the same.
   - ✓✓✓ Increase.
   - ✓✓✓✓ Depends. We need to assess the need first.
   - Other:

5. **The biggest challenge(s) for this WMO** in the next 10 years will be (circle as many as you like):
   - ✓✓ Difficult to fix water resources issues
   - Water resources projects originating beyond our jurisdictional area
   - ✓✓✓✓ Funding
   - ✓ Unsupportive member cities or councils
   - Disagreements within the board
   - ✓ Board turnover
   - ✓ Lack of staff or contracted help

- ✓✓✓✓ Lack of community awareness or support of the WMO and its projects
- ✓✓ Lack of partners, especially those willing to help fund projects
- ✓ Paralysis by analysis – too many plans and studies, not enough projects
- Other:

6. **New things for the WMO in the next 10 years** should be (check all that you like):
   - ✓✓✓✓ Working with upstream and downstream entities, including participating in regional partnerships like One Watershed, One Plan
   - ✓✓✓ Groundwater work
   - ✓ Ditch management and cleaning
   - ✓ Regulation and permitting by the WMO
   - ✓✓✓ Regulation and permitting through cities (i.e. provide minimum standards for city ordinances)
   - ✓✓ More project money due to Watershed Based Funding
   - Other:

7. **What do we need to do for your city to be supportive** of the WMO Plan?
   - *Keep $$ low.*
   - *Get resident support.*
   - *High value for relatively low cost.*
   - *Watershed Based Funding is an incentive for strong city participation. City projects are eligible for this funding only if they are in the SRWMO Plan.*
   - *Planning updates can be given to city councils and staff at planning milestones such as priority setting. An update to them about the May 24 planning kickoff event may be in order. Having city staff help give these presentations may be useful.*
   - *City staff should serve on the planning technical advisory committee. That committee may want to meet relatively soon to discuss Watershed Based Funding implications for planning, comparisons of city water-related ordinances, and local water plan updates that are currently ongoing.*

Other discussion at 4/12/2018 meeting

- *The new watershed plan should be reviewed and updated/amended every two years during its life.*
- *A desire for more cost share grants that encourage residents to do water quality projects. This may be a way to get more work done with minimal additional expenditure.*
- *Increased community awareness of the SRWMO and water quality is needed.*

APPENDIX B:

SRWMO REGULATORY STANDARDS

Sunrise River Watershed Management Organization

Regulatory Standards

Administration

The SRWMO does not have a permitting program. These standards will be administered by the member communities of the SRWMO. Each community must adopt standards at least as protective as, and consistent with, the SRWMO standards in their ordinances, and implement them.

Stormwater

Goal: Maintain water quality and promote infiltration in sandy soils.

Standards:

- **Applicability:** These standards apply to:
  - Subdivision or development of three or more lots OR
  - >1 ac disturbance creating new impervious surfaces.
  - Issuance of new building permits for individual lots in the shoreland zone – in this instance the only applicable standard is that impervious surfaces on the lot may not exceed 25%.
- **Volume control:** Retain 1" from impervious surfaces, preferably by infiltration.
- **Pollutant control:** Post-development must equal pre-development for total phosphorus and suspended solids for the 2-, 10- and 100-year 24-hour storm events.
- **Rate control:** Post-development rates must equal pre-development for the 2-, 10- and 100-year 24-hour storm events.
- **What to do if infiltration is difficult or not advised:** Volume retention, with infiltration and minimizing runoff-generating surfaces as the preferred techniques, must be used to the maximum extent practical to achieve the SRWMO standards. Maximum extent practical shall be determined by the local permitting authority (city or township). Infiltration is prohibited in the circumstances described in the MN Stormwater Manual Design Criteria for Infiltration, including runoff from fueling stations, in the emergency response area of a drinking water supply management area and others.
- **Exempt activities:** road mill and overlay, maintenance and paving of existing gravel roads, agricultural production not creating impervious surfaces, and emergency activities necessary for protection of life, property or natural resources.
- **Special considerations in the shoreland zone:** Impervious surfaces must not exceed 25% of lot area.
- **Pre-treatment** is required before water enters an infiltration practice.

- **Must utilize Atlas 14** precip data when estimating stormwater rates, volumes and pollutants.
- **A legally binding and enforceable maintenance plan** clarifying responsible parties is required for all stormwater infiltration or retention practices.

Wetlands

Goals:

- Filter runoff through a vegetated buffer.
- Prevent disturbance within the wetland.

Standards:

- **Applicability:** These standards apply to:
  - Subdivision or development of three or more lots OR
  - >1 ac disturbance creating new impervious surfaces.
- Buffer width: A minimum 16.5 ft perennially vegetated buffer is required at the wetland boundary.
- **Protections during construction:** The delineated wetland, but not necessarily the buffer area, must be protected during construction with protected with appropriate perimeter erosion control.
- **Buffer seeding:** Any areas where vegetation is removed in the buffer area during construction must be reseeded with a native seed mix, and the applicant is responsible for maintenance or reseeding for 3 years through a legally enforceable agreement with the city/township. These requirements do not apply if the buffer area vegetation is not disturbed during construction.
- **Buffer vegetation:** Buffer shall be a perennial, unmowed vegetation creating continuous cover. Existing vegetation may be used.
- **Buffer within an easement:** The buffer shall be within a drainage and utility easement with the community's restrictions on structures and other activities in a drainage and utility easement.
- **Stormwater discharge to wetlands:** Discharged stormwater must be treated to SRWMO stormwater standards.
- **Water level bounce:** Allowable water level bounce in wetlands must follow MPCA guidance document - *Stormwater and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands*," Minnesota Pollution Control Agency 1997, or subsequent updates.
- **Variances:** Buffer variances may be granted in any of the following conditions:
  - Small wetlands where the entire wetland area is less than or equal to the area of wetland impact allowed without replacement as *de minimis* under the MN Wetland Conservation Act. It is acceptable to have no buffers in these cases.

- Part of the required buffer is outside of the wetland's watershed. Due to topography near the wetland, runoff flows away from and never enters the wetland through surface flows. Variances should only be for that portion of the buffer that would be outside of the wetland's watershed.
- If drainage is redirected to an area where a buffer is feasible.
- If the site is not generating stormwater or is using storm water minimizing techniques that also provide habitat value such as rain gardens, vegetated swales, and other Best Management Practices (BMP's) replace the functions of buffers.
- If the applicant is protecting additional upland, beyond that required by other ordinances or control measures, to connect existing wildlife habitat.
- Undue hardship, as defined in MN Statutes 462.357, subd. 6, subpart 2.
- Others as determined by the permitting authority.
- Roads and other linear projects, except those created as part of new residential or commercial developments.

Subsurface Sewage Treatment Systems

Short term goal: Have consistent triggers for periodic septic system inspections that result in non-compliant systems getting fixed.

Long term goals: If grant funds can be secured,

- Expand triggers for septic system inspections to include property transfer in all SRWMO communities. East Bethel and Columbus have this, Linwood and Ham Lake do not. The SRWMO will pursue grants for development and update of these ordinances, and setting up a process to implement it.
- Provide septic system inspections of all parcels throughout the shoreland district.
- Install community systems where it is more economical than individual fixes.
- Increase grant funds to homeowners for fixing failing septic systems. Priority area is the shoreland zone.

Standards:

- Building permit applications to add a bedroom or square footage shall follow the MN Rules 7080 requirement for a review of the onsite sewage treatment system's design to determine if additional flow can be accommodated.
- Communities must track septic system pumping at each residence or business.
- Communities must send maintenance reminders for residences where the community has no record of maintenance in the last three years.

APPENDIX C:

MEMBER COMMUNITIES' RESPONSIBLITIES SUMMARY

Member Community Responsibilities Summary

This list includes all member community actions in the SRWMO 4th Generation Watershed Management Plan. It serves as a checklist for communities when they prepare local water management plans. It must be submitted to the SRWMO with draft local water management plans, including populating the three right columns. Notes may be added within the "action" column if appropriate.

The SRWMO recognizes that not all items in the action list are appropriate to put in a local water plan. Some are simply routine tasks the city is committed to doing. Those can be indicated in the table below by checking the appropriate column. Communities will need to report completion of all items in annual reporting to the SRWMO using this checklist.

Ref #	Member Community Action	In Local Water Plan	Not in Plan, but city will complete as routine business	Page/section in Local Water Plan, if applicable
		Check ✓ appropriate box		
MC1	**Linwood Township will continue to own and maintain the Martin and Typo Lake carp barriers**, including maintenance cleaning and installing/removing the screens seasonally.			
MC 18	**East Bethel's Finance Director will continue to provide SRWMO assistance** including preparing checks, keeping a financial ledger, invoicing and third-party oversight.			
MC2	**Provide projects for State Watershed Based Funding consideration** to the SRWMO. This non-competitive grant is available to projects in the WMO plan with water quality benefits that do not supplant existing funding.			
MC3	**Provide time annually during a city council or town board work session** to hear a SRWMO update.			
MC4	**Annually report to the SRWMO** accomplishments towards work in this Plan. The reports provide assurance to the SRWMO that planned work is getting done and will be used in SRWMO required reporting to the State.			
MC5	**Provide a link on the community's website to the SRWMO website**.			
MC6	**Provide space in community newsletters for ¼ page minimum SRWMO articles**.			
MC7 MC12 MC16 MC23	**Implement SRWMO septic system and stormwater standards** (Appendix B of SRWMO Plan).			
MC8	**Adopt and enforce a septic system ordinance consistent MN Rules** 7080-7082 and Statues 115.55-56.			

Ref #	Member Community Action	In Local Water Plan	Not in Plan, but city will complete as routine business	Page/section in Local Water Plan, if applicable
MC9	**Add the SRWMO onto distribution lists for development sketch plan reviews**. Consider, but not be bound by, SRWMO comments on development proposals.			
MC10	**Serve as the Local Governmental Units (LGU) administering MN Wetland Conservation Act** in SRWMO.			
MC11	**Fulfill the duties of MS4 permits with the State (for permitted communities only)**. Among these duties the SRWMO's priorities are: (1) inspection and maintenance of existing stormwater treatment, (2) map stormwater conveyance and treatment systems, and (3) ensure new development and redevelopment has the required stormwater treatment (4) sweep streets with curb and gutter once annually in all areas, and twice annually in priority areas. Priority areas shall be areas that drain directly to water bodies and/or natural wetlands without pretreatment of storm water runoff.			
MC13	**Condense all municipal stormwater standards or rules** that are currently in local water plans, storm water pollution prevention plans, ordinances or other documents and place them all (or links to them) in a single location.			
MC14	**Provide household hazardous waste disposal information on community websites**, ultimately directing residents to the Anoka County Household Hazardous Waste Facility.			
MC15	**Provide Anoka County Well Water Wise private well testing program** on community websites.			
MC17	**Preferentially consider applicants for SRWMO Board appointments who are members of stakeholder groups** such as lake associations or local elected officials. Final appointment decisions are always at the discretion of the appointing body.			
MC19 MC23	**Operate permitting programs**. Each member community will adopt, implement, and enforce ordinances that meet or exceed the standards in this Plan. Required ordinances include: • Septic system ordinance • Stormwater ordinance • Wetland ordinance			
MC20	**Obtain level 1 MPCA Smart Salting Certification for all snow plow drivers** within two years of adoption of this plan or their hire date.			

Ref #	Member Community Action	In Local Water Plan	Not in Plan, but city will complete as routine business	Page/section in Local Water Plan, if applicable
MC21	**Obtain level 2 MPCA Smart Salting Certification** (one certification per municipality) within two years of adoption of this plan. **Maintain level 2 MPCA Smart Salting Certification** by annually submitting Best Management Practices and Salt Savings report through the MPCA Winter Maintenance Assessment tool.			
MC22	**Utilize Atlas 14 precipitation data** when implementing stormwater or development ordinances.			
MC24	**Perform maintenance measures** to assure proper function of public drainage system, with the exception of County ditches which are managed by the Anoka County Highway Department.			

APPENDIX D:

GUIDANCE DOCUMENTS LIST

PROJECT PRIORITIZING, TARGETING AND FEASIBLITY STUDIES

SRWMO guidance documents. The following studies and reports are incorporated into the SRWMO plan by reference, were used in the development of this SRWMO Watershed Management Plan, and will be used guide implementation of this management plan. All will be posted in pdf form on the SRWMO website upon approval of this SRWMO plan. Additionally the original public source of the report is noted in the table below.

Guidance Document	Date	Description	Author(s)
Plans and Studies			
Lower St. Croix One Watershed One Plan	2020	An inter-jurisdictional management plan collaboratively created by counties and watershed organizations. It provides regional priorities and goals.	Local collaborative with funding from the MN Board of Water and Soil Resources
Sunrise River Watershed Restoration and Protection Strategies (WRAPS)	2014	This report included water monitoring, water quality analysis and modeling to recommend management actions. Complementary reports include a Sunrise River SWAT Modeling Report and others on the MPCA website for the Sunrise River Watershed. Available at MPCA website.	MN Pollution Control Agency and Chisago Soil and Water Conservation District
Sunrise River Watershed Total Maximum Daily Load	2014	This study estimated pollutant reductions needed at impaired waterbodies. Available at MPCA website.	MN Pollution Control Agency and Chisago Soil and Water Conservation District
Martin and Typo Lake Total Maximum Daily Load (TMDL)	2012	A study of excess phosphorus sources in Martin and Typo Lakes, and high pH and turbidity in the segment of the W. Branch of the Sunrise River in between. Includes pollutant source analysis, reductions needed to meet water quality standards, and an implementation plan. Available at MPCA website.	MN Pollution Control Agency and Anoka Conservation District
Lake St. Croix TMDL Study	2011	A study of excess phosphorus sources to Lake St. Croix. Includes pollutant source analysis, reductions needed to meet water quality standards, and an implementation plan. Available at MPCA website.	MN Pollution Control Agency
Sunrise River Watershed Study	2013	Part of the creation of a TMDL study for the entire Sunrise River watershed, this study includes fish and invertebrate inventories, geomorphic assessment, and creation of a Soil and Water Assessment Tool (SWAT) model. Management recommendations are included. Available at Chisago Co website.	US Army Corps of Engineers
Anoka Sand Plain Partnership 10-Year Strategic Conservation Action Plan	2019	An inter-jurisdictional management plan aimed to identify and implement projects that protect, restore and enhance the landscape through strategic actions and locations to maximize conservation goals. The plan highlights the ecological significance of habitats, groundwater recharge and water quality concerns in the SRWMO as regional priorities. This plan is used to guide priorities, goals, and actions to conserve and restore the natural resources in the region.	Local collaborative

Guidance Document	Date	Description	Author(s)
Anoka County Water Resources Report	2014	This is Anoka County's alternative to a groundwater plan. It includes county-wide information about groundwater issues. It also discusses the protection and management of surface water resources. Available at Anoka County website.	Anoka County
Anoka County Geologic Atlas	2015	A map-based report of geology and hydrogeology. Available at University of MN (part A) and DNR (part B) websites.	MN DNR and University of Minnesota
Project Prioritizing and Targeting Documents			
Martin Lake Carp Management Report and Future Management Feasibility Assessment	2019	This study reports on carp management feasibility and compares it to other water quality projects on a cost effectiveness basis.	Carp Solutions LLC
Linwood Lake Carp Management Feasibility Assessment	2019	This study reports on carp management feasibility and compares it to other water quality projects on a cost effectiveness basis.	Carp Solutions LLC
Ditch 20 Wetland Restoration Feasibility Study to Benefit Downstream Water Quality	2018	This study identified, ranked and provided concept designs for wetland restorations projects upstream of Typo Lake. The projects are aimed at reducing phosphorus export to downstream lakes. Available at the ACD website.	Anoka Conservation District
Martin Lake Stormwater Retrofit Assessment	2011	This study identifies water quality improvement projects within the direct drainage area to Coon Lake. 15 projects are ranked by cost effectiveness at pollutant reduction. Available at ACD website.	Anoka Conservation District
Coon Lake Stormwater Retrofit Analysis	2014	This study identifies water quality improvement projects within the Coon Lake subwatershed. 30 projects are ranked by cost effectiveness at pollutant reduction. Available at ACD website.	Anoka Conservation District

APPENDIX E:

SRWMO SELF-EVALUATION TEMPLATES

To facilitate annual reporting and self-evaluation the SRWMO has prepared templates for self-evaluation of goals and implementation activities. The templates will be populated annually and used within annual reports to BWSR.

The templates are shown in their entirety here, but when populated annually the size of the cells will need to be larger to accommodate text. To manage space, only the most recent completed years will be shown in annual reports. The SRWMO will maintain a digital version of this template. That digital version will be updated according to any future plan amendments.

SRWMO Goals Evaluation Template

Year: _____

			Progress Description						
#	Goal	Related actions in the current year	Not applicable - No progress was planned by this time	Progress planned, but none achieved	Progress, but less than planned	Progress-ing as planned	Ahead of plan	✓ Goal Accomplished	Notes/Description
High Priority Issue Lake and Stream Water Quality									
G1	**Complete eight conservation plans by 2022 for landowners.** Highest priority properties are those with livestock/horses and sites within impaired waters' watershed. Work to be done by the BWSR/NRCS funded Watershed Conservation Planner housed at Chisago SWCD.								__of eight conservation plans done
G2	**Implement projects in five conservation plans** produced by the BWSR/NRCS funded Watershed Conservation Planner housed at Chisago SWCD. Funding sources may include federal agriculture programs or other existing programs.								__of five projects implemented
G3	**Create a new BMP incentives program to benefit lake water quality** that increases participation by increasing available funding and operating the program jointly with lake associations. The SRWMO will provide primary funding while the lake associations will, where willing, provide most promotion & outreach. Where lake associations do not participate the SRWMO will continue to directly offer cost share grants to homeowners.								Program created: yes/no. # projects funded: ____.
G4	**20% or less of lakeshore will be mowed turf to the water's edge or retaining walls.** When most recently inventoried in 2004 lakes had 20% (Linwood Lake), 24% (Coon Lake), 27% (Martin Lake), 37% (Fawn Lake), 4% (Typo Lake). **Install at least two lakeshore buffer or stewardship projects per year** to work toward this goal.								% mowed turf at each lake: ____. # lakeshore projects installed this year:__ and since 2020:__.
G5	**Manage carp in Typo, Martin, Linwood and Coon Lakes recreational lakes to 100/kg per hectare**, the threshold above which they are destructive to lake health. This is equivalent to 89 lbs/acre.								Describe lakes, carp biomass and progress toward goals.
G6	**Road deicing salt will be minimized** through training on effective, science-based deicing techniques.								See specific accomplishments in chlorides section below.
G7	**Work toward 20% phosphorus reduction within the SRWMO** to help meet the multi-agency St. Croix Basin TMDL 20% reduction goal for the entire Sunrise River watershed.								Estimates pollutant reductions In SRWMO: ___ and elsewhere in watershed: (see St. Croix Basin Team
G8	**Achieve pollutant reductions needed to get Martin and Linwood Lakes off the impaired waters list and work toward the reductions needed for other waterbodies.** See plan text for more detail on targeted pollutant reductions management strategies.								Projects and pollutant reductions: ____
G9	**Maintain Coon Lake water quality** through projects that offset landscape pressures that might cause eutrophication.								Coon Lake projects and pollutant reductions: ___

			Progress Description						
#	Goal	Related actions in the current year	Not applicable - No progress was planned by this time	Progress planned, but none achieved	Progress, but less than planned	Progressing as planned	Progressing, ahead of plan	✓ Goal Accomplished	Notes/Description
High Priority - Water Monitoring									
G10	Monitor the effectiveness of installed water quality projects (**effectiveness monitoring**).								Planned water monitoring (see table in plan)
G11	Diagnose water quality problems to inform management (**diagnostic monitoring**).								
G12	Detect changes or trends (**surveillance monitoring**).								
High Priority - Funding									
G13	**SRWMO continues to have approximately 50% of its budget grant funded**.	All							__% grant funded to date.
G14	**Maintain average annual budgets of local funds from member communities <$50,000 from 2020-2025 and <$60,000 from 2026-2030.**	All							Annual budget difference from target in current year: ___ and since 2020: ___.
G15	**Minimize budget variations amongst years.** This requires carrying a balance forward from lower expenditure years to pay for future higher expenditure years.								
G16	**Always have the 10% match required** to secure non-competitive Watershed Based Funding from the State Clean Water Legacy Fund.								Match shortfalls, if any: ___
G17	**Never ask member communities for additional funding** above an approved annual budget to cover unforeseen circumstances.								Special funding requests to cities, if any: ____
G18	**Solicit quotes for professional services** every two years.								Years quotes solicited: ___
High Priority - Communications with Member Communities									
G19	**City councils know about SRWMO projects.**								Describe outreach to
G20	**Annually deliver a written and in person report to city councils and town board.**								Written reports: __ of 4 member communities.
G21	**SRWMO board meetings are posted on each member community's calendar.**								__ of 4 communities' calendars.
High Priority - Outreach and Education									
G22	**Personal, relevant communications** for the key messages and timeline described in the plan text (section 7.5, goal 22).								Deviations from plan: ___
G23	**Diversify outreach methods**, using three different methods each year. Outreach methods shall be prioritized as follows: Highest priority and frequency: member community and lake association newsletters, SRWMO website, workshops, displays and personal interactions. Lower priority and frequency: signage in public places (especially for AIS prevention), direct mailings (for neighborhood-specific issues), social media (for current events items).								Outreach methods used, and frequency: ___
G24	**Consistent messaging across time and space**, including consistency with neighboring jurisdictions.								Describe actions: ____

			Progress Description						
#	Goal	Related actions in the current year	Not applicable - No progress was planned by this time	Progress planned, but none achieved	Progress, but less than planned	Progressing as planned	Progressing, ahead of plan	✓ Goal Accomplished	Notes/Description
G25	**SRWMO becomes a regular contributor to lake association newsletters.**								___ lake association newsletter contributions.
G26	**Promote every completed project** in the lake associations' newsletters, website, Facebook or similar.								__ of __ completed projects promoted.
Medium Priority - Aquatic Invasive Species									
G27	**Identify new infestations** early.								County AIS program
G28	**Contain or eradicate any small scale, newly discovered infestations**.								New infestations and actions: __
Medium Priority - Septic Systems									
G29	**Locate and fix** non-functioning septic systems.								__ located and __ fixed.
G30	**Annually promote to financial assistance** available through Anoka County and Anoka Conservation District for fixing non-compliant septic systems. The SRWMO's target audience is shoreland residents. Support any efforts to increase available funding, which is far less than need.								Program promotion: ___
G31	**Secure grant funds to** (a) develop, and set up implementation of, point of sale septic system inspection requirements. These requirements currently do not exist in Ham Lake or Linwood; (b) inspect shoreland septic systems older than 10 years or without a certificate of compliance in the last 10 years; and (c) assist East Bethel with developing an automated SSTS maintenance tracking and reminder system.								Grants sought or secured: ___
Medium Priority - Development									
G32	**Identify any undesirable natural resource impacts of proposed developments and recommended alternatives** early in the planning process.								__ development reviews.
Medium Priority - Multi-Partner Coordination									
G33	**Every SRWMO water quality improvement project has support from affected stakeholders** including member communities, lake groups, adjacent water management entities, or others.								Recent projects and their supporters: ___
G34	**Attend at least two stakeholder/partner events per year.** The most common example is lake association meetings.								Stakeholder events attended:___
G35	**Partner with Anoka County Parks on shoreline or stormwater demonstration projects.**								Projects progress: ___
Medium Priority - Stormwater Management									
G36	**City stormwater regulations are consistent** with SRWMO Stormwater Standards.								__ of 4 commmunities
G37	**City Stormwater regulations are all found in a single place.** Currently some may be distributed amongst local water plans, storm water pollution prevention plans, ordinances making it difficult for permitting staff and permittees to properly implement.								Cities that have consolidated regulations: ____

			Progress Description						
#	Goal	Related actions in the current year	Not applicable - No progress was planned by this time	Progress planned, but none achieved	Progress, but less than planned	Progressing as planned	Progressing, ahead of plan	✓ Goal Accomplished	Notes/Description
Medium Priority - Groundwater									
G38	**Residents are advised to test private wells regularly for contaminants**.								Describe outreach: ___
G39	**All irrigation systems will be "smart" by 2040**, providing water when needed based upon soil moisture and forecasted rain.								
G40	**Five residential or one larger "smart" irrigation systems will be installed** during the 10-years of this Plan, partially using SRWMO incentive grants. Larger irrigation systems include sporting fields, homeowner associations, schools, or other campuses.								__ of 5 residential and __ of 1 larger systems installed.
G41	**Prevent improper household hazardous waste disposal**.								Household hazardous waste disposal options and promo (
Medium Priority - Administrative Efficiencies									
G42	**SRWMO continues to spend <20% of its local funds on administration on average across years**. Administration, for this purpose, ,includes the following items for which the SRWMO has some control over costs: recording secretary, reporting, and administrative assistance.								__% of local funds spent on admin.
G43	**SRWMO will have a key contact perso**n that can be reached by the public or agencies.								Key contact person: ____
G44	**SRWMO meetings are efficient and occur no more than eight times per year.**								__ meetings this year.
G45	**Board members include representatives from key stakeholder groups** including lake residents and local elected officials.								Stakeholder groups represented on SRWMO Board: ____
G46	**Correct the SRWMO boundary.** Presently eight parcels that are part of the SRWMO are in an area that is discontinuous with the rest of the SRWMO. Corrections are needed with the Rice Creek Watershed District (RCWD) boundary. Starting in 2019 the RCWD is systematically examining hydrologic and political boundaries with the SRWMO. A petition to the state for boundary amendment is anticipated.								Boundary correction done: yes/no
Medium Priority - Chlorides									
G47	**Increase municipal snow plow drivers with level 1 MPCA Smart Salting Certification from one to 100%** of member community plow drivers.								__% of municipal snow plow drivers with level 1 certification.
G48	**Increase the number of member communities with level 2 MPCA Smart Salting Certification from zero to four (100%).** This is an organizational certification that requires completing an organizational salt saving assessment using the online Winter Maintenance Assessment tool.								__% of communities with level 1 certification.

			Progress Description						
#	Goal	Related actions in the current year	Not applicable - No progress was planned by this time	Progress planned, but none achieved	Progress, but less than planned	Progressing as planned	Progressing, ahead of plan	✓ Goal Accomplished	Notes/Description
G49	**Member communities' will have technology on board plow trucks** that helps ensure only the amount of deicing agent required to achieve safe roads.								Describe: ___
Lower Priority - Ditching/Drainage									
G50	**Ditch maintenance activities, if any, will not have a negative water quality impact** on downstream streams and lakes.								Describe: ___
G51	**Replace the deteriorating Linwood Lake outlet weir**, which is owned by the MN DNR. The structure is important to maintain lake levels.								Describe outreach to DNR: ___
Lower Priority - Climate Change									
G52	**Stormwater facilities should be designed to accommodate storm frequencies and intensities** in the most up-to-date climatological data: Atlas 14.								__ of 4 communities using Atlas 14.
Lower Priority - Water Quantity									
G53	**Hydrological systems will be managed to keep current discharge rates and volumes**.								__ of 4 with ordinances requiring pre- and post-
Lower Priority - Fisheries									
G54	**Reduce rough fish when they negatively affect water quality.**								See accomplishments in water quality section above.
G55	**Maintain strong pan fish populations** that will control spawning success of common carp.								Describe: __
G56	**Winter aeration systems will be used** where winterkills of game fish may occur. Loss of game fish affects recreational opportunities and lake water quality.								Aeration in operation at: ___.
Lower Priority - Wildlife Habitat									
G57	**Private and public owners of biologically significant areas will protect, enhance and/or maintain ecological integrity.**								Describe land protection or habitat maintenance: ___
G58	**Restore at least one wetland** in the SRWMO that benefits water quality and habitat.								Wetlands restored: ___

SRWMO Implementation Evaluation Template

#	Plan Action	Funding*	Estimated Expenditure																						TOTAL
			2020		2021		2022		2023		2024		2025		2026		2027		2028		2029			
			Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done		
Operating Tasks (as defined by JPA)																									
1	Recording Secretary services - contractual	SRWMO	$1,400		$1,449		$1,500		$1,552		$1,607		$1,663		$1,721		$1,781		$1,844		$1,908				$16,424
2	Administrator services - contractual	SRWMO	$6,000		$6,210		$6,427		$6,652		$6,885		$7,126		$7,376		$7,634		$7,901		$8,177				$70,388
3	Fiscal mgmt assistance - E Bethel Finance Director & Treasurer	SRWMO	Provided by East Bethel, no cost to SRWMO																						$0
4	Financial contributions calculation update	SRWMO	$320										$320												$640
5	Financial audits	SRWMO	$3,000										$3,563												$6,563
6	Liability Insurance	SRWMO	$1,850		$1,550		$1,581		$1,613		$1,645		$1,678		$1,711		$1,746		$1,780		$1,816				$16,970
7	Reports to BWSR, State Auditor	SRWMO	$1,100		$1,139		$1,178		$1,220		$1,262		$1,306		$1,352		$1,400		$1,448		$1,499				$12,905
8	Annual written communication to member communities	SRWMO	$600		$621		$643		$665		$689		$713		$738		$763		$790		$818				$7,039
9	Community ordinance reviews	SRWMO	$1,920																						$1,920
10	Review/approve community local water plans	SRWMO			$2,240																				$2,240
11	Seek bids for professional services	SRWMO			$100				$100				$100				$100				$100				$500
Non-operating General																									
12	Grant search and applications	SRWMO	$1,000		$1,035		$1,071		$1,109		$1,148		$1,188		$1,229		$1,272		$1,317		$1,363				$11,731
13	Undesignated reserve	SRWMO	$2,029																						$2,029
14	Update Watershed Plan	SRWMO																	$27,000		$27,000				$54,000
Communications with Member Communities																									
15	Project reporting to member communities	SRWMO	Included in project costs and project manager duties																						$0
16	Annual board member reporting to member communities	SRWMO	Provided by SRWMO board members																						$0
17	Project tours	SRWMO	$1,660										$1,850								$2,000				$5,510
Public Outreach																									
18	Lake association and community newsletter content	SRWMO	$920		$2,190		$1,168		$938		$2,184		$1,000		$820		$1,050		$860		$1,100				$12,230
19	Newspaper press releases	SRWMO	Included in project costs and project manager duties																						$0
20	Lakeshore restoration guidance materials	SRWMO					$3,300																		$3,300
21	Shoreland stewardship display	SRWMO	$2,520																						$2,520
22	Community event displays	SRWMO	Provided by SRWMO board members																						$0
23	Stakeholder event attendance	SRWMO	Provided by SRWMO board members																						$0
24	Workshops promotion	SRWMO					$815																		$815
25	Engage citizen leaders	SRWMO	Included in administrator duties																						$0
26	Websites	SRWMO	$700		$725		$750		$776		$803		$831		$860		$2,891		$921		$953				$10,210
27	Anoka Co Outreach Coordinator position	SRWMO			$2,500		$4,450		$4,606		$4,767		$4,934		$5,106		$5,285		$5,470		$5,662				$42,780
29	Advisory committees	SRWMO	Included in administrator duties																						$0
30	Promote Well Water Wise	SRWMO			$50		$52		$54		$55		$57		$59		$61		$64		$66				$518
Water Condition Monitoring																									
31	Water condition monitoring	SRWMO	$8,541		$16,446		$10,369		$9,125		$18,535		$9,775		$8,114		$17,780		$8,632		$11,217				$118,535
Development Reviews																									
32	Development reviews	MC**	$1,000		$1,000		$1,000		$1,000		$1,000		$1,000		$1,000		$1,000		$1,000		$1,000				$10,000
Multi-partner Coordination																									
33	Participate in 1W1P	SRWMO	$640		$662		$686		$710		$734		$760		$787		$814		$843		$872				$7,508

SRWMO Implementation Evaluation Template (continued)

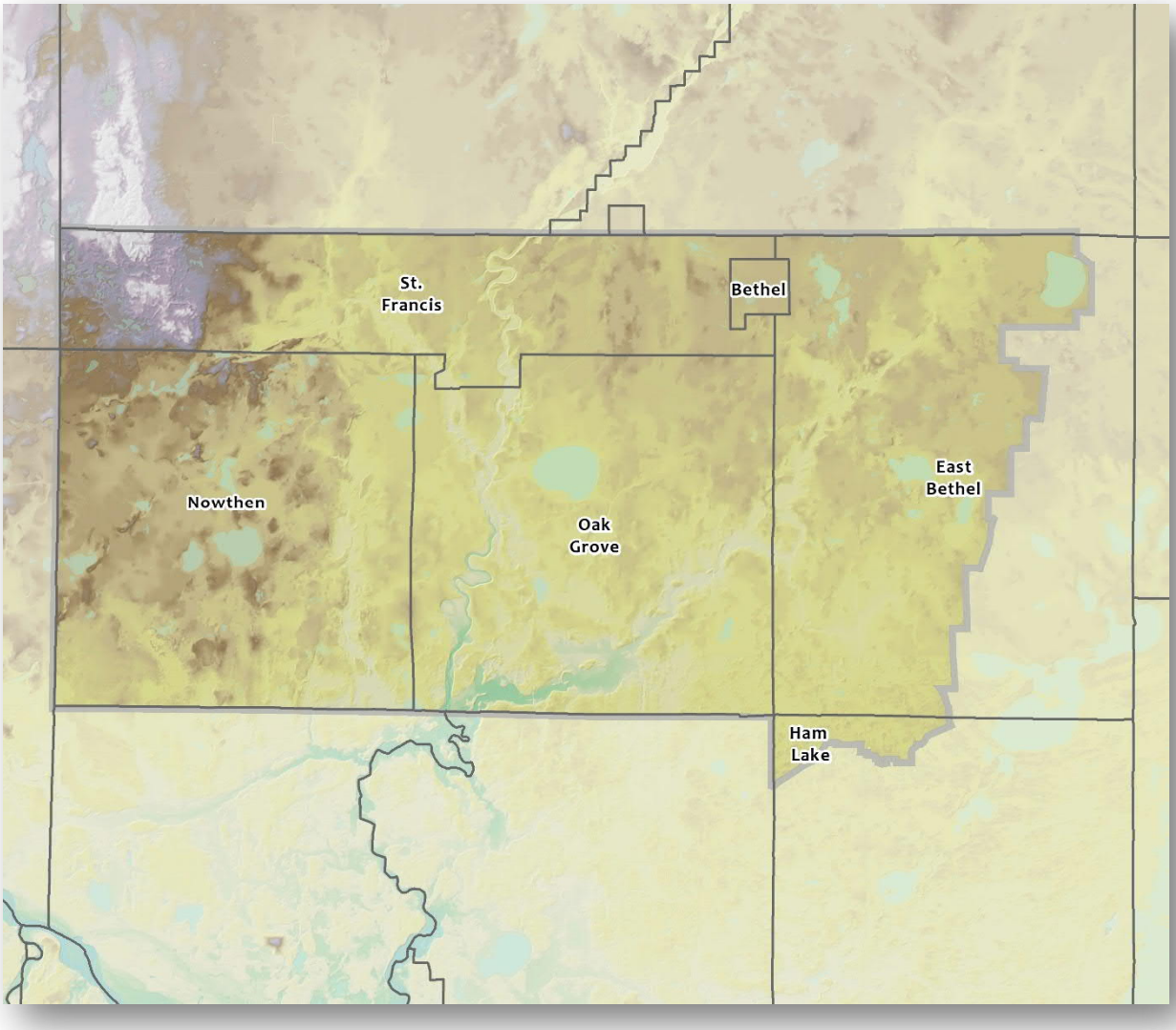
#	Plan Action	Funding*	2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		TOTAL
			Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done	
Water Improvement Projects																							
34	Ag conservation planning outreach	SRWMO			$1,120		$1,120																$2,240
		Grants																					$0
34	Cost share grant program- open to the public	SRWMO	$2,000		$2,500		$1,500		$1,500		$1,000		$1,000		$1,000		$1,000		$1,000		$1,000		$13,500
		Grants																					$0
35	Cost share grant program - through lake associations	SRWMO					$7,500		$7,500				$3,500		$3,500		$3,500						$25,500
		Grants					$30,000		$30,000				$14,000		$14,000		$14,000						$102,000
36	Carp removals	SRWMO	$10,000		$7,500		$7,500																$25,000
		Grants	$40,000		$30,000		$30,000																$100,000
37	Stormwater retrofits	SRWMO	***																				$0
		Grants	$133,580																				$133,580
38	Ditch 20 wetland restoration outreach	SRWMO			$320				$343				$367				$393						$1,423
		Grants																					$0
39	Demonstration projects on public lands	SRWMO											$6,750		$6,750								$13,500
		Grants											$27,000		$27,000								$54,000
40	Support carp barrier annual maintenance	SRWMO	Included in administrator duties																				$0
		Grants																					$0
41	Model projects' pollutant reductions	SRWMO	Included in project costs and project manager duties																				$0
		Grants																					$0
42	Linwood Lake weir repair request	SRWMO	$0																				$0
		Grants																					$0
43	Point of Sale SSTS inspections	SRWMO																					$0
		Communities					$2,000																$2,000
		Grants					$8,000																$8,000
44	Projects identified in adopted guidance documents	SRWMO	$3,800		$0		$0		$0		$6,000		$0		$11,000		$14,500		$0		$0		$35,300
		Grants	$15,200								$24,000				$44,000		$58,000						$141,200
Studies and Inventories																							
45	Carp management feasibility and effectiveness studies	SRWMO	***						$4,000				$5,250										$9,250
		Grants	$21,420						$16,000				$21,000										$58,420
46	Lakeshore photo inventories	SRWMO	Provided by ACD in 2020												$2,000								$2,000
		Grants													$8,000								$8,000
47	Alum feasibility studies	SRWMO							$5,500		$5,500												$11,000
		Grants							$22,000		$22,000												$44,000
48	Linwood Lake subwatershed retrofitting study	SRWMO							$3,000		$2,000												$5,000
		Grants							$12,000		$8,000												$20,000

APPENDIX N

Sunrise River Watershed Management Organization
Wetland Standards

APPENDIX O

Upper Rum River Watershed Management Organization
Stormwater Infiltration Standards



2019 - 2028 Watershed Management Plan

Upper Rum River Watershed Management Organization
Anoka County, MN

July 2019

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Fourth Generation Watershed Management Plan
Upper Rum River Watershed Management Organization

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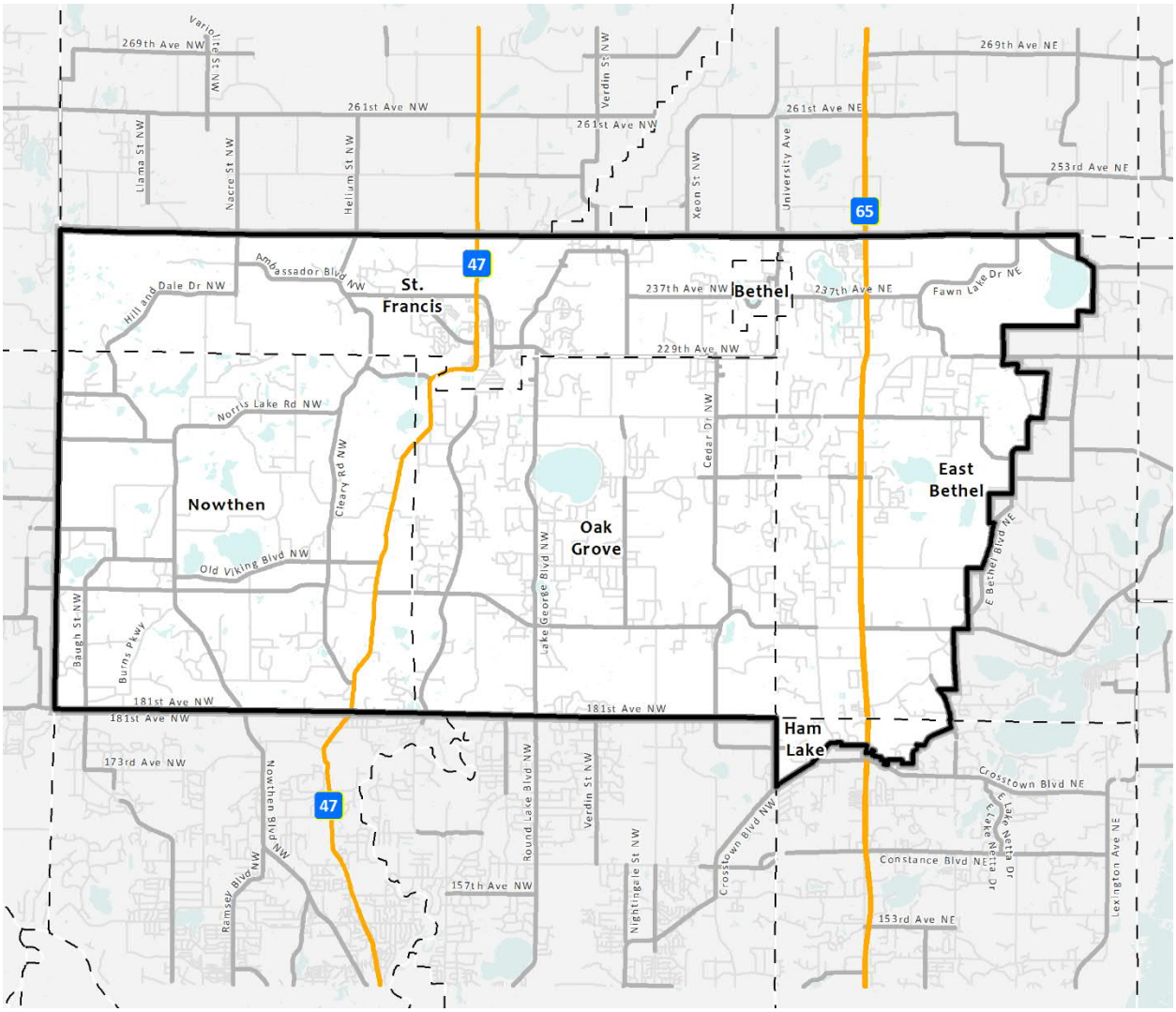
Executive Summary

Introduction

The URRWMO Board initiated work on this 4th Generation Plan in November 2015. The Plan includes information required in Minnesota Administrative Rules Chapter 8410, Local Water Management: an updated land and water resources inventory, goals and policies; an assessment of problems and identification of corrective actions; an implementation program; and a process for amending the Plan. This plan also incorporates available information related to the Rum River Watershed Restoration and Protection Strategy (WRAPS).

The Upper Rum River Watershed is located in the northwest portion of the Minneapolis-St. Paul seven county Metropolitan Area and is comprised of all or part of the following cities in Anoka County:



Community	Area within Watershed (sq. mi.)
Bethel	1
East Bethel	30.7
Ham Lake	1.7
Nowthen	35.2
Oak Grove	35.2
St. Francis	23.4
Total	127.2

Purpose

This Watershed Management Plan (Plan) describes how the Upper Rum River Watershed Management Organization (URRWMO) Board will manage activities in the watershed in the ten year period: 2019 - 2028. This plan is the 4th generation of the URRWMO's watershed management plan.

The URRWMO is a Watershed Management Organization (WMO) formed on June 18, 1991 using a Joint Powers Agreement developed under authority conferred to the member communities by Minnesota Statutes 471.59 and 103B.201 through 103B.251. The agreement was amended in 1997 and again in 2011. The purpose of this Joint Powers Agreement was to establish the Water Management Organization to assist the member local units of government with surface water, ground water, water quality and water usage issues.

The WMO is governed by a Board of Managers that is comprised of 2 members appointed from each community by their respective City Councils. Their purpose is set forth in Minnesota Statutes 103B.201, Metropolitan Surface Water Planning, which codified the Metropolitan Surface Water Management Act of 1982:

(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; and
(8) secure the other benefits associated with the proper management of surface and ground water.

Priority Concerns

The URRWMO Board and Citizen and Technical Advisory Committees identified the following priorities during the planning process. They are listed in the order of importance as adopted by the URRWMO Board. Other concerns were raised, however, their relative ranking was low enough to not warrant inclusion in this priority list.

(1) Funding: Funding available to the watershed through member communities is very limited. Additional funding is necessary to take on actions at the levels suggested by advisory committees and identified by the Rum River WRAPS.

(2) Water Quality: Sampling programs conducted by the WMO have suggested trends of increasing Total Phosphorus concentrations (although Rogers Lake has shown a decline in Phosphorus concentrations). This trend does not appear to be paralleled by increasing trends in chlorophyll-a concentrations or decreasing trends in secchi depth (except for East Twin Lake).

Findings from the Rum River WRAPS has identified that Lake George and the Rum River as short and long term priorities (respectively) for water quality improvement. Lake George has strong evidence for declining water quality trends. The Rum River has a high value for fishing and recreational activities, is classified as a state wild & scenic recreational river, and was commonly referenced in comments from stakeholders.

(3) Water Resources Inventory: The location, condition, and function of constructed stormwater management practices within the watershed are not documented in any way currently useful for watershed planning.

(4) Shoreline Protection: Erosion and sedimentation occurs on some streams in the watershed; notably the Rum River itself.

The URRWMO Board is concerned that the WMO not duplicate efforts by other organizations as well as ensuring that appropriate water management be undertaken at the level of member municipalities.

Prior URRWMO plans focused on studying the watershed to identify impairments so as to prioritize action items. Within the current plan, efforts are now shifting to supporting the implementation of projects within the watershed to improve water quality.

Goals, Strategies, and Responsibilities

A series of goals were developed based on the priorities identified by the URRWMO and the purpose statements set forth in Minnesota Statutes 103B.201. Goals were grouped based on a common theme into eight (8) different goal areas.

A: Water Quantity and Floodplain Management
B: Water Quality
C: Wetlands
D: Groundwater

E: Drainage Systems
F: Reduce Erosion
G: Protect and Enhance Fish and Wildlife Habitat
H: Commission Operations and Programming

The goals were defined to be measureable, when paired with the strategy and implementation table that specifies a timeline and the responsibility parties. The table below summarizes the goals for the Fourth Generation Watershed Management Plan.

Table EX-1: URRWMO Fourth Generation Plan Goals

Goal Area A Water Quantity and Floodplain Management	Goal A.1	Require member communities to update post-construction stormwater management ordinances to be compliant with all applicable Federal, State, and local standards. Protect against development related flooding by requiring local communities to enforce rate control and infiltration requirements. Require the use of either the 24-hr NOAA Atlas-14 data averaged for the URRWMO (Table 2-3 within the URRWMO Plan) or the NRCS published county-wide data for Anoka County, whichever is greater. Measurable by communities maintaining post-development 2-, 10-, and 100-yr or below peak runoff rates and volumes at predevelopment levels.
	Goal A.2	Require member communities to update floodplain management ordinances to be compliant with all applicable Federal, State, and local standards. Maintain existing floodplain storage volumes and provide adequate conveyance for flood flows. Measureable by community annual reports that document the volume of floodplain fill and compensatory storage as well as infrastructure design to serve regulated development.
	Goal A.3	Control increase in runoff volume from landlocked basins by only allowing outlets in conformance with approved local plans. Prohibit new discharges from landlocked basins unless an engineering study is completed to evaluate the effects of the outlet and design to mitigate impacts.
	Goal A.4 (B.5)	Improve BMP performance by requiring member communities to conduct physical inspections to identify any issues or deviations from construction plans and then ensuring any deficiencies are corrected. Measurable by community annual reports that document any required corrective measures and time-frames to complete these items.
Goal Area B Water Quality	Goal B.1	Require member communities to update post-construction stormwater management ordinances to be compliant with all applicable Federal, State, and local standards.
	Goal B.2	Protect water quality by requiring local communities to enforce post development stormwater quality treatment practices in conformance with state and federal standards. Measureable by community annual reports that document that regulated developments achieved minimum levels of water quality treatment.
	Goal B.3	Improve Total Phosphorus concentration in Lake George and the Rum River in accordance with goals and timeline of the Rum River WRAPS.
	Goal B.4	Conduct a Rum River WRAPS progress review in 2022.
	Goal B.5 (A.4)	Improve BMP performance by requiring member communities to conduct physical inspections to identify any issues or deviations from construction plans and then ensuring any deficiencies are corrected. Measurable by community annual reports that document any required corrective measures and time-frames to complete these items.
Goal Area C Wetlands	Goal C.1	Continue current local municipality responsibility as Local Government Unit (LGU) for implementation of the Wetland Conservation Act (WCA). Measurable by community annual reports that document all regulated developments complied with applicable wetland standards and quantification of wetland impacts and mitigation areas. MnDOT will continue to be the WCA LGU within state road right-of-ways.
	Goal C.2	Technical Advisory Committee (TAC) will convene to revise wetland buffer standards.

Table EX-1: URRWMO Fourth Generation Plan Goals (continued)

Goal Area D Groundwater	Goal D.1	Protect the quantity and quality of groundwater resources. Measurable by community annual reports that document that they are complying with their applicable wellhead protection plans. Also measureable by community annual reports that document that developments are complying with infiltration standards (including any prohibitions).
Goal Area E Drainage Systems	Goal E.1	Continue current Anoka County Highway Department jurisdiction over county ditches in the watershed. Discuss annually if reassigning the jurisdiction over County ditches is in the best interest of the watershed.
	Goal E.2	Complete a WMO-wide culvert inventory (sizes, elevations, etc) and provide survey results, observations, and recommendations to member communities and Anoka County.
Goal Area F Reduce Erosion	Goal F.1	Prevent erosion of soil into the Rum River by supporting implementation of projects identified by the 2017 and 2018 ACD Rum River Bank Erosion Assessments.
	Goal F.2	Require member communities to update their construction site erosion control ordinances to be compliant will all applicable Federal, State and local standards.
Goal Area G Protect and Enhance Fish and Wildlife Habitat	Goal G.1	Provide education about the prevention and control of aquatic and invasive species by updating the WMO website to incorporate educational materials.
	Goal G. 2	Protect shoreline areas from development by requiring member communities to update their shoreland management ordinances to be compliant with all applicable Federal, State and local standards.
Goal Area H Commission Operations and Programming	Goal H. 1	Identify and operate within a sustainable funding level that is affordable to member cities.
	Goal H. 2	Foster implementation of watershed management programs by proactively seeking grant funding.
	Goal H. 3	Operate a public education and outreach program prioritizing elected and appointed officials to build better understanding between all stakeholders. Measurable by the annual attendance of elected and appointed officials of member communities (individuals not already on the WMO board) as well as the public.
	Goal H. 4	Operate a monitoring program sufficient to characterize water quantity, water quality, and biotic integrity in the watersheds and to evaluate progress toward meeting goals. Measurable by creating a water quality monitoring plan (2019-2028) that complies with the recommendations of the Rum River WRAP and the URRWMO's Plan.

The URRWMO goals are coupled with a strategy and implementation schedule and a 10-year budget. This allows for the URRWMO to track its progress towards its goals, and adjust strategies overtime based on lessons-learned. The table below outlines the strategies to be adopted that address each of the goals and the responsible party. A more complete version of this table, that includes a timeline and measurable targets, is provided within the text of the URRWMO plan (Table 5-1).

Table EX-2: URRWMO Plan Strategies and Responsible Parties

Goal Area	Strategy Description	Responsible Party	
		URRWMO	Community
A: Water Quantity and Floodplain Management	Establish a uniform minimum runoff control standard for new development and redevelopment that incorporates current stand federal standards. Maintaining post-development 2-, 10-, and 100-yr peak runoff rates at predevelopment levels. Review of local rate control and infiltration requirements to confirm compliance with URRWMO. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.		x
	Documentation of development projects that impact floodplains.		x
	Review of local floodplain management ordinances to confirm compliance with federal, state and local standards. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.		x
	Prohibit new discharges from land locked basins unless an engineering study is completed to evaluate the effects of the outlet and design to mitigate impacts.	x	
	Complete a physical inspection of all BMPs and identify deficiencies and potential retrofits.		x
B: Water Quality	Review of post-development stormwater treatment ordinances to confirm compliance with federal, state and local standards. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.		x
	Fund ongoing water quality sampling within the watershed through partnership with ACD.	x*	
	Partner and fund a portion of water quality projects identified by ACD to improve water quality. Note that the TAC will prioritize project selection (Lake George, Rum River bank stabilization, projects identified within a SWAS).	x*	
	Partner and fund a portion of bank stabilization projects along the Rum River. ACD completed a stream bank inventory in 2017 & 2018 to identify potential sites and interested private landowners. Potential to complete projects on public property as well.Note that the TAC will prioritize project selection (Lake George, Rum River bank stabilization, projects identified within a SWAS).	x*	

Table EX-2: URRWMO Plan Strategies and Responsible Parties (continued)

Goal Area	Strategy Description	Responsible Party	
		URRWMO	Community
B: Water Quality (continued)	Partner and fund an urban stormwater retrofit project that provides water quality benefits to the Rum River. TAC will recommend the project(s) based on SWAS and amend this plan with specific details to allow for grant funding. If additional SWAS's are completed, the TAC will incorporate new projects into consideration for prioritization.	x	x
	Review goals within WRAPS report, identify successful/under-performing projects, and water quality sampling data. Revise WRAPS strategies based on progress.	x	
	Complete a physical inspection of all BMPs and identify deficiencies and potential retrofits.		x
C: Wetlands	Require member communities to enforce regulatory controls for new development and redevelopment construction projects.	x	
	TAC will meet to discuss and revise wetland buffer standards. Standards will be distributed to member communities.	x	
D: Groundwater	Require member communities to review (and enforce) wellhead protection plans and infiltration standards.	x	x
E: Drainage Systems	Consider reassigning the jurisdiction over the county ditches within the watershed.	x	
	Provide funding for watershed culvert inventory. Coordinate with ACD to ensure consistent data collection methodology.	x*	x
F: Reduce Erosion	Partner and fund a portion of bank stabilization projects along the Rum River. ACD is completed a stream bank inventory in 2017 & 2018 to identify potential sites and interested private landowners. Potential to complete projects on public property as well. Note that the TAC will prioritize project selection (Lake George, Rum River bank stabilization, projects identified within a SWAS).	x*	
	Review of local erosion control ordinances to confirm compliance with federal, state and local standards. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.		x
G: Protect and Enhance Fish and Wildlife Habitat	Update URRWMO website to include education materials on the prevention and control of aquatic and invasive species. Materials provided by the Anoka County Parks Aquatic Invasive Species Prevention Program.	x	
	Review of local shoreland management ordinances to confirm compliance with federal, state and local standards.		x

Table EX-2: URRWMO Plan Strategies and Responsible Parties (continued)

Goal Area	Strategy Description	Responsible Party	
		URRWMO	Community
H: Commission Operations and Programming	Hire a Watershed Management Coordinator handle daily operations of the URRWMO and to represent the Board to municipalities, agencies and other water resource management entities.	x	
	Review of annual budget and funding from member communities.	x	x
	Proactively research grant funding opportunities to support URRWMO projects.	x	
	Promote investment within the watershed by encouraging members of the public and appointed officials from communities to attend URRWMO meetings.	x	x
	Update (overhaul) the URRWMO website to keep up with current technology and security measures.	x	
	Fund ongoing water quality sampling within the watershed through partnership with ACD.	x*	
	Each member city is required to prepare a local water management plan that conforms with the URRWMO Plan. The URRWMO will then review and, if appropriate, approve each local water management plan.	x	x
	Coordinate regular TAC meetings to review status of watershed planning efforts, specifically as it relates to ordinance updates & compliance, proposed project selection, and assessment towards water quality goals.	x	

†Some strategies appear twice within the table, and the ID is duplicated. These strategies were deemed to be of high importance to several goal areas, and therefore were repeated for emphasis.

*Some services might be contracted to ACD or other qualified consultant by the URRWMO to fulfill this responsibility.

This Plan provides direction for URRWMO activities through the year 2028. The URRWMO Board may initiate amendments to this plan at any time.

Plan Amendments

This plan will be in effect for ten (10) years from the date of BWSR approval, unless significant changes to the plan are deemed necessary prior to that date. All amendments to this Plan must follow the procedures set forth in this section, or as required by State laws and rules, as revised. Plan amendments may be proposed by any person, agency, city, or the County to the URRWMO Board, but only the URRWMO may initiate the amendment process. The URRWMO may amend its Plan in the interim if either changes are required or if problems arise that are not addressed in the Plan. The URRWMO 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.

This plan requires amendments to the local water management plans of member communities in the form of comprehensive revisions to all ordinances related to water resources management, as well as the inspection and assessment of the function of existing structural drainage infrastructure and stormwater management practices. As before, communities will retain the responsibility to review and approve development projects to ensure that the requirements of ordinances are followed.

CHAPTER 1 – Introduction

The Upper Rum River Watershed Management Organization (URRWMO) Watershed Management Plan provides the vision and guidance for managing the water resources within the boundaries of the WMO. This chapter outlines the role, organizational structure, responsibilities, operations, and previous watershed planning efforts of the URRWMO.

1.1 The Role of Watershed Management Organizations

Watershed Management Organizations (WMOs) are public organizations consisting of member communities based on a watershed boundary. Since watershed boundaries follow natural drainage divides (not political boundaries), WMOs are comprised of the several communities, all within the defined watershed. WMOs are tasked with preparing and implementing water management plans with the aim of solving and preventing water-related problems within the local region.

The State of Minnesota established the Watershed Act in 1955, authorizing the creation of Watershed Districts (WDs) based on the idea that water management policies should be developed on a watershed basis, since water does not follow traditional political boundaries. In 1982, the Minnesota Legislature approved the Metropolitan Area Surface Water Management Act (Minnesota Statutes 103B.201 to 255) that required all local government entities within the seven-county Metro Area to implement surface water management plans through membership in a WMO.

1.2 URRWMO Purpose and Authority

The Upper Rum River Watershed Management Organization (URRWMO) was formed on June 18, 1991 using a Joint Powers Agreement developed under authority conferred to the member communities by Minnesota Statutes 471.59 and 103B.201 through 103B.251. The agreement was amended in 1997 and again in 2011. The purpose of this Joint Powers Agreement was to establish the Water Management Organization to assist the member local units of government with surface water, ground water, water quality and water usage issues. The Upper Rum River Watershed is located in the northwest portion of the Minneapolis-St. Paul seven county Metropolitan Area and is comprised of all or part of the following cities in Anoka County: Bethel, East Bethel, Ham Lake, Nowthen, Oak Grove, and St. Francis.

The WMO is governed by a Board of Managers that is comprised of 2 members appointed from each community by their respective City Councils. Their purpose is set forth in Minnesota Statutes 103B.201, Metropolitan Surface Water Planning, which codified the Metropolitan Surface Water Management Act of 1982:

(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; and

(8) secure the other benefits associated with the proper management of surface and ground water.

The URRWMO Board has adopted these purpose statements as their watershed plan goals.

1.2.1 Governance

A Board of Managers has been established as the governing body of the Upper Rum River Watershed Management Organization. The 12 member Board of Managers is comprised of appointed members from each of the member communities. Many of the appointed members are council members of the member communities. Two members represent the City of Bethel, two members represent the City of East Bethel, two members represent the City of Ham Lake, two members represent the City of Oak Grove, two members represent the City of Nowthen, and two members represent the City of St. Francis.

1.2.2 Responsibilities

The duties of the WMO, as enacted by the Board, are as follows:

- Prepare and adopt a watershed management plan to meet the requirements of Minnesota Rules Chapter 8410.
- Review and approve local water management plans as defined in Minnesota Rules Chapter 8410.
- Exercise the authority of a Watershed District or Watershed Management Organization under Minnesota Statutes Chapter 103B to regulate the development of land when:
  a) A local water management plan has not been approved and adopted.
  b) A local permit requires an amendment to or variance from the local water management plan.
  c) The Board has been authorized by the local government to require permits for land use.

As identified in the Joint Powers Agreement, the Board has the authority to employ persons as necessary, conduct studies, fund improvements, and operate and maintain improvements constructed by the Board. Procedures have been established to finance capital improvement projects in such a manner that costs can be equitably distributed to benefited members for projects of benefit to more than one member. Where only one member community is benefited, that community will be responsible for the entire cost.

1.3 Operations

This section describes the current programs operated by the Board.

1.3.1 Education and Outreach

The Board outlined a series of policies focused on education as part of its Third Generation URRWMO Plan. These strategies were designed to foster responsible water quality management practices by educating residents, business owners, member communities, and developers. The URRWMO coordinates with Anoka Conservation District and member communities for education and outreach activities. Details regarding these activities can be found in the Commissions' Annual Report. Some highlights are below:

Maintain the URRWMO website

The URRWMO website serves as the primary, continuous public outreach tool with general information about the organization, the watershed management plan, meeting agendas and minutes, water monitoring results, profiles of WMO projects, and access to mapping and data tools. Links to the URRWMO website are also provided within member city newsletters and on other websites including the Anoka Conservation District, and member municipality websites.

Know the Flow (KTF) website

In 2013, a county-wide water-theme website (www.KnowTheFlow.us) was established as a public education and outreach tool. Development of the website was through collaboration among the Anoka County Water Task Force of county, city and watershed representatives. The Anoka County Municipal Wellhead Protection Group provided financial support for the development of the Know The Flow (KTF) website. The website announces relevant information and water-related events taking place in the County. The KTF Contacts page lists and links watershed management organizations, including the URRWMO. The URRWMO meetings and announcements, including public hearings are included in the KTF calendar.

Produced the Annual Newsletter

The URRWMO produces a newsletter article including information about the URRWMO, its programs, related educational information, and the URRWMO website address. This article is provided to each member city, to be included it in their city newsletters.

Member Community Efforts

The City of Bethel reached out to 176 households on topics of hazardous water disposal, yard waste management and other activities of the URRWMO.

The City of Ham Lake's newsletter featured education articles on groundwater protection, water conservation, hazardous waste disposal, yard waste management, agricultural best-management-practices, pet waste disposal, and other activities of the URRWMO.

The City of St. Francis provided educational materials to approximately 7,500 residents on topics of groundwater protection, water conservation, yard waste management, pet waste disposal, and hazardous waste disposal.

The City of Nowthen provided educational materials to approximately 1,500 residents on topics of groundwater protection.

The City of Oak Grove provided educational materials to approximately 4,000 residents on topics of groundwater protection, controlling invasive species, hazardous waste disposal, yard waste management, and pest waste disposal.

1.3.2 Monitoring Program

The URRWMO has a cooperative agreement with the Anoka Conservation District (ACD) to a conduct water resources monitoring program that track trends in water quality over time within the watershed. Monitoring is focused on water quality in both lakes and streams in order to detect any changes or problems that might require corrective measures. The URRWMO coordinates with ACD to update the monitoring plan annually as necessary.

The ACD's 2017 monitoring efforts within the URRWMO included the following:

Lake Level Monitoring: Weekly water level monitoring was conducted in the following lakes: East Twin Lake, Lake George, Minard Lake, and Coopers Lake.

Lake Water Quality: Water quality sampling was conducted from May through September, at least once-monthly, for the following parameters: total phosphorus, chlorophyll-a, Secchi transparency, dissolved oxygen, turbidity, temperature, conductivity, pH, and salinity. Monitoring was conducted at Lake George in 2017 (not 2018).

Aquatic Invasive Vegetation Mapping: While not an official URRWMO action, the Anoka Conservation District (ACD) was contracted through the Lake George Lake Improvement District (LGID) to conduct an aquatic invasive vegetation delineation at Lake George.

Stream Water Quality – Chemical Monitoring: Chemical monitoring was conducted from May through September for of the following parameters: total suspended solids, E. coli, total phosphorus, Secchi tube transparency, dissolved oxygen, turbidity, temperature, conductivity, pH, and salinity. Sampling was completed at the following locations: Seeyle Brook at CR 7, Cedar Creek at CR 9, Ford Brook at CR 63, Rumer River at CR 24 and Rum River at CR 7.

Stream Water Quality – Biological Monitoring: Under supervision of the ACD staff, high school science classes collected aquatic macroinvertebrates from streams the following locations: Rum River at Hwy 24. The captured specimen were identified to the family level, and the resulting numbers were used by the ACD to gauge water and habitat quality.

Wetland Hydrology: Continuous groundwater level monitoring was conducted at the following wetlands, to a depth of 40 inches, at a wetland boundary:
Alliant Tech Reference Wetland, Alliant Tech Systems property, St. Francis
Cedar Creek, Cedar Creek Natural History Area, East Bethel
East Twin Reference Wetland, Twin Lakes City Park, Nowthen
Lake George Reference Wetland, Lake George County Park, Oak Grove
Viking Meadows Reference Wetland, Viking Meadows Golf Course, East Bethel

Table 1-1 showing the monitoring activities and other projects over the past ten (10) years completed by the ACD within the URRWMO. Reports describing the last several years of monitoring data are available on the URRWMO website:

www.urrwmo.org/monitoring

Table 1-1: Water Monitoring and other activities conducted within the URRWMO by ACD (2006-2018)

Type	Site	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Lake Levels	Coopers Lake						x	x	x	x	x	x	x	x
	East Twin Lake	x	x	x	x	x	x	x	x	x	x	x	x	x
	Lake George	x	x	x	x	x	x	x	x	x	x	x	x	x
	Minard Lake						x	x	x	x	x	x	x	x
	Rogers Lake						x	x	x	x	x	x	x	x
Lake Water Quality	Coopers Lake													
	East Twin Lake			x			x		x					
	Lake George			x			x		x	x*	x*		x	
	Minard Lake								x	x				
	Pickerel Lake								x	x				
	Rogers Lake				x									
Stream Hydrology	Cedar Creek at Hwy 9	x												
	Ford Brook at Hwy 63	x	x											
	Seeyle Brook at Hwy 7	x	x											
Stream Water Quality, Chemical	Cedar Creek at Co Rd 9	x					x		x	x	x	x	x	x
	Cedar Creek at Fawn Lake Dr	x												
	Cedar Creek at Sims Rd	x												
	Crooked Brook (Ditch 67), multiple locations	x												
	Ford Brook at Hwy 63						x			x	x	x	x	x
	Rum River at Co Rd 24					x	x			x	x	x	x	x
	Rum River at Co Rd 7					x	x			x	x	x	x	x
	Seeyle Brook at Co Rd 7						x		x	x	x	x	x	x
Stream Water Quality, Biological	Ford Brook at Hwy 63	x												
	Rum River at Hwy 24	x	x	x	x	x	x	x	x	x	x	x	x	x
Wetland Hydrology	Alliant Tech Reference Wetland	x	x	x	x	x	x	x	x	x	x	x	x	x
	Cedar Creek (Natural History Area)	x	x	x	x	x	x	x	x	x	x	x	x	x
	East Twin Reference Wetland	x	x	x	x	x	x	x	x	x	x	x	x	x
	Lake George Reference Wetland	x	x	x	x	x	x	x	x	x	x	x	x	x
	Viking Meadows Reference Wetland	x	x	x	x	x	x	x	x	x	x	x	x	x
Education /Other	Anoka County Geologic Atlas				x	x								
	East Twin Lake, Lake George: Lakeshore Mapping		x											
	Homeowner Guide: Outdoors in Anoka County			x										
	Rum River Erosion Field Survey					x								
	Web video of student biomonitoring							x						
Water Quality Improvement Projects	Crooked Brook (Ditch 67): Petro Property Stream bank stabilization					x	x							
	Lake George: Daml Property Lakeshore Restoration								x					
	Lake George: Erickson Property Lakeshore Restoration						x	x						
	Lake George: Lakeshore restoration	x												
	Lake George: Stitt Property Lakeshore Restoration								x	x				

* Included Aquatic Invasive Species Mapping, ACD contracted through the Lake George Lake Improvement District

1.3.3 Rules and Standards

Various government entities are involved in regulating water resources and have overlapping jurisdictions within the URRWMO. Several of these agencies have regulatory standards that are applicable to the URRWMO. The Third Generation Plan outlined many of these regulations, to be implemented through a program at the local level. They address issues related to stormwater discharge rates, water quality treatment, stormwater pond design, wetland management, spill prevention and control, sewage treatment design, erosion and sediment control, floodplains, and shoreland management.

The Minnesota Pollution Control Agency (MPCA) developed the Minimal Impact Design Standards (MIDS) upon direction from the Minnesota Legislature. The intention of MIDS is to "keep the raindrop where it falls in order to minimize stormwater runoff and pollution and preserve natural resources" (MPCA Minnesota Stormwater Manual, Overview of Minimal Impact Design Standards). While the URRWMO has not formally adopted MIDS within its own standards, member communities are encouraged to review MIDS and consider adopting them at a local level to encourage low impact development as communities grow. More information about MIDS can be found on the MPCA's website.

A copy of the Standards, Regulations and Operations are included in Appendix D as a reference for URRWMO Board members, member communities and developers. All member communities should carefully review Appendix D to ensure that local water management plans are in compliance with the URRWMO. A complete listing of the 'Water Quality Standards', 'Wetland Standards', and 'Stormwater Infiltration Standards' (adopted February 3rd, 2009) can be found on the URRWMO website.

1.3.4 Administration

Administration includes preparing and attending regular meetings, taking meeting minutes for public distribution, grant writing, correspondence with other government entities and partners, website maintenance, and annual reporting. Each year, the URRWMO produces an annual report pursuant to Minnesota Rules 8410.0150 that includes activities, progress towards goals and finances. Administrative activities are undertaken by individuals from the member communities and the Anoka Conservation District. A blank template of the annual report is included in Appendix E.

1.4 First, Second, and Third Generation Plans

The URRWMO began development of its first watershed management plan in 1991. Over the next 16 years it was periodically updated. The last update occurred in 2007. The Third Generation of the plan was approved by the state Board of Water and Soil Resources (BWSR) on April 27, 2007, with four subsequent amendments approved by BWSR (January 28, 2009) and subsequently adopted by the URRWMO Board (February 3, 2009). Minnesota Statues 103.B231 requires that a new watershed management plan is adopted by the Board every 5-10 years.

1.4.1 Assessment of Third Generation Plan Performance

While preparing the Fourth Generation of the Watershed Management Plan, the Board conducted a self-assessment to better identify achievements within the URRWMO and those portions of the plan that were

less successful. This self-assessment was unstructured, based on a group discussion by the Board members.

The most successful achievement of the plans were:

- Development of wetland management standards beyond the minimums required by the Minnesota Wetland Conservation Act. Standards are based on a wetland classification developed by the URRWMO, and include requirements for buffers, setbacks, excavations, and prohibition of any impact to high priority wetlands. The effective date of the wetland standards is February 3, 2009. The Wetland Standards are posted on the URRWMO website.

- Development of post-construction infiltration standards for site development. The standards include site assessment requirements, design and performance standards, and maintenance guidelines for infiltration facilities. The effective date of the infiltration standards is February 3, 2009.

- Establishment of water quality standards for East Twin Lake, Lake George, and the Rum River which establish policies designed to achieve a goal of non-degradation of water quality in each waterbody. The effective date of the water quality standards is February 3, 2009. A complete listing of the 'Water Quality Standards', 'Wetland Standards', and 'Stormwater Infiltration Standards' can be found on the URRWMO website.

- Development of a water quality monitoring plan. This plan is a revision to the water monitoring plan established as part of the URRWMO second generation watershed management plan which was effective up until 2012. The revised plan extends through 2018 and includes lake water quality and level monitoring, stream water quality and flow monitoring, biomonitoring in the Rum River, and reference wetland hydrology monitoring. The effective date of the water quality monitoring plan standards is January 13, 2013.

Those areas that fell short of expectations included:

- Understanding and blending the outcomes of the Local Surface Water Management Plans. The member communities of the URRWO prepared localized management plans, but unfortunately the outcomes of these plans were not well communicated back to the URRWMO. Individual plan components (e.g. watershed boundaries, discharge rates, etc.) were inconsistent between each plans, making it challenging to use the modelled outputs to identify potential problems/issues within the larger watershed.

- Development of a formal evaluation procedure. Historically, the URRWMO has not had a clear method of self-evaluation towards goals and implementation strategies. Part of this hinges on the lack of an administrative staff member, dedicated to structuring normal URRWMO operations and fostering communication between government agencies.

- The self-assessment also highlighted differences in opinion of the identification of priority issues, specifically between WMO Board members and other governmental agencies. These differences

might be significant to overcome and will require concentrated teamwork and communication when implementing a new Watershed Management Plan. BWSR completed a Performance Review and Assistance Program (PRAP) review of the URRWMO in 2014 which highlights some of these differences in opinion.

1.5 Fourth Generation Plan Organization

Watershed management plans should contain several clearly defined elements, as outlined in Minnesota Statue 103B.231, subdivision 6. By following this guidance, the URRWMO can carefully identify current and potential issues within the watershed, and framed the proposed Goals, Policies and Implementation plan accordingly. This plan is divided into five Chapters as follows:

(1) Introduction: Describes the purpose of the URRWMO, history, responsibilities, current operations, and the components of this management plan.

(2) Inventory and Condition Assessment: Describes the physical environment of the watershed including the topography, geology, soils, biological and human environment, existing land use, surface water system, wetlands, and floodplains.

(3) Assessment of Issues and Opportunities: Describes the issues identified by the URRWMO through a gaps analysis and a series of public meetings, where individuals vocalized their concerns and prioritize identified issues within the watershed.

(4) Goals and Policies: Describes the goals and policies the Board will work towards in the next ten-year period covered by this Plan.

(5) Implementation Plan: Describes the proposed action and implementation plan that the Board will undertake to achieve the Goals and Policies of the plan. Includes a discussion of implementation costs and financing and how the Board will evaluate progress and the requirements of the member communities.

CHAPTER 2 – Inventory and Condition Assessment

This chapter summarizes the land and water resources within the URRWMO. It contains information regarding the topography, climate and precipitation, soils, geology, vegetation, wildlife, existing and future land use, surface waters, wetlands, floodplains, and groundwater.

2.1 Watershed Physical Environment

As required in Minnesota Rules Section 8410.0060, this section of the plan provides a general description and summary of the climate, geology, surficial topography, surface and groundwater resource data, soils, land use, public utility services, water based area land ownership, fish and wildlife habitat, unique features, scenic areas and possible pollutant sources. This section also identifies where detailed information can be obtained for many of these areas of concern. This information is provided to the extent necessary to provide guidance to the URRWMO in managing water resources and is not intended to be used for anything beyond high-level planning.

2.1.1 Location

The Upper Rum River Watershed is located in the northwest portion of the Minneapolis-St. Paul seven county Metropolitan Area, and is comprised of all or part of six cities in Anoka County, as listed in Table 2-1. Figure 2-1 displays the watershed boundary and location within the county.

Table 2-1: URRWMO Communities

Community	St. Area within Watershed (sq. mi.)
Bethel	1
East Bethel	30.7
Ham Lake	1.7
Nowthen	35.2
Oak Grove	35.2
St. Francis	23.4
Total	127.2

2.1.2 Topography and Drainage

The topography of the Upper Rum River Watershed varies from the highest elevation of approximately 1,130 feet above mean sea level in the northwestern corner to the lowest elevation of about 860 feet at the point that the Rum River leaves the watershed boundary in the south-central area. In general, the land is quite flat with gently sloping areas.

The Upper Rum River Watershed contains numerous lakes, wetlands, watercourses and ditches. The watershed contains four major DNR Public Watercourses: (1) Cedar Creek, (2) Ford Brook, (3) Seelye Brook, and (4) Rum River. Water collects in these systems and is eventually discharged to the Rum River.

The subwatershed boundaries tributary to lakes and streams within the watershed are outlined on Figure 2-2.

2.1.3 Climate/Precipitation

Precipitation is monitored at numerous sites surrounding the Upper Rum River Watershed, including a Station in St. Francis that has been recording precipitation, snowfall and snow depth since 1990. These stations are monitored by volunteer and various government agencies to develop a comprehensive record of weather patterns within the region. Data can be retrieved from the Minnesota Climatology Working Group, MNDNR, or the Midwestern Regional Climate Center. Summary precipitation data for the St. Francis monitoring station is provided in Table 2-2.

Table 2-2: Precipitation Summary for the St. Francis Monitoring Station (217308).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (in)	0.75	0.89	1.41	2.11	3.41	3.84	3.65	4.15	3.24	2.09	1.4	0.99
Median (in)	0.58	0.73	1.32	1.96	3.29	3.39	3.28	4.58	3.11	1.57	1.16	0.86
Low Value (in)	0.01	0	0.19	0.19	1.1	0.22	1.34	0.11	0.35	0.2	0.05	0.09
High Value (in)	3.28	2.82	3.86	7.63	7.39	10	6.91	6.82	6.98	7	3.86	3.1

* Source: Midwestern Regional Climate Center

Standards for characterizing precipitation events have been developed based upon monitoring data. Precipitation events are characterized based upon the probability of a storm event with a given total precipitation to occur in any given year. Often times this is expressed as a return interval. For instance, a 50-year storm event is a rainfall event that has a 2% chance of occurrence in any given year. The criteria for characterizing storm events in east central Minnesota are in Table 2-3, derived specifically for the Upper Rum River Watershed based on the NOAA Atlas 14 Precipitation Frequency Estimates in GIS format.

Table 2-3: Frequency Distribution of Precipitation Events.

Storm Duration	Recurrence Interval							
	1-year	2-year	5-year	10-year	25-year	50-year	100-year	200-year
5-min	0.36	0.43	0.53	0.62	0.74	0.84	0.94	1.17
10-min	0.53	0.62	0.78	0.91	1.09	1.23	1.37	1.71
15-min	0.64	0.76	0.95	1.11	1.33	1.50	1.67	2.09
30-min	0.91	1.07	1.35	1.57	1.89	2.13	2.38	2.96
60-min	1.17	1.39	1.75	2.06	2.51	2.87	3.24	4.16
2-hr	1.43	1.70	2.15	2.55	3.13	3.60	4.09	5.35
3-hr	1.59	1.88	2.39	2.85	3.53	4.09	4.69	6.26
6-hr	1.85	2.19	2.79	3.34	4.17	4.88	5.64	7.64
12-hr	2.13	2.50	3.18	3.80	4.74	5.53	6.38	8.63
24-hr	2.44	2.83	3.54	4.19	5.20	6.03	6.94	9.31

*The data in Table 2-3 was derived from the NOAA Atlas 14 GIS raster dataset and is specific to the Upper Rum River Watershed (averaged across the watershed). Any modeling for designs should follow the data provided by MN NRCS. All precipitation events are reported in inches.

NOAA Atlas 14 Precipitation-Frequency Atlas of the United States Volume 8 Version 2.0: Midwestern States (Colorado, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, Wisconsin), U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, Maryland, 2013

2.1.4 Soils

There are four general soil associations within the watershed as determined by the "Soil Survey of Anoka County, Minnesota" as follows:

Zimmerman-Isanti-Lino Association
The topography of these soils is level to undulating. Zimmerman soils are excessively drained soils consisting of very dark gray to dark-brown fine sand underlain by yellowish-brown and light yellowish-brown fine sand. Isanti soils are very poorly drained black fine sandy loam underlain by gray and dark gray fine sand. These soils occur in depressions and low lying areas. Lino soils are somewhat poorly drained black, dark gray or dark grayish-brown loamy fine sand underlain by mottled brown and light brownish gray-fine sand. The high water table is at or near the surface in many of the depressions that occur throughout this association. This association dominates from the eastern border of the watershed to the Rum River.

Hubbard-Nymore Association
The topography of these soils is gently sloping and excessively drained sandy soils throughout. Hubbard soils are black and dark grayish brown at the surface and are underlain by dark brown and yellowish brown coarse sand. Nymore soils are very dark gray and black to very dark grayish brown loamy sand underlain by dark brown loamy sand. It is an outwash plain that is dissected by drainage ways and dotted with large depressions. This association is prominent along the Rum River and between Lake George and Cedar Creek.

Heyder-Kingsley-Hayden Association
The topography of these soils is gently undulating to steep they are often excessively drained to well drained soils formed in loamy glacial till. Heyder and Kingsley soils occur on hill crests and hillsides. Heyder soils are very dark grayish-brown fine sandy loam underlain by grayish-brown fine sandy loam. With the exception of Emmert-Kingsley association in the northwest this soil dominates the watershed from its western border to Seeyle Brook and the Rum River.

Emmert- Kingsley Association
The topography of these soils is gently undulating to steep. They are often excessively drained to well-drained soils formed in loamy and sandy glacial drift, much of the association in the watershed is gravel coarse sand. Emmert soils consist of dark gray gravelly coarse sandy loam underlain by brown to very pale brown coarse sand or gravelly coarse sand. They typically occupy irregularly-shaped knolls and hills. Kingsley soils occupy hill crests and hillsides. Kingsley soils have a surface layer of very dark gray fine sandy loam underlain by pale brown fine sandy loam. This association is only present in the northwestern corner of the watershed.

These soils can be described based on their hydrologic characteristics (Table 2-4). The majority of soils in the Upper Rum River Watershed are Groups A and A/D. All soils listed as Group A/D are extremely wet soils and are considered D soils in the undrained condition since they are ponded or saturated and would result in discharge if additional precipitation were added. From a resource management standpoint they do not present the same concerns as Group D soils found in uplands. Most of Nowthen and western St. Francis is Group B soils with only small areas scattered in the remainder of the watershed. The watershed has Group C soils located in western St. Francis, northwestern Nowthen and two small areas in southern Nowthen.

Table 2-4: Hydrologic Soil Groups

Group A	(Low runoff potential) – Soils having high infiltration rates even when thoroughly wetted, consisting chiefly of deep, well to excessively drained sands and/or gravel. These soils have a high water transmission rate and would result in a low runoff potential. Min infiltration rate: greater than 0.30 inch/hr.
Group B	Soils having moderate infiltration rates when thoroughly wetted, consisting chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate water transmission rate. Min infiltration rate: 0.15 to 0.30 inch/hr.
Group C	Soils having slow infiltration rates when thoroughly wetted, consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture and a slow infiltration rate. These soils have a slow water transmission rate. Min infiltration rate: 0.05 to 0.15 in/hr.
Group D	(High runoff potential) – Soils having very slow infiltration rates when thoroughly wetted, consisting chiefly of clay soils with a high swelling potential, soils with a high permanent water table, soils with clay pan or clay layer at or near the surface, and shallow soils over nearly impervious materials. These soils have a very slow water transmission rate. Min infiltration rate: 0 to 0.05 in/hr.

Source: Hydrology Guide for Minnesota, U.S. Dept of Ag, Soil Conservation Service, St Paul, Minnesota[2]

A detailed map showing all the soil types of Anoka County is provided by in the United States Department of Agriculture Soil Conservation Service publication entitled Soil Survey of Anoka County, Minnesota. A

complete digital representation of the soils survey data is available and was utilized for soil characteristics maps. Figure 2-3 shows the soils within the watershed based on hydrologic soil classifications.

2.1.5 Geology

2.1.5.1 Anoka County Geologic Atlas Update

In 2009, watershed organizations, including the URRWMO jointly paid the local cost necessary for the Minnesota Geological Survey to prepare an Anoka County Geologic Atlas to obtain important geologic and hydrogeologic information that will help address watershed management issues. In 2013, Part A (geology) of the Atlas was published. Part B (hydrogeology) was published in 2016. The Geologic Atlas provides important information for the inventory and assessment of the geology and groundwater resources within the Upper Rum River Watershed.

2.1.5.2 Surficial Geology

The landscape of the Upper Rum River Watershed was shaped by several ice advances into east central Minnesota during the last glaciation, which occurred about 10,000 years ago. In the Upper Rum River Watershed a large glacial outwash deposit, called the Anoka Sandplain, is the dominant geomorphic feature. It was formed largely by glacial drainage from the receding Grantsburg Sublobe of the Des Moines glacier. The Surface of the Anoka Sandplain is flat to moderately undulating. Low regions of upland represent areas of till left from previous ice movements that were not buried by the outwash sand. Other features of positive relief are patches of sand dunes formed by southwesterly winds after the outwash streams left the Sandplain. Landscape features of negative relief include numerous lakes and marshes, which formed as ice blocks, originally buried by the outwash sand that melted to create the depressions, and are now filled with water or organic soils. As a result of the above-mentioned glacial actions, glacial outwash is the predominant surficial geologic formation in the watershed, about one-third of which is covered by organic soils.

Topography in the URRWMO differs from the rest of Anoka County due to an end moraine. The glaciers deposited large mounds of gravel in what is now the western part of the City of St. Francis and northwestern Nowthen. Melt water from the retreating glaciers shaped much of what is now Anoka County, a large outwash plain dominated by gently rolling sand and shallow lakes and wetlands. The highest point of the WMO area is in the northwestern St. Francis at an elevation of 1130 feet above sea level (this is also the highest point in Anoka County). The lowest point is 860 feet above sea level in the southern edge of the WMO area where Cedar Creek meets the Rum River.

2.1.5.3 Bedrock Geology

The surficial glacial deposits of the URRWMO overlie bedrock of Cambrian sandstones that dip gently to the southeast. The uppermost formation across most of the URRWMO is the Tunnel City Group (Upper Cambrian). This formation was formerly named the Franconia Formation. The Tunnel City Group is a very fine to coarse grained, commonly silty and glauconitic sandstone with some shale and dolomite. The Tunnel City Group formation is 100 to 200 feet (30 to 60 meters) thick. In the URRWMO, it is thickest in the east and thins in the west.

In the areas where the Tunnel City Group has eroded away, narrow bands of the Wonewoc Sandstone (Lower Cambrian) exist as the uppermost bedrock formation. The Wonewoc Sandstone was formerly classified as two formations: Ironton and Galesville Sandstone. From a hydrogeologic standpoint, the Ironton formation is now commonly referred to as the upper Wonewoc and the Galesville is referred to as the lower Wonewoc. The upper Wonewoc is a white to grey, medium grained, moderately well to poorly sorted commonly silty quartzose sandstone. It is at most 46 feet (14 meters) thick. The lower Wonewoc is a white to grey predominantly medium grained, well sorted quartzose sandstone. It is as much as 100 feet (30 meters) thick. The boundary between these two portions of the Wonewoc sandstone are often difficult to determine. Like the Franconia, the Ironton and Galesville Sandstone formations were renamed after the Minnesota Geological Survey unified their designations to correspond with Wisconsin Geologic Survey designations.

Underlying the Wonewoc Formation is the Eau Claire Formation. The Eau Claire Formation is the uppermost bedrock in the northwest corner of the URRWMO. The Eau Claire formation is composed of red shale, grey-green shale, fine grained quartzose sandstone and fine grained glauconitic quartzose sandstone. The shale's are generally interbedded layers within the quartzose sandstone and are less than 8 feet (2.5 meters) thick. This formation is nearly 200 feet (60 meters) thick.

2.2 Watershed Biological Environment

2.2.1 Biodiversity Significance Ranks

The Minnesota Biological Survey (MBS) conducts field surveys to evaluate the distribution and status of the state's plants, animals, and native communities. Each site that is surveyed is assigned a biodiversity significant rank, based on the following criteria:

- the presence of rare species populations
- the size and condition of native plant communities within the site
- the landscape context of the site

The four biodiversity significant ranks are defined by MDNR as:

Outstanding
Sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most ecologically intact or functional landscapes.

High
Sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes.

Moderate
Sites contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes.

Below
Sites lack occurrences of rare species and natural features or do not meet MBS standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movement, buffers surrounding higher-quality natural areas, areas with high potential for restoration of native habitat, or open space.

Site rankings within the Upper Rum River Watersheds are shown on Figure 2-4. This information should be used by the member communities for land planning and development review. Note that the MBS does not cover the entire state. Survey sites are selected by the DNR staff and through consultation with resource managers within the region. Areas that are not mapped can include those where native plant communities have been altered by human actions and/or native plant communities are below the minimum size criteria for mapping.

The MDNR also identifies Lakes of Biological Significance (LBS) based on four different community types: aquatic plants, fish, amphibians and birds. Note that many Minnesota lakes have not been samples for plans and animals, so the LBS list will periodically be revised based on updated sampling information. Lake rankings (outstanding, high or moderate) and also shown on Figure 2-4.

2.2.2 Natural Areas and Wildlife Management Areas

In addition to the areas noted as part of the Minnesota Biological Survey, a number of natural areas and wildlife management areas are within the watershed as listed below:

- Cedar Creek Ecosystem Science Reserve
  The Cedar Creek Ecosystem Science Reserve (CCESR), located in East Bethel in the northeastern portion of the URRWMO, was established in 1940 for the study and preservation of this mosaic of natural areas where the three major biomes of Minnesota merge, northern coniferous, eastern broadleaf deciduous forest and prairie/savanna to the west. CCESR is considered a site of outstanding biodiversity by the Minnesota County Biological Survey.
- Burman Wildlife Management Area
  Additional unique vegetation communities like wet meadows, hardwood swamps and dry oak forests are included in the Burman Wildlife Management Area in the City of Oak Grove and farther down the stream along Cedar Creek. Oak forests, other hardwood stands, and commercial and conservation pine groves are also common features of the landscape.
- Bethel Wildlife Management Area
- Carl B Bonnell Wildlife Management Area
- Robert and Marilyn Burman Wildlife Management Area
- Mallard Marsh Wildlife Management Area
- Lake George Aquatic Management Area
- Sandhill Crane Natural Area
- Wildlife Corridors
- State Wildlife Action Plan
  The MNDNR developed the 2015-25 Wildlife Action Plan, which can be referenced to understand the greatest conservation needs of the state, and assist in focusing planning efforts of the URRWMO.

- Central Region Regionally Significant Ecological Areas (CRRSEA)
  The MNDNR has conducted an analysis to identify regionally significant terrestrial and wetland ecological areas. Areas are classified as Moderate, High or Outstanding, and can provide important ecological functions. Within the URRWMO, 3.6 square miles are classified as Moderate, 4.8 square miles are High, and 37.7 square miles are Outstanding. Figure 2-5 displays the Regional Significant Ecological Areas within the URRWMO.

2.2.3 Greenway Corridors

Beginning in 1999, the Anoka County Parks and Anoka Conservation District has been involved in several wildlife/greenway corridor projects. This includes inventorying the Minnesota Land Cover Classification System and identifying wildlife corridors that can be included in local comprehensive plans. Incorporating open space into planning efforts can improve property values, protect and improve water quality, and promote conservation of wildlife habitat.

The Metro Conservation Corridors (MeCC) is a strategy for prioritizing areas for habitat protection within the Twin Cities metro area. The MeCC focuses planning efforts on strategic areas, and should improve the cost-effectiveness of projects by enhancing communication between different partner organizations. Leveraging state funding, MeCC projects include the restoration/enhancement upland and wetland habitats, acquiring conservations easements, and acquiring land. Figure 2-6 displays the Metro Conservation Corridor within the URRWMO. Completed MeCC projects within the URRWMO are listed below.

Anoka County Parks, Restoration
Metro Greenways Program (2003), 150 acres

Beach Farm (257), Acquisition (Conservation Easement)
Minnesota Land Trust (2003), 70 acres

Deer Lake (405), Acquisition (Conservation Easement)
Minnesota Land Trust (2009), 45 acres

Emmans Farm (280), Acquisition (Conservation Easement)
Minnesota Land Trust (2003), 80 acres

Emmans Farm (281), Acquisition (Conservation Easement)
Minnesota Land Trust (2003), 12.5 acres

NW Anoka County Greenway, Acquisition (Conservation Easement)
Metro Greenways Program (2003), 64.8 acres

Rum River (360), Acquisition (Conservation Easement)
Minnesota Land Trust (2007), 53 acres

2.2.4 Unique Features and Scenic Areas

2.2.4.1 **Rare and Endangered Species**

The Upper Rum River watershed provides habitat for a significant number of Blanding's turtles (Emydoidea blandingii), a State Threatened Species. As part of the Rum River watershed, the URRWMO area is considered by the Nongame Wildlife Program to be potentially important for Blanding's turtles, because of verified sightings of the species and at least some remaining habitat.

In addition to Blanding's turtles, the Cedar Creek Natural History Area (NHA) and the Helen Allison Savanna Scientific and Natural Area (adjacent to the southeast boundary of Cedar Creek NHA and outside of the watershed) support many rare plants. Their combined areas contain: five state Endangered, three state Threatened, and six state Special Concern plant species. Habitat for red-shouldered hawks (Buteo lineatus), a Special Concern species, and Sandhill cranes (Grus Canadensis), a species recently removed from Special Concern status on the state list, is also provided. The areas' natural communities form a complex of forests and wetlands that not only support a significant number of rare species, but also provide important habitat for more common native plants and animals. These two areas are high priority sites of statewide significance.

Two significant wetlands occur within the Sandhill Crane Natural Area: Tamarack Swamp Mineotrophic Subtype #30 and Shrub Swamp#25. A state threatened plant, Viola lanceloata #24 occurs on the north side of Neds Lake, just north of the park/forest boundary. Sandhill cranes have been heard in the marshes south of Neds Lake.

A biologically sensitive area is located along that portion of Cedar Creek extending southwest from Cedar Drive (Hwy 13) to Lake George Boulevard. Eight Natural communities, including an oak savannah, hardwood, shrub, tamarack swamps, oak forests and an emergent marsh form a complex of native upland and lowland communities. A rare, but unlisted, plant, Polygonum arifolium #15, Blanding's turtles and Sandhill cranes have been documented in the area.

Four high quality natural communities are located west of Norris Lake and Mud Lake. They include a rich fen, shrub swamp, tamarack swamp, and cattail marsh. Blanding's turtles have been found in or near Norris Lake from 1955-1989. Three additional natural communities, including rich fen, oak forest, and an oak savannah, occur in an area of southwest Oak Grove.

A state Threatened plant (Rotala ramosior) has been found along three shorelines with and adjacent to John Anderson Memorial Park in East Bethel. The occurrence within the park is located on Coopers Lake. Two additional occurrences are located on Minard Lake and on a small lake southeast of Coopers Lake.

In Nowthen, a bald eagle nest (Haliaeetus leucocephalus) on the east side of Goose Lake has been active since 1993.

Two high quality forest communities occur on the east side of an oxbow in the Rum River, approximately one mile north of St. Francis. A high quality complex of upland forest and swamp is located north of Highway 28 in St. Francis. Two rare plants were found within the complex: Panax quinquefolius, a state listed Special Concern species, Polygonum arifolium, a rare, but unlisted species.

Two high quality wetlands occur adjacent to an intermittent stream that enters Seelye Brook. North of the complex is a Maple-Basswood Forest which supports Panax quinquefolius.

The MNDNR has mapped out Native Plant Communities (sometimes called natural communities) that are considered remnants of pre-settlement vegetation. Native plant communities have undergone very little human disturbance since pre-settlement times. They can be generically classified into groups by vegetation and major habitat features. Like much of the larger Twin Cities Metropolitan Area, the URRWMO has only small patches of pre-settlement native plant communities remaining with many occurring in the Cedar Creek Ecosystem Science Reserve.

Native plant communities are functional units of the natural landscape, classified and described by considering vegetation, hydrology, landform, soils and natural disturbance regimes. The native plant community system and subtype descriptions given below describe vegetation and habitat characteristics present in the Upper Rum River Watershed. Of the ~7,000 acres of natural communities within the watershed, approximately 25% are located the Cedar Creek Ecosystem Science Reserve (Table 2-5, Figure 2-7). Future priorities and protection efforts may be added to the URRWMO plan with the completion of future inventories and assessments.

Table 2-5: Native Plant Communities in the Upper Rum River Watershed

System Description	Native Plant Community	# Sites within URRWMO	Acres In URRWMO	S Rank*
Acid Peatland System	Low Shrub Poor Fen	13	57	S5
Fire-Dependent Forest/Woodland System	Central Dry Oak-Aspen (Pine) Woodland	3	109	
	Oak - (Red Maple) Woodland	31	572	S4
	Oak - Aspen Woodland	39	548	S2
	Pin Oak - Bur Oak Woodland	27	502	S3
	Southern Dry-Mesic Oak (Maple) Woodland	16	154	
Floodplain Forest System	Silver Maple - (Virginia Creeper) Floodplain Forest	5	60	S3
Forested Rich Peatland System	Alder - (Maple - Loosestrife) Swamp	16	476	S5
	Tamarack Swamp (Southern)	32	484	S2S3
Lakeshore System	Sand Beach (Inland Lake)	3	28	S1
Marsh System	Cattail - Sedge Marsh (Northern)	2	157	S2
	Northern Bulrush-Spikerush Marsh	7	427	
	Northern Mixed Cattail Marsh	14	322	
Mesic Hardwood Forest System	Red Oak - Basswood Forest (Noncalcareous Till)	1	4	S4
	Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest	7	130	S3
	Red Oak - Sugar Maple - Basswood - (Large-Flowered Trillium) Forest	7	23	S4
Open Rich Peatland System	Graminoid - Sphagnum Rich Fen (Basin)	4	177	S4
	Northern Rich Fen (Basin)	10	85	
Upland Prairie System	Dry Barrens Oak Savanna (Southern), Oak Subtype	15	263	S1S2
Wet Forest System	Black Ash - (Red Maple) Seepage Swamp	1	5	S1S2
	Black Ash - Yellow Birch - Red Maple - Alder Swamp (Eastcentral)	4	79	S4
	Black Ash - Yellow Birch - Red Maple - Basswood Swamp (Eastcentral)	28	540	S3
	Lowland White Cedar Forest (Northern)	8	166	S3
Wet Meadow/Carr System	Sedge Meadow	24	305	S4 or S5
	Sedge Meadow, Tussock Sedge Subtype	2	144	S4
	Willow - Dogwood Shrub Swamp	53	1,193	S5
Total		372	7,011	

*S rank: Conservation Status

S1: Critical imperiled, S2: Imperiled, S3: Vulnerable to Extirpation, S4: Uncommon but not Rare, S5: Common and Abundant

The information on Table 2-5 was derived from a GIS database provided the Minnesota Department of Natural Resources based on results from the Minnesota Biological Survey, State Park land cover data, Forestry native plant community data, and Wildlife Management Areas land cover data.

Rare features data included in Table 2-6 was provided by the Natural Heritage and Nongame Research Program of the Division of Fish and Wildlife, Minnesota Department of Natural Resources(DNR) and were current as of October 2004. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be constructed to mean that no significant features are present. In addition, there may be inaccuracies in the data, of which the DNR is not aware and shall not be held responsible for. Permission to use this data does not imply endorsement or approval by the DNR of any interpretations or products derived from the data.

Table 2-6: Rare Species in the Upper Rum River Watershed

Common Name	Scientific Name	Status	# Reported in URRW
Plants			
American Ginseng	Aristida tuberculosa	SPC	2
Beach-Heather	Hudsonia tomentosa	SPC	1
Clinton's Bulrush	Scirpus clintonii	SPC	1
Cross-Leaved Milkwort	Polygala cruciata	END	2
Halberd-Leaved Tearthumb	Polygonum arifolium var. pubescens	NON	3
Lance-Leaved Violet	Viola lanceolata	THR	3
Least Moonwort	Botrychium simplex	THR	3
Long-Bearded Hawkweed	Hieracium longipilum	NON	2
Ram's-head Lady's Slipper	Cypripedium arietinum	THR	2
Rhombic-Petaled Evening Primrose	Oenothera rhombipetala	SPC	2
Sea-beach Needlegrass	Aristida tuberculosa	SPC	1
Tall Nut-rush	Scleria triglomerata	END	2
Tooth-cup	Rotala ramosior	THR	3
Twisted Yellow-eyed Grass	Xyris torta	END	1
Virginia Bartonia	Bartonia virginica	END	2
Walter's Barnyard Grass	Echinochoa walteri	NON	1
Water Willow	Decodon verticillatus	SPC	1
White Wild Indigo	Baptisia alba	SPC	1
Birds			
Bald Eagle	Haliaeetus leucocephalus	SPC	2
Red-Shouldered Hawk	Buteo lineatus	SPC	3
Sandhill Crane	Grus Canadensis	NON	8
Hooded Warbler	Wilsonia citrine	SPC	1
Reptiles			
Blanding's Turtle	Emydoidea blandingii	THR	42
Butterflies			
Karner Blue	Lycaeides melissa samuelis	END	1
Leonard's Skipper	Hesperia leonardus	SPC	2
Regal Frittilary	Speyeria idalia	SPC	1
Insects			
A Species of Jumping Spider	Paradamoetas fontana	SPC	1
	Metaphidippus arizonensis	SPC	1
	Tutelina formicaria	SPC	1
Mollusk			
Black Sandshell Mussel	Ligumia recta	SPC	1
Creek Heelsplitter Mussel	Lasmigona compressa	SPC	1

SPC = Special Concern, THR = Threatened, END = Endangered, NON = Not Listed But Rare

The URRWMO does not have any forestry state land. However, there are some the DNR offers a range of different services/information that can help support and protect forested areas within the URRWMO. Information on each of these programs are available on the DNR's website:

- Forested riparian areas can provide plant diversity, wildlife and fish habitat, nutrient/sediment/water interception as well as recreational opportunities. Anyone who currently is managing riparian forests are mare recommended to consult the Minnesota Forest Resource Council's Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers and Resources Managers to maintain these ecosystems.
- Forest Stewardship Program is intended to support private landowners with 20+ acres of forested land. For a fee, a DNR Forester can provide advice, support and develop a plan for the forested land to make it eligible for property tax relief programs and state cost-share assistance for management work.
- Community Forestry information is targeted towards urbanized areas and communities. There are grant programs, details on the DNR's Arbor Month, and information other best management practices available for public use on the DNR's website.
- Emerald Ash Borer is of growing concern across the state. Member cities and residents within the URRWMO are also recommended to considering future impacts of the Emerald Ash Borer on their community. The MDNR has more information on how to prepare for any financial impacts communities will have resulting from tree deaths.
- The School Forest Program act as a classroom for students and also provide water quality benefits. Two schools within the URRWMO are enrolled in the DNR's School Forest Program: Cedar Creek Community School and East Bethel Community School.
- The Minnesota Forest Legacy Program provides conservation easements for private forests. A portion of the URRWMO is within the Lower St. Croix Forest Legacy Area.

2.2.4.2 Scientific and Natural Areas

There are no DNR Designated Scientific and Natural Areas within the watershed.

2.2.4.3 Recreational and Scenic Riverways

The Rum River is a state designated Scenic and Recreational River way, flowing south from Lake Mille Lacs 145 miles to its confluence with the Mississippi River in the City of Anoka. The river was added to Minnesota's Wild and Scenic Rivers Program in 1978. This covers the stretch from Mille Lacs, Sherburne, Isanti, and Anoka Counties.

Classifications of wild rivers are those which exist in a free-flowing state with excellent water quality and with adjacent lands that are essentially primitive or undeveloped (i.e., adjacent lands still present an overall natural character, but in places may have been developed for agricultural, residential or other land uses).

Classifications of recreational rivers are those that may have undergone some impoundment or diversion in the past and that may have adjacent lands which are considerably developed, but that are still capable of being managed so as to further the purposes of this act. This means that bordering lands may have

already been developed for a full range of agricultural or other land uses, and may also be readily accessible by pre-existing roads or railroads.

Wildlife and fish can be found along or in the Rum River; white-tailed deer, gray and fox squirrels, cottontail rabbits, snowshoe hares, beavers, minks, muskrats, raccoons, loons, great blue herons, songbirds, and waterfowls nesting are a few of the animals found along the Rum River. Smallmouth Bass, Northern Pike, and Walleyes can be found in the Rum River. Smallmouth Bass are popular among the anglers along the river. Northern Pike are common near the headwaters. Walleyes are common in the river from Princeton to Anoka. The Rum River Watershed contains extensive backwater marshes, sandy upland plains, farmland and bottom lands covered with maple, elm and other hardwoods. The remains of a once vast pine forest can be seen, near the river's lowest reaches, through the red and white pine trees.

2.3 Watershed Human Environment

2.3.1 Current Land Use

Existing land use within the watershed describes the history of the area and its future. As shown on the existing land use map (Figure 2-8, based on the Metropolitan Council's 2010 Generalized Land Use), approximately 15% of the watershed is residential development. Agriculture production is another common land use, particularly in Nowthen. Following settlement of the area, farming was a common land use with row crops and hay as common crops. Sod and tree farming are other forms of agriculture in the watershed, supplying the areas growing landscape needs. Parkland and public land make up 8% of the watershed with Cedar Creek Ecosystem Reserve (CCESR) making up nearly half of the public open space. Wetlands and lowlands for the most part are unavailable for development; however, these lands are used for recreational hunting, bird watching, hiking and fire wood gathering.

There have been two major changes in land use since European settlement: the initial clearing of land for agriculture production and now the conversion of those agricultural lands and additional clearing for roads, houses, businesses and other facilities that support a growing population. As the population and individual households increase so do the stresses on the natural environment of the watershed. Since most of the current and future households within the watershed are serviced by individual sewage treatment systems and individual wells there is the potential for water impairment if local and state laws are not followed.

2.3.2 Future Land Use

The development that has generally occurred within the URRWMO boundary has consisted primarily of land use conversion from agricultural to rural residential. This land use change has resulted in a decrease of storm water runoff volume. Where areas have developed more densely, an increase in runoff volume has occurred.

Portions of St. Francis, Bethel, Oak Grove and East Bethel are served by municipal water supplies or waste water treatment facilities. Other areas require the use of individual septic systems and wells. These individual systems limit where dense development will occur. The planned land use within the WMO is shown in Figure 2-9 (Regional Planned Land Use, Metropolitan Council).

The Metropolitan Council produced forecasts for population and households for the entire metropolitan region from 2010 to 2040 in 10 year increments. Forecasts were adopted in May 2014, and updated in July 2015. Forecasts for the communities with the URRWMO shown in Table 2-7.

Table 2-7: Metropolitan Council Population & Household Forecast

Community	Population				Households			
	2010	2020	2030	2040	2010	2020	2030	2040
Bethel	466	480	520	550	174	190	220	230
East Bethel	11,626	12,400	15,400	18,400	4,060	4,700	6,000	7,400
Ham Lake	15,296	16,200	17,700	18,700	5,171	5,800	6,600	7,100
Nowthen	4,443	4,590	5,100	5,500	1,450	1,600	1,860	2,100
Oak Grove	8,031	8,600	9,500	10,400	2,744	3,100	3,600	4,100
St. Francis	7,218	8,200	10,400	12,600	2,520	3,100	4,100	5,100

2.3.3 Water Based Recreation

There are several park facilities within the watershed that provide activities such as swimming, fishing, and boating. The following parks are location at lakes and water bodies within the URRWMO:

Sandhill Crane Natural Area (East Bethel)
This natural consists of 172 acres intended to remain natural without trails or roads.

Lake George Park (Oak Grove)
The 265 acre park includes a boat launch, picnic areas, a swimming beach, and hiking trails.

Rum River Central Park (Oak Grove)
This park is partly within the City of Oak Grove and partly within the City of Andover. The park has trails, camping, and picnic areas. A boat launch is available within the City of Andover.

Pickerel Lake Park (Nowthen)
A boat access is available at Pickerel Lake.

East Twin Lake Park (Nowthen)
This park offers a swimming beach, picnic areas, trails, and a boat access.

Rum River Canoe Access (St. Francis)
A walk-in boat access is available on the Rum River in St. Francis.

2.3.4 Water Appropriations

The Minnesota DNR regulates surface water and groundwater appropriations thorough a permitting program. Active surface water and groundwater appropriations can be found on the MDNR's website at:

https://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/index.html

A search of the MNDNR Permitting and Reporting System (MNPARS) database was completed to identify all water users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. This is common during the construction of new structures and utilities, and dewatering is required. A permit is also required for maintenance of stormwater ponds that require dewatering in excess of 10,000 gallons per day or one million gallons per year. The information obtained from MNPARS for all active surface and groundwater appropriation permits (thru 2015) is shown in Figure 2-10. Local municipalities are encouraged to communicate the Water Appropriation Permit requirements to their residents. The MNDNR should be contacted for current details regarding specific permits.

Member communities can reference the DNR Water Use records to follow the trend of water use within the URRWMO (and their community) to become more aware of the locations of aquifers within the region and access trends of groundwater use.

2.4 Watershed Water Resources

2.4.1 Riparian Protection and Water Quality Practices

In 2015, the Minnesota Legislature passed (and revised in 2016) statues to require the inventory and land use practices for riparian (lakes, streams and rivers) protection and water quality (Minnesota Statute 103F.48). Commonly referred to as the "Buffer Law," soil and water conservation districts were required to provide the completed an inventory of lands areas that do not meet buffer requirements to local water management authorities. The Local water management authorities must then address implementation of the recommendations when updating their plans.

Anoka Conservation District has completed an inventory of lands areas that do not meet buffer requirements ("Additional Waters"), and provided the criteria to the URRWMO on June 30th, 2017. The Anoka Conservation District, in accordance with MN Statue 103F.48, identified water matching the following criteria as potentially benefitting from perennially vegetated riparian buffers or other best management practices:

1. Hydrologically connected, open waterways and wetlands as part of a flowing drainage network, and
2. Wetlands of high or outstanding ecological value and/or supporting rare species.

This Buffer Law presents new challenges and opportunities for the County, its watershed management organizations/districts and residents. The URRWMO Board discussed the implementation of ACD's recommendations for these "Additional Waters". At this time, the URRWMO is focused on other implementing projects to support specific goals within the current 10-year planning cycle (see Chapter 4).

However, the URRWMO will reference the ACD's "Explanatory Supplement" for guidance on placement of future riparian buffers, specifically the results of their GIS analysis.

2.4.2 Lakes

There are thirty-one (31)-named lakes within the URRWMO boundary; Table 2-8 provides information on all of the named lakes, including the DNR lake number, surface area, maximum depth, use classification, DNR shoreland management lake classification, overall condition, and water quality sampling information collected by the MPCA. Figure 2-11 shows the location of the named lakes and ponds within the URRWMO.

All of the lakes within the Upper Rum River Watershed have the use classification of 2B, 3C (2B: a healthy, warm water aquatic community. 3C: Industrial cooling and a materials transport use without a high level of treatment). The DNR Shoreland Management Lake Classification varies by lake. The three classes include:

- Natural Environment Lakes usually have less than 150 total acres, less than 60 acres per mile of shoreline, and less than three dwellings per mile of shoreline. They may have some winter kill of fish; may have shallow, swampy shoreline; and are less than 15 feet deep.

- Recreational Development Lakes usually have between 60 and 225 acres of water per mile of shoreline, between 3 and 25 dwellings per mile of shoreline, and are more than 15 feet deep.

- General Development Lakes usually have more than 225 acres of water per mile of shoreline and 25 dwellings per mile of shoreline, and are more than 15 feet deep.

Table 2-8: Characteristics of Lakes in the Upper Rum River Watershed

							10-Year Average of All Summer Samples***			
Lake	DNR ID#	Surface Area (ac)	Max Depth (ft)	Use Classification	DNR Shoreland Management Lake Classification*	Overall Condition**	TP (µg/L)	Chlorophyll-a (µg/L)	Secchi Depth (m)	Number of samples
Bass	02-0135-00	76.9	5	2B, 3C	NE					
Bear	02-0131-00	21.4	unknown	2B, 3C	NE					
Benjamin	02-0136-00	31.6	unknown	2B, 3C	NE					
Bethel Pond	02-0772-00	unknown	unknown	2B, 3C						
Booster Pond	02-0056-00	5.4	unknown	2B, 3C	NE					
Burns	02-0122-00	85.7	18	2B, 3C	NE					
Cedar Bog	02-0152-00	3.3	unknown	2B, 3C						
Coopers	02-0070-00	46.2	8	2B, 3C	NE					
Deer	02-0059-00	71.0	9	2B, 3C	NE					
East Twin	02-0133-00	76.0	66	2B, 3C	NE	2	21	5	4	33, 32, 32
Eckstrom	02-0129-00	6.0	unknown	2B, 3C	NE					
Fish	02-0065-00	318.9	10	2B, 3C	NE					
George	02-0091-00	480.4	32	2B, 3C	GD	2	28	8	2	44, 44, 122
Goose	02-0127-00	64.9	unknown	2B, 3C	NE					
Grass	02-0092-00	12.3	unknown	2B, 3C	NE					
Hickey	02-0096-00	40.5	unknown	2B, 3C	NE					
Lone Pine	02-0055-00	5.7	unknown	2B, 3C	NE					
McCann	02-0138-00	85.8	unknown	2B, 3C	NE					
Minard	02-0067-00	126.7	7	2B, 3C	RD		89	2	1	9
Mud	02-0060-00	20.4	4	2B, 3C	NE					
Mud	02-0105-00	73.5	unknown	2B, 3C	NE					
Mud	02-0097-00	0.9	unknown	2B, 3C	NE					
Neds	02-0057-00	163.8	3.5	2B, 3C	NE					
Norris	02-0106-00	55.0	17	2B, 3C	NE				3	18
Nowthen Pond	02-0126-00	6.1	unknown							
Pickerel	02-0130-00	238.7	5	2B, 3C	NE	1	24	7	1	19, 19, 19
Pinnaker	02-0128-00	36.9	unknown	2B, 3C	NE					
Rogers	02-0104-00	41.3	unknown	2B, 3C	RD	3	59	20	1	25, 25, 25
Sand Shore	02-0102-00	38.2	unknown	2B, 3C	NE				2	4
Swan	02-0098-00	33.1	2	2B, 3C	NE					
Twin	71-0001-00	32.4	18	2B, 3C	NE				3	44

*DNR Shoreland Management Lake Classification
GD: General Development, NE: Natural Environment, RD: Recreational Development

**Overall Conditions
1: Suitable for swimming and wading, with good clarity and low algae levels throughout the open water season.
2: Suitable for swimming and wading, with good clarity and low algae levels throughout the open water season. Concentrations of mercury in fish tissue exceed the water quality standar
3: Not always suitable for swimming and wading due to low clarity or excessive algae caused by the presence of nutrients such as phosphorus in the water.

***10-year Average of All Summer Samples provided by the MPCA. Additional sampling has been conducted by other organizations and is not included within the statistics.

Blanks within the table are due to data availability.

All of the member communities within the URRWMO have completed a shoreland ordinance, shown in Table 2-9.

Table 2-9: Shoreland Management Ordinances

Local Government Unit	Adopted Shoreland Ordinance
Nowthen	Yes
City of Bethel	Yes
City of East Bethel	Yes
City of Ham Lake	Yes
City of St. Francis	Has Rum River Scenic District and Urban Stormwater Ordinance
City of Oak Grove	Yes

Anoka Conservation District collects water quality samples within some of the lakes in the Upper Rum River Watershed. Figure 2-11 displays the ACD monitoring sites in lakes between 2006 and 2018; a summary of the ACD sampling efforts are described in Chapter 1 Section 3.2 of the plan. Results of the historical monitoring efforts are available on the URRWMO website:

http://www.urrwmo.org/monitoring

The Minnesota Pollution Control Agency submitted a list of 303(d) impaired waters on April 4, 2018 and the list was approved by the EPA on January 28, 2019. Two (2) lakes within the Upper Rum River watershed were listed as impaired:

East Twin Lake
Affected designated use: Aquatic consumption
Pollutant or Stressor: Mercury in fish tissue
TMDL approved in 2008

Lake George
Affected designated use: Aquatic consumption
Pollutant or Stressor: Mercury in fish tissue
TMDL approved in 2007

2.4.3 Rivers and Streams

The URRWMO has approximate 155 miles of rivers and streams within its boundaries (based on the National Hydrology dataset). These include portions of the following named rivers/streams: Cedar Creek, Crooked Brook, Ford Brook, Mahoney Brook, Rum River, and Seelye Brook. Figure 2-11 shows the location of the named rivers and streams within the URRW.

Anoka Conservation District collects water quality samples within some of the rivers in the URRWMO. Figure 2-11 displays the ACD monitoring sites in rivers between 2006 and 2016; a summary of the ACD sampling efforts are described in Chapter 1 Section 3.2 of the plan. Results of the historical monitoring efforts are available on the URRWMO website:

http://www.urrwmo.org/monitoring

The Minnesota Pollution Control Agency submitted a list of 303(d) impaired waters on April 4, 2018 and the list was approved by the EPA on January 28, 2019. Six (6) river/stream segments within the Upper Rum River watershed were listed as impaired (Table 2-10).

Three (3) segments of the Rum River immediately downstream of the URRWMO are also listed as impaired, and any actions taken by the URRWMO might impact these segments as well.

Table 2-10: MPCA's 2018 Impaired Waters List (Rivers and Streams)

Within the URRWMO or Downstream	Water body name	Water body description	Year added to List	AUID	Affected designated use	Pollutant or stressor
Within URRWMO	Cedar Creek	Headwaters to Rum R	2016	07010207-521	Aquatic Recreation	Escherichia coli
Within URRWMO	Crooked Brook	CD 28 to Cedar Cr	2006	07010207-575	Aquatic Life	Dissolved oxygen
Within URRWMO	Mahoney Brook	T33 R24W S34, south line to Cedar Cr	2016	07010207-682	Aquatic Life	Fishes bioassessments
Within URRWMO	Seelye Brook	Headwaters to Rum R	2016	07010207-528	Aquatic Recreation	Escherichia coli
Within URRWMO	Rum River	Seelye Bk to Cedar Cr	1998	07010207-503	Aquatic Consumption	Mercury in fish tissue
Within URRWMO	Rum River	Stanchfield Cr to Seelye Bk	1998	07010207-504	Aquatic Consumption	Mercury in fish tissue
Downstream	Rum River	Cedar Cr to Trott Bk	1998	07010207-502	Aquatic Consumption	Mercury in fish tissue
Downstream	Rum River	Trott Bk to Anoka Dam	1998	07010207-666	Aquatic Consumption	Mercury in fish tissue
Downstream	Rum River	Madison/Rice St in Anoka to Mississippi R	1998	07010207-556	Aquatic Consumption	Mercury in fish tissue

2.4.4 Ditches

The watershed contains a number of private and public ditches. These ditches were constructed in the late 1800's and early 1900's. Minimal maintenance has been performed on these ditches since their construction. While original construction plans exist for many ditches, the "as-built" drawings do not, thus making repairs and maintenance problematic. The Anoka County Highway Department is the ditch authority for the County Ditches in the watershed. Table 2-11 lists the County Ditches and Figure 2-12 shows the location of the ditches.

Table 2-11: County Ditches within the URRWMO

Ditch No.	Length (miles)	Year Constructed	Location
13	11.48	1891	East Bethel
14	3.97	1891	Nowthen
18	3.47	1893	St. Francis, Oak Grove
19	12.76	1893	St. Francis, Oak Grove
21 (71)	4.54	1893	Ham Lake, Oak Grove
27	8.65	1899	Nowthen
28	7.33	1898	East Bethel, Ham Lake
30	1.1	1898	St. Francis, Nowthen
36	2.65	1899	East Bethel
38	2.43	1900	East Bethel
42	3.83	1907	Nowthen
48	4.98	1908	East Bethel, Oak Grove
49	9.29	1909	Nowthen
50	0.64	1910	Nowthen
64	2.96	1920	Nowthen
65	2.53	1921	Nowthen
67	3.03	1922	East Bethel
28	1.1		Ham Lake, East Bethel

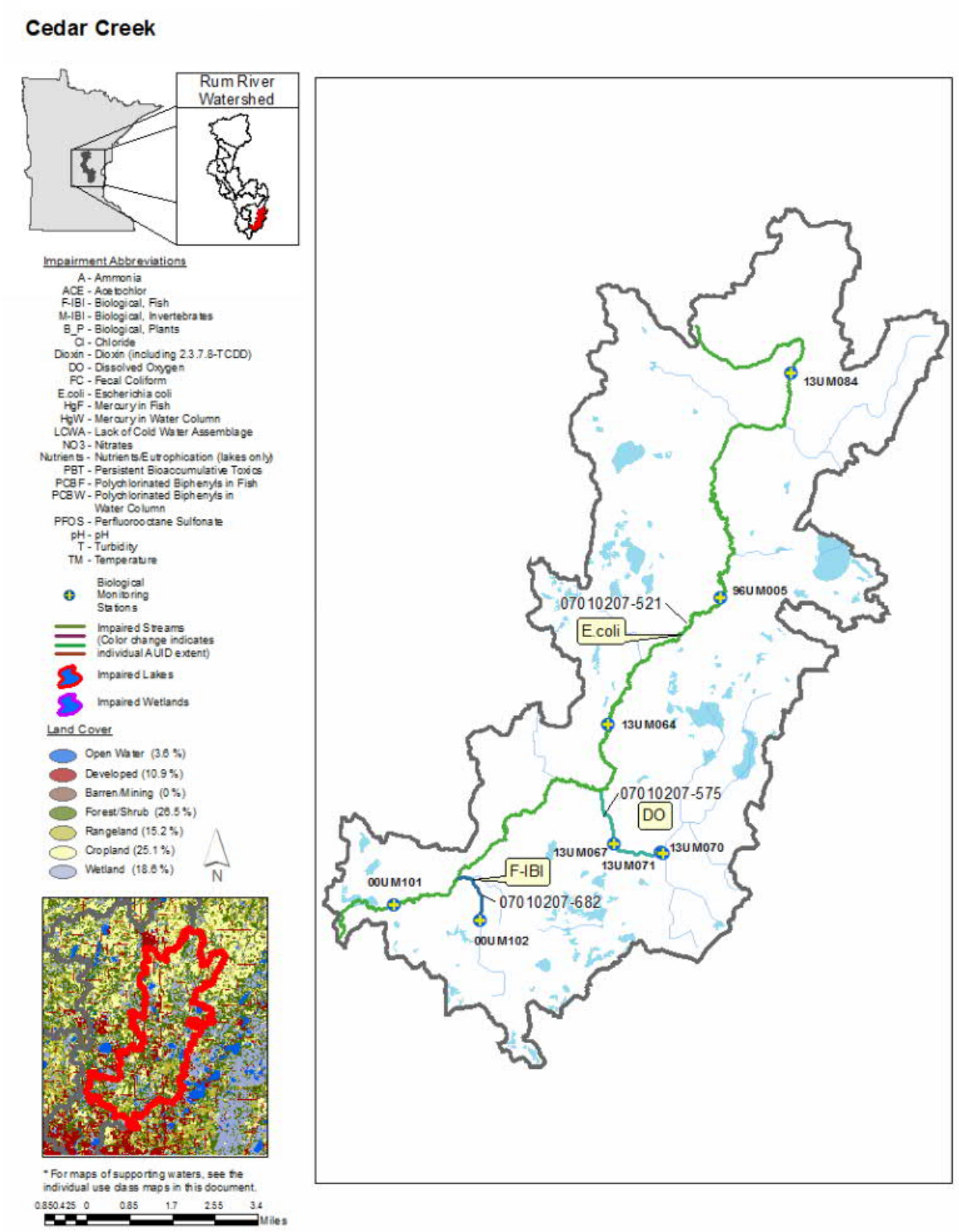
2.4.5 Water Quality Trends

Comprehensive review of all water quality information is pivotal in identifying long term trends within the URRWMO, and can be used to prioritize waterbodies for water quality improvement efforts. The Rum River Watershed Monitoring and Assessment Report, published by the PCA in October 2016, highlighted some of the visible water quality trends within the larger Rum River watershed (HUC 8 scale). The report also provides information on water quality trends at a subwatershed scale – aggregated HUC 12 and HUC 14 subwatersheds, with drainage areas of approximately 300-500 square miles. A complete copy of the report can be found at the MNPCA website below:

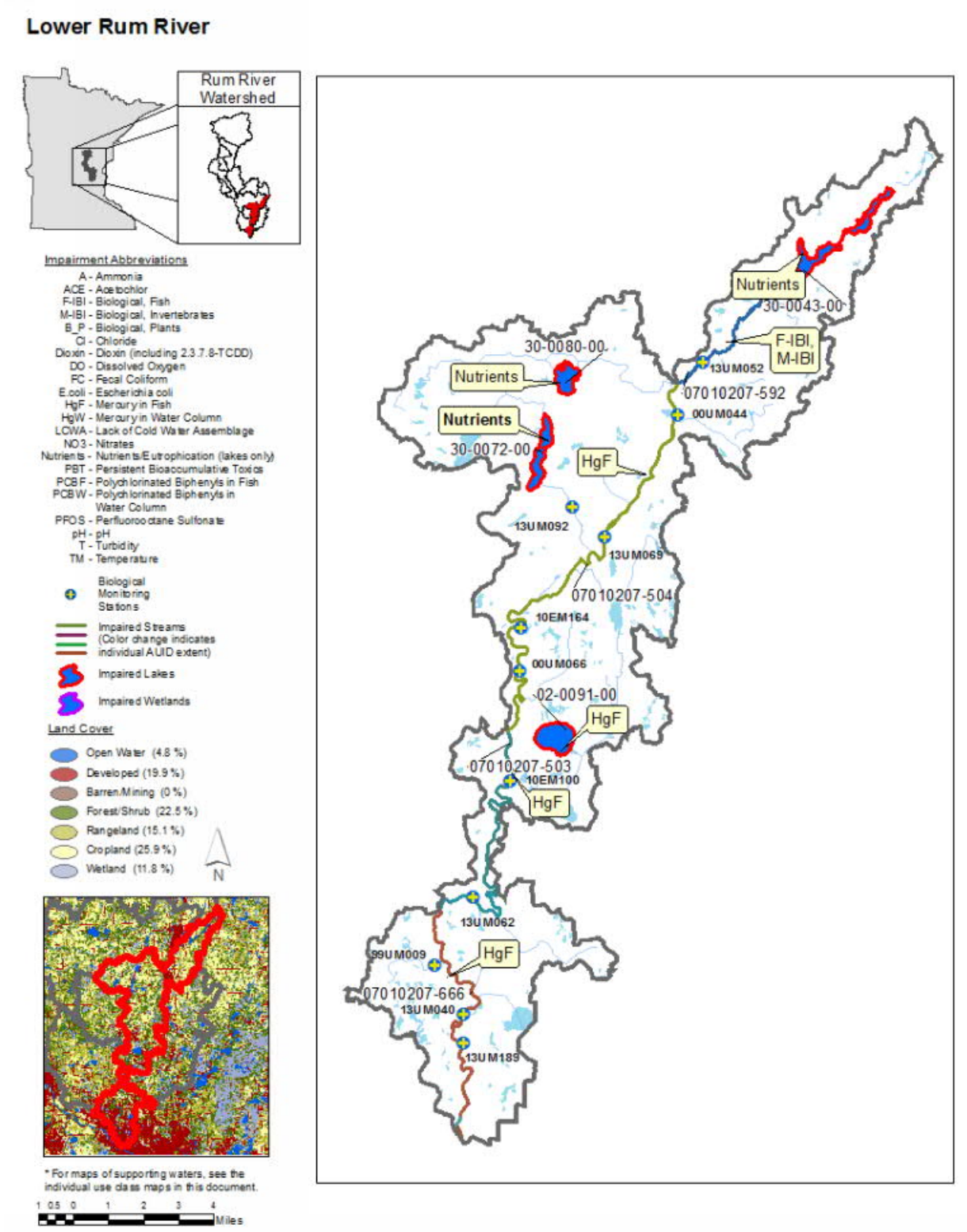
https://www.pca.state.mn.us/sites/default/files/wq-ws3-07010207b.pdf

A basic summary of water quality sampling results identified within the 2016 report within the URRWMO boundary is outlined within this document. For more detailed information, please refer to the complete report. Four (4) aggregated HUC 12 and 14 subwatersheds fall partially within the URRWMO boundary: Cedar Creek, Lower Rum River, Seelye Brook, and Trott Brook. The following graphics are taken from the report are included within this document to facilitate a more comprehensive understanding of measured trends and impairments within the URRWMO.

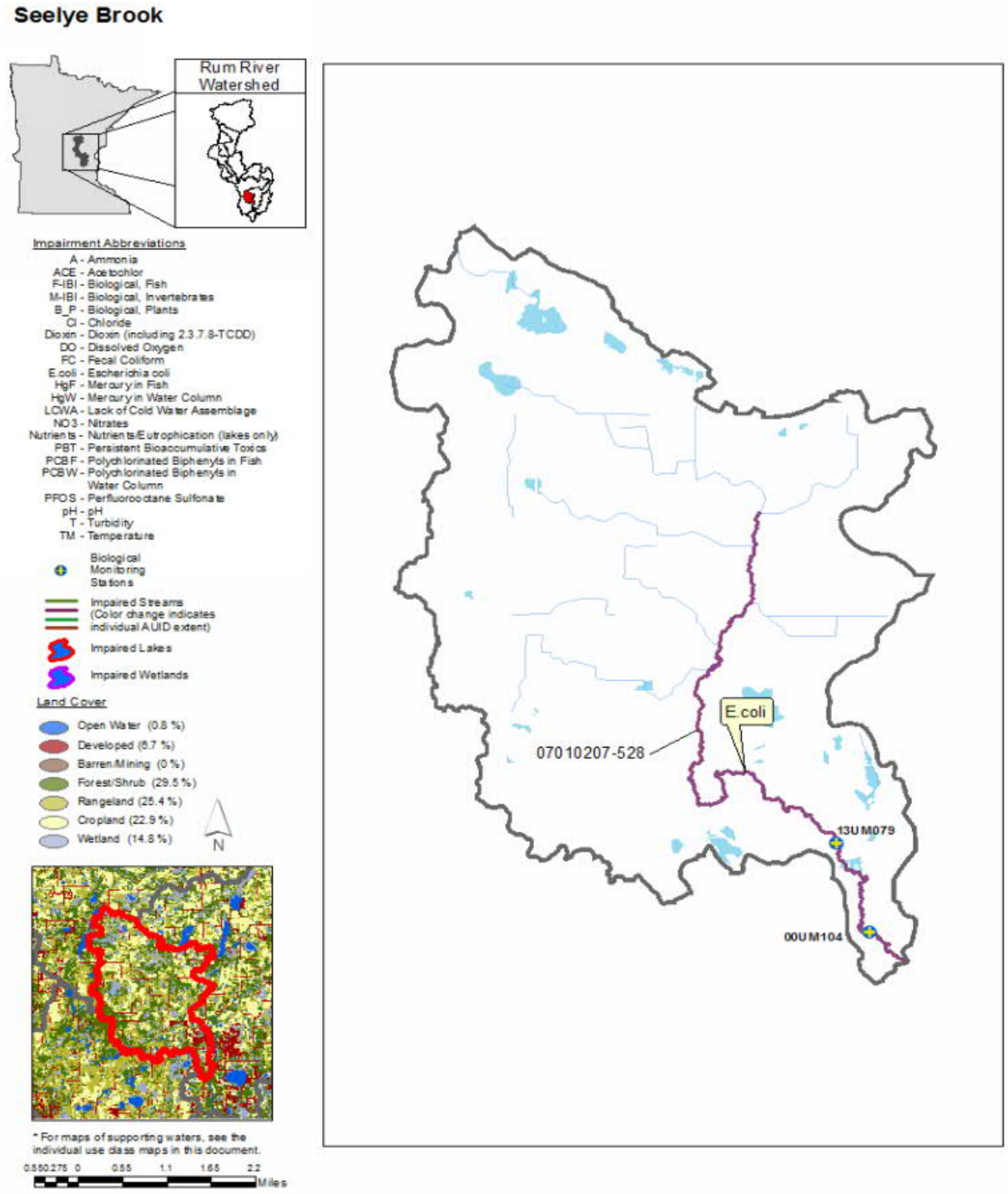
Graphic 2-1: Currently listed impaired waters by parameter and land use characteristics in the Cedar Creek Aggregated 12-HUC. (Graphic from Rum River Watershed Monitoring and Assessment Report, October 2016)



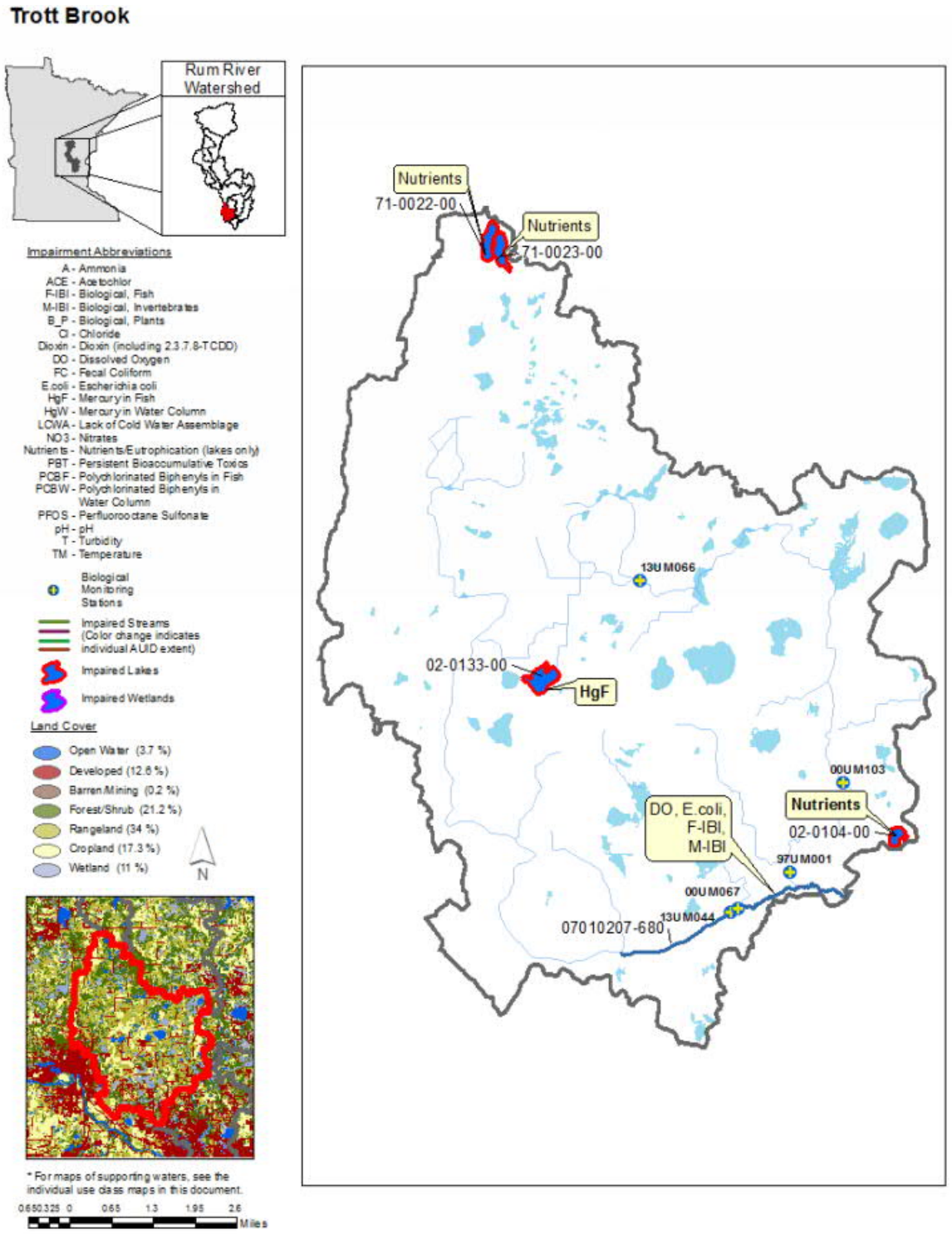
Graphic 2-2: Currently listed impaired waters by parameter and land use characteristics in the Lower Rum River Aggregated 12-HUC. (Graphic from Rum River Watershed Monitoring and Assessment Report, October 2016)



Graphic 2-3: Currently listed impaired waters by parameter and land use characteristics in the Seelye Brook Aggregated 12-HUC. (Graphic from Rum River Watershed Monitoring and Assessment Report, October 2016)



Graphic 2-4: Currently listed impaired waters by parameter and land use characteristics in the Trott Brook Aggregated 12-HUC. (Graphic from Rum River Watershed Monitoring and Assessment Report, October 2016)



Water quality standards define a concentration (or condition) of surface wasters that allow those waters to meet their designated uses. Standards can be numerical (e.g. a concentration of a pollutant) or narrative (e.g. statement regarding the biological condition of a waterbody). Carefully reviewing if a waterbody meets these standards can assist in prioritizing where water quality improvement projects should be implemented throughout the watershed. The Rum River Watershed Restoration and Protection Strategy (WRAPS) Report also leveraged the same water quality assessment document when prioritizing project locations and developing implementation strategies. The following four tables provide insight into some of the existing water quality conditions throughout the watershed.

Table 2-12 provides details on the aquatic life and recreation assessments for stream reaches, focusing on only those streams and sampling locations that fall within the URRWMO. This information can be used to determine if the stream is meeting those standards appropriate for its designated uses. Four of the monitored streams meet the standards and have full support for the Aquatic Life Designated Use, two (Crooked Brook and Mahoney Brook) are not meeting the standards. Cedar Creek and Seelye Brook are not meeting the standards for Aquatic Recreation.

Table 2-13 provides the Minnesota Stream Habitat Assessment (MSHA) rating for those streams within the URRMO boundaries. This offers insight as to how well the stream reach is providing a healthy habitat for fish and other aquatic species. The Rum River has a 'Good' MSHA score, six (6) stream segments have a 'Fair' classification, and three (3) are classified as 'Poor'.

Table 2-14 outlines the Channel Condition Assessment for those stream reaches within the URRWMO. Understanding the physical indicators of the channel condition can help identify locations where channel banks are unstable, and potentially help prioritize bank stabilization projects. The banks of the Rum River and segment of Seelye Brook were classified as 'Fairly Stable', eight (8) reaches were classified as 'Moderately Unstable', and one (1) segment of Cedar Creek was classified as 'Severely Unstable'.

Table 2-15 displays the current lake assessments for those waterbodies within the URRWMO. Four (4) of the five lakes support Aquatic Recreation; Rogers lake is classified as non-supporting.

Table 2-12: Aquatic life and recreation assessments on stream reaches. (Table derived from Rum River Watershed Monitoring and Assessment Report, October 2016)

Aggregated HUC 12	AUID Reach Name , Reach Description	Biological Station ID	Reach Length (miles)	Use Class	Aquatic Life Indicators:											Aquatic Life	Aquatic Rec. (Bacteria)
					Fish IBI	Invert IBI	Dissolved Oxygen	TSS	Secchi Tube	Chloride	pH	Ammonia -NH_3	Pesticides ***	Eutrophication			
														Phosphorous	Response Indicator		
Cedar Creek	07010207-521 Cedar Creek, Headwaters to Rum R	00UM101, 13UM064, 13UM084	28.55	WWg	MTS	MTS	IF	MTS	MTS	MTS	MTS	MTS		MTS		FS	NS
	07010207-575 Crooked Brook, CD 28 to Cedar Cr	13UM067	2.32	WWg	MTS	MTS	IF	IF	IF		IF	IF		IF		NS	NA
	07010207-682 Mahoney Brook, T33 R24W S34, southline to Cedar Cr	00UM102	1.24	WWg	EXS	MTS	IF	IF	IF		IF	IF		IF		NS	NA
Lower Rum	07010207-503 Rum River, Seelye Bk to Cedar Cr	10EM100	6.79	WWg	MTS	MTS	IF	IF	IF		IF	IF		IF		FS	NA
	07010207-504 Rum River, Stanchfield Cr to Seelye Bk	13UM069, 00UM066	34.41	WWg	MTS	MTS	MTS	MTS	MTS	MTS	MTS	MTS		IF		FS	NA
Seelye Brook	07010207-528 Seelye Brook, Headwaters to Rum R	00UM104, 13UM079	12.4	WWg	IF*	IF*	IF	MTS	MTS	MTS	MTS	MTS		IF		IF*	NS
Trott Brook	07010207-587 Unnamed ditch, Unnamed ditch to Goose Lk	13UM066	1.09	WWm	MTS	MTS	IF	IF	IF		IF	IF		IF		FS	NA

Abbreviations for Indicator Evaluations: MTS = Meets Standard; EXS = Fails Standard; IF = Insufficient Information

Abbreviations for Use Support Determinations: -- = No Data, NA = Not Assessed, IF = Insufficient Information, FS = Full Support (Meets Criteria); NS = Impaired (Fails Standards)

Key for Cell Shading: = existing impairment, listed priorto 2014 reporting cycle; = new impairment; = full support of designateduse; = insufficient information.

Abbreviations for Use Class: WWg = warmwater general, WWm = Warmwater modified, WWe = Warmwater exceptional, CWg = Coldwater general, CWe = Coldwater exceptional, LRVW = limited resource value water

*Assessments were completed using proposed use classifications changes that have not yet been written into rule.

Table 2-13: Minnesota Stream Habitat Assessment (MSHA) Table derived from Rum River Watershed Monitoring and Assessment Report, October 2016

Aggregated HUC 12	# Visits	Biological Station ID	Reach Name	Land Use (0-5)	Riparian (0-15)	Substrate (0-27)	Fish Cover (0-17)	Channel Morph. (0-36)	MSHA Score (0-100)	MSHA Rating
Cedar Creek	1	00UM101	Cedar Creek	3.5	10.5	14	8	13	49	Fair
	3	00UM102	Mahoney Brook	3.08	9.83	10	12.67	18	53.58	Fair
	1	13UM064	Cedar Creek	3.5	12	15	8	20	58.5	Fair
	1	13UM067	Crooked Brook	4.5	11	8.25	13	21	57.75	Fair
	1	13UM070	Unnamed ditch (Branch 3 Lateral 2)	1.75	9.5	4	1	7	23.25	Poor
	1	13UM071	County Ditch 28	3.75	10	9	6	7	35.75	Poor
Lower Rum River	4	10EM100	Rum River	3.25	12.63	20.46	13.5	26	75.84	Good
	1	00UM066	Rum River	3.5	14	24	16	34	91.5	Good
Seelye Brook	3	00UM104	Seelye Brook	3	11	10.87	12	20	56.87	Fair
	3	13UM079	Seelye Brook	3.42	13.67	10.93	10	12.33	50.35	Fair
Trott Brook	1	13UM066	Unnamed ditch	2.5	10	9	14	2	37.5	Poor

Qualitative habitat ratings

= Good: MSHA score above the median of the least-disturbed sites (MSHA>66)

= Fair: MSHA score between the median of the least-disturbed sites and the median ofthe most-disturbed sites (45 < MSHA < 66)

= Poor: MSHA score belowthe median ofthe most-disturbed sites (MSHA<45)

Table 2-14: Channel Condition and Stability Assessment (CCSI) Table derived from Rum River Watershed Monitoring and Assessment Report, October 2016

Aggregated HUC 12	# Visits	Biological Station ID	Stream Name	Upper Banks (43-4)	Lower Banks (46-5)	Substrate (37-3)	Channel Evolution (11-1)	CCSI Score (137-13)	CCSI Rating
Cedar Creek	1	00UM101	Cedar Creek	30	29	32	11	102	severely unstable
	1	13UM071	County Ditch 28	31	17	26	3	77	moderately unstable
	1	13UM070	Unnamed ditch	27	15	30	3	75	moderately unstable
	1	00UM102	Mahoney Brook	20	25	21	3	69	moderately unstable
	1	13UM067	Crooked Brook	21	25	10	3	59	moderately unstable
	1	13UM064	Cedar Creek	12	13	22	3	50	moderately unstable
Lower Rum River	1	10EM100	Rum River	6	13	16	3	38	fairly stable
	1	00UM066	Rum River	15	9	11	3	38	fairly stable
Trott Brook	1	13UM066	Trib. to Goose Lake	18	10	28	3	59	moderately unstable
Seelye Brook	2	00UM104	Seelye Brook	10	15.5	22	4	51.5	moderately unstable
	1	13UM079	Seelye Brook	13	29	30	5	77	moderately unstable
	1	13UM079	Seelye Brook	7	15	15	3	40	fairly stable

Qualitative channel stability ratings

= stable: CCSI < 27 = fairly stable: 27 < CCSI < 45 = moderately unstable: 45 < CCSI < 80 = severely unstable: 80 < CCSI < 115 = extremely unstable: CCSI > 115

Table 2-15: Lake assessments. Table derived from Rum River Watershed Monitoring and Assessment Report, October 2016

Aggregated HUC 12	Name	MNDNR Lake ID	Area (acres)	Trophic Status	Percent Littoral	Max. Depth (m)	Mean Depth (m)	CLMP Trend	Mean TP (µg/L)	Mean chl-a (µg/L)	Mean Secchi (m)	AQR Support Status	AQL Support Status
Cedar Creek	Minard	02-0067-00	127	E		2.1			88.63	1.8	1.1	FS	
Lower Rum River	George	02-0091-00	480	E	79	9.8	2.4	D	28	8.1	2.1	FS	IF
Trott Brook	Rogers	02-0104-00	41	E				I	59	19.7	1.1	NS	
	Pickerel	02-0130-00	239	M		1.5		I	24	7.4	1.4	FS	IF
	East Twin	02-0133-00	76	M		20.1	4.0	NT	22	5.2	3.7	FS	IF

Abbreviations:
D -- Decreasing/Declining Trend
I -- Increasing/Improving Trends
NT – No Trend
H – Hypereutrophic
E – Eutrophic
M – Mesotrophic
FS – Full Support
NS – Non-Support
IF – Insufficient Information
O - Oligotrophic

Key for Cell Shading: = existingimpairment, listed prior to 2016 reporting cycle; = new impairment; = full support of designated use

The Rum River WRAPS (released July 2017) Report summarizes water quality trends within the larger HUC-8 scale watershed. This watershed approach was designed to characterize all of the waterbodies in a comprehensive manner, provide a vision of overall watershed health, and provide a cost-effective way for smaller organizations (like the URRWMO) to focus activities on high priority areas. A brief summary of this document as it pertains to the URRWMO is included within this text. A complete copy of the report can be found at the MNPCA website below.

https://www.pca.state.mn.us/water/watersheds/rum-river

Within the URRWMO, three (3) lakes had enough data available to determine trends in water clarity. East Twin Lake (02-0133) exhibited no trend, Lake George had strong evidence of a declining trend, and Pickerel Lake had evidence that it was improving. The WRAPS recommended that Lake George be a short term priority for focused water quality planning efforts.

The WRAPS document also reported on water quality trends within the Rum River. One stream sampling location falls downstream of the URRWMO boundary along the Rum River at the Pleasant Street Bridge in Anoka, MN (Site ID H21021001). For the period of record sampled (1953 through 2010), total suspected solids decreased by 72%, total phosphorus decreased by 52%, nitrate/nitrate had increased by 22%, biochemical oxygen demand decreased by 65% and chlorides increased by 606%. It is suspected that decreases in suspended soils, total phosphorus, and biological oxygen demand are due to upgrades at the wastewater treatment plants. Although nitrates/nitrites and chlorides are increasing, the river still meets the water quality standards.

Water quality sampling data has been collected on behalf of the URRWMO by Anoka County. A series of basic plots were created during the development of this plan and are included in Appendix C of this document. More information regarding the URRWMO water quality sampling can be found on the URRWMO website.

2.4.6 Wetlands

A wetland inventory has been completed by the US Fish and Wildlife Service as published on the National Wetland Inventory (NWI). Wetlands cover more than one-quarter of the watershed, totaling over 23,000 acres (Figure 2-13). This inventory was originally conducted using aerial photos and infrared photos from 1979 to 1988, and was updated through the MNDNR in a multi-agency collaborative effort. This wetland inventory updated is based on 2010 and 2011 digital aerial photos.

A complete listing of the 'Wetland Standards' (adopted February 3rd, 2009) can be found on the URRWMO website.

2.4.7 Public Waters

Minnesota State Statues identify public waters (Statue 103G.005, Subdivision 15); DNR Waters has regulatory jurisdiction over these lakes, wetlands and watercourses. The DNR Public Waters/Wetlands map is shown on Figure 2-14.

2.4.8 Floodplain

The Upper Rum River Watershed includes ~14,650 acres of mapped 100-year floodplain and ~3,080 acres of mapped 500-year floodplain (Figure 2-15). It is important to note that these areas of mapped floodplain are not inclusive of all floodplains in the URRWMO. These floodplains band the streams of the watershed including Seelye Brook, Ford Brook, Cedar Creek and some of the major ditches. Other large floodplain areas are part of the watershed's major wetland complexes including those in northeastern Nowthen and those near the Sandhill Crane Natural Area. Flood Data are derived from the Flood Insurance Rate Maps (FIRMs) published by the Federal Emergency Management Agency (FEMA). The FIRM is the basis for floodplain management, mitigation, and insurance activities for the National Flood Insurance Program (NFIP). Insurance applications include enforcement of the mandatory purchase of flood insurance by property owners who are being assisted by Federal Programs or by federally supervised, regulated or insured agencies or institutions in the acquisition or improvement of land facilities located or to be located in identified areas having special flood hazards.

The National Flood Insurance Program originally mapped the Upper Rum River Watershed's flood boundaries as part of the Flood Insurance Studies in 1979 and 1980. Recently, these maps were updated to County-wide format in 2015, which can be found on FEMA's website (www.msc.fema.gov). Refer to Flood Insurance Study (FIS) Reports 27003CV001A and 27003CV002A for details about the County-wide study. Flood Insurance Rate Map (FIRM) panel 27003CIND1A is the map index covering the URRW, and can be used to identify the appropriate map panels for each community.

Note that new precipitation frequency estimates were published in NOAA Atlas 14 (see Section 2.1.3 for more information of these estimates specific to the URRWMO). Member communities might consider remapping their floodplains and associated models using these updated estimates. The URRWMO is supportive of any floodplain remapping efforts.

The Flood Insurance Study of Anoka County (27003CV001A) includes a list of peak discharges for the 1-percent-annual-chance-event (e.g. 100-year flood) within Volume 1, Table 6. This table was reviewed to identify the locations within the URRWMO and the reported peak discharges are included in Table 2-16.

Table 2-16: Peak discharges for detailed study locations within the URRWMO
Table derived from FEMA's Flood Insurance Study of Anoka County, MN
27003CV001A, Effective Date December 16, 2015, Table 6

Flooding Source	Location	Peak Discharge (cubic ft/sec) 1-Percent-Annual-Chance
Cedar Creek	At confluence with Rum River	1,160
	Approx. 0.73 miles from Viking Blvd NW/County Rd 22	999
	Below confluence of Crooked Brook	999
	Above confluence of Crooked Brook	704
	Above MN State Hwy 65	519
Ford Brook	Approx. 0.36 miles downstream of Verde Valley Rd NW	766
Rum River	Just upstream of confluence with Seelye Brook	13,600
Seelye Brook	Approx. 0.49 miles upstream of Francis Blvd NW/State Hwy 47	1,537

The URRWMO Board has discussed flooding and determined there are no flood problem areas of priority concern within the URRWMO at this time. This information was based on the board members communication with their constituents.

2.4.9 Groundwater

2.4.9.1 **Surficial Aquifers**

The surficial outwash (Anoka Sand Plain) deposits located across the eastern two-thirds of the URRWMO will yield small to large quantities of water. Where the aquifer has sufficient saturated thickness, a well may yield several hundred gallons of water per minute. The grey till (surficial material) in the western third of the URRWMO will yield little water because of the low hydraulic conductivity associated with till.

However buried lenses of sand and gravel located within the till may yield sufficient water depending on thickness and extent of the layers. The red drift and ice contact deposits in the northwest corner of the URRWMO may yield sufficient quantities of water. It is difficult to predict high water yielding capacity due to the stratified zones and varying hydraulic conductivities.

The regional groundwater flow within the surficial aquifers and glacial drift is generally to the southeast, except near the Rum River and Cedar Creek where ground water tends to flow toward these surface waters. Rum River and Cedar Creek are predominately discharge areas for groundwater. Therefore, Cedar Creek and Rum River would be characterized as known groundwater and surface water connections. Areas not near the Rum River and Cedar Creek are predominately groundwater recharge areas.

2.4.9.2 Bedrock Aquifers

The Tunnel City Group (formerly the Franconia Formation) which covers all but the northwest corner of the URRWMO has moderate to high water yielding capacity. The Wonewoc sandstone (formerly the Ironton and Galesville Sandstone Formations) lies to the northwest of the Tunnel City Group and is the uppermost bedrock in a band approximately 1.6 to 3.2 kilometers (1 to 2 miles) wide. The Tunnel City Group and Wonewoc Aquifer has moderate to high water yielding capabilities. The hydraulic conductivities are variable in these aquifers, with the highest generally in the lower Wonewoc (formerly named the Galesville Sandstone). Wells in these aquifers may be capable of yielding several hundred gallons of water per minute.

Underlying the Tunnel City Group and Wonewoc formations is the Eau Claire formation. The Eau Claire formation may yield low quantities of water in certain locations, but is not generally considered an aquifer. The Eau Claire formations act as a confining layer between the Cambrian sandstones and the Cambrian Mt. Simon-Precambrian Hinckley aquifers. The Mt. Simon-Hinckley Aquifer, which underlies the entire URRWMO, dips gently to the southeast. Regional groundwater flow in the Mt. Simon-Hinckley Aquifer is to the southeast. The water in the aquifer is under artesian pressure.

2.4.9.3 Groundwater Quality

The metropolitan area is developed over an extensive groundwater aquifer system that consists of several good sources of water separated and protected by relatively impervious confining layers. Hazardous waste sites, sanitary landfills, dump sites, feedlots, pipelines, and leaking underground or above ground storage tanks or spills and private disposal sites may contaminate groundwater resources.

Drinking water throughout the URRWMO is obtained primarily from shallow private wells. A large portion of St. Francis and 7% of Oak Grove's population is served by municipal well and water systems. The remaining residential and commercial properties within the URRWMO utilize private wells for potable and other water needs. The high yielding Prairie du-Chien- Jordan aquifer that is available in other Twin Cities Metropolitan areas is not available in the URRWMO. As a result residents in the URRWMO must rely on the shallow surficial drift aquifer, which is highly susceptible to contamination in most areas. The bedrock aquifers available include the Tunnel City Group-Wonewoc and lower lying Mt. Simon-Hinckley aquifer.

Most ground water quality protection is in the form of Wellhead Protection Planning. The primary purpose of these plans is to identify potential sources of contamination and put a plan in place to protect groundwater supplies and areas where special measures are most needed. Ten Anoka County cities formed a Joint Powers Organization (JPO) to jointly collaborate in the joint implementation of common elements of their wellhead protection plans to maximize their effectiveness and reduce costs. The Anoka County Municipal Wellhead Protection Group (ACMWPG) serves as an advisory committee, allowing coordination of communities whose wellhead protection areas often extend into an adjacent community. On April 7, 2014, the St. Francis City Council joined the JPO.

The protection of water quality is a function of numerous statutes, rules and programs that are implemented by various federal, state and local agencies. Surface and groundwater water resources are interconnected are best managed in a comprehensive manner. Instead of preparing a county groundwater protection plan (under Minnesota Statute 103B.255), Anoka County has established a Water Task Force to develop collaborative initiatives to enhance the water protection actions of state and local

agencies including the URRWMO. While state agencies may establish water protection programs, it is communities that are generally responsible for implementation and monitoring the programs to determine that they are sufficient and effective. Watershed Plans that protect the quality of surface water also protects groundwater. Surface water and precipitation recharges groundwater by infiltration on land and by surface water infiltration.

The URRWMO area is also within the source water protection area for the cities of Minneapolis and St. Paul. These cities draw drinking water from the Mississippi River approximately 20 miles downstream from the URRWMO. Source water protection planning for these cities is being coordinated by the Minnesota Rural Water Association (MRWA). The URRWMO will work with the MRWA through the implementation schedule in this plan to protect and improve source water drinking supplies in areas downstream of the URRWMO.

The URRWMO has one superfund site within its boundary, the East Bethel Sanitary Landfill. Volatile organic compounds were found in on-site monitoring wells, and the site was placed on the Minnesota Permanent list of Priorities in 1984. Site remediation continues, with groundwater quality improving. More information can be found on the EPA's website:
https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0503926

CHAPTER 3 – Assessment of Issues and Opportunities

This chapter of the plan outlines the issues and opportunities facing the URRWMO. Issue identification was a fundamental aspect of developing this plan, which included a careful review of the Third Generation Plan by watershed stakeholders, paying particular attention to the historically identified issues.

A series of four public meetings were conducted in 2016 with watershed and to help identify gaps in the activities and regulations in the watershed relative to the requirements of Minnesota Rule 8410, Minnesota Statue 103B and local needs. In addition, all available information related to the Rum River Watershed Restoration and Protection Strategy (WRAPS) was incorporated into the discussions.

3.1 Assessment of Problems and Issues

3.1.1 Identifying Gaps

The URRWMO identified gaps in spring/summer of 2016, receiving additional input from stakeholders in September 2016. It was noted that input received was primarily from members of the URRWMO board; additional stakeholder opinions would be desirable for future efforts to identify gaps within the watershed. Table 3-1 shows the identified problems/issues in nine categories:

- Surface Water Quality
- Development management
- Local (Municipal) Surface Water Management Planning
- Wetlands
- Agricultural Management
- Forest Resources
- Invasive Species
- Groundwater
- Funding

Table 3-1: Identified Concerns, Issues and Gaps within the URRWMO.

#	Identified Concern/Issue/Gap
Surface water quality	
1	The URRWMO is implementing a water quality monitoring plan to track water quality trends and evaluate effectiveness of policies and land us practices. *Note that this concern was stated in 2016. Since that time, the URRWMO has approved additional water quality sampling through 2019.
2	The following water bodies have been listed as impaired by the MPCA: Lake George: Mercury East Twin Lake: Mercury Rum River: Mercury Crooked Brook: Low oxygen Seelye Brook: E. Coli Cedar Creek: E. Coli Mahoney Brook: Fish bioassessments
Development Management	
3	Lack of consistent guidelines or minimum runoff control requirements for new development and redevelopment. This includes Post-construction Stormwater Management, Floodplain Management, and Shoreline Management.
4	Limited understanding and information available regarding the location and size of landlocked basins within the watershed. Allowing development project to construct new outlets for these basins could impact the rest of the watershed.
5	Many mapped flood zone designations within the URRWMO are classified as Zone A, meaning that a detailed modeling as not yet been performed. Therefore, because "detailed hydraulic analyses have not been performed on these areas, no base flood elevations are shown."
Local (Municipal) Surface Water Management Planning	
6	The location of all of the publically and privately owned Best-Management-Practices (BMPs) are not known by the URRWMO at this time. Knowing their locations, relative age, and efficiency will be helpful for future planning efforts. Individual communities might be tracking this information; if so, there is a need for increased communication between member communities and the URRWMO.
7	Individual member communities have local surface water management plans. Some of these plans overlap, covering the same geographic area. However, the subwatershed boundaries do not match between the plans, and the modeling outputs (e.g. direction of flow, peak flows, and discharge locations) are also inconsistent.
8	Road salt application in the winter might be impacting local streams, increasing chloride concentrations. Over-salting might also be causing communities to spend more money on road maintenance than is needed.

Table 3-1(cont.): Identified Concerns, Issues and Gaps within the URRWMO.

#	Identified Concern/Issue/Gap
Wetlands	
9	Wetland buffer standards are inconsistent between member communities, and might not meet current state standards.
Agricultural Land Management	
10	Agricultural sites that are good options for implementing Best Management Practices (to improve water quality) are unknown at this time. Identifying these locations can help with future planning efforts.
11	Funding opportunities for agricultural Best Management Practices are available, and could be better utilized by stakeholders within the URRWMO. Also, the URRWMO might also provide funding to support BMP implementation.
Forest Resources	
12	Emerald Ash Borer is a non-native invasive species that has been infecting and killing ash trees.
13	Portions of the URRWMO were historically forested. Restoring forests within the floodplain might be a natural floodplain management technique that warrants consideration.
Invasive Species	
14	There is limited understanding of the extent of invasive species within surface waters in the URRWMO. Mitigation measurements are not feasible without understanding the scale and extent of the problem.
15	Public understanding of invasive species is limited, and public involvement would be necessary for limiting the spread of invasive species.
16	Individualized plans for mitigating invasive species are not available at this time. Local communities might be interested in developing a site-specific study and or mitigation plan for reducing invasive species in their surface waters.
Groundwater	
17	Little is known about ground water levels, water quality and trends over time within the URRWMO. Groundwater concerns are often regional, and will extend beyond the limits of the URRWMO.
18	It is not known if the region has the groundwater capacity to support private wells.
Funding	
19	Funding within the URRWMO is limited for larger scale projects. There are opportunities for alternative funding sources, but they are not currently being utilized.

3.1.2 WRAPS Findings and Proposed Actions

The Minnesota Pollution Control Agency used a watershed-based approach to identify and address threats to water quality by: (1) collecting water quality data, (2) assessing the monitoring results, (3) developing strategies to restore and improve the water bodies (Watershed Restoration and Protection Strategy, WRAPS), and then (4) implementing projects across the watershed. This process is completed on a 10-year cycle across the 80-major watersheds within the state.

The URRWMO falls within the Rum River watershed, and new WRAPS report was being completed during the writing of the URRWMO plan. The preliminary and final findings were presented to the URRWMO to assist into their planning process, and incorporated into this plan. Figure 3-1 shows the waterbodies of interest within the WRAPS report.

In July 2017, the final Rum River WRAPS report was published. The WRAPS study identified different waterbodies to be prioritized for short-term or long-term protection based on water quality monitoring data, a series of different modeling tools, and public input. More details on the prioritization process can be found in the WRAPS report:

https://www.pca.state.mn.us/water/watersheds/rum-river

Within the URRWMO, Lake George was classified as a short-term priority, citing declining water quality trends. The Rum River was also classified as a short-term priority, as it is vulnerable to riparian corridor land use changes, habitat degradation and erosion. The Rum River was also classified as a long-term priority for multiple reasons: it has high value for fishing and recreation (classified as a State Wild & Scenic Recreation River), the adjacent land is subject to land use change and increased drainage, and the river was commonly mentioned in stakeholder feedback as a waterbody of concern.

The URRWMO wants to maintain continuity with the WRAPS report, and therefore will prioritize water quality improvement projects within Lake George and the Rum River. In addition, the URRWMO will adopt those strategies listed within the WRAPS report for waterbodies within the URRWMO boundary. A copy of the Rum River WRAPS Strategies within the URRWMO (as derived from tables 3.3-7 and 3.3-8) is provided in Table 3-2 to provide additional clarity on how the WRAPS strategies apply to the watershed planning area.

Several other waterbodies, including Crooked Brook and Seelye Brook, within the boundaries of URRWMO are also classified by MPCA as impaired. While these streams were not given highest priority by the URRWMO within this version of the URRWMO Plan, it is recognized that efforts to improve the water quality in these waterbodies is needed. The URRWMO will coordinate with partners, specifically the Anoka County Conservation District, if a partner's planning efforts focus on improvements within these water bodies within the URRWMO.

Improvements in waterbodies upstream of the URRWMO will also have significant impacts on the water quality within the URRWMO boundaries. Therefore, the URRWMO will regularly participate in neighboring watershed planning efforts to developed unified solutions, improve communication, and increase collaboration on shared issues.

Table 3-2: Rum River WRAPS Strategies within the URRWMO.
Derived from tables 3.3-7 and 3.3-8 in The Rum River Watershed Restoration and Protection Strategy Report, July 2017

Waterbody and Location		Parameter	Water Quality		Strategies	Strategy Type	Estimated Scale of Adoption Needed	Primary Responsibility							Timeline to reach WQ goal	Interim 10-yr Milestone
Waterbody ID	Location & Counties		Current Conditions	Goals/Targets				Wshd. Distt.	MDA	SWCD	MPCA	MS4	County	DNR	Other	
George 02-0091	Anoka	TP	TP=25.6mg/L	TP=22.5mg/L	Streambank or Shoreline Protection	Install projects identified in an accelerated implementation plan.	75% projects installed.			x						20 years	TP <24 mg/L
					Non-Structural Management Practices	Manage curly leaf pondweed and Eurasian watermilfoil	Mgmt plan followed.							x			
						Near-shore management projects	1000 ft.			x					x		500 ft.
Pickerel 02-0130	Anoka	TP	TP=24.3mg/L	TP=17.8mg/L	Special Projects	Secure shoreland protection through easement, fee title purchase, or other means.	2 easement projects.			x					x	30 years	TP < 23 mg/L
East Twin Lake 02-0133	Anoka	TP	TP=21.1mg/L	TP=18.7mg/L	Special Projects	Secure shoreland protection through easement, fee title purchase, or other means.	2 easement projects.			x						20 years	TP= 20 mg/L
					Regulations/Ordinances/ Enforcement	Ensure new development adheres to strict runoff standards to prevent eutrophication of this high quality lake.	100% compliance of standards.						x				
Seelye Bk 07010207-528	Anoka, Isanti	E. coli	Exceeded the Geo Mean 10/15 times	Geo Mean: 126/100 ml Individual 1,260/100 ml	Special Projects	Pursue easement establishment with a focus on areas identified in existing priority areas (i.e. MN Land Trust Maps)	86% reduction in V. high flows and 51% reduction in mid flows.								x	35 years	Exceedance < 25%
					Livestock Waste Management	Install BMPs that minimize runoff and/or enhanced enforcement of existing regulations at feedlots in the headwaters			x	x							
					Wetland Restoration/Creation	Identify headwaters or lateral ditches which can be restored to wetlands. Consider using wetland restoration banking credit sales to fund these activities.				x				x			
					Urban Stormwater Management Practices	Meet MS4 requirements.							x		x		
					Streambank or Shoreline Protection	Stream restoration with channel work plus removal of perched culverts								x			

Table 3-2: Rum River WRAPS Strategies within the URRWMO.
Derived from tables 3.3-7 and 3.3-8 in The Rum River Watershed Restoration and Protection Strategy Report, July 2017

Waterbody and Location		Parameter	Water Quality		Strategies	Strategy Type	Estimated Scale of Adoption Needed	Primary Responsibility							Timeline to reach WQ goal	Interim 10-yr Milestone
Waterbody ID	Location & Counties		Current Conditions	Goals/Targets				Wshd. Distt.	MDA	SWCD	MPCA	MS4	County	DNR	Other	
Rum River	Anoka, Isanti	MSHA and TP	MSHA average score rated "good". TP mean is 123.1 mg/L	Keep MSHA average scores at "good: rating. Reduce TP to fall below standard.	Streambank or Shoreline Protection	Riverbank stabilization and near-shore gully stabilization. Stabilize eroding streambanks with native vegetation plantings; forested plantings on outside river bends; no variances for buildings on outside bends.	Determine through inventory work			x						>30 years	1 mi. eroding riverbank stabilized
					Inventory/Mapping	Identify parcels with high values for water quality, riparian corridor connectivity and habitat. Protect through easement for fee title acquisition.	100% of river corridor			x					x	5 years	100% of river corridor
						Inventory and prioritize erosion sites.				x							
					Streambank or Shoreline Protection	Secure shoreland protection through easement, fee title purchase, or other means. Or improve habitat on private parcels. Highest priority on ecological restoration of rivers-edge ag fields.	2 easements obtained			x				x		20 years	1 easement.
					Urban Stormwater Management Practices	Stabilize outfalls and stormwater discharge points.	Watershed wide					x	x			10 years	Completion
						Install stormwater treatment identified in SWCD subwatershed assessments and elsewhere.			x	x		x					

Table 3-2: Rum River WRAPS Strategies within the URRWMO.
Derived from tables 3.3-7 and 3.3-8 in The Rum River Watershed Restoration and Protection Strategy Report, July 2017

Waterbody and Location		Parameter	Water Quality		Strategies	Strategy Type	Estimated Scale of Adoption Needed	Primary Responsibility							Timeline to reach WQ goal	Interim 10-yr Milestone
Waterbody ID	Location & Counties		Current Conditions	Goals/Targets				Wshd. Distt.	MDA	SWCD	MPCA	MS4	County	DNR	Other	
All applicable lakes and streams	All applicable counties	multiple	Varies		Monitoring /Data Collection	See section 4 of this report for water monitoring recommendations.	N/A	x		x	x					Data collected.
					Urban Stormwater Management Practices	MIDS or similar should be adopted for new development and redevelopment.	MIDS adopted.					x	x			MIDS drafted
					Conservation Drainage	Minimize cleaning of ditches or similar improvements that export water from the landscape more quickly.	No net increase of water.			x						No net increase of water.
					Inventory/Mapping	Inventory sizing and elevation of culverts. An inventory will allow future unpermitted changes to be detected and corrected.	Inventory completed.	x		x		x	x	x	x	5 years	Inventory completed
						Inventory/upgrade stormwater infrastructure that may be undersized based on projected changes in storm volume and frequency.		x		x		x	x	x	x	30 years	
					Streambank or Shoreline Protection	Riparian habitat protection and restoration through BMPs, & easements.	Acres of protected habitat increased.			x						20 years	No net loss of habitat
						Correct bank erosion, including a modest number of large bank failures and large number of modest bank failures.	75% problem areas fixed.			x				x			25% sites fixed.
					Regulations/Ordinances/ Enforcement	Local enforcement of existing regulations including buffer law, scenic and recreational river rules, and shoreline ordinances.	100% compliance.						x	x		10 years	100% compliance.

Management Considerations for the Entire Rum River Watershed While the tables above provide waterbody-specific management direction, cohesive management across the entire Rum River Watershed is critical. The State of Minnesota has recognized this, and

- Focus efforts – watershed-wide, efforts must focus substantial resources on the highest priorities. Efforts that are broadly scattered geographically are less likely to be effective.
- Hydrological changes and flooding – Increased drainage, including that which occurs by cleaning ditches which have been idle for long periods, has the potential to negatively impact all downstream entities with flooding. Similarly, wetland restoration and
- Water quality – While downstream impacts of water quality in the river are obvious, many of the lakes in the watershed are inter-connected with the river as well.
- River's scenic nature – This State Wild, Scenic and Recreational River is a high priority regionally.
- Consistency – Studies and inventories, such as culvert inventories, are best done in a coordinated fashion with the same methods and outputs in order to best direct management efforts.
- Modeling – The HSPF model and Scenario Application Manager (SAM) tool, developed as part of this WRAP, can be used to evaluate management scenarios in the future.

3.2 Identification of Priority Issues and Policies

The URRWMO Board and Citizen and Technical Advisory Committees identified the following issues during the planning process. Issues are listed in the order of importance adopted by those participating in the discussion. Other potential issues have been raised; however, their relative ranking of was significantly lower than those reported here. These issues are in many ways fundamentally different from those identified in the 2007 plan, both in terms of their content (or omission).

1. Funding: Funding available to the watershed through member communities is very limited. Additional funding is necessary to take on actions suggested by advisory committees and anticipated to be identified by the Rum River WRAPS. Throughout this planning period, the Board agreed to increase the funding for the URRWMO initiatives and take advantage of grant opportunities in order to implement projects and meet the plan goals.

2. Water Quality: Sampling programs conducted by the WMO have shown a trend of increasing Total Phosphorus concentrations (although Rogers Lake has shown a decline in Phosphorus concentrations). This trend does not appear to be paralleled by increasing trends in chlorophyll-a concentrations or decreasing trends in secchi depth (except for East Twin Lake). The Rum River WRAPS has identified several impaired waterbodies that the URRWMO should address, specifically Lake George and the Rum River. Any water quality projects that are selected will prioritize these waterbodies. Tropic state index graphs and water quality trend information are included in Appendix C.

   It was noted within the planning process that studies on "in-lake issues" for Lake George might be valuable, possibly focusing on plants, fish habitat and/or motor boat impacts. The URRWMO is supportive of this type of research and could be included within a future SWAS.

3. Water Resources Inventory: There is little information available regarding the location and quality of potentially critical water resources such as land locked basins and wetlands. Additionally, the location, condition, and function of constructed stormwater management practices within the watershed are not documented in any way currently useful for watershed planning.

4. Shoreline Protection: Erosion and sedimentation issues continue on some streams in the watershed; notably the Rum River itself.

The URRWMO Board plans to address each of these issues through the implementation of the following policies.

Cooperation. The primary focus of the URRWMO will be on water resource management issues that transcend municipal boundaries. The member communities are required by this Plan to revise their local surface water management plans to incorporate additional activities regarding assessment and planning for stormwater runoff, specifically in the areas of regional accounting of peak rates of discharge, volume of runoff, and water quality.

Monitoring. The watershed will continue to conduct flow and level monitoring as well as water quality sampling programs. The current program operated by the URRWMO will be reviewed and revised as

appropriate. Additionally, the URRWMO will conduct watershed reconnaissance projects, either desktop or field exercises to create a database of water resources information for the watershed. This information will be disseminated to stakeholder groups including member Cities for use in local planning efforts.

Regulation. The URRWMO will continue to require local municipalities to implement regulatory programs geared toward the protection of water resources. Depending on the findings of revised local water management plans and other monitoring programs and studies conducted by the URRWMO, local regulatory programs may need to be revised to include additional water resources protection measures. Regardless, all regulatory programs will be required to be updated to incorporate evaluations of current hydrological information (notably NOAA Atlas 14) and to be consistent with other State and Federal requirements.

Operation. The operation strategy for this plan is targeted primarily at member communities with some areas targeted at the public and/or another agency. Activities which will specifically be conducted by URRWMO include:

- Conducting water quantity and quality studies to understand baseline conditions and to identify trends.
- Active participation in discussions about upstream projects, outside of the URRWMO, that may affect water quality or flooding in the URRWMO.
- Review of local water management plans to evaluate their consistency with the Watershed Plan and the Rules and Operations outlined in Appendix D.
- Encouragement of donations, grants, and in kind contributions of public and private organizations for plan implementation.
- Conducting annual reviews of the Watershed Management Plan and its implementation.

CHAPTER 4 – Goals

Based on the identification and prioritization of issues/gaps within the watershed, the URRWMO developed a set of goals and policies that will guide implementation efforts. These goals were developed based on the inputs from the URRWMO stakeholders, the WRAPS report, and communications with staff from the ACD and other governmental organizations. It should be noted that the priority issues for URRWMO stakeholders and other government agencies varied considerably. However, the goals presented within this plan reflect those selected by the URRWMO Board.

The status of each of these goals will be tracked annually in accordance with Chapter 5 – Implementation Plan. The goals identified in each Goal Area are prioritized in order of importance (i.e. Goal A. 1. a higher priority than Goal A. 2.) On an annual basis the WMO will notify member communities of the following goals and the requirements necessary to achieve them. Member communities will be expected to review and update their ordinances and policies to ensure they align with WMO goals.

The following sections provide background information and context for each Goal Area, and lists the URRWMO's associated goals. The goal statements are relisted in Table 4-1 for emphasis and readability.

4.1 Goal Area A: Water Quantity and Floodplain Management

One of the URRWMO's responsibilities is to prevent and mitigate flooding throughout the watershed. The following goals address flooding issues by confirming that development and redevelopment within the watershed does not result in downstream flooding. The main focus is to maintain the current flood profile within the watershed.

Floodplain management is the management of development and other activities in or near the floodplain to prevent flood damages as well as the construction of capital improvement projects that change the way in which flood water moves through a watershed, generally intended to reduce risk of flood damage to existing structures and infrastructure. The Federal Emergency Management Agency (FEMA) has created maps which identify many areas of 100-yr floodplain within the boundaries of the URRWMO; however, it is recognized that FEMA maps are not inclusive of all floodplains within URRWMO. Furthermore, due to limitations in the development of these maps, both in terms of financial and technical resources, the URRWMO recognizes that the FEMA maps may not be accurate in all instances. The URRWMO requires member cities to operate within the limitations of available resources, to manage floodplains and development within floodplains to prevent, to the maximum extent practicable, development which will be at risk to 100-yr flood damage as well as activities which may increase flood risk for existing development.

Goal A. 1. Require member communities to update post-construction stormwater management ordinances to be compliant with all applicable Federal, State, and local standards. Protect against development related flooding by requiring local communities to enforce rate control and infiltration requirements. Measurable by communities maintaining post-development 2-, 10-, and 100-yr peak runoff rates at predevelopment levels.

Goal A. 2. Require member communities to update floodplain management ordinances to be compliant with all applicable Federal, State, and local standards. Maintain existing floodplain storage volumes and provide adequate conveyance for flood flows. Measureable by community

annual reports that document the volume of floodplain fill and compensatory storage as well as infrastructure design to serve regulated development.

Goal A. 3. Control increase in runoff volume from landlocked basins by only allowing outlets in conformance with approved local plans. Prohibit new discharges from landlocked basins unless an engineering study is completed to evaluate the effects of the outlet and design to mitigate impacts.

Goal A. 4. Improve BMP performance by requiring member communities to conduct physical inspections to identify any issues or deviations from construction plans and then ensuring any deficiencies are corrected. Measurable by community annual reports that document any required corrective measures and time-frames to complete these items.

4.2 Goal Area B: Water Quality

Several waterbodies in the URRWMO boundaries have been listed as impaired, including Lake George, East Twin Lake, the Rum River, Crooked Brook, Seelye Brook, Mahoney Brook, and Cedar Creek. The following goals focus on improving the water quality in lakes in streams.

Goal B. 1. Require member communities to update post-construction stormwater management ordinances to be compliant with all applicable Federal, State, and local standards.

Goal B. 2. Protect water quality by requiring local communities to enforce post development stormwater quality treatment practices in conformance with state and federal standards. Measureable by community annual reports that document that regulated developments achieved minimum levels of water quality treatment.

Goal B. 3. Improve Total Phosphorus concentration in Lake George and the Rum River in accordance with goals and timeline of the Rum River WRAPS.

Goal B. 4. Conduct a Rum River WRAPS progress review in 2022.

Goal B. 5. Improve BMP performance by requiring member communities to conduct physical inspections to identify any issues or deviations from construction plans and then ensuring any deficiencies are corrected. Measurable by community annual reports that document any required corrective measures and time-frames to complete these items.

The WRAPS study of the Rum River Watershed was completed in July 2017. The URRWMO wants to maintain continuity between its 10-year plan and the WRAPS recommendations. Therefore, the strategies listed within the WRAPS report are included within the Strategies and Implementation Schedule (see Chapter 5).

Management needs for the watershed exceed available resources, and therefore prioritization and focus is needed to achieve goals in high priority areas. The Rum River and Lake George were selected as the highest priority waterbodies within this planning cycle, which is concurrent with the findings of the 2017 WRAPs study. Several other waterbodies, including Crooked Brook, Seelye Brook, Mahoney Brook, and Cedar Creek, within the boundaries of URRWMO are also classified by MPCA as impaired. While these

streams were not given highest priority by the URRWMO within this version of the URRWMO Plan, it is recognized that efforts to improve the water quality in these waterbodies is needed. The URRWMO will coordinate with partners, specifically the Anoka County Conservation District, if a partner's planning efforts focus on improvements within these water bodies within the URRWMO.

4.3 Goal Area C: Wetlands

WMO member communities serve as the Local Government Units (LGUs) for managing wetlands under the Wetland Conservation Act (WCA). The duties of the LGU includes reviewing and approving wetland delineations, wetland exemptions/no-loss applications, and wetland replacement plan applications. Other responsibilities include coordinating Technical Evaluation Panel meetings and communications, enforcing wetland monitoring activities, and coordinating with other agencies to enforce violations. The following goals focus on fulfilling all of the LGU requirements for wetland protection and conservation.

Goal C. 1. Continue current local municipality responsibility as Local Government Unit (LGU) for implementation of the Wetland Conservation Act (WCA). Measurable by community annual reports that document all regulated developments complied with applicable wetland standards and quantification of wetland impacts and mitigation areas. MnDOT will continue to be the WCA LGU within state road right-of-ways.

Goal C. 2. Technical Advisory Committee (TAC) will convene to revise wetland buffer standards.

4.4 Goal Area D: Groundwater

Maintaining clean groundwater supplies is critical to the human and environmental health of the watershed. The URRWMO aims to ensure a sustainable groundwater supply for the region.

Goal D. 1. Protect the quantity and quality of groundwater resources.

4.5 Goal Area E: Drainage Systems

The jurisdictional drainage ditches within the URRWMO are under the ditch authority of Anoka County Highway Department (see Table II-3 for a summary of the ditch-drainage systems within the watershed). Within the Fourth Generation Plan, the URRWMO recommends continuing with the current ditch authority.

Goal E. 1. Continue current Anoka County Highway Department jurisdiction over county ditches in the watershed. Discuss annually if reassigning the jurisdiction over County ditches is in the best interest of the watershed.

Goal E. 1. Complete a WMO-wide culvert inventory (sizes, elevations, etc) and provide survey results, observations, and recommendations to member communities and Anoka County.

4.6 Goal Area F: Reduce Erosion

Although erosion occurs naturally, it is often accelerated through human activities, and can be a major contributor to water pollution. The following goal focuses on reducing erosion in water courses within the URRW, with an initial action item prioritizing an assessment of the Rum River.

Goal F. 1. Prevent erosion of soil into the Rum River by supporting implementation of projects identified by the 2017 ACD Rum River Bank Erosion Assessment.

Goal F. 2. Require member communities to update their construction site erosion control ordinances to be compliant will all applicable Federal, State and local standards.

4.7 Goal Area G: Protect and Enhance Fish and Wildlife Habitat

Diverse and healthy ecosystems are beneficial for maintaining a wildlife habitat, and can positively affect soils, surface water quality, fisheries, landscape aesthetics, and recreation opportunities. Invasive species may cause economic and/or environmental harm to human health or threaten natural resources within the watershed. The following goal focuses on addressing aquatic invasive species (AIS) that inhabit waterbodies that threaten to damage natural resources and local economies.

Goal G. 1. Provide education about the prevention and control of aquatic and invasive species by updating the WMO website to incorporate educational materials.

Goal G. 2. Protect shoreline areas from development by requiring member communities to update their shoreland management ordinances to be compliant with all applicable Federal, State and local standards.

4.8 Goal Area H: URRWMO Operations and Programming

The URRWMO operates several routine programs, including developing an annual budget for projects within the watershed, identifying funding and grant opportunities to supplement the WMO's budget, operating a public education and outreach program, and maintaining a monitoring program (to identify issues within the watershed and evaluate progress towards goals.) The following goals focus on the fulfilling these regular programming activities for the URRWMO.

Goal H. 1. Identify and operate within a sustainable funding level that is affordable to member cities.

Goal H. 2. Foster implementation of watershed management programs by proactively seeking grant funding.

Goal H. 3. Operate a public education and outreach program prioritizing elected and appointed officials to build better understanding between all stakeholders. Measurable by the annual attendance of elected and appointed officials of member communities (individuals not already on the WMO board) as well as the public.

Goal H. 4. Operate a monitoring program sufficient to characterize water quantity, water quality, and biotic integrity in the watersheds and to evaluate progress toward meeting goals. Measurable by revising the water quality monitoring plan in 2018 to comply with the recommendation of the Rum River WRAP and implementation of revised plan from 2019 through 2028.

Table 4-1: URRWMO Plan Goals (2019-2028)

Goal Area A Water Quantity and Floodplain Management	Goal A.1	Require member communities to update post-construction stormwater management ordinances to be compliant with all applicable Federal, State, and local standards. Protect against development related flooding by requiring local communities to enforce rate control and infiltration requirements. Require the use of either the 24-hr NOAA Atlas-14 data averaged for the URRWMO (Table 2-3 within the URRWMO Plan) or the NRCS published county-wide data for Anoka County, whichever is greater. Measurable by communities maintaining post-development 2-, 10-, and 100-yr or below peak runoff rates and volumes at predevelopment levels.
	Goal A.2	Require member communities to update floodplain management ordinances to be compliant with all applicable Federal, State, and local standards. Maintain existing floodplain storage volumes and provide adequate conveyance for flood flows. Measureable by community annual reports that document the volume of floodplain fill and compensatory storage as well as infrastructure design to serve regulated development.
	Goal A.3	Control increase in runoff volume from landlocked basins by only allowing outlets in conformance with approved local plans. Prohibit new discharges from landlocked basins unless an engineering study is completed to evaluate the effects of the outlet and design to mitigate impacts.
	Goal A.4 (B.5)	Improve BMP performance by requiring member communities to conduct physical inspections to identify any issues or deviations from construction plans and then ensuring any deficiencies are corrected. Measurable by community annual reports that document any required corrective measures and time-frames to complete these items.
Goal Area B Water Quality	Goal B.1	Require member communities to update post-construction stormwater management ordinances to be compliant with all applicable Federal, State, and local standards.
	Goal B.2	Protect water quality by requiring local communities to enforce post development stormwater quality treatment practices in conformance with state and federal standards. Measureable by community annual reports that document that regulated developments achieved minimum levels of water quality treatment.
	Goal B.3	Improve Total Phosphorus concentration in Lake George and the Rum River in accordance with goals and timeline of the Rum River WRAPS.
	Goal B.4	Conduct a Rum River WRAPS progress review in 2022.
	Goal B.5 (A.4)	Improve BMP performance by requiring member communities to conduct physical inspections to identify any issues or deviations from construction plans and then ensuring any deficiencies are corrected. Measurable by community annual reports that document any required corrective measures and time-frames to complete these items.
Goal Area C Wetlands	Goal C.1	Continue current local municipality responsibility as Local Government Unit (LGU) for implementation of the Wetland Conservation Act (WCA). Measurable by community annual reports that document all regulated developments complied with applicable wetland standards and quantification of wetland impacts and mitigation areas. MnDOT will continue to be the WCA LGU within state road right-of-ways.
	Goal C.2	Technical Advisory Committee (TAC) will convene to revise wetland buffer standards.

Table 4-1 Continued: URRWMO Plan Goals (2019-2028)

Goal Area D Groundwater	Goal D.1	Protect the quantity and quality of groundwater resources. Measurable by community annual reports that document that they are complying with their applicable wellhead protection plans. Also measureable by community annual reports that document that developments are complying with infiltration standards (including any prohibitions).
Goal Area E Drainage Systems	Goal E.1	Continue current Anoka County Highway Department jurisdiction over county ditches in the watershed. Discuss annually if reassigning the jurisdiction over County ditches is in the best interest of the watershed.
	Goal E.2	Complete a WMO-wide culvert inventory (sizes, elevations, etc) and provide survey results, observations, and recommendations to member communities and Anoka County.
Goal Area F Reduce Erosion	Goal F.1	Prevent erosion of soil into the Rum River by supporting implementation of projects identified by the 2017 and 2018 ACD Rum River Bank Erosion Assessments.
	Goal F.2	Require member communities to update their construction site erosion control ordinances to be compliant will all applicable Federal, State and local standards.
Goal Area G Protect and Enhance Fish and Wildlife Habitat	Goal G.1	Provide education about the prevention and control of aquatic and invasive species by updating the WMO website to incorporate educational materials.
	Goal G. 2	Protect shoreline areas from development by requiring member communities to update their shoreland management ordinances to be compliant with all applicable Federal, State and local standards.
Goal Area H Commission Operations and Programming	Goal H. 1	Identify and operate within a sustainable funding level that is affordable to member cities.
	Goal H. 2	Foster implementation of watershed management programs by proactively seeking grant funding.
	Goal H. 3	Operate a public education and outreach program prioritizing elected and appointed officials to build better understanding between all stakeholders. Measurable by the annual attendance of elected and appointed officials of member communities (individuals not already on the WMO board) as well as the public.
	Goal H. 4	Operate a monitoring program sufficient to characterize water quantity, water quality, and biotic integrity in the watersheds and to evaluate progress toward meeting goals. Measurable by creating a water quality monitoring plan (2019-2028) that complies with the recommendations of the Rum River WRAP and the URRWMO's Plan.

CHAPTER 5 – Implementation Plan

This Chapter describes the responsibilities of the Upper Rum River Watershed Management Organization and the responsibilities the URRWMO has delegated to its member cities. Many agencies also have jurisdiction within the URRWMO; however, the roles and responsibilities of those agencies are not discussed in this plan. This Chapter presents the URRWMO implementation program, including its capital improvement program (CIP) and other implementation responsibilities.

A structured implementation schedule follows that documents all of the strategies that will be undertaken in an effort to meet the goals set forth in Chapter 4. This is paired with a 10-year operating budget, where the costs associated with each strategy are accounted for in terms of their projected timelines, as well as annual administrative activities.

This current plan is a transition in comparison to prior URRWMO plans: from studying and monitoring towards project implementation. Projects have been identified primarily by the ACD, with the understanding that the URRWMO will contribute a portion of the funding required for implementation and assist in finding grants for the remaining costs. Grant matching money will be saved annually by the URRWMO, and dispersed as individual projects move forward.

5.1 URRWMO Responsibilities

The URRWMO serves many water resource management roles, as listed in Minnesota Statutes 103B and summarized in Chapter 1. While the URRWMO is the entity ultimately responsible for fulfilling the duties of Minnesota Statutes 103B, the URRWMO seeks to collaborate with its member cities, community groups, and others to achieve its goals. With specific regard to action items documented in this plan, the URRWMO will conduct the following activities over the duration of the planning period where this plan is applied:

1. Conduct Annual Reporting and Evaluations
2. Conduct Water Quality Monitoring
3. Intercommunity Planning
4. Implementation of the URRWMO Capital Improvement Program

5.1.1 Reporting and Evaluation

The URRWMO 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 URRWMO must submit to BWSR an activity report for the previous calendar year. The URRWMO must submit an audit report for the previous fiscal year within 180 days of the end of the URRWMO fiscal year. The required contents of the annual activity report are specified in Minnesota Rules 8410. Generally, the URRWMO's annual report includes:

1. An activity report documenting:
    - Current board members, contacts, employees, and consultants serving,
    - A summary of significant trends in water quality indicated by sampling data,
    - Progress in implementing the watershed management plan,
    - Status of local plan adoption and implementation,

    - Educational activities undertaken in the previous year
2. The proposed next year's work plan
3. A financial and audit report including a projected annual budget and contributions from member communities

The annual report provides an opportunity for the URRWMO to assess the effectiveness of implementation of its goals and policies. If the URRWMO determines that programmatic changes are necessary, the URRWMO will 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 actions (or inaction) reveals implementation inconsistent with the URRWMO Plan, the URRWMO will take action to ensure that URRWMO rules and policies are being implemented by the member cities. The steps below describe how the URRWMO will handle any instances where member cities are not complying with the URRWMO Plan:

a) Staff/URRWMO Board members identify the issue. It should be brought to the URRWMO Board for review and first try to correct the problem at the staff level.
b) If corrective action is unsuccessful, the issue will be escalated to the URRWMO Board and LGU City Council.
c) If the issue is still unresolved, the URRWMO Board will notify BWSR for additional guidance since the issue could limit the URRWMO's ability to implement the plan.

The URRWMO 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 URRWMO Managers, Alternate Managers, and designated officers; and a list of employees and contact information.

The URRWMO website is located at: www.urrwmo.org

Historically, the URRWMO has not had its own staff, nor assigned city staff or consultant staff with authority to maintain the daily operations of the WMO, represent the WMP to other regulatory agencies, and oversee the implementation of the plan. This issue was identified in the 2014 Performance Review and Assistance Program (PRAP) report (page 29).

As part of this 4th generation plan focused on implementation of projects within the WMO, it was deemed necessary to hire a Watershed Management Coordinator. This individual will be available to represent the Board to municipalities, agencies and other water resource management entities. The responsibilities of this position will also include:

- Facilitating regular URRWMO meetings
- Manage the Technical Advisory Committee (TAC)
    - Oversee organization and composition of TAC
    - Establish meeting schedules, discussion topics, and secure venues
    - Conduct meetings and manage discussions
    - Prepare meeting minutes and compile final reports on TAC guidance
- Facilitating the review of local watershed plans

    - Conduct reviews personally and/or
    - Contract/arrange technical review by others
- Identifying grant/funding opportunities and compiling/submitting grant application materials
- Monitoring the WMO plan schedule and budget
- Documenting education/outreach activities
- Posting materials to the URRWMO website
- Compiling the annual activity report based on responses from member communities
    - Prepare annual Financial Report
    - Prepare Annual Report to BWSR
- Conduct a biennial evaluation of progress towards goals and implementation actions

Member communities will be responsible for updating their local ordinances and provide feedback to the URRWMO on their annual reporting forms. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.

URRWMO meetings will take place regularly throughout the year (approximately 10 meetings), and Technical Advisory Committee (TAC) meetings will be scheduled based on planning needs and the implementation schedule. It is predicted that two (2) TAC meetings will occur in 2019, four (4) meetings in 2020 and 2021, and then once per year for the period of 2022-2028.

The URRWMO is required to evaluate the implementation of the actions in its plan at least every two years (MN Administrative Rules 8410.0105 Subp. 1C). The Watershed Management Coordinator will be responsible for creating a biennial reporting form to fulfill this requirement. In crafting this form, the Watershed Management Coordinator will take into account the following items:

- Confirm receipt of the annual reporting forms from the member communities. Use these annual reports as well as personal communication to determine if member communities are complying with the URRWMO plan. If local communities are found to be out of compliance, follow the procedures listed in above within Section 5.1.1 of this plan.
- Reference all of the action items listed within the Strategies and Implementation Schedule (Table 5-3). A goal and timeline are listed for each action item, which can be used to formally evaluate progress towards the URRWMO goals. The Watershed Coordinator will report to the URRWMO Board if any changes need to be made to the implementation schedule as a result of this evaluation, and suggest plan amendments.
- Review the URRWMO Website to confirm that all items are current. Provide feedback to the board if changes to the website are required to better support the implementation of the plan.
- Review water quality sampling results. Any trends should be reported to the Board to assess progress towards water quality improvement and/or suggest changes to the implementation schedule based on the findings.

5.1.2 Water Quality Monitoring

The URRWMO will continue to monitor water quality of waterbodies within the URRWMO (Goal H.4). In November 2018 the URRWMO reviewed its annual monitoring plan and made adjustments to the plan in response to changing conditions in the watershed, the findings of other studies (such as the Rum River WRAPS) and the updated goals and strategies within this plan.

A subcommittee of board members and the ACD met to draft the monitoring schedule for the next ten years. The URRWMO then convened a Technical Advisory Committee meeting on November 20th 2018 and solicited their input into this revised water quality monitoring plan. The URRWMO monitoring schedule are shown in Table 5-1. Note that some sites are currently being monitored by other agencies while other sites are partially funded by the URRWMO in cooperation with other organizations.

Note that the URRWMO will provide a fixed amount annually for the monitoring program. Any unused funds in one year will be placed into a rollover account to be used in subsequent years when costs are greater than $7,500. Table 5-2 outlines the estimated annual costs roll over contribution/deductions to fund the URRWMO Water Quality monitoring by contract with ACD.

Table 5-1: URRWMO 10-year Monitoring Schedule and Cost Estimates

			Percentage of Monitoring Cost provided by the URRWMO												
Type	Site	Monitored by funded the URRWMO every (x) yrs	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	10-Yr Total	Site Notes	Goal/Purpose	Program Notes
Lake Levels Volunteers	Lake George	1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	$3,636.73	Critical to monitor due to new weir.	Track water levels to address concerns, blockages, etc in an informed manner.	ACD installs/surveys gauge and manage data. Volunteers collect data.
	East Twin Lake	1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	$3,636.73	Data has led to past corrective actions (blockage clearing) by city.		
	Coopers Lake	1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	$3,636.73	Lake level complaints led to monitoring initiation in 2011.		
	Minard Lake	1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	$3,636.73			
Lake Water Quality ACD option	Lake George	4	100%				100%				100%		$6,322.41	Declining lake wq trends and upcoming projects makes frequent monitoring a priority. Additional years of monitoring are highly desirable whenever funding allows.	Track declining trend and effectiveness of installed projects.	ACD collects 10 samples/yr at 1 m depth. Includes total phosphorus, chlorophyll-a, secchi transparency, temp, dissolved oxygen, conductivity, turbidity, salinity. Includes report, trend analysis and presentation to lake group.
	East Twin Lake	3			100%			100%				100%	$6,609.80	URRWMO will seek a volunteer to monitor through the CAMP program; if none is found the URRWMO will fund ACD monitoring. Baseline data exists. Every 3rd yr monitoring sufficient to track trends.	Long term trend analysis.	
	Pickerel Lake	0 (Monitored by Met Council)											$0.00	Met Council is monitoring		
	Fish Lake	0 (Monitored by Met Council)											$0.00	Met Council is monitoring		
Lake Water Quality CAMP volunteer option	Lake George	0 (monitored by ACD)											$0.00	Declining lake wq trends and upcoming projects makes frequent monitoring a priority.	Track declining trend and effectiveness of installed projects.	Met Council volunteer program requiring local sponsor. One time up front equip cost of $225 plus $750 annually (2019 cost). WMO would need to secure a volunteer. Add $150/yr for ACD to pick up volunteer's samples 3-4x/yr as required so Met Council staff can get samples from a gov't office. Analyses include TP, chlorophyll-a, secchi transparency and temp. Includes short report.
	East Twin Lake	3											$0.00	Priority, high quality recreational lake. Few homes and not-every-year monitoring = difficult to find volunteer? Seek volunteer, if none secured use ACD option. Baseline data exists. Every 3rd yr monitoring sufficient to track trends.		
	Pickerel Lake	0 (Monitored by Met Council)											$0.00	Met Council monitoring this lake		
	Fish Lake	0 (Monitored by Met Council)											$0.00	Met Council monitoring this lake		
Stream Water Quality	Rum R at CR 24	3				50%	50%			50%	50%		$3,452.30	Top of URRWMO	Long term trend analysis.	Baseline data exists, so monitoring 1 of every 3 yrs with 8 samples seems sufficient. To spread costs the URRWMO has monitored 4 samples per yr instead of 8, and done this two yrs in a row. Pushed the start date out to 2022 due to higher budgets already in 2019-2021.
	Rum R at CR 7	3				50%	50%			50%	50%		$3,452.30	Bottom of URRWMO		
	Seelye Br at CR 7	3				50%	50%			50%	50%		$3,452.30	St. Francis WWTP discharges to this stream have changed.		
	Cedar Cr at CR 9	3				50%	50%			50%	50%		$3,452.30	Impaired water.		
	Ford Br at CR63	3				50%	50%			50%	50%		$3,452.30			
	Ditch 19 at Rum River	0											$0.00	No monitoring planned. Possible future monitoring considered.		
Stream Water Levels	Rum R at CR 24	0											$0.00	USGS has Rum River water level monitoring station.	Not selected because there are no flooding concerns, nor need to calculate pollutant loading.	Monitored up until the mid 2000's. Switched to recording water level only when water quality samples are taken for cost savings.
	Rum R at CR 7	0											$0.00			
	Seelye Br at CR 7	0											$0.00			
	Cedar Cr at CR 9	0											$0.00			
	Ford Br at CR63	0											$0.00			
Reference Wetlands	East Twin Ref Wtld	1	60%	60%	60%	60%	60%	68%	100%	100%	100%	100%	$5,985.55	Annual URRWMO contributions are scaled such that overall monitoring program costs do not exceed a $7,500 URRWMO Board-set limit. The Anoka Conservation District will close funding gaps for reference wetlands not paid by URRWMO.	Ensure wetland regulatory determinations are accurate, fast and less expensive for the applicant.	Program designed to help ensure accurate wetland regulatory determinations for residents. 19 sites county wide, all of which are paid by the WMO/WD except in the URRWMO where the WMO only pays for 3 of 5.
	Lake George Ref Wtld	1	60%	60%	60%	60%	60%	68%	100%	100%	100%	100%	$5,985.52			
	Alliant Tech Ref Wtld	1	60%	60%	60%	60%	60%	68%	100%	100%	100%	100%	$5,985.52			
	Cedar Ref Wtld	1	60%	60%	60%	60%	60%	68%	100%	100%	100%	100%	$5,985.52			
	Viking Ref Wtld	1	60%	60%	60%	60%	60%	68%	100%	100%	100%	100%	$5,985.52			
Biomonitoring	Rum River at St. Francis HS	0 (to be funded with non-URRWMO dollars)											$0.00	URRWMO supports this program, but funding must be from outside sources. Funding from the American Legion is likely. URRWMO, ACD and/or will submit funding requests.	Outreach and education.	Program defunded by URRWMO around 2012. Previously river biota were monitored with students for 15+ yrs. It's an outreach program as much as monitoring. School as expressed interest in restarting it.
Total Annual Cost			$5,015.00	$3,301.65	$5,372.19	$7,486.62	$9,842.88	$6,272.03	$5,519.36	$10,245.03	$13,006.78	$8,606.70	$74,668.23			

Table 5-2: URRWMO Funding Plan for Water Monitoring

The URRWMO will provide $7,500 of local funds annually. Any unused funds in one year will be placed into a rollover account to be used in subsequent years when costs are >$7,500. Estimated costs are from the Anoka Conservation District for 2019 plus 3.5% inflation estimate for subsequent years.

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Annual URRWMO Funding Amount	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500
Est Annual Cost	$5,015	$3,302	$5,372	$7,487	$9,843	$6,272	$5,519	$10,245	$13,007	$8,607
Monitoring Rollover Acct										
Contributions	$2,485	$4,198	$2,128			$1,228	$1,981			
Funds Used				-$13	$2,343			$2,745	$5,507	$1,107
Balance	$2,485	$6,683	$8,811	$8,825	$6,482	$7,710	$9,690	$6,945	$1,438	$332

5.1.3 URRWMO Intercommunity Planning

The URRWMO relies on the member cities for primary management of runoff and water management issues. The URRWMO will provide leadership and assist member cities with intercommunity water management issues. To this end, the URRWMO will:

1. Review Local Plans – Review city local water management plans for consistency with URRWMO goals and intercommunity consistency. Refer to Appendix D for details regarding the URRWMO Standards, Regulations, and Operations. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.

2. Review Local Ordinances – Review local ordinances for consistency with URRWMO goals and conformance with minimum state and federal standards. (Goals A.1, A.2, B.1, F.2, and G.2)

3. Conduct Subwatershed Assessment Studies (SWAS) – Support SWASs that identify and prioritize best management practices at a more localized scale to assist in project selection by TAC. (Goal B.3). Locations of SWAS will be recommended by the TAC and selected by the URRWMO Board with consideration of these priority subwatersheds:

   <u>Highest priority</u>
   Rum River direct drainage (minor watershed #21095)
   Pickerel Lake
   Ford Brook

Medium priority
Seelye Brook
East Twin Lake
Others as recommended by the TAC and amended into the plan by URRWMO Board

4. Technical Advisory Committee – Establish a Technical Advisory Committee for purposes of providing leadership for conducting local surface water management plans. The technical advisory committee will be convened at varying intervals and may include different representatives depending on the elements of local planning being considered. It is anticipated that the TAC will provide input on the following items at a minimum:

    a) Developing a revised annual report form. Items to be included are details on regulatory activities and development plans (e.g. application of rate control, floodplain, wetland regulations, etc.) The annual report form is used as a measurement tool for many of the URRWMO Plan strategies, and therefore the forms needs to be comprehensive to address each of the appropriate strategies (see Section 5.3).

    b) Reviewing and revising the wetland buffer standards. (Goal C.2)

    c) Developing land locked basin standards. Any development that allows discharge from landlocked basins will require an engineering study, and the TAC should outline at a minimum (1) what is required in the engineering report and (2) what constitutes acceptable safeguards for opening a closed depression. (Goal A.3)

    d) Standardizing approaches for conducting watershed culvert inventory data collection. (Goal E.2)

    e) Standardizing approaches for conducting inspections of existing stormwater BMPs. This will allow all member communities to evaluate things such that maintenance needs and/or improvement opportunities using the same metrics. The TAC should outline the scope of work and develop a report form. (Goals A.4 and B.5)

    f) Providing assistance to municipalities in ordinance revisions. Ordinances include construction site erosion & control, post-construction stormwater management, floodplain management and shoreline zoning. (Goals A.1, A.2, B.1, F.2, and G.2)

    g) Project prioritization and selection. Select projects from Lake George Management Plan, St. Francis Stormwater Retrofit Analysis, Rum River Field Assessment, and any future SWAS. (Goal B.3)

    h) Establish future Subwatershed Assessment Studies (SWAS). (Goal B.3)

    i) Develop standards for Local Plans.

5. Water Quality Goals – Revisit and/or revise water quality goals for waterbodies based on the WRAPS report and the findings of the local water management plans.

6. WRAPS Review – Conduct a WRAPS review in 2022. (Goal B.4)

7. Education and Outreach – Operate an education and outreach program with the purpose of fostering a better understanding of watershed processes, promoting the URRWMO goals, and better engagement with stakeholders (Goal H.3).
    - One 'targeted audience' will be elected and appointed officials (who are not on the WMO board) encouraging their attendance at URRWMO meetings.
    - A second 'target audience' are members of the public who will be reached via the URRWMO website and annual newsletters prepared by member communities. The website and newsletters will promote ongoing activities of the URRWMO, identify current water quality improvement projects within the watershed, and provide tips on how individuals might participate/contribute to future activities.
    - Members of the URRWMO board will also represent the URRWMO by attending meetings held by other WMOs, Lake Associations, Government agencies, and other parties interested in maintain and improving water quality within the region.
    - The ACD created a staff position focused on education and outreach within the County, including those areas with the URRWMO. The URRWMO is highly supportive of this new initiative and supports the continuation/advancement of ACD's outreach efforts.

5.1.4 Implementation of the URRWMO Capital Improvement Program

The URRWMO is responsible for developing and managing a capital improvement program (CIP), which includes the development and implementation of capital projects to address water quality, flooding, and other issues within the watershed. Local communities may have projects that the URRMWO will provide financial or technical assistance for, if requested by the member community. (Goal B.3)

Guidance documents help the URRWMO prioritize and select projects that advance the goals outlined within this plan. The URRWMO has adopted by reference all of the guidance documents within Appendix F. If future guidance documents are completed, the URRWMO can amend this plan (following Minnesota Rules 8410) and update Appendix F to identify all guidance documents adopted by reference.

As of March 2019, an initial three guidance documents have been adopted by reference. Please refer to Appendix F to determine if more guidance documents have been adopted since this date.

(1) Lake George water quality projects

Monitoring in Lake George has revealed declining water quality trends. The ACD finalized a diagnostic study of potential water quality improvement projects around the lake in December 2018. The URRWMO supports this effort and will contribute a portion of the grant matching funds to support project development. The project prioritization is still ongoing at this time, but possible projects will include:

- Iron enhanced sand bench within the Lake George Regional Park
- Replace/repair Ditch 19 weir.
- Numerous lakeshore restorations.
- Wetland restorations, primarily north of the lake.

- Prevent increases in stormwater inflow to the lake by:
    - Requiring retention of stormwater in new developments.
    - Keeping landlocked areas landlocked.
    - Consider MIDS or similar stormwater standards within the lake's watershed.
    - Ensure culverts are replaced with culverts of the same size and elevation.
    - Minimize ditch cleaning that enhances water delivery to the lake.

The URRWMO has adopted it by reference and the TAC will use the analysis to recommend priority projects for implementation. Once a project is selected, the URRWMO will amend the URRWMO plan (following Minnesota Rules 8410) to clearly describe the project, the measureable goals to be achieved, the estimated total project cost, the URRWMO's cost, outside funding sources, and the project partners.

Within the ten-year planning cycle, the URRWMO will reduce watershed TP loading by 20lbs, so as to dampen the effects of wet years, which have 25% higher TP loadings and the poorest water quality. Refer to the Lake George Water Quality Improvement Assessment report for more details.

In addition, any new development that drains directly to Lake George will require pre- and post-development TP and runoff volume and rates to be the same. The results of this study suggest that there will be 65% TP increase using 2030 land use (assuming no BMPs are put into place).

(2) Rum River Field Assessment

Portions of the Rum River are experiencing significant bank erosion, which leads to reduced water quality. Some bank erosion is natural, but healthy levels of erosion are relatively slow and on a small scale in stable river system. Erosion can be accelerated by a variety of factors and result in higher sediment loads within the stream. ACD conducted a streambank inventory in 2017 and another in 2018 to identify sites with high levels of erosion, and soliciting interest from private landowners to participate in future projects. The URRWMO funded a portion of the 2017 study. In addition, erosion sites on public lands will be identified for the future for project development. The URRWMO supports this effort and will allocate a portion of the budget for grant matching funds.

The URRWMO TAC will use the inventory to recommend priority projects for implementation. Once a project is selected, the URRWMO will amend the URRWMO plan (following Minnesota Rules 8410) to clearly describe the project, the measureable goals to be achieved, the estimated total project cost, the URRWMO's cost, outside funding sources, and the project partners.

Within the ten-year planning cycle, the URRWMO will install riverbank stabilization projects achieving 180 tons/yr of suspended solids reduction and 250 lbs/yr total phosphorus reduction. 25 project sites have been identified (refer to ACD riverbank inventory guidance document). Of these sites 9 are cedar tree revetments, 9 are bioengineering with minor grading and light toe armoring and two are hard armoring including significant regrading and rip rap to a 10-year flood elevation.

(3) City of St. Francis Stormwater Retrofit Analysis
The City of St. Francis coordinated with ACD to conduct a city-wide stormwater BMP retrofit analysis. The report identified and ranked seventeen (17) water quality improvement projects all of which drain to the Rum River. Projects were ranked by nutrient reduction (TP and TSS) and also assigned an estimated project cost and annual maintenance fees. This allows for project prioritization on a rating scale (e.g. $ per lb TP removed per year). Since all of the BMPs drain to the Rum River, these projects would provide a water quality benefit to all of the communities downstream.

The Rum River WRAPS includes Urban Stormwater Management Practices in communities along the Rum River within their Strategy Table for the Lower Rum River HUC 10 Subwatershed (see Table 3-3). Supporting urban stormwater BMP projects in St. Francis would therefore align well with the WRAPS strategy.

The URRWMO TAC use the analysis to recommend priority projects for implementation. Once a project is selected, the URRWMO will amend the URRWMO plan (following Minnesota Rules 8410) to clearly describe the project, the measureable goals to be achieved, the estimated total project cost, the URRWMO's cost, outside funding sources, and the project partners.

Within the ten-year planning cycle, the URRWMO will install projects reducing phosphorus by at least 3 lbs/yr and suspended solids by 500 lbs/yr.

These three plans are examples of a Subwatershed Assessment Study (SWAS), which are invaluable for project selection. Other communities within the URRWMO might also undertake similar efforts, and bring the final report to the URRWMO for review. Upon acceptance by the URRWMO, the URRWMO will amend the URRWMO plan (following Minnesota Rules 8410) to adopt the new SWAS as a guidance document, revising Appendix F accordingly. All SWAS's will clearly describe the project(s), the measureable goals to be achieved, the estimated total project cost, the URRWMO's cost, outside funding sources, and the project partners.

Locations of SWAS will be recommended by the TAC and selected by the URRWMO Board with consideration of these priority subwatersheds:

<u>Highest priority</u>
Rum River direct drainage (minor watershed #21095)
Pickerel Lake
Ford Brook

<u>Medium priority</u>
Seelye Brook
East Twin Lake
Others as recommended by the TAC

If the TAC identifies a new priority subwatershed for a SWAS, the URRWMO will follow the plan amendment procedures outlined in Section 5.5.2. In order to simply the amendment process, the plan was written so that changes can be made to Appendix F.

Note that the Pilot Watershed Based Funding identified metro communities as potential recipients for funding, but the proposed projects need to be specifically identified within an approved 8410 plan. Therefore, it is in the best interest of the URRWMO to quickly identify projects and amend the WMO plan accordingly in order to be eligible for funding opportunities.

5.2 Member City Responsibilities

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

1. Manager and Alternate Manager appointment: Each member city is entitled to appoint two managers and one alternate manager to the URRWMO. Alternates only get to vote in the absence of a regular representative. Sections 2.2, 2.3, and 2.4 of the URRWMO's joint powers agreement documents the conditions for manager appointments.

2. Technical Advisory Committee (TAC): When the URRWMO decides to convene a TAC, the URRWMO will invite staff and/or elected officials from member communities to be part of the TAC. Addendum 2 to the URRWMO's joint powers agreement identifies roles and responsibilities of TAC members.

3. Local Water Management Plan: Each member city is required to prepare a local water management plan that conforms with the URRWMO Plan. The URRWMO will then review and, if appropriate, approve each local water management plan. Local plans are to include new and/or revised modeling studies to assess runoff rates, volumes and/or water quality in accordance with direction from the URRWMO TAC. Refer to Appendix D for details regarding the URRWMO Standards, Regulations, and Operations.

4. 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 URRWMO and the policies presented in this Plan. Affected ordinances/controls may include erosion and sediment control, wetland management, floodplain/zoning, stormwater management, and others.

5. Stormwater Inspections – Conduct inspections of existing stormwater management practices.

6. Culvert Inventory – Prepare an inventory of all drainage structures located along major open channel drainage systems that convey continuous flow.

7. TMDL Implementation Plans – Prepare implementation plans to comply with the recommendations of the approved TMDL studies, as they become available.

8. Capital Improvement Projects: Member cities implement the capital improvement projects identified herein.

9. Finances: Each member city is required to contribute annually to the URRWMO operating fund.

10. Annual Reporting: Each member city is required to complete an Annual Activity Report (Appendix E) to the URRWMO.

5.3 Strategies and Implementation Schedule

5.3.1 Implementation Program Components

As stated in the Chapter 5 introduction, this current plan is geared toward project development within the watershed, while maintaining a monitoring program and continuing administrative activities. An implementation schedule was created to provide clarity of each implementation activity: a strategy description, the responsible parties (e.g. URRWMO, Member Communities, or ACD), and timeframe for completion. Each activity is tied to one (or more) of the URRWMO goal statements, and was designed to be measureable. This will allow the URRWMO to regularly assess their process towards each goal, identify success-stories and problems, and keep the organization on a defined timeline. Each strategy was assigned an ID, which is cross referenced within the 10-year Implementation Budget (Section 5.3.1) to more adequately assess the costs associated with each activity. Table 5-3 provides a list of all the proposed strategies and an implementation schedule for the URRWMO within the 2019-2028 planning cycle.

Table 5-3: URRWMO 2019 – 2028 Strategies and Implementation Schedule

Goal Area	Goal	Location	Strategy Type	Strategy Description	Measurement Method	Goal/Target	Responsible Party		Time-line to reach goal	Interim 10-yr Mile-stone	Strategy ID †
							URRWMO	Community			
A: Water Quantity and Floodplain Management	A.1	Communities	Ordinance	Establish a uniform minimum runoff control standard for new development and redevelopment that incorporates current stand federal standards. Maintaining post-development 2-, 10-, and 100-yr peak runoff rates at predevelopment levels. Review of local rate control and infiltration requirements to confirm compliance with URRWMO. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.	Minimum runoff control standard developed for the URRWMO & integrated into the approved Regulations table (Appendix D). Annual reports from communities indicating ordinance compliance.	100% compliance		x	2020		1
	A.2	Communities	Inventory	Documentation of development projects that impact floodplains.	Annual reports from communities documenting the volume of floodplain fill and compensatory storage.	100% compliance		x	Annually		2
	A.2	Communities	Ordinance	Review of local floodplain management ordinances to confirm compliance with federal, state and local standards. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.	Annual reports from communities indicating ordinance compliance.	100% compliance		x	2020		3
	A.3	Watershed wide	Review	Prohibit new discharges from land locked basins unless an engineering study is completed to evaluate the effects of the outlet and design to mitigate impacts.	Annual report from the WMO documenting review process, discussion and decisions.	100% compliance	x		Annually		4
	A.4 (B.5)	Communities	Inventory	Complete a physical inspection of all BMPs and identify deficiencies and potential retrofits.	Reports from each community identifying BMP locations, condition and potential improvements.	100% compliance		x	2026		5

Table 5-3: URRWMO 2019 – 2028 Strategies and Implementation Schedule

Goal Area	Goal	Location	Strategy Type	Strategy Description	Measurement Method	Goal/Target	Responsible Party		Time-line to reach goal	Interim 10-yr Mile-stone	Strategy ID †
							URRWMO	Community			
B: Water Quality	B.1 & B.2	Communities	Ordinance	Review of post-development stormwater treatment ordinances to confirm compliance with federal, state and local standards. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.	Annual reports from communities indicating ordinance compliance.	100% compliance		x	2020		6
	B.3 & H.4	Watershed wide	Sampling	Fund ongoing water quality sampling within the watershed through partnership with ACD.	Annual review of water quality sampling to detect trends of increasing/decreasing water quality	na	x*		Annually		7
					Review TP concentration in Lake George towards WRAPS goal	WRAPS Goal: TP=22.5mg/L	x*		20 years	TP <24 mg/L	8
					Review TP concentration in Pickerel Lake towards WRAPS goal	WRAPS Goal: TP=17.8mg/L	x*		30 years	TP < 23 mg/L	9
					Review TP concentration in East Twin Lake towards WRAPS goal	WRAPS Goal: TP=18.7mg/L	x*		20 years	TP= 20 mg/L	10
					Review TP concentration in Minard Lake towards WRAPS goal	WRAPS Goal: TP=28.3 mg/L	x*				11
					Review E.Coli concentration in East Twin Lake towards WRAPS goal	WRAPS Goal: Geo Mean: 126/100 ml Individual 1,260/100 ml	x*		35 years	Exceedance < 25%	12
					Review MSHA and TP concentration in Rum River towards WRAPS goal	WRAPS Goal: Keep MSHA average scores at "good" rating. Reduce TP to fall below standard.	x*		>10 years	Measured decrease in TP	13

Table 5-3: URRWMO 2019 – 2028 Strategies and Implementation Schedule

Goal Area	Goal	Location	Strategy Type	Strategy Description	Measurement Method	Goal/Target	Responsible Party		Time-line to reach goal	Interim 10-yr Mile-stone	Strategy ID †
							URRWMO	Community			
B: Water Quality (continued)	B.3	Lake George	Best Management Practices	Partner and fund a portion of water quality projects identified by ACD to improve water quality. Note that the TAC will prioritize project selection (Lake George, Rum River bank stabilization, projects identified within a SWAS).	Annual report from ACD indicating progress. Project description outlining TP load reductions for each implemented project.	Provide funding for 2+ projects within 10-year planning period. Reduce watershed TP loading by 20 lbs (9%). Any new development that drains directly to Lake George will require pre- and post-development TP and runoff volume and rates to be the same. (refer to Lake George Qater Quality Improvement Asessment report)	x*		10 years	Complete 1 project. Start a 2nd project	14
	B.3 & F.1	Rum River	Best Management Practices	Partner and fund a portion of bank stabilization projects along the Rum River. ACD completed a stream bank inventory in 2017 & 2018 to identify potential sites and interested private landowners. Potential to complete projects on public property as well. Note that the TAC will prioritize project selection (Lake George, Rum River bank stabilization, projects identified within a SWAS).	Annual report from ACD indicating progress. Project description outlining TSS and TP load reductions for each implemented project.	Provide funding for 2+ projects within 10-year planning period Install riverbank stabilizations achieving 180 tons/yr of suspended solids reduction and 250 lbs/yr phosphorus reduction. 25 project sites have been identified (refer to 2018 ACD riverbank inventory guidance document).	x*		10 years	Complete 1 project. Start a 2nd project	15
	B.3	Rum River/St. Francis	Best Management Practices	Partner and fund an urban stormwater retrofit project that provides water quality benefits to the Rum River. TAC will recommend the project(s) based on SWAS and amend this plan with specific details to allow for grant funding. If additional SWAS's are completed, the TAC will incorporate new projects into consideration for prioritization.	Annual report from partner agency/community indicating progress. Project description outlining TSS and TP load reductions for each implemented project.	Provide funding for 2+ projects within 10-year planning period. Install projects reducing TP by at least 3 lbs/yr and TSS by 500 lbs/yr.	x	x	10 years	Complete 1 project. Start a 2nd project	16

Table 5-3: URRWMO 2019 – 2028 Strategies and Implementation Schedule

Goal Area	Goal	Location	Strategy Type	Strategy Description	Measurement Method	Goal/Target	Responsible Party		Time-line to reach goal	Interim 10-yr Mile-stone	Strategy ID †
							URRWMO	Community			
B: Water Quality (continued)	B.4	Watershed wide	Review	Review goals within WRAPS report, identify successful/under performing projects, and water quality sampling data. Revise WRAPS strategies based on progress.	At least 2 URRWMO board meetings focused on WRAPS progress towards goals. Participate in at least 50% of WRAPS meetings with partnering agencies.	Revised strategies by 2022	x		5 years		17
	B.5 (A.4)	Communities	Inventory	Complete a physical inspection of all BMPs and identify deficiencies and potential retrofits.	Reports from each community identifying BMP locations, condition and potential improvements.	100% compliance		x	2026		5
C: Wetlands	C.1	Communities	Ordinance	Require member communities to enforce regulatory controls for new development and redevelopment construction projects.	Annual reports from communities indicating ordinance compliance.	100% compliance	x		2020		18
	C.2	URRWMO	Ordinance	TAC will meet to discuss and revise wetland buffer standards. Standards will be distributed to member communities.	Meeting minutes from TAC meeting and revised standards documents.	100% compliance	x		2020		19
D: Groundwater	D.1	Communities	Ordinance	Require member communities to review (and enforce) wellhead protection plans and infiltration standards.	Annual reports from communities indicating ordinance compliance. One URRWMO meeting that includes a presentation of all wellhead protection plans within the URRWMO and their major components as an educational exercise.	100% compliance	x	x	2020		20
E: Drainage Systems	E.1	Watershed wide	Review	Consider reassigning the jurisdiction over the county ditches within the watershed.	One URRWMO meeting that discusses current policies in regards to ditches and consider potential improvements.	100% compliance	x		2021		21
	E.2	Watershed wide	Inventory	Provide funding for watershed culvert inventory. Coordinate with ACD to ensure consistent data collection methodology.	Inventory completion.	Inventory 100% complete	x*	x	2022		22

Table 5-3: URRWMO 2019 – 2028 Strategies and Implementation Schedule

Goal Area	Goal	Location	Strategy Type	Strategy Description	Measurement Method	Goal/Target	Responsible Party		Time-line to reach goal	Interim 10-yr Mile-stone	Strategy ID †
							URRWMO	Community			
F: Reduce Erosion	F.1 & B.3	Rum River	Best Management Practices	Partner and fund a portion of bank stabilization projects along the Rum River. ACD is completed a stream bank inventory in 2017 & 2018 to identify potential sites and interested private landowners. Potential to complete projects on public property as well. Note that the TAC will prioritize project selection (Lake George, Rum River bank stabilization, projects identified within a SWAS).	Annual report from ACD indicating progress.	Provide funding for 2 projects within 10-year planning period	x*		10 years	Complete 1 project. Start a 2nd project	15
	F.2	Communities	Ordinance	Review of local erosion control ordinances to confirm compliance with federal, state and local standards. If needed, the URRWMO Board will authorize the Watershed Coordinator to complete a review of updated ordinances to confirm they comply with the URRWMO's Standards.	Annual reports from communities indicating compliance.	100% compliance		x	2020		23
G: Protect and Enhance Fish and Wildlife Habitat	G.1	URRWMO	Education	Update URRWMO website to include education materials on the prevention and control of aquatic and invasive species. Materials provided by the Anoka County Parks Aquatic Invasive Species Prevention Program.	Website updated.	100% compliance	x		2020		24
	G.2	Communities	Ordinance	Review of local shoreland management ordinances to confirm compliance with federal, state and local standards.	Annual reports from communities indicating compliance.	100% compliance		x	2020		25
H: Commission Operations and Programming	All Goals	URRWMO	Administrative	Hire a Watershed Management Coordinator handle daily operations of the URRWMO and to represent the Board to municipalities, agencies and other water resource management entities.	Staff member hired	Staff member hired	x		2020		26
	H.1	Communities	Review	Review of annual budget and funding from member communities.	Meeting minutes from annual meeting addressing the URRWMO budget, 10-year plan goals, and funding needs.	Annual meeting with revised budget to reach 10-year plan goals.	x	x	Annually		27
	H.2	URRWMO	Grant Applications	Proactively research grant funding opportunities to support URRWMO projects.	Grant application and URRWMO annual reports.	Five grant applications within 10-year planning period	x		2028		28

Table 5-3: URRWMO 2019 – 2028 Strategies and Implementation Schedule

Goal Area	Goal	Location	Strategy Type	Strategy Description	Measurement Method	Goal/Target	Responsible Party		Time-line to reach goal	Interim 10-yr Mile-stone	Strategy ID †
							URRWMO	Community			
H: Commission Operations and Programming (continued)	H.3	URRWMO	Education	Promote investment within the watershed by encouraging members of the public and appointed officials from communities to attend URRWMO meetings.	Meeting attendance records.	20% of URRWMO meeting attendees are not members of the board	x	x	2028		29
	H.3	URRWMO	Education	Update (overhaul) the URRWMO website to keep up with current technology and security measures.	Website updated.	100% compliance	x		2020		30
	H.4 & B.3	Watershed wide	Sampling	Fund ongoing water quality sampling within the watershed through partnership with ACD.	Annual report from ACD on sampling. Revise sampling schedule annually.	Provide annual funding for sampling.	x*		Annually		7-13
	All Goals	Communities	Review	Each member city is required to prepare a local water management plan that conforms with the URRWMO Plan. The URRWMO will then review and, if appropriate, approve each local water management plan.	Annual reports from communities status of plan review and status of approval with URRWMO.	100% compliance	x	x	2020		31
	H.1, A.1, A.2, A.3, A.4, B.1, B.2, B.3, B.4, B.5, C.2, D.1, E.2, F.1, F.2	URRWMO	Review	Coordinate regular TAC meetings to review status of watershed planning efforts, specifically as it relates to ordinance updates & compliance, proposed project selection, and assessment towards water quality goals.	Meeting minutes from gatherings, published on the URRWMO website.	At least one meeting annually, with additional meetings scheduled early on within the planning period (2019-2021) to accomplish specific tasks listed in Section 5.1.3	x		Annually		32

†Some strategies appear twice within the table, and the ID is duplicated. These strategies were deemed to be of high importance to several goal areas, and therefore were repeated for emphasis.

*Some services might be contracted to ACD or other qualified consultant by the URRWMO to fulfill this responsibility.

5.3.2 Implementation Program Budget

Table 5-4 provides a comprehensive list of the projects, activities, and programs that comprise the URRWMO implementation program. Each of the strategies listed within Table 5-3 are cross-referenced to the budget to visualize how funds are allocated. Any annual activities were assigned a 2.5% inflation increase per year to account for rising project costs.

Three (3) different projects were identified throughout the planning process: Lake George Water Quality Projects, Rum River Bank Stabilization Projects and the St. Francis Stormwater BMP Retrofits (Section 5.1.4). The URRWMO is committed to supporting these efforts by allocating a portion of its annual funds for grant matching. Many grant applications require that the grantee "match" a portion of the funds that the grant provides. By offering a grant matching money, the URRWMO will improve the likelihood of a project receiving grant dollars.

However, since the timing of the grant applications are unknown, the URRWMO decided to start saving a set amount each year. All of the estimated grant matching amounts for the aforementioned three projects were summed and divided over the 10-year planning cycle. This allows the URRWMO to save over time, and grant matching funds will be available as applications are submitted.

In addition, if an implementation activity is completed under budget or no longer completed, the WMO will apply those remaining funds to address the next priority issue/project.

Table 5-4: 2019 – 2028 Implementation Program and Budget

					2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		Notes on budget items†
	Strategy ID	Description		Estimated hr/year	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	
Annual Programs	2, 4, 18, 20, 27, 29	Watershed Management Coordinator Cost for 2019 are based on estimated hours at a rate of $80/hr	Annual Financial Report	(8)	$640		$656		$672		$689		$706		$724		$742		$761		$780		$799		
			Annual Report for BWSR	(16)	$1,280		$1,312		$1,345		$1,378		$1,413		$1,448		$1,484		$1,522		$1,560		$1,599		Each community committed to documenting local activities.
	26		Facilitate Regular URRWMO Meetings	(40)	$3,200		$3,280		$3,362		$3,446		$3,532		$3,621		$3,711		$3,804		$3,899		$3,996		Assumed 4 hours for Coordinator to organize 10 meetings per year.
	19, 21, 32		Semi-Annual TAC meeting‡	Variable. See notes.	$3,200	$9,000	$6,560	$18,450	$6,724	$18,911	$1,723	$4,846	$1,766	$4,967	$1,810	$5,091	$1,856	$5,219	$1,902	$5,349	$1,949	$5,483	$1,998	$5,620	Assuming 2.5% inflation increase per year for annual activities. Assuming 20 hours for Coordinator to organize each of the meeting and $750 per community per meeting. Assuming two TAC meetings in 2019, four meetings in 2020 and 2021, and one meeting per year for 2022-2028.
	31		Review Local Water Management Plans	(96)			$7,872																		Assuming 16 hours per community.
	28		Grant Applications	(45)	$3,600		$3,690		$3,782		$3,877		$3,974		$4,073		$4,175		$4,279		$4,386		$4,496		Assuming one (1) grant application per year.
			Misc. Administrative Activities	(20)	$1,600		$1,640		$1,681		$1,723		$1,766		$1,810		$1,856		$1,902		$1,949		$1,998		
		Watershed Insurance			$2,300		$2,358		$2,416		$2,477		$2,539		$2,602		$2,667		$2,734		$2,802		$2,872		
		Audit in 2020 and 2025																							Insurance dividends received annually should be placed in an account for future audits and watershed plan updates. Each audit is estimated to be approximately $1000.
		Secretarial Services			$1,200		$1,230		$1,261		$1,292		$1,325		$1,358		$1,392		$1,426		$1,462		$1,499		
	24	Public Education & Outreach, Contracted to ACD			$1,000		$1,025		$1,051		$1,077		$1,104		$1,131		$1,160		$1,189		$1,218		$1,249		
	7, 8, 9, 10, 11, 12, 13	Water Quality Monitoring			$7,500		$7,500		$7,500		$7,500		$7,500		$7,500		$7,500		$7,500		$7,500		$7,500		Reference Section 5.1.2 for more details on the Monitoring plan and funding schedule.
	24, 30	Website Maintenance and Updates			$800		$820		$841		$862		$883		$905		$928		$951		$975		$999		$800 for annual maintenance with assumed 2.5% inflation increase per year.
		Next 10-year plan update																					$50,000		

Table 5-4: 2019 – 2028 Implementation Program and Budget

	Strategy ID	Description	Estimated hr/year	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		Notes on budget items†
				WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	WMO	MC	
Projects	14	Lake George water quality project																						Money will be used as the local match with principal funding from grants, completing one grant application per year. If grant funding is not secured for one specific year, the funds will be retained by the URRWMO and combined with future years' allocations for three years. If accumulated project funds meet 45K (or other amount determined by the board based on high-ranking projects), the following year(s)' budgets for this item may be reduced to zero. Note that projects will be prioritized and selected by the TAC overtime. If the project cost exceeds grant funding availability, the URRWMO will revise their budgeting appropriately to accommodate. Current estimates are based on a 75K project/SWAS study, consisiting of 60K in grant funds with the URRWMO providing a 25% match (15K), and assuming 2.5% inflation increase per year to account for rising costs.
	15	Rum River bank stabilization project				15,000		15,375		15,759		16,153		16,557		16,971		17,395		17,830		18,276		
	16	Projects from Adopted Subwatershed Assessment Studies (SWAS) (e.g. St. Francis Stormwater Retrofit)																						
Inventories/ Assessments	22	Watershed Culvert Inventory					$20,000		$20,500															Each community committed to completing culvert inventory, in accordance with guidance provided by TAC.
	5	Stormwater BMP assessments													$30,000								$33,114	Assessments shifted to later within the 10-year cycle to assist in budgeting.
	1, 3, 6, 23, 25	Municipal Ordinance Review					$30,000																	Each community committed to ordinance review, in accordance with guidance provided by TAC. Assuming five (5) ordinances to review for six (6) communities.
	16	Subwatershed Assessment Studies (SWAS) for Waterbodies of Interest						$15,375				$16,153				$16,971				$17,830				Anticipated to apply for grant funding for SWAS in 2020 and complete the SWAS the following year. Current estimates are based on a 60K SWAS study. This cycle will repeat biennially.
	17	WRAPS Review										$3,500												
Totals for URRWMO and Member Communities				$26,320	$9,000	$52,943	$68,450	$61,385	$39,411	$41,803	$4,846	$62,314	$4,967	$43,540	$35,091	$61,412	$5,219	$45,365	$5,349	$64,141	$5,483	$97,281	$38,734	
Grant Funding	28	Assuming one (1) application per year, alternating an applications for a project and an application for a SWAS.				$60,000		$61,500		$63,038		$64,613		$66,229		$67,884		$69,582		$71,321		$73,104		Current estimates are based on a 75K project/SWAS study, consisiting of 60K in grant funds with the URRWMO providing a 25% match (15K), and assuming 2.5% inflation increase per year to account for rising project costs.

MC: Member Communities. Dollar amounts listed are cumulative for all communities. Values are only listed if the task is specifically for the URRWMO and not already within normal municipal budgeting. Estimated amounts will not be given to the WMO, but will be in-kind contributions.
†Assume 2.5% inflation increase per year for annual activities
‡Technical Advisory Committee (TAC) to meet more frequently between 2019-2021. Activities to include (in no particular order):

a) Development of a revised annual report form. Things to be included are details on regulatory activities – development plans (application of rate control, floodplain, wetland regulations, etc.)
b) Revised wetland buffer standards
c) Land Locked Basin standards (what is required in a report, what constitutes acceptable safeguards for opening a closed depression)
d) Culvert inventory (scope, means)
e) BMP assessments (scope, report form)
f) Municipal ordinance revisions (construction site E/C, post-construction stormwater management, floodplain management, and shoreland zoning).
g) Project prioritization and selection from Lake George Management Plan, St. Francis Stormwater Retrofit Analysis, Rum River Field Assessment and future SWAS's.
h) Establish future SWAS's.
i) Develop standards for local plans. Potentially compare these with the Lower Rum WMO standards.

5.3.3 Funding

5.3.3.1 Funding Mechanisms Available to the URRWMO

URRWMO Operating Fund
Through the URRWMO JPA, each member city contributes annually to the URRWMO operating fund. The general fund is to be used for administrative purposes and certain operating expenses. Contributions to the operating fund by member cities is determined according each community's land area within the watershed as well as each community's market valuation in the watershed. Subdivision 2 of the URRWMO Joint Powers Agreement provides detail on how each city's annual contribution is determined.

The operating fund is used to pay for all URRWMO expenses including administrative expenses, plan development costs, review expenses, capital improvement costs, management programs, and management studies.

Ad Valorem Tax
Minnesota Statutes 103B.231 requires watershed districts and joint powers WMOs within the metropolitan area to prepare watershed management plans which are to include capital improvement programs. Minnesota Statute 103B.251 allows WMOs to certify capital improvements to the county for payment for capital improvement projects included in a WMO's watershed management plan. The county can then issues bonds and levy an ad valorem tax on all taxable property in the WMO (or subwatershed unit of the WMO) to pay for the projects.

URRWMO is not listed as a special taxing district under Minnesota Statutes 275.066 and so is not eligible to raise funds through direct Ad Valorem taxation as provided in Minnesota Statutes 103B.241.

Emergency Projects
Minnesota Statutes 103B.252 allows local units of government or WMOs with an approved and adopted plan to declare an emergency and order work to be done without a contract, and without levy limits.

5.3.3.2 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
- County Grants (e.g., Natural Resource Grants, Environmental Response Fund)

5.3.3.3 State Funding Sources

In addition to stormwater utility fees, taxes, assessments, and the other funding sources discussed above, the cities and/or the URRWMO 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 Chapter 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.

At the time of drafting this plan, the URRWMO identified the Clean Water Funds Competitive Grant as a good fit for URRWMO project work and for additional Subwatershed Assessment Studies (SWAS's). Therefore, the current budget/implementation schedule allocated time/funds for one grant application per year. In additional, the URRWMO will submit for non-competitive Clean Water Funds, anticipated to be available either annually or biennially in the upcoming years.

The URRWMO will be selecting priority projects for implementation from three (3) existing study reports: Lake George water quality projects, Rum River bank stabilization projects, and St. Francis Stormwater BMP Retrofits (see Section 5.1.4). In the future, the URRWMO anticipates completion of a number of additional Subwatershed Assessment Studies which are expected to identify additional projects intended to improve water quality, reduce flooding or otherwise improve the watershed in accordance with the URRWMO goals. These projects will be added to previous study project recommendations for priority ranking by the TAC.

Once the TAC recommends the priority projects, the plan will be amended (following Minnesota Rules 8410) to clearly describe the project, the measureable goals to be achieved, the estimated total project cost, the URRWMO's cost, outside funding sources, and the project partners. At this stage, a specific grant funding opportunity will be selected based on the project type. The aforementioned agencies can provide clarity on the most appropriate grant opportunity.

5.3.3.4 Federal Funding Sources

The URRWMO and member cities may also receive funding from various federal sources which are diverse and too numerous to include in this document.

5.3.3.5 Private Funding Sources

In addition to state and federal funding sources, some private funding sources may be available.

5.4 Impacts on Local Government

5.4.1 URRWMO Operating Fund

The URRWMO'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 URRWMO's purposes and implementing the Plan.

As in the past, the URRWMO's implementation of watershed programs will be funded through the URRWMO's operating fund (Table 5-5). Since the member cities contribute funds directly to the URRWMO operating fund, this has a direct financial impact on the member cities.

Table 5-5: Planned Member Community Financial Contributions to the URRWMO

Member Community	Estimated Contribution to URRWMO	2019	2020	2021	2022	2023	2024-2028
Bethel	1.08%	$284	$572	$663	$451	$673	$3,367
East Bethel	24.21%	$6,372	$12,817	$14,861	$10,121	$15,086	$75,472
Ham Lake	0.99%	$261	$524	$608	$414	$617	$3,086
Nowthen	23.66%	$6,227	$12,526	$14,524	$9,891	$14,744	$73,758
Oak Grove	29.69%	$7,814	$15,719	$18,225	$12,411	$18,501	$92,556
St. Francis	20.37%	$5,361	$10,784	$12,504	$8,515	$12,693	$63,501
TOTAL		$26,320	$52,943	$61,385	$41,803	$62,314	$311,740

Some URRWMO policies place increased responsibility on member cities. 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 URRWMO 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 URRWMO 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).

5.4.2 Local Water Management Plans and Official Controls

The URRWMO requires member cities to revise their official controls and management programs (e.g., ordinances) affected by the URRWMO Plan within 2 years of adoption of this URRWMO Plan. This is anticipated to represent a substantial effort on the part of each community and will represent a financial

cost in addition to addition to annual contributions to the URRWMO since it is anticipated the each city will need to engage the services of a consultant to develop revised local plans and then as required by 8410.0160 Subp. 6..

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 URRWMO 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 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 URRWMO. Member city ordinances, management programs, and other official controls required by the URRWMO Plan must be implemented within 2 years of URRWMO Plan adoption. Revisions to local water management plans or local controls that are potentially inconsistent with the URRWMO plan must be submitted by the member cities to the URRWMO for review. The URRWMO has compiled their Standards, Regulations and Operations in Appendix D. All member communities should carefully review Appendix D to ensure that local water management plans are in compliance with the URRWMO.

"Local Water Management Plans and Official Controls" need to be consistent with the Local Plan Requirements identified in 8410.0105. Subp. 9 and 8410.0160. However, local comprehensive plans were due on December 31st, 2018, and therefore could not incorporate the updates to the URRWMO Plan. Therefore, any local comprehensive plans that were submitted by the 2018 deadlines will need to review the URRWMO plan and amend the Comprehensive Plans to comply with the URRWMO if there are any discrepancies. This review must be completed within 2-years of the URRWMO plan adoption. Subsequent updates of Local Plan Requirements and deadline shall follow 8410.0105. Subp. 9 and 8410.0160 and be completed in conjunction with member community's 10-year comprehensive plan update.

5.5 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 Anoka County for review, in accordance with Minnesota statutes. The URRWMO held a public hearing on the Plan on March 13, 2019; BWSR approved the Plan on May 22, 2019; the URRWMO formally adopted this Plan on July 9, 2019.

5.5.1 Stakeholder and Public Involvement

Input from review agencies and other public stakeholders was solicited during the development of this Plan. Additionally, during the development of this plan, the URRWMO performed an exercise commonly known as a 'gaps analysis' to develop recommendations regarding additional technical data needed to further develop the URRWMO Plan. The gaps analysis considered responses to the Plan notification letter received from the BWSR, MDNR, Metropolitan Council, and Anoka County.

The gaps analysis considered concerns raised by the URRWMO managers, as well as responses from various review agencies and the public and led to the development of the current watershed program. The two most significant issues identified by the gaps analysis were:

1. A need for more comprehensive data regarding conditions within the watershed (such as the findings of comprehensive hydrologic, hydraulic, and water quality modeling). Some of this data exists within local planning documents, however, each document was developed in its own way and level of detail making them difficult to compare to one another.

2. A need to incorporate the findings of the Rum River WRAPS. At the time of the writing of this document the Rum River TMDL and WRAPS document has not been finalized, however, it is anticipated that these studies will provide significant technical data and findings that will assist the URRWMO in the development of future studies and capital improvement plans.

The URRWMO gathered input from the residents, elected and appointed officials, city staff, state agencies and other partners through this plan revision process. Beginning in November 2015, URRWMO sent a letter to stakeholders requesting input regarding priority concerns, water management goals, potential partnerships, watershed programs or anything of concern to the stakeholders. This letter was sent to 20 entities including the six URRWMO Member Cities, Anoka County, Anoka Conservation District, the Lower Rum River WMO, Isanti Co, Mille Lacs Co, Sherburne Co, the Sunrise River WMO, the MN DNR, the MN Dept. of Health, the MN Dept. of Agriculture, the Metropolitan Council Environmental Services, the MN Pollution Control Agency, the MN Dept. of Transportation, and MN BWSR. The URRWMO received responses from eight (8) of these entities, including one (2) cities, one (1) WMO, two (2) counties, and four (4) state agencies.

In spring 2016, representatives from URRWMO met with each member community to specifically solicit input from each member community regarding watershed planning issues. Through this process no technical issues were identified. Furthermore, each community voiced concerns about potential expansion of URRWMO programs that would result in additional annual expense to the Cities.
Additionally, beginning in February 2016 and extending through November 2016, URRWMO held seven (7) meetings to develop the 4th generation watershed plan. This included an open house on June 29, 2016, a technical advisory committee meeting in the afternoon of July 2016, and a citizen advisory committee meeting in the evening of July 20, 2016.

A draft version of this plan was submitted for the 90-day review on October 11, 2017. Agencies comments provided by BSWR and Met Council required additional changes to this plan before it could be approved. The URRWMO Board members continued to hold meetings and maintain discussion with the agencies, and had a break through Workshop meeting on September 25th, 2018. Agencies and board members agreed on certain key elements to be included within the plan, and discussed a timeline for re-submittal. Specific items to be added included:

- Adopt by reference the yet-to-be-published Lake George Management Plan
- Adopt by reference the St. Francis Stormwater Retrofit Analysis
- Adopt by reference the Rum River Field Assessments (2017 and 2018)
- Commit to providing a local match for one project from each of the 3 (three) aforementioned Plans/Analysis/Assessment within the next planning cycle
- Actively pursue grants for State match

- Hire a Watershed Management Coordinator
- Identify members for TAC and develop a meeting schedule
- Complete additional SWAS studies leveraging grants through the Clean Water Fund

All of these elements were added into the plan document, with the understanding that plan amendments will be required in the near future, specifically after the TAC identifies priority projects. This plan will need to be amended to provide specifics about the selected project, the measureable goals to be achieved, the estimated total project cost, the URRWMO's cost, outside funding sources, and the project partners.

5.5.2 Amendments to Plan

It is the intention of the Upper Rum River Watershed Management Organization (URRWMO) to have this water management plan reviewed and approved by the Board of Water and Soil Resources (BWSR). This plan will be in effect for ten (10) years from the date of BWSR approval, unless significant changes to the plan are deemed necessary prior to that date.

All amendments to this Plan must follow the procedures set forth in this section, or as required by State laws and rules, as revised. Plan amendments may be proposed by any person, agency, city, or the County to the URRWMO Board, but only the URRWMO may initiate the amendment process. The URRWMO may amend its Plan in the interim if either changes are required or if problems arise that are not addressed in the Plan. Changes to this Plan not requiring an amendment are specified in Minnesota Administrative Rules 8410.0140 Subpart 1. C. Subp. 1a.

The URRWMO 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 provisions described in Minnesota Rules 8410.0140 Subp. 2. In accordance with Minnesota Statutes 103B.231, Subd. 11, the plan amendment process is the same as the Plan review process including submitting the amendment to:

- member communities,
- Anoka County
- state review agencies
- the Metropolitan Council, and
- BWSR

for a 60-day review; responding in writing to any comments from reviewers; holding a public hearing on the proposed amendment; submitting the final revised amendment and responses to comment to the BWSR for a 90-day review and approval.

The URRWMO will follow the minor plan amendment process, requiring only one 30-day review period, when proposed amendments are determined to be minor according to the provisions for minor amendments as established in Minnesota Rules 8410.0140 Subp. 2.

When and if plan amendments are completed, the URRWMO will prepare and distribute those amendments consistent with Minnesota Rules 8410. The URRWMO will maintain a distribution list of everyone receiving a copy of this Plan. Within 30 days of adopting an amendment, the URRWMO will

distribute copies of the amendment to everyone on the distribution list and post the amendment on the URRWMO website.

CHAPTER 6 – Acronyms

ACD	Anoka Conservation District
ACMWPG	Anoka County Municipal Wellhead Protection Group
AIS	Aquatic Invasive Species
BWSR	Board of Water and Soil Resources
CCESR	Cedar Creek Ecosystem Science Reserve
CIP	Capital Improvement Program
DNR	Department of Natural Resources
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
JPA	Joint Powers Agreement
KTF	Know the Flow (www.KnowTheFlow.us)
LGID	Lake George Improvement District
LID	Lake Improvement District
MBS	Minnesota Biological Survey
MeCC	Metro Conservation Corridors
MPCA	Minnesota Pollution Control Agency
MRWA	Minnesota Rural Water Association
NOAA	National Oceanic and Atmospheric Administration
SWAS	Subwatershed Assessment Study
TAC	Technical Advisory Committee
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
URRW	Upper Rum River Watershed
URRWMO	Upper Rum River Watershed Management Organization
USGS	United States Geological Survey
WD	Watershed District
WMO	Watershed Management Organization
WRAPS	Watershed Restoration and Protection Strategy

FIGURES

GIS DATA SOURCES

Active Water Appropriation Permits	MNDNR Permitting and Reporting System
Aerial Imagery	USDA National Agriculture Imagery Program (NAIP) 2015
Basemap	ESRI
Central Region Regionally Significant Ecological Areas	MDNR
County Ditches	URRWMO
Existing Land Use	Metropolitan Council, Generalized Land Use 2010
Flood Zone Designations	FEMA (Anoka Co: 27003C 2015/12/15; Isanti Co: 27059C 2006/04/12; Sherburne Co: 27141C 2011/11/16)
Hydrologic Soil Groups	USDA-NRCS SSURGO Soils Database
Metro Conservation Corridors	MNDNR
Monitoring Locations	Annual Reports for the URRWMO
Municipal Boundaries	US Census (Topologically Integrated Geographic Encoding and Referencing, TIGER)
National Wetland Inventory	MNDNR
Native Plant Communities	MNDNR
Planned Land Use	Metropolitan Council, Regional Planned Land Use
Public Waters and Wetlands	MNDNR
Regionally Significant Ecological Areas	MNDNR
Roads	US Census (Topologically Integrated Geographic Encoding and Referencing, TIGER)
Site of Biodiversity Significance	Minnesota Biological Survey
Streams/Rivers	USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary	MN Board of Water and Soil Resources (BWSR)
Waterbodies	USGS National Hydrography Dataset (NHD)
Watersheds (HUC 8 and 12)	USGS National Hydrography Dataset (NHD)

APPENDIX A

URRWMO Joint Powers Agreement

APPENDIX B

URRWMO Planning Communication Log

APPENDIX C

Tropic State Index Graphs and Water Quality Trends

APPENDIX D

URRWMO Standards, Regulations, and Operations

APPENDIX E

Annual Activity Report to the URRWMO

APPENDIX F

URRWMO Guidance Documents Adopted by Reference

FIGURES

GIS DATA SOURCES

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Upper Rum River Boundary	MN Board of Water and Soil Resources (BWSR)
Waterbodies	USGS National Hydrography Dataset (NHD)
Watersheds (HUC 8 and 12)	USGS National Hydrography Dataset (NHD)

FIGURE 2-1
LOCATION MAP

Upper Rum River WMO Boundary

County

Municipality

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

Data Sources
Basemap: ESRI
County: US Census (TIGER)
Municipal Boundaries: US Census (TIGER)
Upper Rum River Boundary: MN Board of Water and

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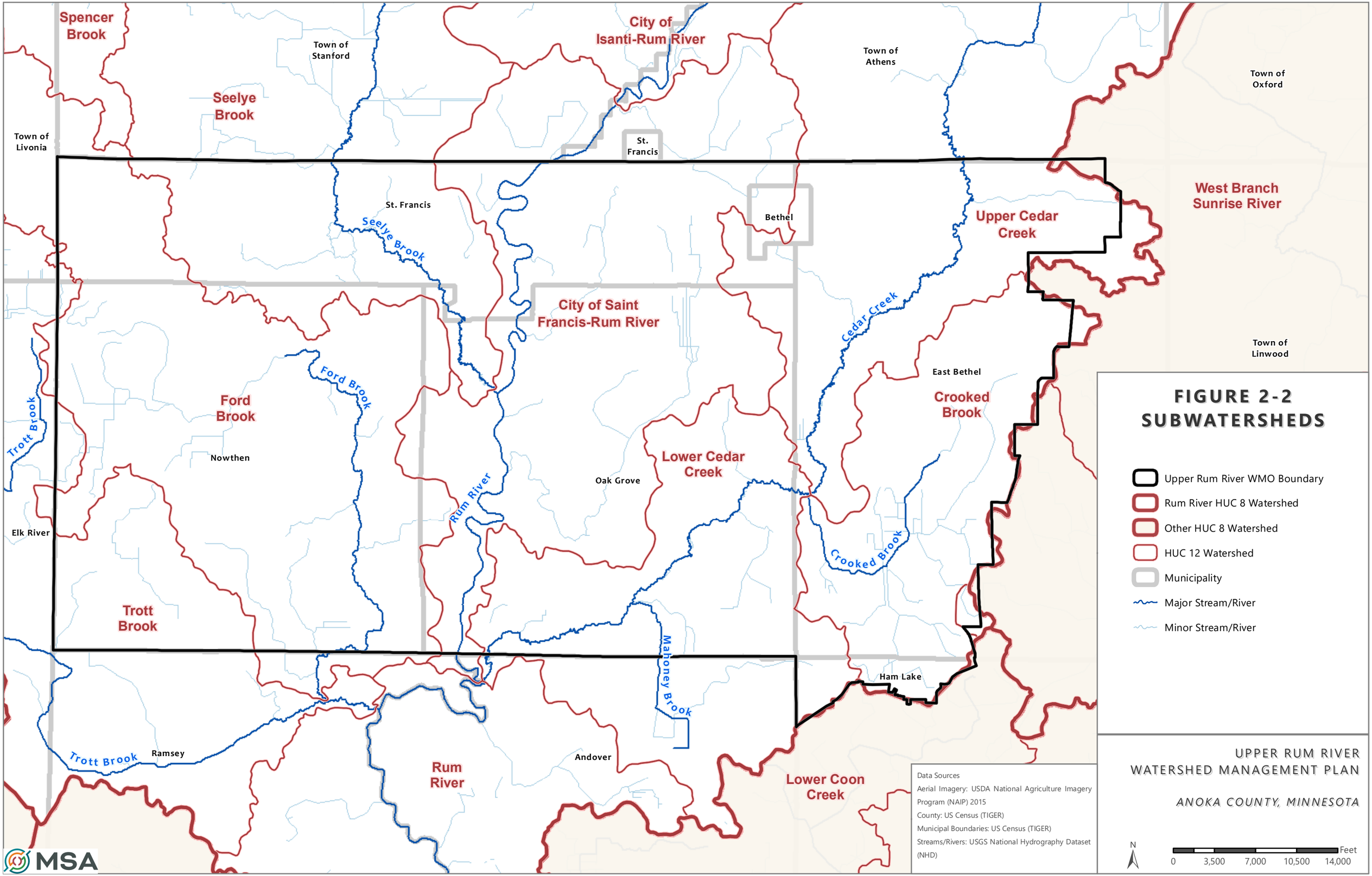
Spencer Brook
Town of Stanford
City of Isanti-Rum River
Town of Athens
Town of Oxford
Seelye Brook
Town of Livonia
St. Francis
St. Francis
Seelye Brook
Bethel
Upper Cedar Creek
West Branch Sunrise River
City of Saint Francis-Rum River
Cedar Creek
Town of Linwood
East Bethel
Crooked Brook
Ford Brook
Ford Brook
Trott Brook
Nowthen
Lower Cedar Creek
Oak Grove
Rum River
Elk River
Crooked Brook
Trott Brook
Mahoney Brook
Ham Lake
Trott Brook
Ramsey
Andover
Rum River
Lower Coon Creek
FIGURE 2-2
SUBWATERSHEDS
Upper Rum River WMO Boundary
Rum River HUC 8 Watershed
Other HUC 8 Watershed
HUC 12 Watershed
Municipality
Major Stream/River
Minor Stream/River
Data Sources
Aerial Imagery: USDA National Agriculture Imagery Program (NAIP) 2015
County: US Census (TIGER)
Municipal Boundaries: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN
ANOKA COUNTY, MINNESOTA
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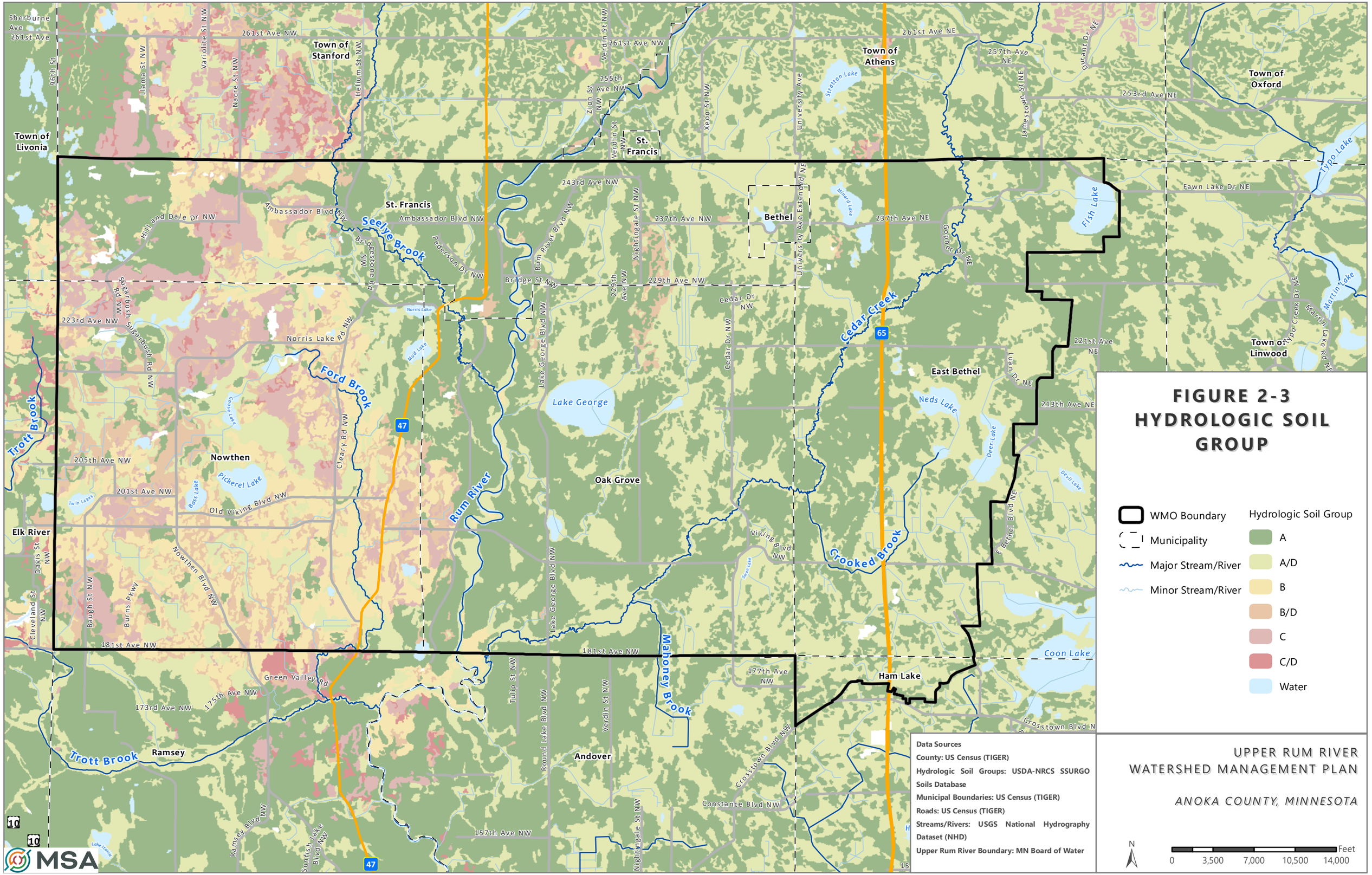

FIGURE 2-3
HYDROLOGIC SOIL GROUP

WMO Boundary
Municipality
Major Stream/River
Minor Stream/River

Hydrologic Soil Group
- A
- A/D
- B
- B/D
- C
- C/D
- Water

Data Sources
County: US Census (TIGER)
Hydrologic Soil Groups: USDA-NRCS SSURGO Soils Database
Municipal Boundaries: US Census (TIGER)
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary: MN Board of Water

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

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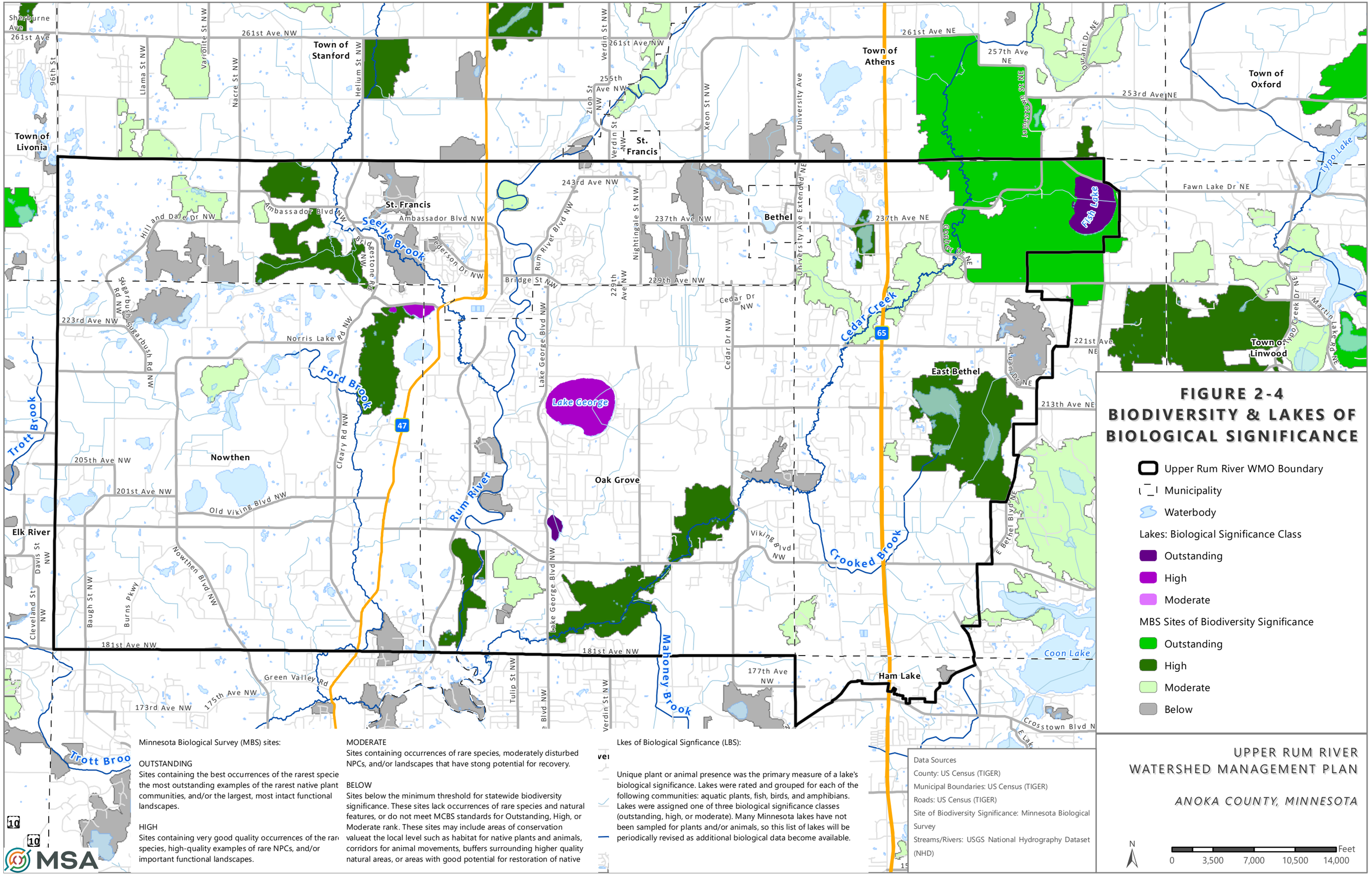

FIGURE 2-4
BIODIVERSITY & LAKES OF BIOLOGICAL SIGNIFICANCE

- Upper Rum River WMO Boundary
- Municipality
- Waterbody

Lakes: Biological Significance Class

- Outstanding
- High
- Moderate

MBS Sites of Biodiversity Significance

- Outstanding
- High
- Moderate
- Below

Minnesota Biological Survey (MBS) sites:

OUTSTANDING
Sites containing the best occurrences of the rarest specie the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes.

HIGH
Sites containing very good quality occurrences of the rar species, high-quality examples of rare NPCs, and/or important functional landscapes.

MODERATE
Sites containing occurrences of rare species, moderately disturbed NPCs, and/or landscapes that have stong potential for recovery.

BELOW
Sites below the minimum threshold for statewide biodiversity significance. These sites lack occurrences of rare species and natural features, or do not meet MCBS standards for Outstanding, High, or Moderate rank. These sites may include areas of conservation valueat the local level such as habitat for native plants and animals, corridors for animal movements, buffers surrounding higher quality natural areas, or areas with good potential for restoration of native

Lkes of Biological Signficance (LBS):

Unique plant or animal presence was the primary measure of a lake's biological significance. Lakes were rated and grouped for each of the following communities: aquatic plants, fish, birds, and amphibians. Lakes were assigned one of three biological significance classes (outstanding, high, or moderate). Many Minnesota lakes have not been sampled for plants and/or animals, so this list of lakes will be periodically revised as additional biological data become available.

Data Sources
County: US Census (TIGER)
Municipal Boundaries: US Census (TIGER)
Roads: US Census (TIGER)
Site of Biodiversity Significance: Minnesota Biological Survey
Streams/Rivers: USGS National Hydrography Dataset (NHD)

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

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FIGURE 2-5
CENTRAL REGION REGIONALLY SIGNIFICANT ECOLOGICAL AREAS

- Upper Rum River WMO Boundary
- Municipality
- Waterbody
- Major Stream/River
- Minor Stream/River
- Regionally Significant Ecological Areas MLCC
- Regional Ecological Corridors MLCCS

Data Sources
Central Region Regionally Significant Ecological Areas: MDNR
County: US Census (TIGER)
Municipal Boundaries: US Census (TIGER)
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)

UPPER RUM RIVER WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

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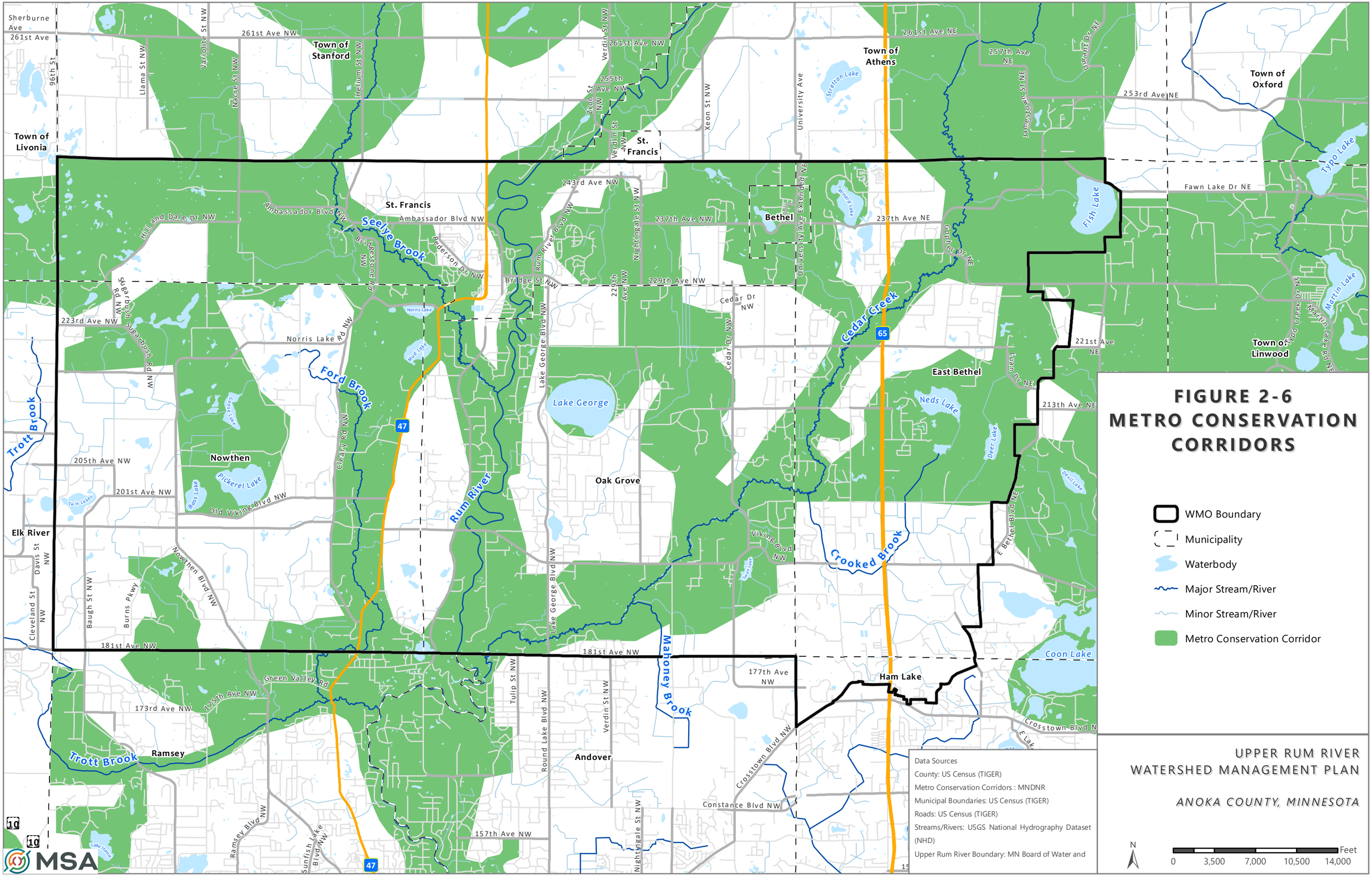

FIGURE 2-6
METRO CONSERVATION CORRIDORS

- WMO Boundary
- Municipality
- Waterbody
- Major Stream/River
- Minor Stream/River
- Metro Conservation Corridor

Data Sources
County: US Census (TIGER)
Metro Conservation Corridors : MNDNR
Municipal Boundaries: US Census (TIGER)
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary: MN Board of Water and

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

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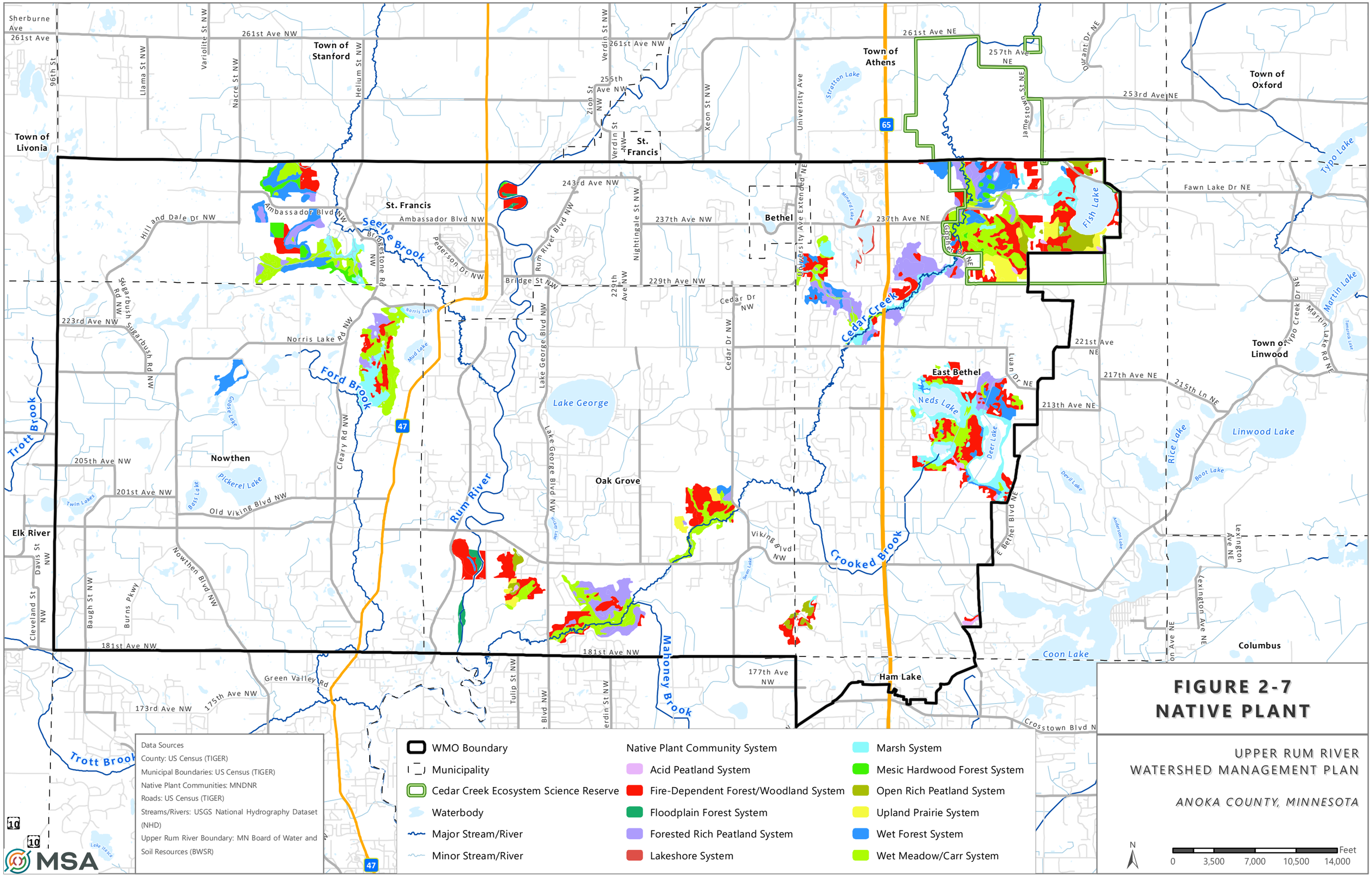

Data Sources
County: US Census (TIGER)
Municipal Boundaries: US Census (TIGER)
Native Plant Communities: MNDNR
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary: MN Board of Water and Soil Resources (BWSR)

- WMO Boundary
- Municipality
- Cedar Creek Ecosystem Science Reserve
- Waterbody
- Major Stream/River
- Minor Stream/River

Native Plant Community System
- Acid Peatland System
- Fire-Dependent Forest/Woodland System
- Floodplain Forest System
- Forested Rich Peatland System
- Lakeshore System
- Marsh System
- Mesic Hardwood Forest System
- Open Rich Peatland System
- Upland Prairie System
- Wet Forest System
- Wet Meadow/Carr System

FIGURE 2-7
NATIVE PLANT

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

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0 3,500 7,000 10,500 14,000 Feet

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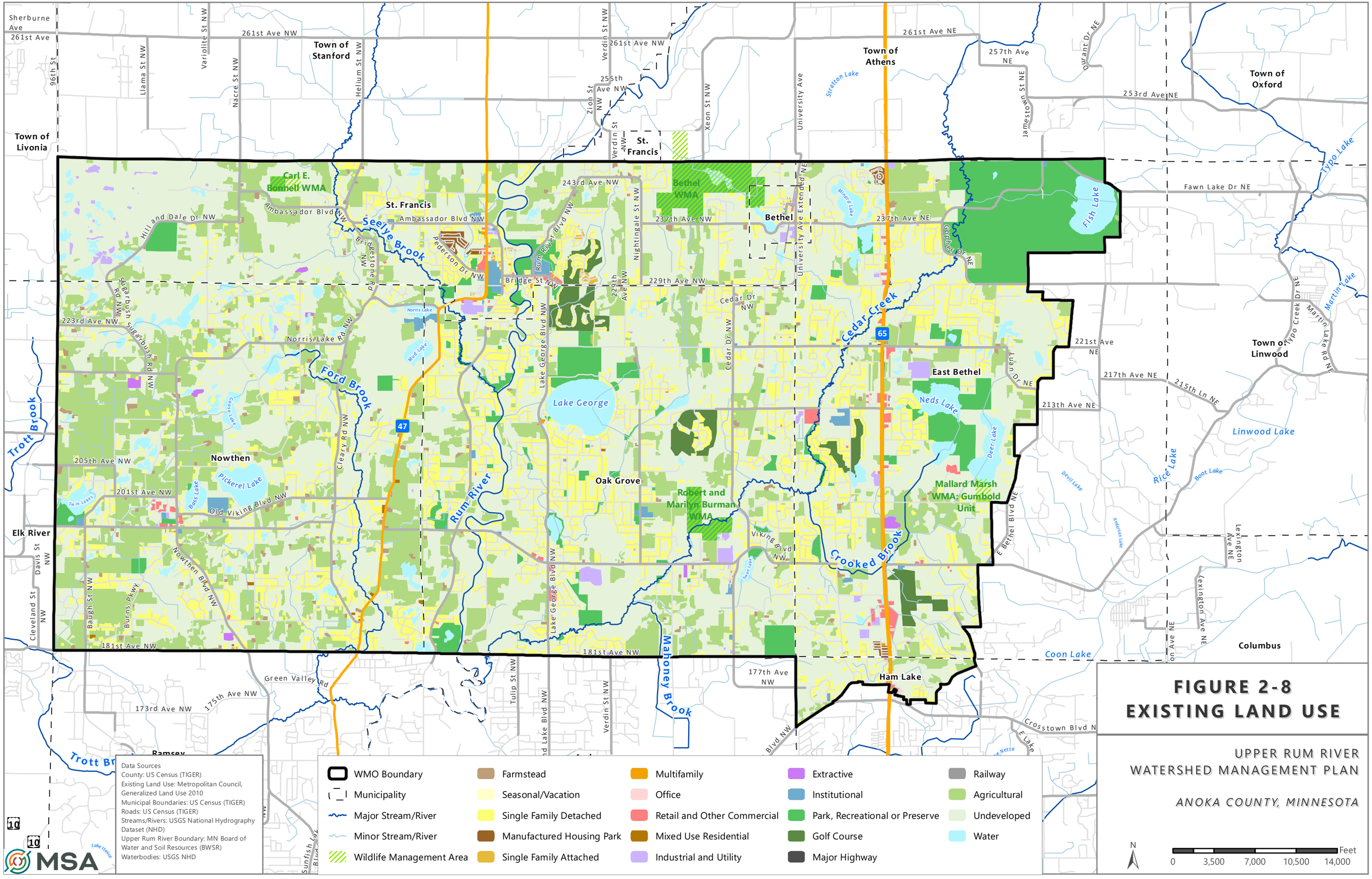

Data Sources
County: US Census (TIGER)
Existing Land Use: Metropolitan Council, Generalized Land Use 2010
Municipal Boundaries: US Census (TIGER)
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary: MN Board of Water and Soil Resources (BWSR)
Waterbodies: USGS NHD

- WMO Boundary
- Municipality
- Major Stream/River
- Minor Stream/River
- Wildlife Management Area
- Farmstead
- Seasonal/Vacation
- Single Family Detached
- Manufactured Housing Park
- Single Family Attached
- Multifamily
- Office
- Retail and Other Commercial
- Mixed Use Residential
- Industrial and Utility
- Extractive
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Railway
- Agricultural
- Undeveloped
- Water

MSA

FIGURE 2-8
EXISTING LAND USE

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

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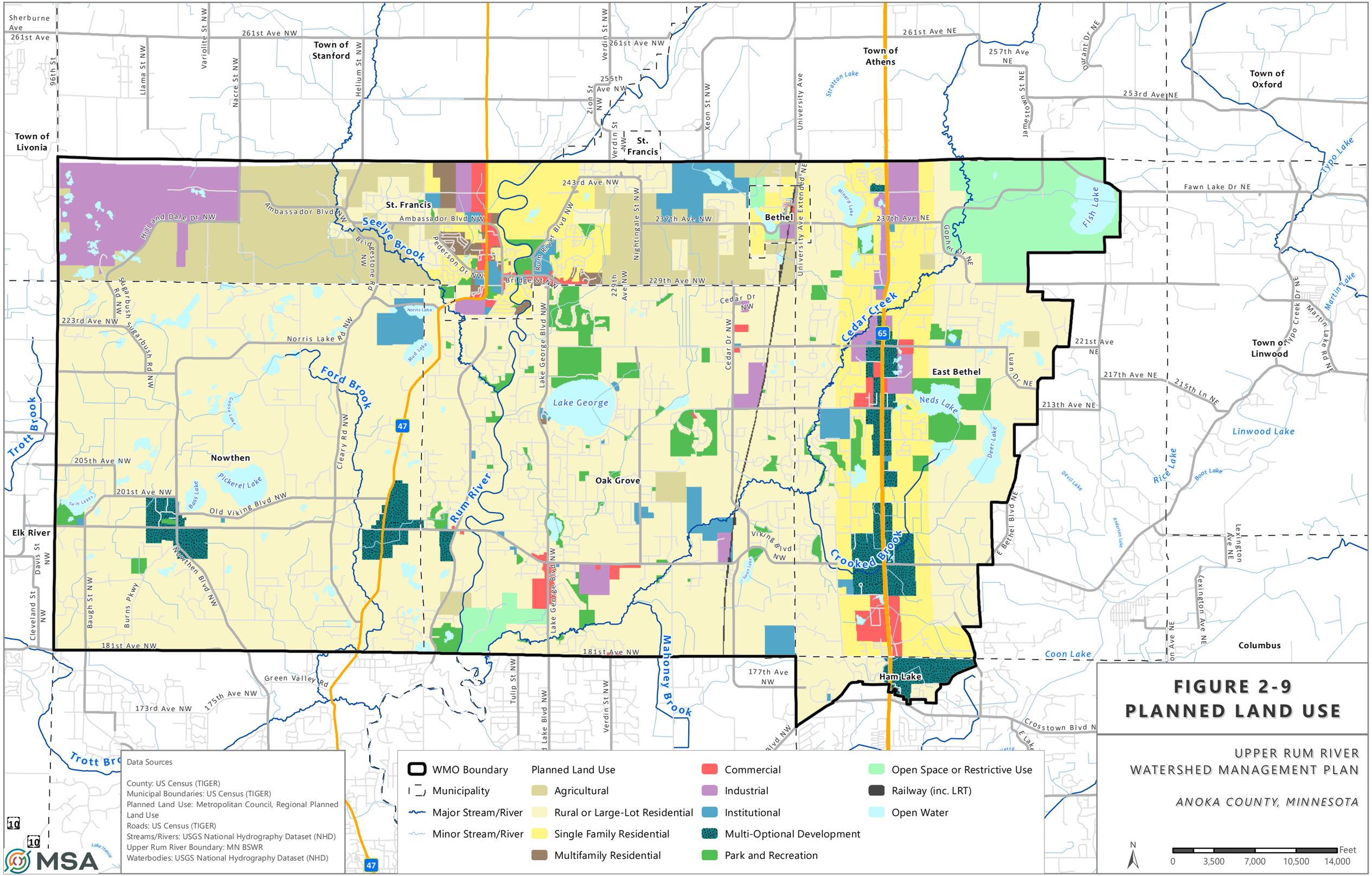
0 3,500 7,000 10,500 14,000 Feet



Data Sources

County: US Census (TIGER)
Municipal Boundaries: US Census (TIGER)
Planned Land Use: Metropolitan Council, Regional Planned Land Use
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary: MN BSWR
Waterbodies: USGS National Hydrography Dataset (NHD)

- WMO Boundary
- Municipality
- Major Stream/River
- Minor Stream/River

Planned Land Use

- Agricultural
- Rural or Large-Lot Residential
- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Railway (inc. LRT)
- Open Water

FIGURE 2-9
PLANNED LAND USE

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

N

0 3,500 7,000 10,500 14,000 Feet

MSA

FIGURE 2-10
SURFACE AND GROUND WATER APPROPRIATIONS

- WMO Boundary
- Municipality
- Waterbody
- Major Stream/River
- Minor Stream/River

Active MPARS Permits

- Agricultural Irrigation
- Industrial Processing
- Non-Crop Irrigation
- Pollution Containment, Special Categories
- Water Level Maintenance
- Water Supply

Data Sources

Active Water Appropriation Permits: MNDNR Permitting and Reporting System (2018)

County: US Census (TIGER)

Municipal Boundaries: US Census (TIGER)

Roads: US Census (TIGER)

Streams/Rivers: USGS National Hydrography Dataset (NHD)

Upper Rum River Boundary: MN Board of Water and

UPPER RUM RIVER WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

N

0 3,500 7,000 10,500 14,000 Feet

MSA

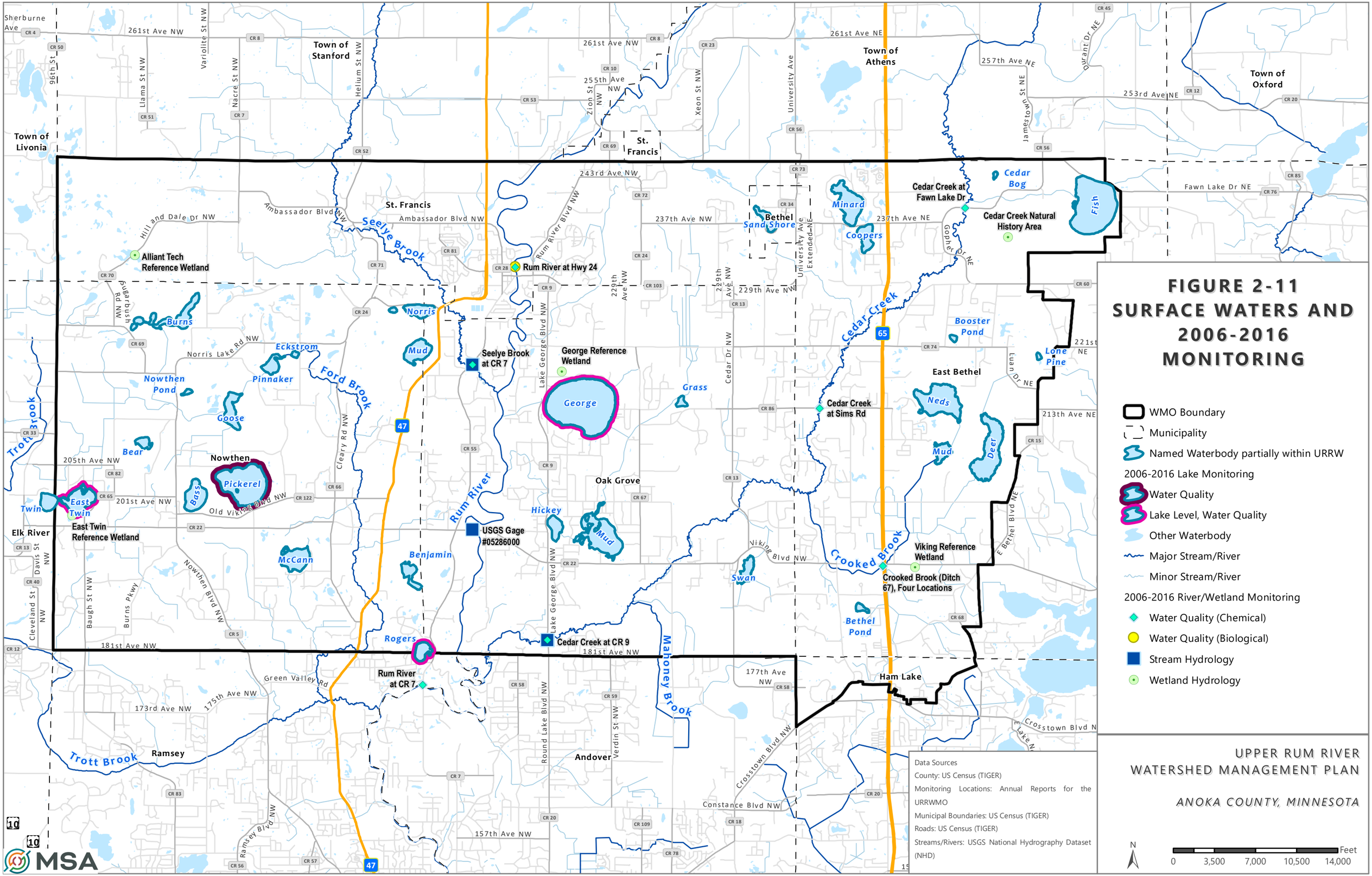


FIGURE 2-11
SURFACE WATERS AND 2006-2016 MONITORING

- WMO Boundary
- Municipality
- Named Waterbody partially within URRW

2006-2016 Lake Monitoring
- Water Quality
- Lake Level, Water Quality
- Other Waterbody
- Major Stream/River
- Minor Stream/River

2006-2016 River/Wetland Monitoring
- Water Quality (Chemical)
- Water Quality (Biological)
- Stream Hydrology
- Wetland Hydrology

Data Sources
County: US Census (TIGER)
Monitoring Locations: Annual Reports for the URRWMO
Municipal Boundaries: US Census (TIGER)
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)

UPPER RUM RIVER WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

N

0 3,500 7,000 10,500 14,000 Feet

MSA

FIGURE 2-12
COUNTY DITCHES

Upper Rum River WMO Boundary
Municipality
Waterbody
Major Stream/River
Minor Stream/River
Ditches

Data Sources
County: US Census (TIGER)
County Ditches: URRWMO
Municipal Boundaries: US Census (TIGER)
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary: MN Board of Water and

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

N
0 3,500 7,000 10,500 14,000 Feet

MSA

FIGURE 2-13
NATIONAL WETLAND INVENTORY

Upper Rum River WMO Boundary
Municipality
Waterbody
Major Stream/River
Minor Stream/River
National Wetland Inventory

Data Sources
County: US Census (TIGER)
Municipal Boundaries: US Census (TIGER)
National Wetland Inventory: MNDNR
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary: MN Board of Water and

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

N
0 3,500 7,000 10,500 14,000 Feet

MSA

FIGURE 2-14
DNR PUBLIC WATERS/ WETLANDS

- Upper Rum River WMO Boundary
- Municipality
- Public Water Watercourse
- Public Ditch/Altered Natural Watercourse
- Public Water Basin
- Public Water Wetland

Data Sources
County: US Census (TIGER)
Municipal Boundaries: US Census (TIGER)
Public Waters and Wetlands: MNDNR
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)
Upper Rum River Boundary: MN Board of Water and

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

N

0 3,500 7,000 10,500 14,000 Feet

MSA

10

FIGURE 2-15
FEMA FLOODPLAIN

WMO Boundary
Municipality
Waterbody
Major Stream/River
Minor Stream/River

Flood Zone Designations
A: 1% Annual Chance of Flooding, no BFE
AE: 1% Annual Chance of Flooding, with BFE
AE: Regulatory Floodway

Data Sources
County: US Census (TIGER)
Flood Zone Designations: FEMA (Anoka Co: 27003C 2015/12/15; Isanti Co: 27059C 2006/04/12; Sherburne Co: 27141C 2011/11/16)
Municipal Boundaries: US Census (TIGER)
Roads: US Census (TIGER)
Streams/Rivers: USGS National Hydrography Dataset (NHD)

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

N
0 3,500 7,000 10,500 14,000 Feet

MSA

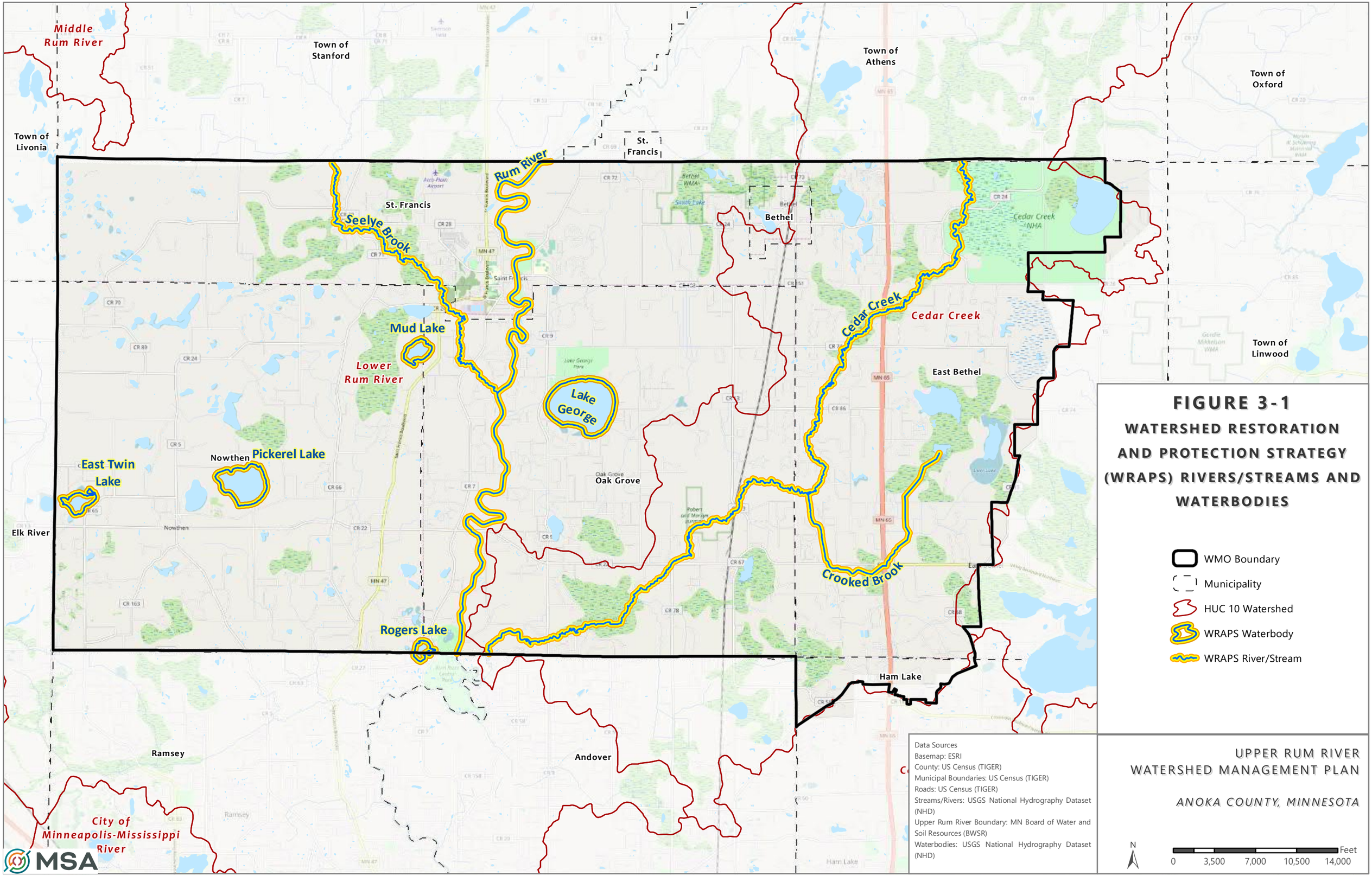


FIGURE 3-1

WATERSHED RESTORATION AND PROTECTION STRATEGY (WRAPS) RIVERS/STREAMS AND WATERBODIES

UPPER RUM RIVER
WATERSHED MANAGEMENT PLAN

ANOKA COUNTY, MINNESOTA

MSA

APPENDIX A

URRWMO Joint Powers Agreement

AMENDED
JANUARY 2011

UPPER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION
JOINT POWERS AGREEMENT

THIS AGREEMENT, made and entered into as of the date of execution by and between the Local Government Units of: City of Bethel, City of East Bethel, City of Ham Lake, City of Nowthen, City of Oak Grove, and City of St. Francis for the establishment of a watershed management organization. The purpose of this Joint Powers Agreement is to establish a Water Management Organization to assist the member local units of government with surface water, ground water, water quality and water usage issues.

WHEREAS, the parties to this Agreement have authority pursuant to Minnesota Statutes, Chapter 471.59 to jointly or cooperatively by agreement exercise any power common to the contracting parties and pursuant to Minnesota Statutes, Sections 103B.201 to 103B.255 have authority to jointly or cooperatively manage or plan for the management of surface water;

WHEREAS the parties to this Agreement desire to prepare a surface water management plan for the purpose of management and implementation of the programs required by Minnesota Statutes, Sections 103B.201 to 103B.255.

NOW, THEREFORE, the parties to this Agreement do mutually agree as follows:

SECTION I
General Purpose

1.1 It is the general purpose of the parties to this Agreement to establish an organization to jointly and cooperatively develop a Watershed Management Plan and an Implementation Program and a Capital Improvement Program for the purposes of (a) protecting, preserving, and using natural surface and groundwater storage and retention systems in the Upper Rum River Watershed; (b) minimizing public capital expenditures needed to correct flooding and water quality problems; (c) identifying and planning for means to effectively protect and improve surface and groundwater quality; (d) establishing more uniform local policies and official controls for surface and ground water management; (e) preventing erosion of soil into surface water systems; (f) promoting groundwater recharge; (g) protecting and enhancing fish and wildlife habitat and water recreational facilities; and (h) securing the other benefits associated with the proper management of surface and groundwater. The plan and programs shall operate within the boundaries of the Upper Rum River Watershed as set forth in Addendum 1 attached hereto (hereinafter "Area").

SECTION II
Upper Rum River Watershed Management Organization

2.1 Establishment: There is hereby established the "Upper Rum River Watershed Management Organization" whose membership shall be appointed in accordance with the

provisions of this section and whose duties shall be to carry out the purposes contained herein. The Upper Rum River Watershed Management Organization (hereinafter "Organization") shall be constituted as described in Section 2.2.

2.2 Membership Appointment: Each party to this Agreement shall appoint two (2) representatives to serve as members of the Organization board. Each representative of a party to this agreement who is current in the payment of their share of operating expenses shall have one (1) vote. Representatives appointed to the Organization board shall be evidenced by a resolution or certified copy of official meeting minutes of the governing body of each party and filed with the Organization.

2.3 Alternate Members: One (1) alternate member of the Organization board may be appointed by appropriate resolution or certified copy of official meeting minutes of the governing body of each party to this Agreement, filed with the Organization. The alternate member may attend any meeting of the Organization board when a regular member representing that party is absent and vote on behalf of the party the member represents. If an Organization board member is also an officer of the Organization, the alternate member shall not be entitled to serve as such officer.

2.4 Term: The members of the Organization board shall be filled by the governing body of the party whose membership position on the board is vacant. Removal of a board member or alternate board member shall be at the sole discretion of the appointing authority. The term of appointment is at the sole discretion of the appointing authority.

2.5 Vacancies: The Organization shall notify the Board of Water and Soil Resources of member appointments and vacancies in member positions within thirty (30) days. A vacancy on the Organization board shall be filled by ninety (90) days after the vacancy occurs by the governing body of the party whose membership position on the board is vacant.

Vacancies resulting from expiration of members' terms and other reasons shall be filled only after published notice of the vacancy once a week for two (2) successive weeks in a newspaper of general circulation in the watershed management organization area; the notices must state that the party is considering applications for appointment of a member to the Organization board and that persons interested in being appointed to serve on the board may submit their names to the appointing authority for consideration. A vacancy shall not be filled until at least fifteen (15) days have elapsed after the last published notice.

2.6 Additional Parties – Membership: The Organization, with the ratification of the governing bodies of all voting members of the Organization, may invite other local government units within the Upper Rum River Watershed to also become parties to this Agreement. The governing body of any such additional party shall appoint a member to the Organization who shall have voting rights in accordance with the provisions of Section 2.2 and in all respects thenceforth enjoy the full rights, duties, and obligations of this Agreement.

2.7 Compensation and Expenses: The Organization members shall not be entitled to compensation or reimbursement for expenses incurred in attending meetings, except to the

extent that the governing body of a party may determine to compensate or reimburse the expenses of the member(s) it appoints, in which case the obligation to make such payments shall be that of the party and not that of the Organization.

2.8 Officers: The Organization board shall elect from its membership a chair, a vice-chair, a secretary. All such officers shall hold office for a term of one (1) year and until their successors have been qualified and duly elected by the board. An officer may serve only while a member of the Organization. A vacancy in an office shall be filled from the membership of the board by election for the remainder of the unexpired term of such office.

2.9 Duties of Officers: The duties of the officers of the Organization shall be as outlined in Robert's Rules of Order Newly Revised 10th Edition.

2.10 Quorum: Voting members of the Organization board representing a majority of the parties to this Agreement shall constitute a quorum. Less than a quorum may adjourn a scheduled meeting.

2.11 Meetings:

A. Annual Meeting. The annual meeting of the Organization board will be held in May of each year at Oak Grove City Hall. At the annual meeting the board, at a minimum, shall:

    1. Elect officers;
    2. Establish the annual budget and work plan;
    3. Hear recommendations on amendments to this agreement and the watershed management plan;
    4. Biennially renew or decide on contracts for professional, legal, and administrative services; and
    5. Decide on regular meeting dates.

B. Meeting Notices. Notice of all regular and special meetings shall be provided with a minimum of seventy-two (72) hours advance notice of the meeting to all parties of this agreement. Such meeting notice shall be posted on the official notification board for each party to this Agreement.

C. Special meetings may be held at the call of the chair or by any three (3) members of the board giving not less than seventy-two (72) hours written notice of the time, place and purpose of such meeting delivered, mailed or e-mailed to the residence of each Organization member and delivered, mailed or e-mailed to the City Hall of each party to this Agreement.

D. All meetings of the board are subject to Minnesota Statutes and the notice provisions contained therein. Posted notice, when required, shall be given separately by each party to this Agreement.

2.12 Conduct of Meetings: The Organization board shall adopt rules of order and procedure

for the conduct of its meetings in accordance with Robert's Rules of Order Newly Revised 10th Edition; the board may adopt any such rules as a majority the parties to this Agreement shall agree. Decisions by the board may not require more than a majority vote, except a decision on a capital improvement project may require no more than a two-thirds vote. All meetings of the board are subject to Minn. Stat. 13D (Minnesota Open Meeting Law).

2.13 Organization Office: The office of the Organization shall be the Oak Grove City Hall, 19900 Nightingale Street NW, Cedar, Minnesota 55011. All notices to the Organization shall be delivered or served at said office.

SECTION III
Organization Powers and Duties

3.1 Authority: Upon execution of the Agreement by the parties, the Organization shall have authority provided for in Minnesota Statures, Chapter 103B.211 through 103B.255 that provides for, in part:

A. The authority to prepare, adopt, and implement a plan for the Upper Rum River Watershed meeting the requirements of Minnesota Statutes, Section 103B.231.

B. The authority to review and approve local water management plans as provided in Minnesota Statutes, Section 103B.235C. This is subject to amendment by the legislature.

3.2 Watershed Management Plan: The Organization shall prepare a Watershed Management Plan for the Upper Rum River Watershed. The plan shall be in compliance with Minnesota Statutes, Chapter 103B.231, Subd. 4 and 6 as from time to time amended. The Chapter describes plan contents to include but not limited to the following.

A. Describe the existing physical environment, land use and development in the Upper Rum River Watershed, and shall further describe the environment, land use and development proposed in existing local and metropolitan comprehensive plans;

B. Present information on the hydrologic system in the Upper Rum River Watershed and its components, including any drainage systems previously constructed under Minnesota Statutes, Chapter 103E, and existing and potential problems relating thereof;

C. State objectives and policies, including management principles, alternatives and modifications, water quality, and protection of natural characteristics;

D. Set forth a management plan, including the hydrologic and water quality conditions that will be sought and significant opportunities for improvement;

E. Describe the effect of the Watershed Management Plan on existing drainage systems;

F. Describe conflicts between the Watershed Management Plan and existing plans of local government units;

G. Set forth an Implementation Program consistent with the Watershed Management Plan, which includes a Capital Improvement Program and standards and schedules for amending the comprehensive plans and official controls of local government units in the watershed to bring about conformance with the Watershed Management Plan; and

H. Set out a procedure for amending the Watershed Management Plan.

The plan shall be amended as required from time to time.

3.3 Employment: The Organization may contract for services from parties to this Agreement, or may employ such other persons as it deems necessary. Where staff services of a party are utilized, such services shall not reduce the financial commitment of such party to the operating fund of the Organization unless the Organization so authorizes.

3.4 Committees: The Organization may appoint such committees and sub-committees as it deems necessary. The Organization shall establish citizen and technical advisory committees unless other means of public participation are established. See Addendum 2 attached.

3.5 Rules and Regulations: The Organization may prescribe and promulgate such rules and regulations as it deems necessary or expedient to carry out its powers and duties and the purpose of the Agreement.

3.6 Review and Recommendations: Review and Recommendations: Where the Organization is authorized or requested to review and make recommendations on any matter relating to the Watershed Management Plan, the Organization shall act on such matter within sixty (60) days of receipt of the matter referred. Failure of the Organization to act within sixty (60) days shall constitute approval of the matter referred, unless the Organization requests and receives from the referring unit of government an extension of time to act on the matter referred. Such extension shall be in writing and acknowledged by both parties.

The Board shall adopt an appeal procedure for any party aggrieved by a decision of the Board or an alleged failure to implement the Plan pursuant to Minnesota Statutes, Chapter 103B.231, Subd. 13.

3.7 Ratification: The Organization may, and where required by this Agreement shall, refer matters to the governing bodies of the parties for review, comment or action.

3.8 Financial Matters:

Subdivision 1 - Method of Operation: The Organization may collect and receive money and contract for services subject to the provision of the Agreement from the parties and from any other sources approved by the Organization. The Organization may incur expenses and make disbursements necessary and incidental to the effectuation of the

purposes of this Agreement. Funds may be expended by the Organization in accordance with procedures established herein. Upon Board approval, invoices shall be initialed by the chair or vice-chair for payment by the Organization office. Other legal instruments shall be executed on behalf of the Organization by the chair, vice-chair or an appointed Board member.

Subdivision 2 - Operating Funds : On or before June 1 of each year, Organization shall prepare a work plan and an operating budget for the following year. The annual budget shall budget provide details to support the proposed revenues and expenditures for the Organization. This detail shall be sufficient to meet standard budget and/or accounting principles generally recognized for governmental organizations. Expenditures may include administrative expenses, plan development costs, review expenses, capital improvement costs, Management Programs, Management Studies costs in Section 3.12, and insurance costs as authorized in Section 3.14. Upon the approval of the majority of voting members of the Organization, the budget shall be recommended to the parties for ratification along with a statement showing each party's proposed share of the budget. The budget shall be implemented only after ratification by each party to this Agreement. Failure to ratify or pay its share of the budget by any party to this Agreement shall be subject to the procedures in Section 3.6. Each party shall contribute funds toward the budget according to the following methods:

Work Plan – ((PA / WA) + (PV / WV)) / 2 = the party's percentage share of the organization's operating budget.

PA = Party's area within the watershed organization area
WA = watershed organization area
PV = party's market valuation within the watershed organization area
WV = market valuation of the watershed organization area

Operating Costs – Total amount to be divided equally between each community member of the Joint Powers Agreement. Operating costs per the operating budget are defined as copies, postage, recording secretary fees, insurance, and administrative fee charged to each member community.

After ratification the chair or vice-chair shall certify the recommended budget to each party on or before June 1 of each year together with a statement showing the amounts due from each party. Each party shall pay over to the Organization the amount owing in two equal installments, the first on or before January 1 and second on or before July 1 in accordance with the tax year for which the amount due is being paid.

Subdivision 3 - Review Services: When the Organization is authorized or requested to undertake a review and submit recommendations to a party as provided in this Agreement, the Organization shall conduct such review, without charge, except as provided below. Where the project size and complexity of review are deemed by the Organization to be extraordinary and substantial, the Organization may charge a fee for such review services, the amount to be based upon direct and indirect costs attributable to that portion of review services determined by the Organization to be extraordinary and substantial. Where the

Organization determines that a fee will be charged for extraordinary and substantial review services, or where the flowage enters the Upper Rum River, but the party is not a member of the Upper Rum River Watershed Management Organization, the party to be charged shall receive written notice from the Organization of the services to be performed and the fee therefore, prior to undertaking such review services. Unless the party to be charged objects within fifteen (15) days of receipt of such written notice to the amount of the fee to be charged, such review services shall be performed and the party shall be responsible for the cost thereof. If the party to be charged objects to the proposed fee for such services within fifteen (15) days, and the party and the Organization are unable to agree on a reasonable alternative amount for review services, such extraordinary and substantial review services shall not be undertaken by the Organization.

3.9 Annual Audits: The Organization shall annually prepare a comprehensive financial report on operations and activities for the fiscal year defined as January 1 through December 31. An annual audit shall be provided that includes a full and complete audit of all books and accounts the Organization office is charged with maintaining. Such audits shall be conducted in accordance with generally accepted auditing principles and guidelines. A copy of the annual financial report and auditor's statement shall be provided to all parties and to the Board of Water and Soil Resources. The report to the Board of Water and Soil Resources shall include an annual activity report. All of its books, reports, and records shall be available for and open to examination by any party at all reasonable times.

3.10 Gifts, Grants, Loans: The Organization may, within the scope of this Agreement, accept gifts; may apply for and use grants of money or other property from the United States, the State of Minnesota, a local government unit or other governmental unit or organization or any person or entity for the purpose described herein. The Organization may enter into any reasonable agreement required in connection therewith. The Organization shall comply with any laws or regulations applicable to grants, donations and agreements. The Organization may hold, use, and dispose of such money or property in accordance with the terms of the gift, grant, or agreement relating thereto.

3.11 Contracts: The Organization may make such contracts and enter into any such agreements as it deems necessary to make effective any power granted to it by this Agreement. Every contract for the purchase or sale of merchandise, materials, or equipment by the Organization shall be let in accordance with the Uniform Municipal Contracting Law, Minnesota Statutes, Section 471.345 and the Joint Exercise of Powers Statute, Minnesota Statues, Section 471.59. No member or employee of the Organization or officer or employee of any of the parties shall have direct or indirect interest in any contract made by the Organization.

3.12 Works of Improvement: Works of improvement for protection and management of the natural resources of the Area, including, but not limited to, improvements to property, land acquisition, easements, or right-of-way, may be initiated by:

A. Recommendation of the Organization to a party or parties; or

B. Petition to the Organization by the governing body of a party or parties.

Where works of improvement are recommended by the Organization, the Organization shall first determine whether such improvement will result in a local or regional benefit to the Area. Where the Organization determines that the benefits from the improvement will be local or not realized beyond the boundaries of the party in which the improvement is to be established, the Organization shall recommend such improvement to the governing body of the unit of government which the Organization determines will be benefited thereby, with the total estimated cost of the improvement and a description of the benefits to be realized.

The Organization shall recommend such improvement to each governing body of the units of government which the Organization determines will be benefited thereby. The recommendation of the Organization shall include the total estimated cost of the improvement, a description of the extent of the benefits to be realized by each unit of government and the portion of the cost to be borne by each party benefited in accordance with the extent of the benefit of each unit of government as described by the Organization.

Each party to whom the Organization submits such recommendation shall respond within sixty (60) days from receipt of such recommendation. Where the Organization determines that the benefits of such improvement will be local, the unit of government to whom such recommendation is made may decline to ratify and undertake said improvement. Where the Organization determines that the benefits of such improvement will be regional, unless all parties to whom such recommendation is directed decline to ratify and undertake said improvement, the Organization shall continue to review and recommend alternative methods of cooperation and implementation among those parties ratifying the recommendation of the Organization, unless and until the Organization determines that said improvement is no longer feasible.

When works of improvement are initiated by the governing body of a party or parties to this Agreement, said governing body or bodies shall submit a petition to the Organization setting forth a description of the proposed work of improvement, the benefits to be realized by said improvement, its total estimated cost and a proposed cooperative method for implementation of the improvement, if applicable. The Organization shall review and make recommendations on the proposed improvement and its compliance with the Organization's management plan in accordance with the provisions of Section 3.5 of this Agreement.

When a proposed improvement may be eligible for federal or state funds as a cost-share project, the Organization may undertake a proposed work of improvement for the area, subject to Organization recommendation to and ratification by the parties to this Agreement, as required for an improvement of regional benefit.

The Organization is further authorized to undertake experimental improvement projects within the Area to serve as a basis for evaluation of other improvements by the parties. When the Organization determines to undertake an experimental improvement project, the costs of such project shall be the obligation of the Organization and not of the parties to this Agreement.

3.13 Claims: The Organization or its agents may enter upon lands within or without the Upper Rum River Watershed to make surveys and investigations to accomplish the purpose of the Organization. The Organization shall be liable for actual damages resulting there from, but every person who claims damages shall serve the Chairperson or Secretary of the Organization with a notice of claim as required by Minnesota Statutes, Section 466.05. The Organization shall obtain court orders authorizing and directing such entries when necessary due to refusals of landowners to allow the same.

3.14 Indemnification and Insurance: Any and all claims that arise or may arise against the Organization, its agents or employees as a consequence of any act or omission on the part of the Organization or its agents or employees while engaged in the performance of this Agreement shall in no way be the obligation or responsibility of the parties. The Organization shall indemnify, hold harmless and defend the parties, their officers and employees against any and all liability, loss, costs, damages, expenses, claims, or actions, including attorney's fees which the parties, their officers, or employees may hereafter sustain, incur, or be required to pay, arising out of or by reason of any act or omission of the Organization, its agents or employees in the execution, performance, or failure to adequately perform the Organization's obligations and understandings pursuant to the Agreement.

The Organization agrees that in order to protect itself as well as the parties under the indemnity provision set forth above, it will at all times during the term of this Agreement keep in force the following protection in the limits specified:

A. Commercial General Liability / Professional Liability ($500,000 per individual; $1,500,000 per incident) including the following endorsements:

B. Automobile Coverage ($0)

C. Worker's Compensation Coverage (statutory minimum)

The minimum liability limits shall be increased to the statutory limits provided for member local units of government in Minnesota Statutes.

Any policy obtained and maintained under this clause shall provide that it shall not be cancelled, materially changed or not renewed without thirty (30) days prior notice thereof to each of the parties.

Prior to the effective date of this Agreement, and as a condition precedent to this Agreement, the Organization will furnish the parties with certificates of insurance listing each party to the Agreement as an additional insured.

3.15 General: The Organization may take all such other actions as are reasonably necessary and convenient to carry out the purpose of this Agreement.

SECTION IV
Mediation

4.1 The parties agree that any controversy that cannot be resolved shall be submitted for mediation. Mediation shall be conducted by a mutually agreeable process by all parties.

SECTION V
Termination of Agreement

5.1 This Agreement may be terminated by approval of two-thirds vote of the governing bodies of each party hereto, provided that all such approvals occur within a ninety (90) day period. Withdrawal of any party may be accomplished by filing written notice with the Organization and the other parties 60 days prior to the effective date of termination. No party may withdraw from this Agreement until the withdrawing party has met its full financial obligations through the effective date of such withdrawal.

SECTION VI
Dissolution of Organization

6.1 The Organization shall be dissolved under any of the following conditions:

A. Upon termination of this Agreement;

B. Upon unanimous agreement of all parties; or

C. Upon the membership of the Organization being reduced to fewer than three (3) parties.

At least 90 days notice of the intent to dissolve shall be given to affected counties and the Board of Water and Soil Resources. Upon dissolution, all personal property of the Organization shall be sold, and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the parties. Such distribution of Organization assets shall be made in proportion to the total contributions to the Organization for such costs made by each party. All payments due and owing for operating costs under Section 3.8,B or other unfilled financial obligations, shall continue to be the lawful obligation of the parties.

SECTION VII
Amendment

7.1 The Organization may recommend changes and amendments to this Agreement to the governing bodies of the parties. Amendments shall be adopted by a two-thirds majority vote of the governing bodies of the parties as evidenced by meeting minutes of the governing body, within ninety (90) days of referral. Amendments shall be evidenced by appropriate resolutions or certified copies of meeting minutes of the governing bodies of each party filed with the Organization and shall, if no effective date is contained in the amendment, become effective as of the date all such filings have been completed.

SECTION VIII
Counterparts

8.1 This Agreement may be executed in several counterparts and all so executed shall constitute one Agreement, binding on all of the parties hereto. Each party to the agreement shall receive a fully executed copy of the entire document following adoption by all parties.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the _____ day of _____, 2010.

CITY OF BETHEL

By:_____
Mayor

By:_____
City Administrator / City Clerk

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the _____ day of _____, 2010.

CITY OF EAST BETHEL

By:_____
Mayor

By:_____
City Administrator / City Clerk

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the _____ day of _____, 2010.

CITY OF HAM LAKE

By:_____
Mayor

By:_____
City Administrator / City Clerk

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the _____ day of _____, 2010.

CITY OF NOWTHEN

By:_____
Mayor

By:_____
City Administrator / City Clerk

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the _____ day of _____, 2010.

CITY OF OAK GROVE

By:_____
Mayor

By:_____
City Administrator / City Clerk

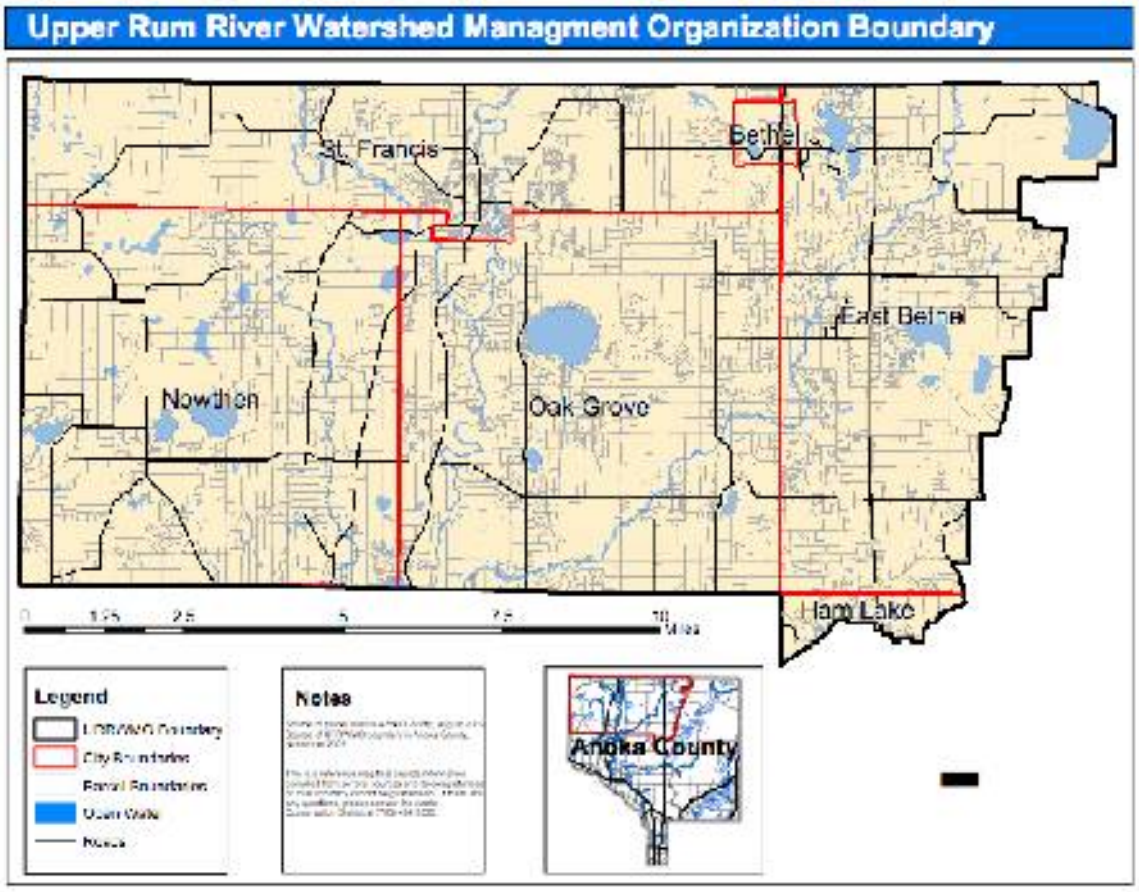
IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the _____ day of _____, 2010.

CITY OF ST. FRANCIS

By:_____
Mayor

By:_____
City Administrator / City Clerk

Addendum 1


Upper Rum River Watershed Managment Organization Boundary
St. Francis
Bethel
East Bethel
Nowthen
Oak Grove
Ham Lake
Legend
Notes
Anoka County

Addendum 2

The Organization shall establish citizen and technical advisory committees and other means of public participation.

Regular, recurring public participation opportunities shall include:

- Open mike at each Organization meeting,
- Contact information posted on the Organization website, such that the public may contact an Organization representative outside of public meetings.

Citizen and/or technical advisory committees will be formed from time-to-time as deemed appropriate by the Organization and shall be issue-specific. Committees may be formed that include both citizens and technical experts. Committees shall operate by seeking consensus, while noting any dissenting opinions. Committee findings shall be reduced to writing and submitted to the Organization Board. In all cases, committees shall be advisory and their findings shall be referred to the Organization Board for final decision-making.

Issues that may warrant formation of advisory committees include:

- Amendments or updates to the Organization's watershed Management Plan
- Lake level or water quality issues,
- A total maximum daily load (TMDL) impaired waters study or implementation of the study,
- Capital improvement projects,
- Major hydrological changes in the watershed,
- Others as deemed appropriate by the Organization Board.

Technical advisory committees shall include technical experts, and invited members may include:

- Staff and/or elected officials from affected communities,
- MN Department of Natural Resources,
- MN Pollution Control Agency,
- MN Board of Water and Soil Resources,
- Metropolitan Council,
- Anoka Conservation District,
- Others, as deemed appropriate by the Organization Board.

Citizen advisory committees shall include residents and elected officials from the affected area, and invited members may include:

- Homeowners,
- Business owners
- Lake association or lake improvement district representatives,
- Others, as deemed appropriate by the Organization Board.

All advisory committees shall include at least one URRWMO Board member.

APPENDIX B

URRWMO Planning Communication Log

URRWMO Planning Communication Log				
Date	Medium	From	To	Topic
Mar-19				
3/6/2019	email	MSA	Jamie Schurbon, ACD	Guidance Documents
3/5/2019	email	Jamie Schurbon, ACD	MSA	Public Hearing thoughts
3/1/2019	email	MSA	URRWMO Stakeholders	Public Hearing Notice and Board responses to 60-day plan comments
Feb-19				
2/27/2019	email	Jamie Schurbon, ACD	URRWMO	March 5 meeting reference removal from website
2/22/2019	email	Jamie Schurbon, ACD	MSA	URRWMO Measureable Goals
2/20/2019	phone	Dan Fabian, BWSR	MSA	URRWMO 60-day plan comments and updated reporting forms
2/20/2019	email	Dan Fabian, BWSR	John West, URRWMO Chair	Board meeting
2/19/2019	email	Jamie Schurbon, ACD	MSA	URRWMO Plan edits
2/11/2019	email	Jeanne Daniels, DNR	MSA	URRWMO 60-day plan comments
2/11/2019	email	Dan Fabian, BWSR	MSA	URRWMO 60-day plan comments
2/11/2019	email	Emily Resseger, MCES	MSA	URRWMO 60-day plan comments
2/11/2019	email	Jamie Schurbon, ACD	MSA	URRWMO 60-day plan comments
2/4/2019	email	Jamie Schurbon, ACD	MSA	URRWMO 60-day plan comments
2/4/2019	email	Karen Blaska, Anoka County	MSA	URRWMO 60-day plan comments
Jan-19				
1/28/2019	email	Bart Biernat, Anoka County	MSA	Water Task Force 4/24/2019 meeting
1/28/2019	email	Beth Neuendorf, MNDOT	MSA	URRWMO 60-day plan comments
1/24/2019	email	Ginger Berg, Bethel	MSA	URRWMO meeting attendance
1/24/2019	email	Bart Biernat, Anoka County	MSA	URRWMO 2019 Coordinator Services
1/18/2019	email	MSA	Bethel	Bethel attendance at URRWMO meetings
1/18/2019	email	MSA	Ham Lake	Member costs in Draft plan
1/18/2019	email	MSA	Member Communities	URRWMO 2019 Coordinator Services
1/18/2019	email	Jamie Schurbon, ACD	MSA	URRWMO 2019 Coordinator Services
Dec-18				
12/27/2018	email	Bart Biernat, Anoka County	MSA	URRWMO 60-day plan comments
12/21/2018	email	Dan Fabian, BWSR	MSA	Website Feedback
12/21/2018	email	Dan Fabian, BWSR	URRWMO Stakeholders	URRWMO 60-day plan deadline
12/18/2018	email	Bonnie Finnerty, MPCA	MSA	URRWMO 60-day plan comments
12/14/2018	email	MSA	URRWMO Stakeholders	URRWMO 60-day plan submittal
12/14/2018	email	MSA	Jamie Schurbon, ACD	URRWMO 2019 Coordinator Services
12/14/2018	email	MSA	URRWMO Stakeholders	URRWMO 60-day plan submittal
Nov-18				
11/20/2018	email	Jamie Schurbon, ACD	MSA	URRWMO 2019 Coordinator Services
11/20/2018	email	Jamie Schurbon, ACD	MSA	TAC Follow-up
11/20/2018	meeting	MSA	TAC	TAC meeting
11/20/2018	email	Jamie Schurbon, ACD	MSA	East Twin Lake monitoring
11/15/2018	meeting	MSA	MSA, ACD, URRWMO members	Monitoring Site Selection
11/13/2018	email	Jamie Schurbon, ACD	MSA	Monitoring Site Selection
11/13/2018	email	Bart Biernat, Anoka County	MSA	Culvert Inventory
11/2/2018	email	MSA	URRWMO Stakeholders	TAC meeting invitation
11/1/2018	email	MSA	BWSR and ACD	TAC meeting coordination
Oct-18				
10/31/2018	email	MSA	BWSR and ACD	TAC meeting coordination
10/31/2018	email	Jamie Schurbon, ACD	MSA	URRWMO monitoring site selection
10/31/2018	email	Dan Fabian, BWSR	MSA	URRWMO monitoring site selection
10/29/2018	email	Jamie Schurbon, ACD	MSA	Plan Comments
10/25/2018	email	St. Francis	URRWMO	St. Francis WQ improvements
10/24/2018	email	Jamie Schurbon, ACD	MSA	October 30 Meeting
10/24/2018	email	Dan Fabian, BWSR	MSA	October 30 Meeting
10/21/2018	email	MSA	Bart Biernat, Anoka County	Know the Flow
10/21/2018	email	MSA	Jamie Schurbon, ACD	Website
10/11/2018	email	MSA	Jamie Schurbon, ACD	Lake George Plan Status
Sep-18				
9/28/2018	email	Lan Tornes	Paul Teicher, St. Francis	St. Francis WQ improvements
9/19/2018	email	MSA	Jamie Schurbon, ACD	Rum River Inventory
9/18/2018	meeting	MSA	Dan Fabian, BWSR	Plan Status
9/10/2018	email	MSA	Tom Collins, Ham Lake	Plan Comment
Aug-18				
8/27/2018	meeting	MSA/URRWMO	Oak Grove	Plan Status
8/23/2018	meeting	MSA/URRWMO	East Bethel	Plan Status
8/20/2018	meeting	MSA/URRWMO	Ham Lake	Plan Status
8/20/2018	meeting	MSA/URRWMO	St. Francis	Plan Status
8/16/2018	meeting	MSA/URRWMO	Bethel	Plan Status
8/15/2019	meeting	MSA/URRWMO	Nowthen	Plan Status
Jun-18				
6/6/2018	meeting	MSA	Dan Fabian, BWSR	Plan Status
May-18				
5/25/2018	meeting	MSA/URRWMO	Jamie Schurbon, ACD	WMO Administration
Dec-18				
12/8/2018	meeting	MSA	Dan Fabian, BWSR	Plan Status
Jul-17				
7/12/2017	email	MSA	Bonnie Finnerty, MPCA	Plan Comment
7/11/2017	email	Bonnie Finnerty, MPCA	MSA	Plan Comment

URRWMO Planning Communication Log				
Date	Medium	From	To	Topic
Jun-17				
6/7/2017	email	Benjamin Gozola	MSA	Funding Inquiry
6/1/2017	email	MSA	Jamie Schurbon	Public Hearing Date for Website
May-17				
5/26/2017	email	MSA	Dan Fabian	Project Update
5/19/2017	email	MSA	Dan Fabian	Project Update and Plan Comments
5/18/2017	email	Dan Fabian	MSA	Project Update Status Request
5/10/2017	email	Jamie Schurbon	MSA	Rum WRAPS on Public Notice
Apr-17				
4/11/2017	email	Jamie Schurbon	MSA	Project Ideas
4/3/207	email	Jamie Schurbon	MSA	April Meeting Cancelation
Mar-17				
3/20/2017	email	Dan Fabian	MSA	2017 CWF Grants
Feb-17				
2/6/2017	email	Reed Larson	MSA	Plan Comments
2/9/2017	email	Mark Korin	MSA	Plan Comments
2/10/2017	email	Dan Fabian	MSA	Plan Comments
2/10/2017	email	Emily Resseger	MSA	Plan Comments
2/11/2017	email	MSA	Dan Fabian	Oak Grove Plan Comments
2/13/2017	email	MSA	Dan Fabian	60-day comment period
2/13/2017	vmail	Jeanne Daniels	MSA	Plan Comments ETA 2/15/17
2/14/2017	email	Bart Biernat	MSA	AIS Grant Application
2/15/2017	email	Jeanne Daniels	MSA	Plan Comments
Jan-17				
1/18/2017	email	Jack Forslund	MSA	Plan Comments
1/20/2017	email	Kate Drewry	MSA	Difficulty getting plan
1/22/2017	email	Todd Haas	MSA	Plan Comments
1/23/2017	email	MSA	Jamie Schurbon	Plan Link
1/26/2017	email	MSA	Dan Fabian	Forwarded Ham Lake and Anoka Comments
1/26/2017	email	John Freitag	MSA	MDH has no comments
1/27/2017	email	Beth Neuendorf	MSA	Carryover of 3rd Generation plan standards
1/30/2017	email	MSA	Beth Neuendorf	Carryover of 3rd Generation plan standards
1/31/2017	email	Jamie Schurbon	MSA	Plan Comments
Dec-16				
12/7/2016	email	MSA	URRWMO Board, Member Communities, Bart Biernat, Jamie Schurbon, Todd Haas, Kate Drewry, John Freitag, Jeff Berg, Judy Sventek, Juline Holleran, Dan Fabian, Kathy Berkness, Jean Daniels	Board-Approved Draft Plan and Review Letter
12/7/2016	email	Jamie Schurbon	MSA	Posting URRWMO to Website
12/7/2016	email	Dan Fabian	MSA	Plan Review Roster and submittal requirements
12/7/2016	email	Dan Fabian	MSA	Posting Plan on Website
12/7/2016	email	Dan Fabian	MSA	Additional Website comments
12/7/2016	email	Dan Fabian	MSA	Website links are working
12/7/2016	email	Todd Haas	MSA	Received Plan
12/20/2016	email	Dan Fabian	MSA	Confirmation of receipt of materials
12/22/2016	email	Tom Collins	MSA	Plan Comments
12/22/2016	email	Dan Fabian	MSA	Forwarded Tom Collin Comments
Nov-16				
11/1/2016	in person	MSA	URRWMO Board	Transmittal of Draft Watershed Plan - Revised chapters 4 and 5
11/7/2016	Phone Call	Randy Bettinger	MSA	Comments on Draft Plan
11/18/2016	email	John West	MSA	Comments on Draft Plan (budget values)
11/21/2016	email	Lan Tornes	MSA	Comments on Draft Plan
11/21/2016	email	Kevin Armstrong	MSA	Comments on Draft Plan (no comments)
11/21/2016	email	Jamie Schurbon (ACD)	MSA	Transmittal of Draft Rum River WRAP report
Oct-16				
10/30/2016	email	MSA	URRWMO Board	Transmittal of Draft Watershed Plan
Sep-16				
9/1/2016	email	MSA	URRWMO Board	Transmittal of Memorandums - 1.) Summary of Issues and Priorities, 2.) Summary of Board Priorities, 3.) Estimated annual budget, 4.) Draft Plan Executive Summary
9/11/2016	email	Lan Tornes	MSA	Comments on Draft Plan Executive Summary
9/13/2016	email	Kevin Armstrong	MSA	Comments on Draft Plan Executive Summary (no comments)
Jul-16				
7/1/2016	email	MSA	Public Works directors of member communities, Kate Drewry, Karen Jensen, Jamie Schurbon, Dan Fabian; copied to URRWMO Board	TAC meeting invitation
7/1/2016	email	MSA	URRWMO Board	CAC invitation - send to interested persons
7/1/2016	email	MSA	Jamie Schurbon, ACD	Request for water quality data and annual reports not posted to URRWMO website

URRWMO Planning Communication Log				
Date	Medium	From	To	Topic
7/5/2016	email	Jamie Schurbon, ACD	MSA	Reply to request on 7/1 with requested data
7/5/2016	email	Karen Jensen, METC	MSA	Clarification of TAC invitation; Joe Mulcahy will be attending in her place; several follow up emails from MSA and METC
7/5/2016	email	Dan Fabian, BWSR	MSA	Suggestion to invite Bonnie Finnerty, MPCA, to TAC and involve with Plan since WRAPP is an important component
7/7/2016	email	Anoka government	MSA	Notice of revetments on the Rum River – Grants Available to Landowners
7/7/2016	in person			Plan meeting - discussed Open House,
7/11/2016	email	MSA	Sherry Fiskewold, Oak Grove City Clerk	Contribution to the City of Oak Grove newsletter informing the public about the URRWMO Plan Update
7/12/2016	email	MSA	Member city administrators and clerks	Estimate of program costs based on comments received; solicitation for input from individuals on their goals and priorities - requested it be forwarded on to Council and Staff; encouraged participation in CAC/TAC
7/12/2016	email	MSA	URRWMO Board	Estimate of program costs based on comments received; solicitation for input from individuals on their goals and priorities; encouraged participation in CAC/TAC
7/12/2016	email	MSA	Bonnie Finnerty, MPCA	TAC meeting invitation (was missed on original invitation list)
7/13/2016	email	Shane Nelson, City of Nowthen	MSA	Shane Nelson, Corrie LaDoucer and Joe Glaze are planning to attend the TAC meeting on behalf of Nowthen (staff)
7/13/2016	email	MSA	Dan Fabian, BWSR	Transmitted electronic copy of Open House BWSR questionnaire responses and analysis done by MSA including memo
7/14/2016	email	MSA	Member cities	Request for copies of local water management plans
7/14/2016	email	Member cities	MSA	Received local water plans (individual messages but combined here for simplicity)
7/14/2016	email	Lan Tornes, URRWMO Board Member	MSA	Goals for URRWMO plan
7/14/2016	email	Bonnie Finnerty, MPCA	MSA	Comments on Plan update and priorities/concerns; will not be attending TAC
7/15/2016	email	Lan Tornes, URRWMO Board Member	MSA	Plan cost feedback
7/15/2016	email	Randy Bettinger, URRWMO Board Member	MSA	City of Nowthen plan cost feedback
7/18/2016	email	Kevin Armstrong, URRWMO Board member	MSA	Plan feedback and goals and principles
7/18/2016	phone, email follow up	MSA	Jamie Schurbon, ACD	Called to ask what direct role URRWMO would need to play with regard to the Buffer Map/Governor's Buffer Initiative; for now, mostly lies with local government and other agencies to enforce, URRWMO should help educate and get the word out
7/19/2016	email	Rich Wiitala, City of Beth Council Member	MSA	City of Bethel response on budget increase
7/19/2016	email	Steve Kane, Mayor, City of St. Francis	MSA	City of St. Francis response to budget increase
7/19/2016	email	Denise Webster, City of Ham Lake Clerk	MSA	City of Ham Lake response to budget increase
7/19/2016	email	Tom Johnson, City of Ham Lake Council	MSA	City of Ham Lake response to budget increase
7/20/2016	email	Brian Kirkham, City of Beth Council Member	MSA	Bethel City comments on 10 year plan and budget increase
7/20/2016	in person			Technical Advisory Committee (TAC) meeting at 2:00 PM
7/20/2016	in person			Citizens Advisory Committee (CAC) meeting at 6:30 PM
7/20/2016	email	MSA	Dan Fabian, BWSR	Provided digital copy of TSI and TP graphs presented at TAC
7/21/2016	email	MSA	Dan Fabian, BWSR	Request for copy of Lake George grant application and summary of other potential grants WMO would be eligible for
7/21/2016	email	MSA	Kate Drewry, MnDNR	Request for more information on a plan for the easement/property acquisition grants/programs-by-others that was mentioned at TAC; request for summary of grants that the WMO may be eligible for
7/22/2016	email	Kate Drewry, MnDNR	MSA, other state/regional agencies	Links to information on land protection options and grant opportunities
7/25/2016	email	Kate Drewry, MnDNR	MSA, BWSR, ACD, DNR	Information on the Anoka Sandplain Partnership and encouragement to join and financially support this group
7/27/2016	email	MSA	URRWMO Board	Client feedback survey
7/28/2016	email	Julie Blackburn, RESPEC Consulting & Services	WRAPP partners	Request from partners for input on restoration and protection scenarios for the Rum River watershed
Jun-16				
6/6/2016	in person			Plan meeting - approved Plan schedule, set CAC/TAC date, set next Plan meeting dates, approved website updates, reiterated imperative to reach out to public/get the word out about Open House, initial discussion of new items to potentially incorporate into Plan; minutes posted on URRWMO website
6/6/2016	email	MSA	URRWMO Board	Draft Open House notification letter for Board approval
6/6/2016	email	MSA	Bonnie Finnerty, MPCA	Invited to speak at URRWMO Open House; declined
6/7/2016	email	MSA	MSA	Establish preliminary cost estimate for farm buffer easements and other farmland improvements
6/7/2016	email	MSA	Lan Tornes, URRWMO Board	Comments on notification letter re: Open House; signed final version received 6/13/16 via email

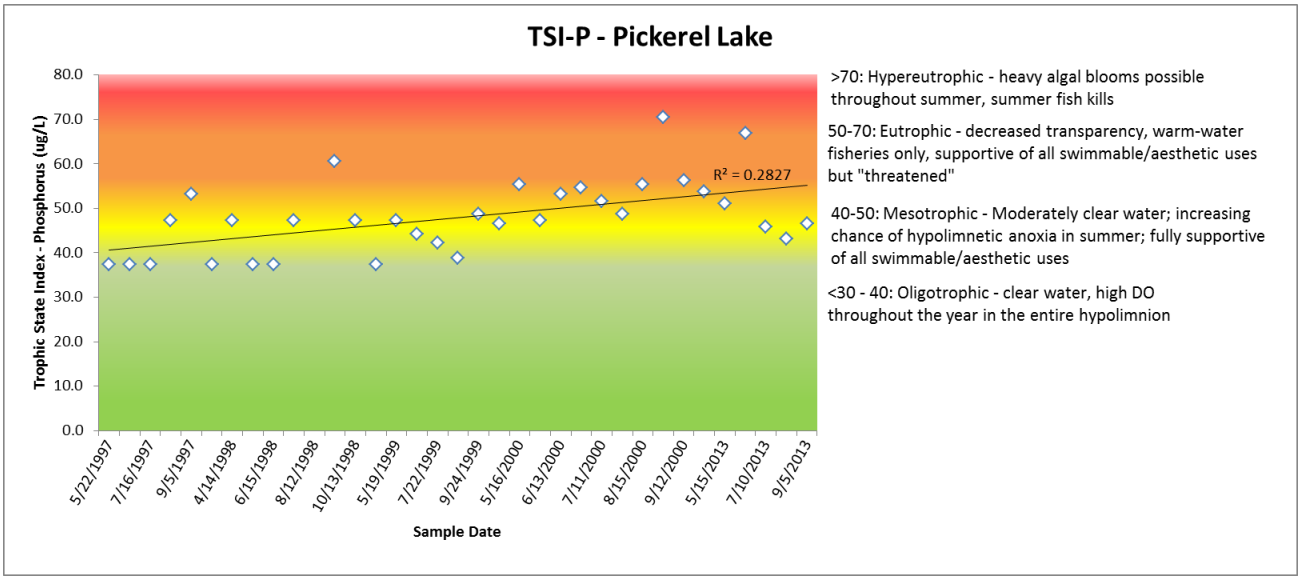
URRWMO Planning Communication Log				
Date	Medium	From	To	Topic
6/8/2016	email	Tom Collins, URRWMO Board member	MSA	Ham Lake comments on potential action items that were presented at 6/6 meeting
6/12/2016	email	MSA	Dan Fabian, BWSR	Transmitted Plan schedule approved by Board; asked if would consider speaking at Open House; notice of CAC/TAC date; notice of website updates to include feedback tool and link to URRWMO website from member cities' websites
6/13/2016	email	Dan Fabian, BWSR	MSA	Response to 6/12/16 email; agreement to speak at Open House, reminder of notification timeline, reminder to advertise Open House
6/13/2016	email	MSA	URRWMO Board	Signed notification letter received
6/13/2016	email	MSA	Stakeholders	Open House notification
6/14/2016	letter	MSA	Stakeholders	Open House notification
6/16/2016	email	Dan Denno, URRWMO Board Chair	MSA	Comments on the 10-Year Plan update
6/17/2016	email, phone	MSA	MSA	Worked with IT department to create online web meeting for interested persons to attend Open House remotely via a link on the URRWMO website
6/18/2016	email	Lan Tornes, URRWMO Board	MSA	Comments regarding potential Plan action items that were presented at 6/6 meeting
6/21/2016	email	MSA	Dan Fabian, BWSR	Response to 6/13/16 email; equipment available and location of Open House, informed that notice was sent out via email and post
6/22/2016	email	Jamie Schurbon, ACD	MSA	Most recent draft of Rum River WRAP management strategies table - authorized for internal use only
6/22/2016	email	MSA	Jamie Schurbon, ACD	Summary Plan spreadsheet sent for comment and cost estimate; confirmation of speaking at Open House
6/23/2016	email	MSA	URRWMO Board	Request to Board to have each member city post notice of the Open House/Initial Plan meeting on their website and cross-post a link to the URRWMO (this was a follow up reminder since it was discussed at 6/6 meeting)
6/23/2016	email	MSA	URRWMO Board	Request to Board to do what they can to get interested persons to attend Open House and push for public involvement
6/23/2016	email	Bonnie Finnerty, MPCA	MSA	Notice that she will not attend Open House and that Jamie Schurbon will give presentation on WRAPP
6/23/2016	phone	MSA	Holly Nelson, Isanti County	Reminded/personally invited to attend Open House and solicited any questions or feedback
6/23/2016	phone	MSA	Doug Welter, Beaver Brook Sportsman's Club	Reminded/personally invited to attend Open House and solicited any questions or feedback
6/23/2016	phone	MSA	Kriste Ericsson, Friends of the Rum River	Reminded/personally invited to attend Open House and solicited any questions or feedback
6/23/2016	phone	MSA	Wiley Buck, Great River Greening	Reminded/personally invited to attend Open House and solicited any questions or feedback
6/23/2016	phone	MSA	Andrea Brandon, The Nature Conservancy	Reminded/personally invited to attend Open House and solicited any questions or feedback
6/23/2016	phone	MSA	David Tilman, Cedar Creek Ecosystem Science Reserve	Reminded/personally invited to attend Open House and solicited any questions or feedback
6/23/2016	phone	MSA	Trevor Russell, The Friends of the Mississippi River	Reminded/personally invited to attend Open House and solicited any questions or feedback
6/23/2016	email	Dan Fabian, BWSR	MSA	Request for Open House agenda, question about what the URRWMO is doing to ensure public turnout at Open House
6/27/2016	email	MSA	Dan Fabian, BWSR	Transmitted Open House agenda and informed of all methods by which Open House was advertised
6/29/2016	in person			URRWMO Open House/Initial Planning meeting - agenda and minutes posted on URRWMO website
6/30/2016	email	Mary Rainville, City of Nowthen Council Member	MSA	Posted information about the URRWMO Plan update on the Nowthen Bulletin Board Facebook page
May-16				
5/3/2016				Regular Board meeting - minutes posted on URRWMO website
5/18/2016	email	Jamie Schurbon, ACD	MSA	Invitation to attend WRAPP partners meeting; provided 1st draft WRAPP materials
5/18/2016	email	Dan Fabian, BWSR	MSA	Feedback and approval of Plan schedule; WRAPP update
5/24/2016	in person			Chuck Schwartz attended WRAPP meeting on behalf of URRWMO Board
5/24/2016	in person, email follow up on 6/6/16	MSA	Bonnie Finnerty, MPCA	Invited to speak at URRWMO Open House
5/24/2016	in person	MSA	Todd Hass, Andover Assistant DPW and Chair of the LRRWMO	Chuck Schwartz made contact and invited to attend and speak at URRWMO Open House
5/25/2016	email	Jamie Schurbon, ACD	WRAPP Partners	Provided minutes from WRAPP meeting
Apr-16				
4/4/2016	email	Dan Fabian, BWSR	MSA	Example plan schedule to follow, example Plan update
4/4/2016	in person			Plan meeting - minutes posted on URRWMO website
4/5/2016	email	Jamie Schurbon, ACD	WRAPP Partners	Notification of WRAPP meeting to be held April 11; draft of WRAPP management strategies table to be completed by partners
4/6/2016	email	MSA	Jamie Schurbon, ACD	Inquired about any comments received for WRAPP and progress update

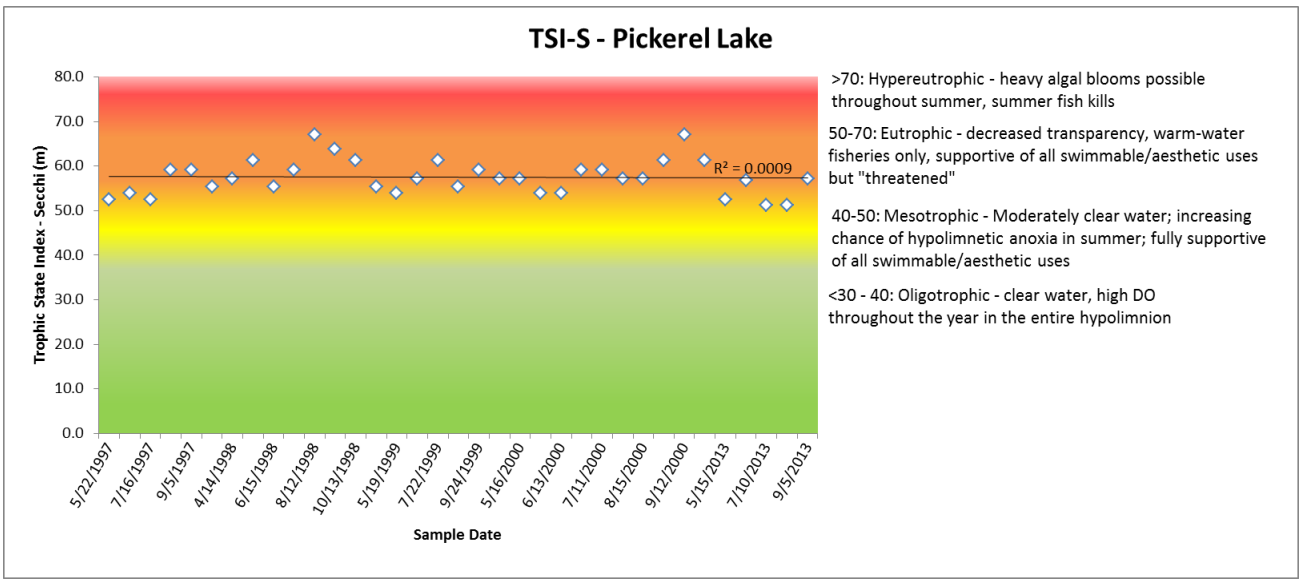
URRWMO Planning Communication Log				
Date	Medium	From	To	Topic
4/7/2016	in person			Chuck Schwartz, MSA, met with City of Nowthen for a workshop with Council
4/8/2016	email	WRAPP Partners	Jamie Schurbon, ACD	Notified that WRAPP meeting for April 11 was cancelled; next meeting May 24. May affect release date of WRAPP.
4/8/2016	email	MSA	Dan Fabian, BWSR	Forwarded above message regarding WRAPP cancellation and MSA's concerns for delay
4/11/2016	in person			Chuck Schwartz, MSA, met with City of Oak Grove for a workshop with Council
4/25/2016	email			
4/29/2016	email	Jamie Schurbon, ACD	URRWMO Board, MSA	Annual URRWMO newsletter; also submitted to The Courier
4/29/2016	email	MSA	Dan Fabian, BWSR	Transmitted draft plan schedule for content review before submitting to Board for approval
Mar-16				
3/4/2016	email	Dan Fabian, BWSR	MSA	Forwarded contact information for several additional stakeholders to reach out to; reminded to get pre-approval for the Advisory committees and other means of public and technical participation acceptable to BWSR (8410.0045 Subp. 2)
3/4/2016	email	MSA	Board	Draft letters to send out to agencies and citizen stakeholders
3/7/2016	email	MSA	Jamie Schurbon, ACD	Requested data presented in Annual Reports and any Annual Reports not listed on website
3/8/2016	website			URRWMO scheduled and posted regular meetings and Open House dates
3/8/2016	in person			Plan meeting - Discussed and approved Public Involvement Plan, decided to refer to WRAPS as WRAPP, determined who was appropriate to approve items on Board's behalf, plans to move forward with MSA meeting with individual cities; minutes posted on URRWMO website
3/11/2016	email	MSA	Dan Fabian, BWSR	MSA sent a letter outlining the URRWMO plan for public engagement as discussed at the March 8th meeting
3/15/2016	email	MSA	Member cities	Request to meet with each member community to discuss Plan update, specific watershed concerns each city may have, and any issues the city would like addressed by the WMO. Attached was a memo of items to guide the discussion.
3/15/2016	email	Dan Fabian, BWSR	MSA	Response to March 11th email and asked follow up questions
3/17/2016	email	MSA	Dan Fabian, BWSR	Response to March 15th email
3/17/2016	in person			Chuck Schwartz, MSA, met with East Bethel staff and engineer
3/18/2016	email	Dan Fabian, BWSR	MSA	Approval of Public Engagement Plan by BWSR; suggestion to update website to include 10-year plan info; request for Plan schedule/timeline
3/20/2016	email	Gail Gessner, URRWMO Recording Secretary	MSA	Provided editable URRWMO letterhead for official correspondence
3/21/2016	in person			Chuck Schwartz, MSA, met with Bethel staff
3/22/2016	in person			Chuck Schwartz, MSA, met with Ham Lake administrator and engineer
3/23/2016	email	URRWMO Board	Citizen groups	Letter to citizen groups informing them of Plan update and inviting participation Sent to: Lake George Conservation Club (mail), Lake George Improvement District, Friends of Rum River, Beaver Brook Sportsman's Club, Great River Greening and the Anoka Sandplain Partnership, Cedar Creek Ecosystem Science Reserve, MN Land Trust, Friends of the Mississippi River
3/24/2016	email	BWSR	URRWMO Board	One Watershed One Plan content and operating requirements approved; RFP available
3/25/2016	email	URRWMO Board	Agencies	Notification of letter sent to citizen groups, invitation to participate; Sent to: City of Bethel, City of East Bethel, City of St. Francis, City of Ham Lake, City of Nowthen, City of Oak Grove, Anoka County, Anoka Conservation District, Lower Rum River WMO, Isanti Co Water Planner, Mille Lacs Co Water Planner, Sherburne Co Water Planner, Sunrise River WMO, The Nature Conservancy, BWSR
3/25/2016	email	Dan Fabian, BWSR	MSA	Information regarding changes to MN Rule 8410
3/25/2016	email	Corrie LaDoucer, City of Nowthen	MSA	Obtained information on City policies and ideas on what they would want in Plan; follow up with in-person meeting with Council on 4/7/16
3/30/2016	email	Jared Voge, City of St. Francis	MSA	Obtained information on City policies and ideas on what they would want in Plan
3/31/2016	phone	MSA	Bonnie Finnerty, MPCA	Inquired as to whether there were any WRAPP updates
Feb-16				
2/8/2016	email	MSA	Jamie Schurbon, ACD	Request of Plan update Notification letter
2/15/2016	in person			Special Meeting - MSA and URRWMO Board discuss 10-Year Plan Update and MSA presents findings from comments review and 2007 Plan; minutes posted on URRWMO website
2/16/2016	email	MSA	Board	Notified Board of new Dropbox account
2/23/2016	phone	MSA	Dan Fabian, BWSR	Discussed CAC/TAC, project timeline, and minimum Plan requirements
2/23/2016	email	MSA	Dan Fabian, BWSR	Follow up to phone call providing MSA contact information
2/23/2016	phone, email	MSA	Bonnie Finnerty, MPCA	Discussed availability of Rum River WRAPs findings and recommendations – no formal information released until mid-May

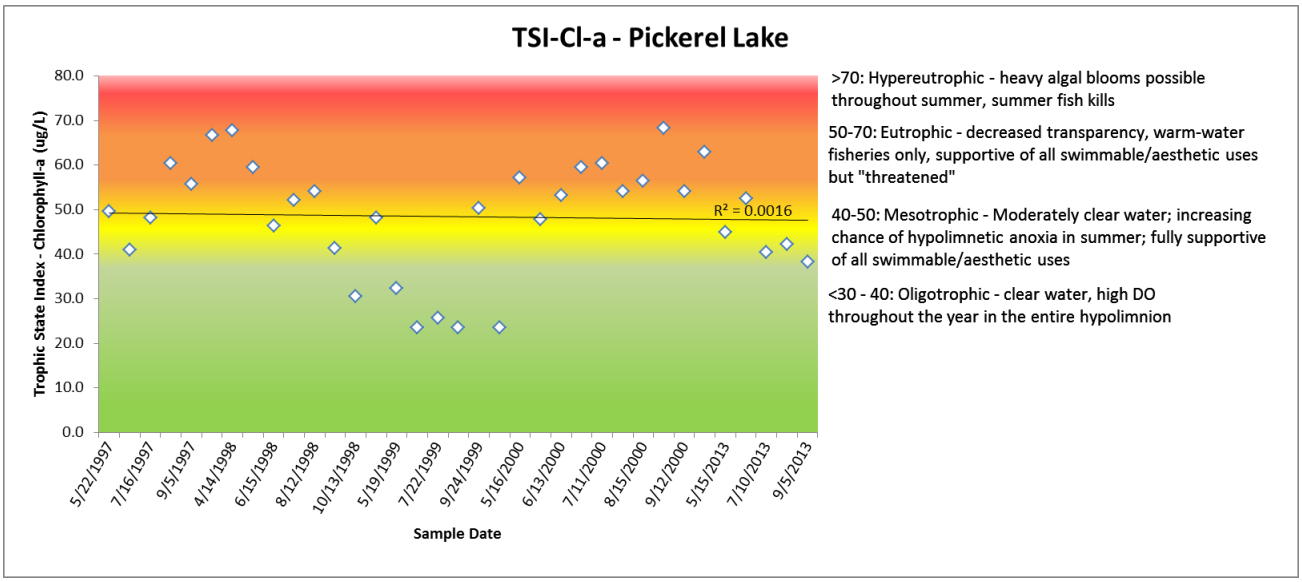
URRWMO Planning Communication Log				
Date	Medium	From	To	Topic
2/24/2016	phone, email	MSA	Jamie Schurbon, ACD	Received list of contact information for citizen groups to reach out to, Discussed Rum River WRAPs (Jamie sits on committee), Jamie enrolled MSA in email list to receive minutes from meetings to stay informed until information is released mid-May
2/26/2016	email	MSA	Doug Welter Beaver Brook Sportsman's Club	Doug contacted Jamie Schurbon on behalf of the club and we followed up with a reply
Jan-16				
1/25/2016	email	Jamie Schurbon, ACD	Board	Comments from Plan update
Dec-15				
Nov-15				
11/19/2015	letter, email	Jamie Schurbon on behalf of URRWMO	Stakeholders	Notification of Plan update

APPENDIX C

Tropic State Index Graphs and Water Quality Trends

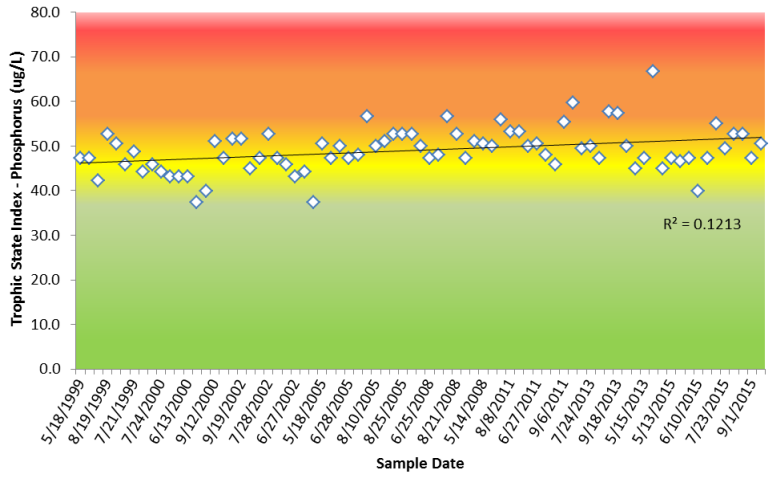






Reference: Carlson (1977)

TSI-P - Lake George



>70: Hypereutrophic - heavy algal blooms possible throughout summer, summer fish kills

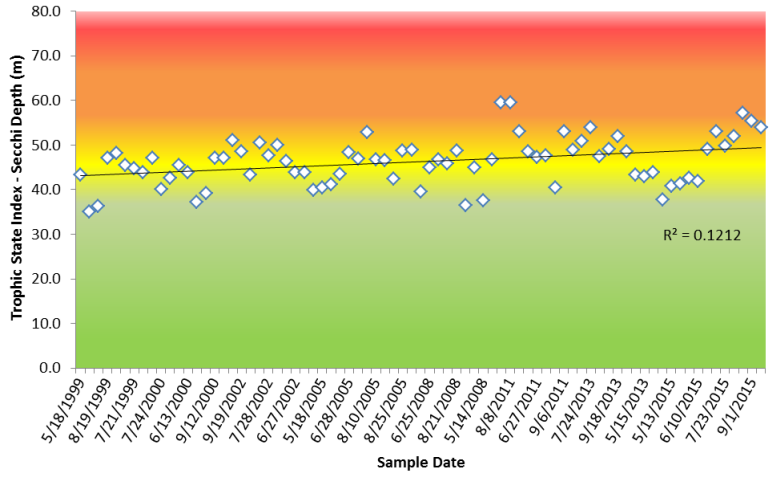
50-70: Eutrophic - decreased transparency, warm-water fisheries only, supportive of all swimmable/aesthetic uses but "threatened"

40-50: Mesotrophic - Moderately clear water; increasing chance of hypolimnetic anoxia in summer; fully supportive of all swimmable/aesthetic uses

<30 - 40: Oligotrophic - clear water, high DO throughout the year in the entire hypolimnion

Source: Carlson (1977)

TSI-S - Lake George



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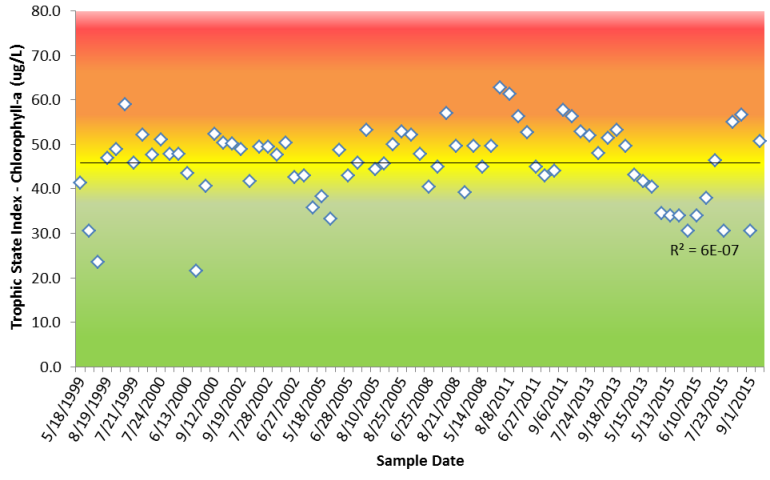
Source: Carlson (1977)

TSI-Cl-a - Lake George



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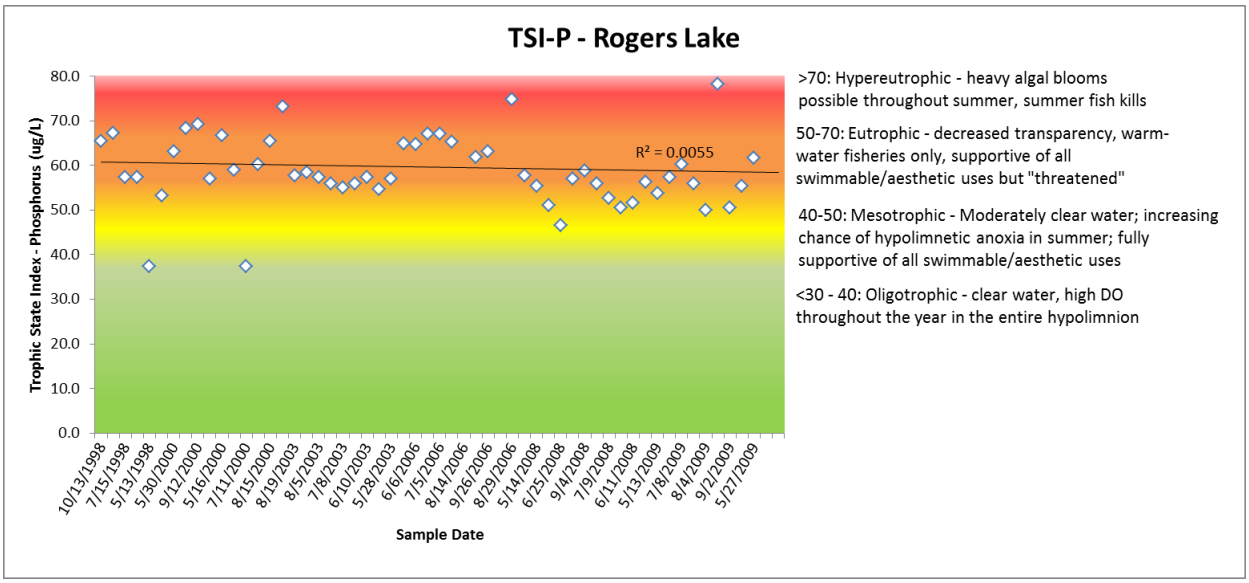
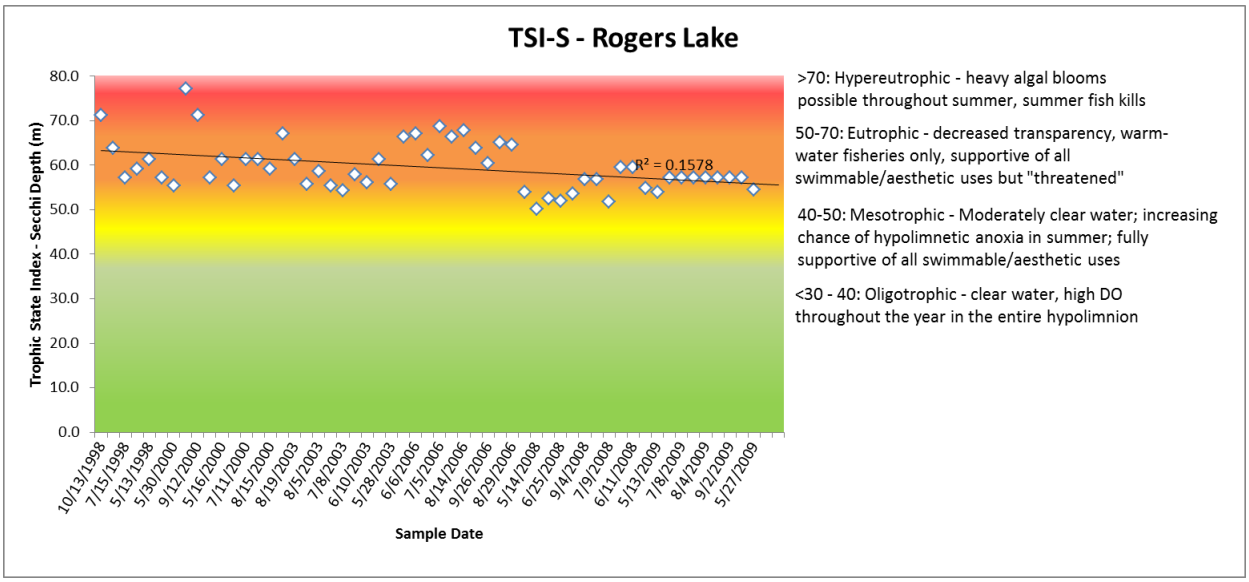
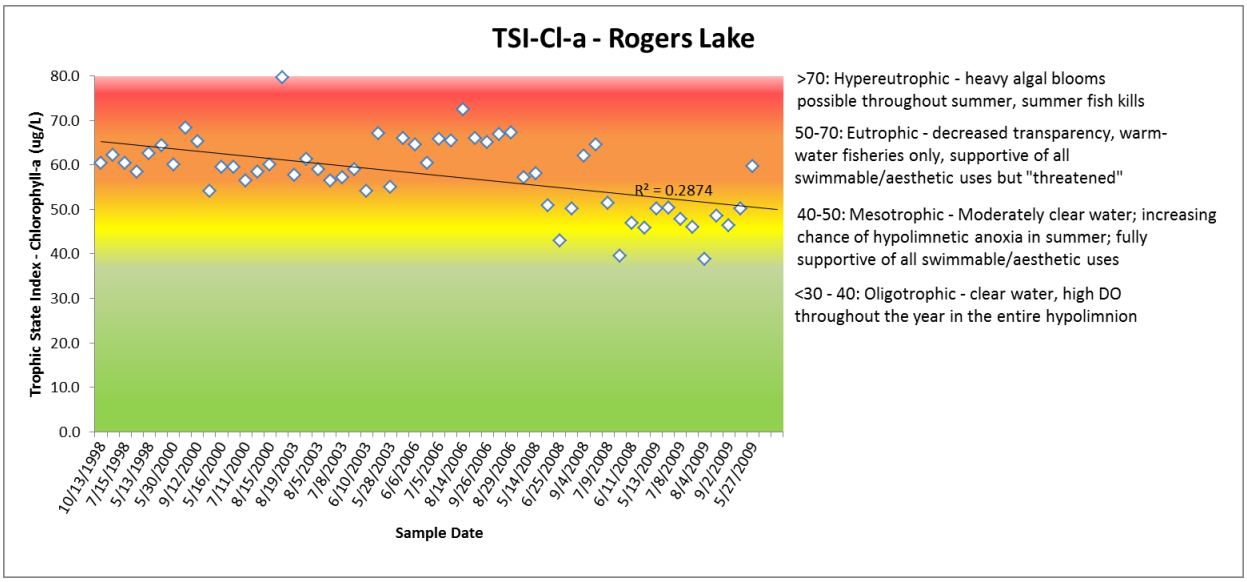
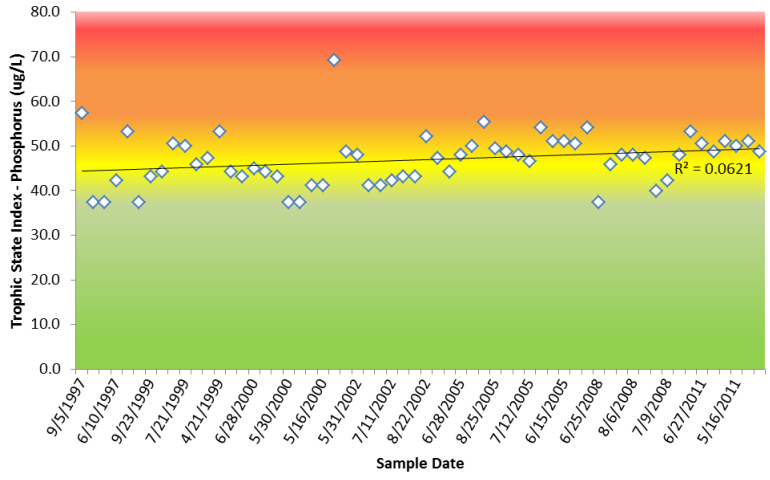






Reference: Carlson (1977)

TSI-P - East Twin Lake



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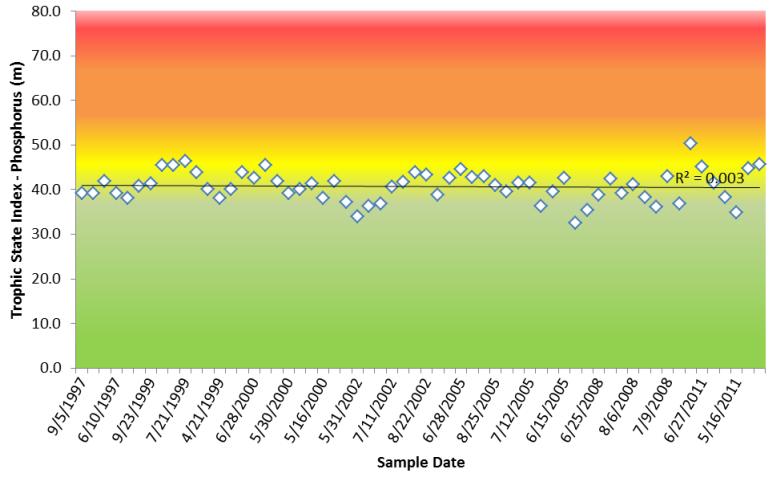
Source: Carlson (1977)

TSI-S - East Twin Lake



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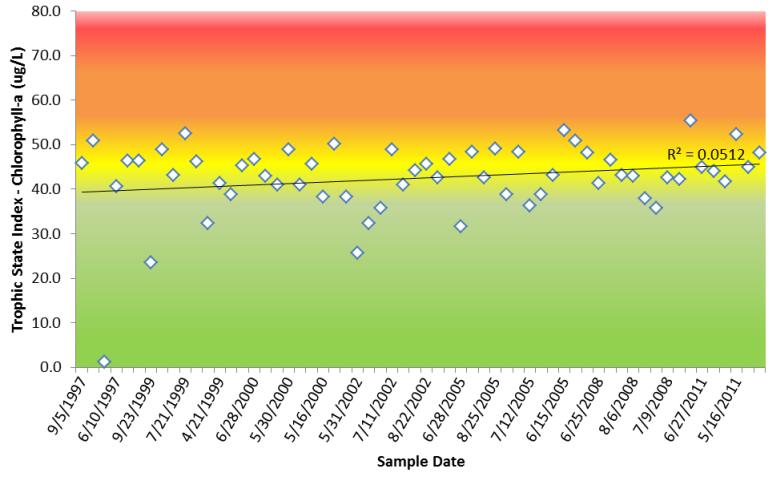
TSI-Cl-a - East Twin Lake



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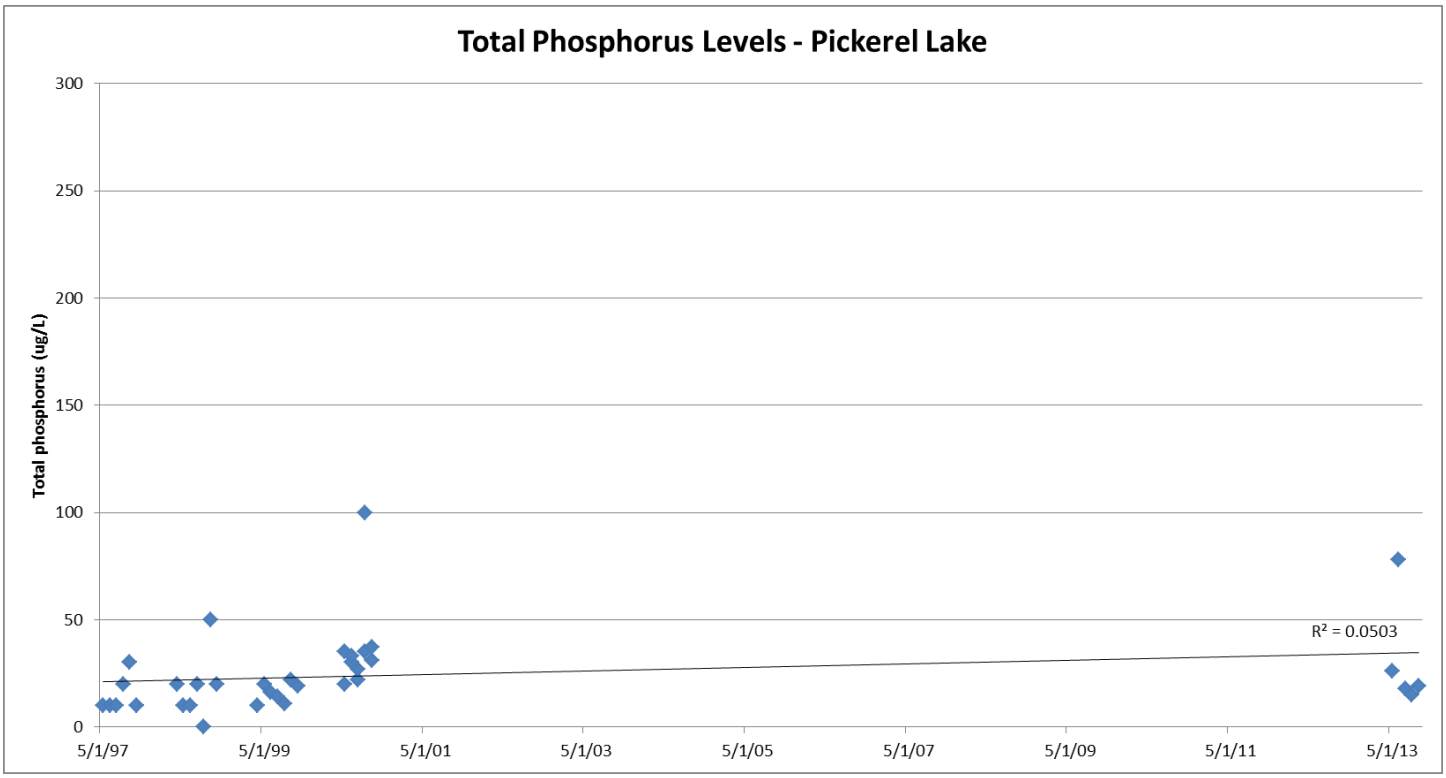
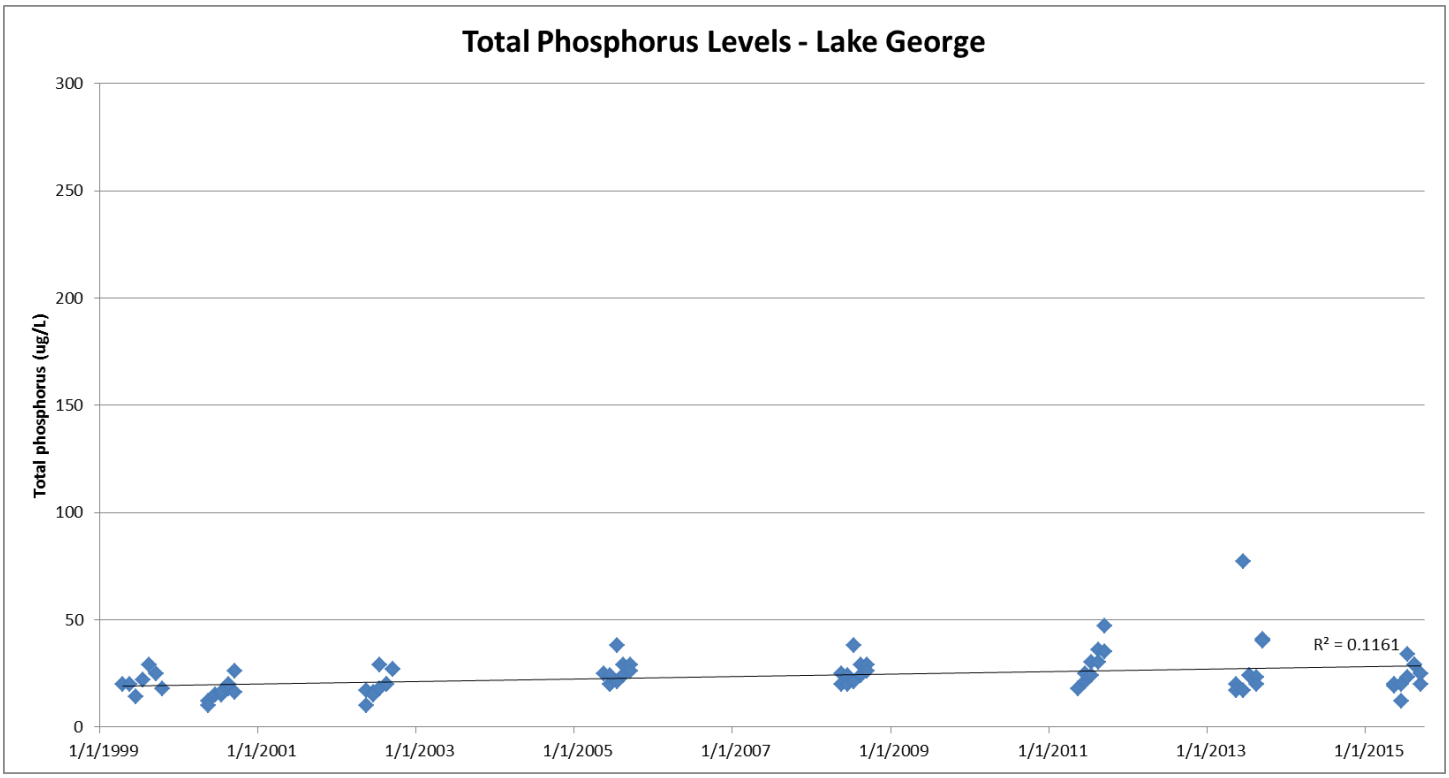
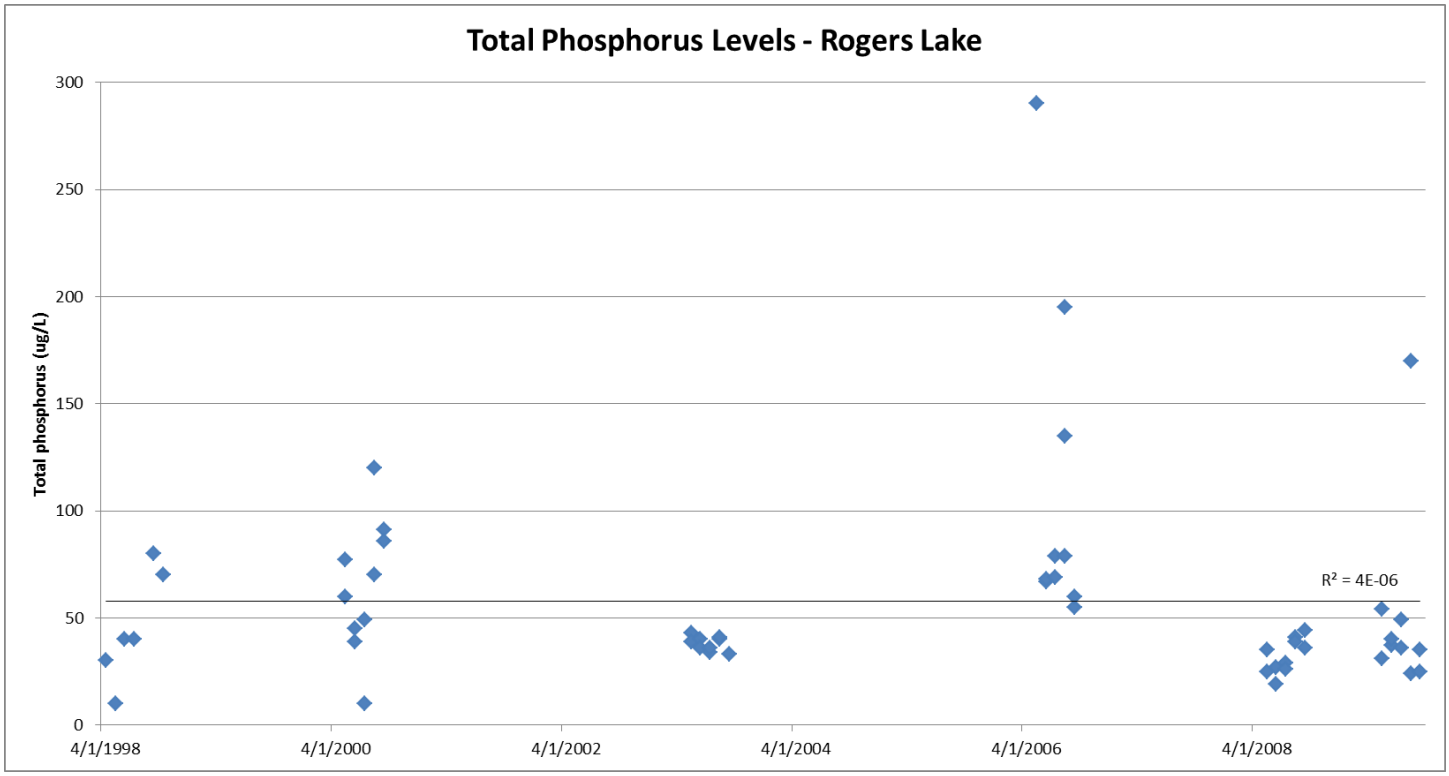
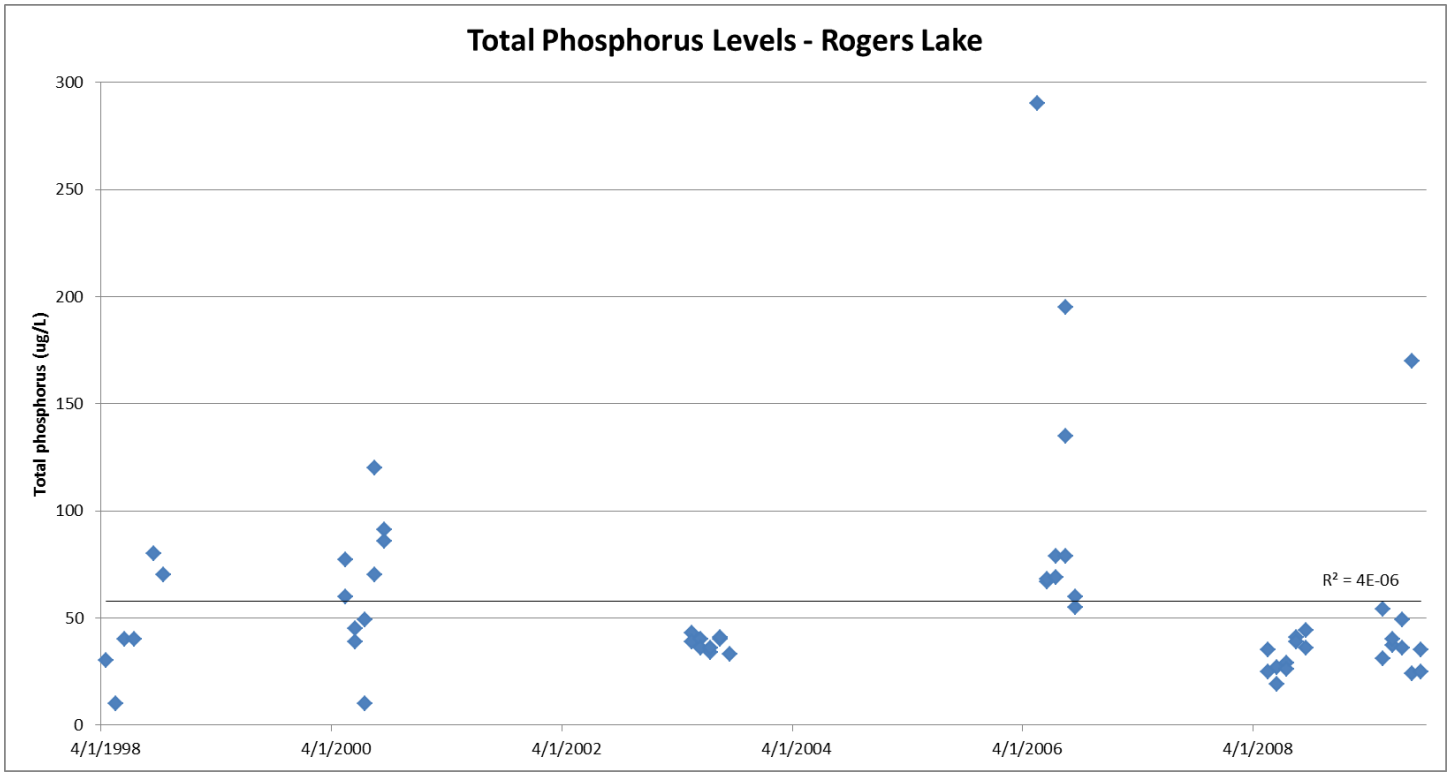
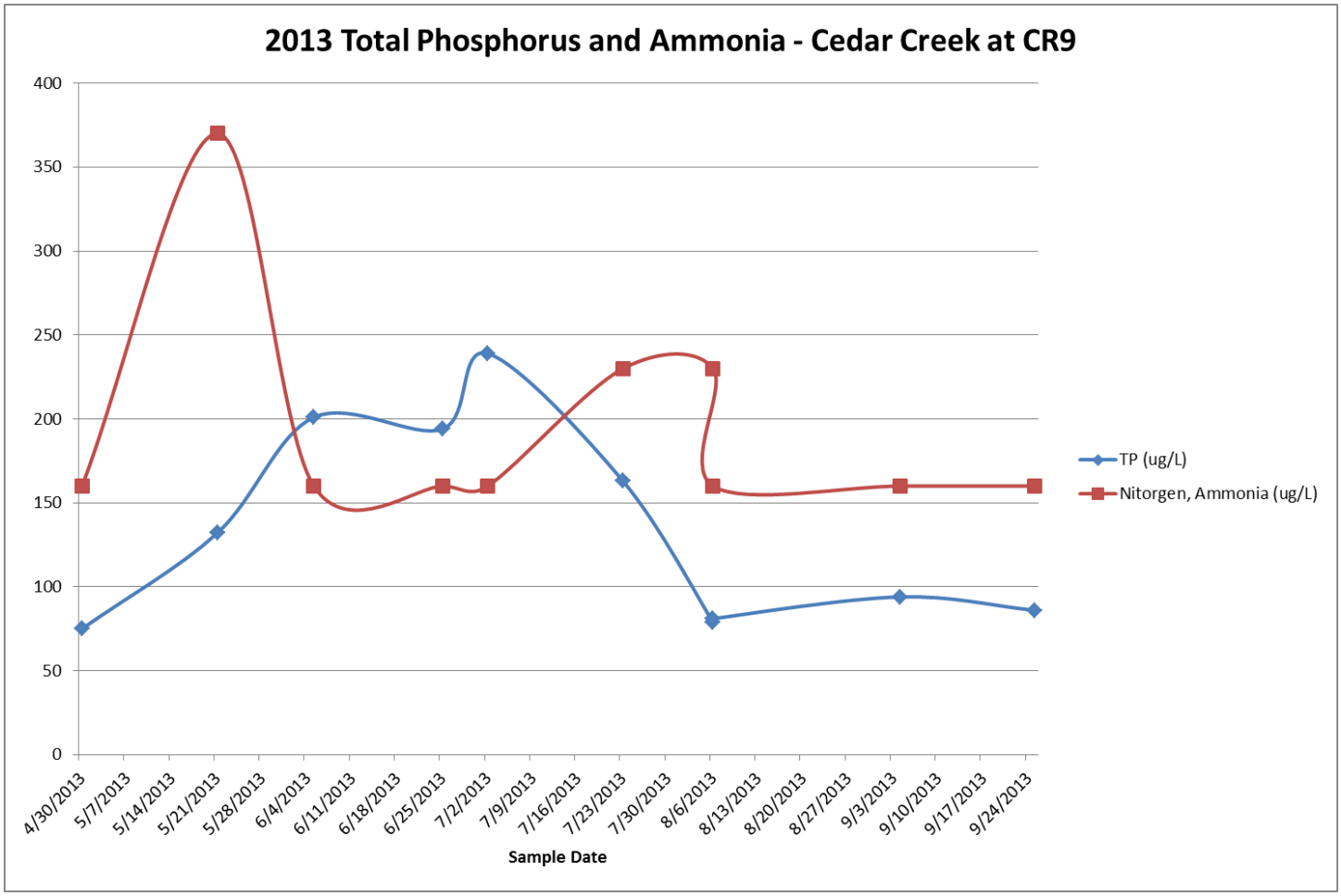
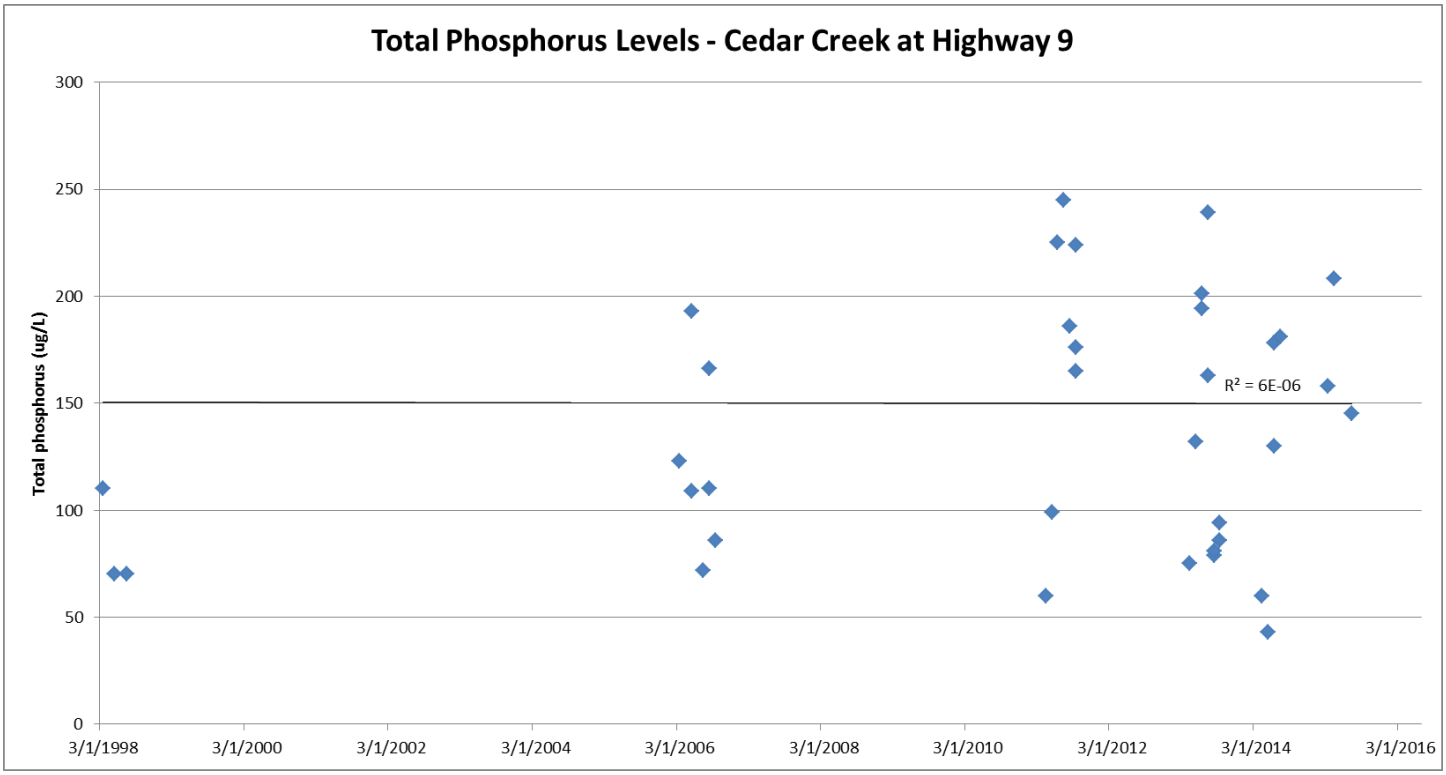

Total Phosphorus Levels - Pickerel Lake
Total phosphorus (ug/L)
300
250
200
150
100
50
0
5/1/97
5/1/99
5/1/01
5/1/03
5/1/05
5/1/07
5/1/09
5/1/11
5/1/13
R² = 0.0503


Total Phosphorus Levels - Lake George
Total phosphorus (ug/L)
300
250
200
150
100
50
0
1/1/1999
1/1/2001
1/1/2003
1/1/2005
1/1/2007
1/1/2009
1/1/2011
1/1/2013
1/1/2015
R² = 0.1161


Total Phosphorus Levels - Rogers Lake
Total phosphorus (ug/L)
300
250
200
150
100
50
0
4/1/1998
4/1/2000
4/1/2002
4/1/2004
4/1/2006
4/1/2008
R² = 4E-06

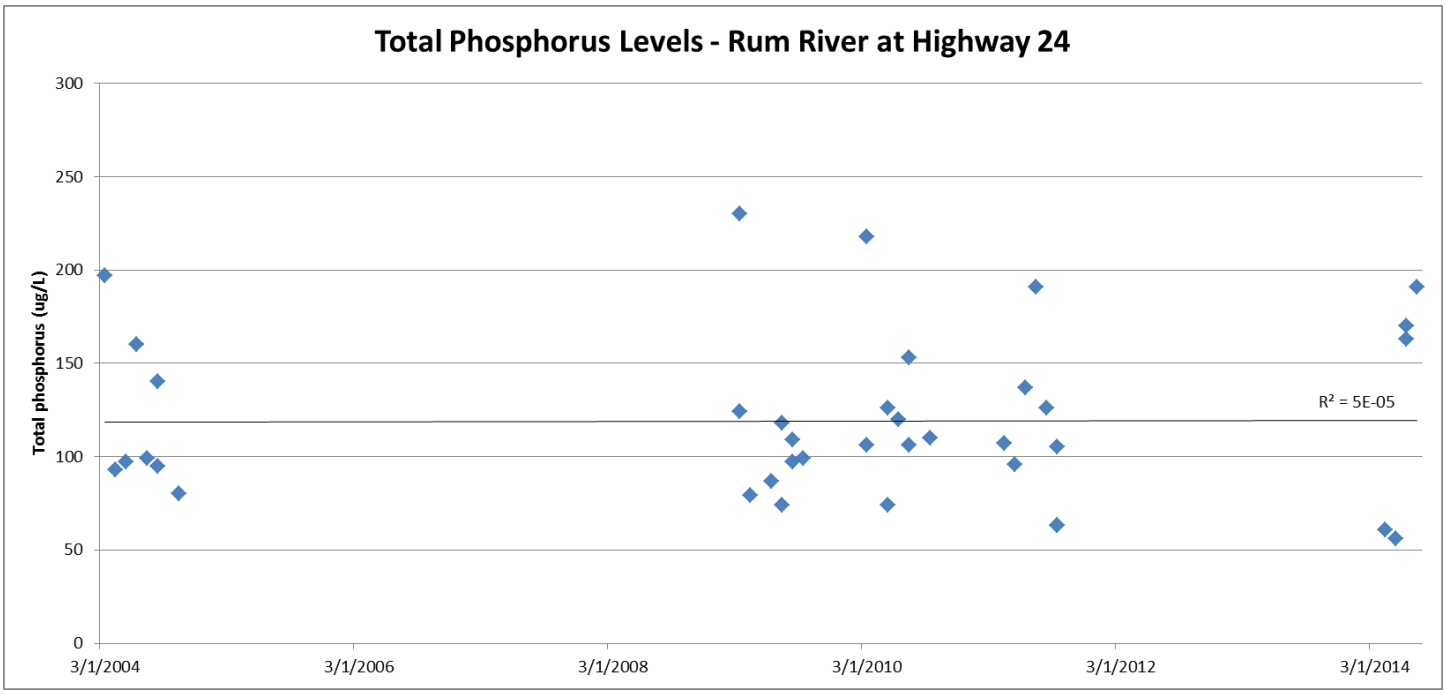

Total Phosphorus Levels - Rogers Lake
Total phosphorus (ug/L)
300
250
200
150
100
50
0
4/1/1998
4/1/2000
4/1/2002
4/1/2004
4/1/2006
4/1/2008
R² = 4E-06

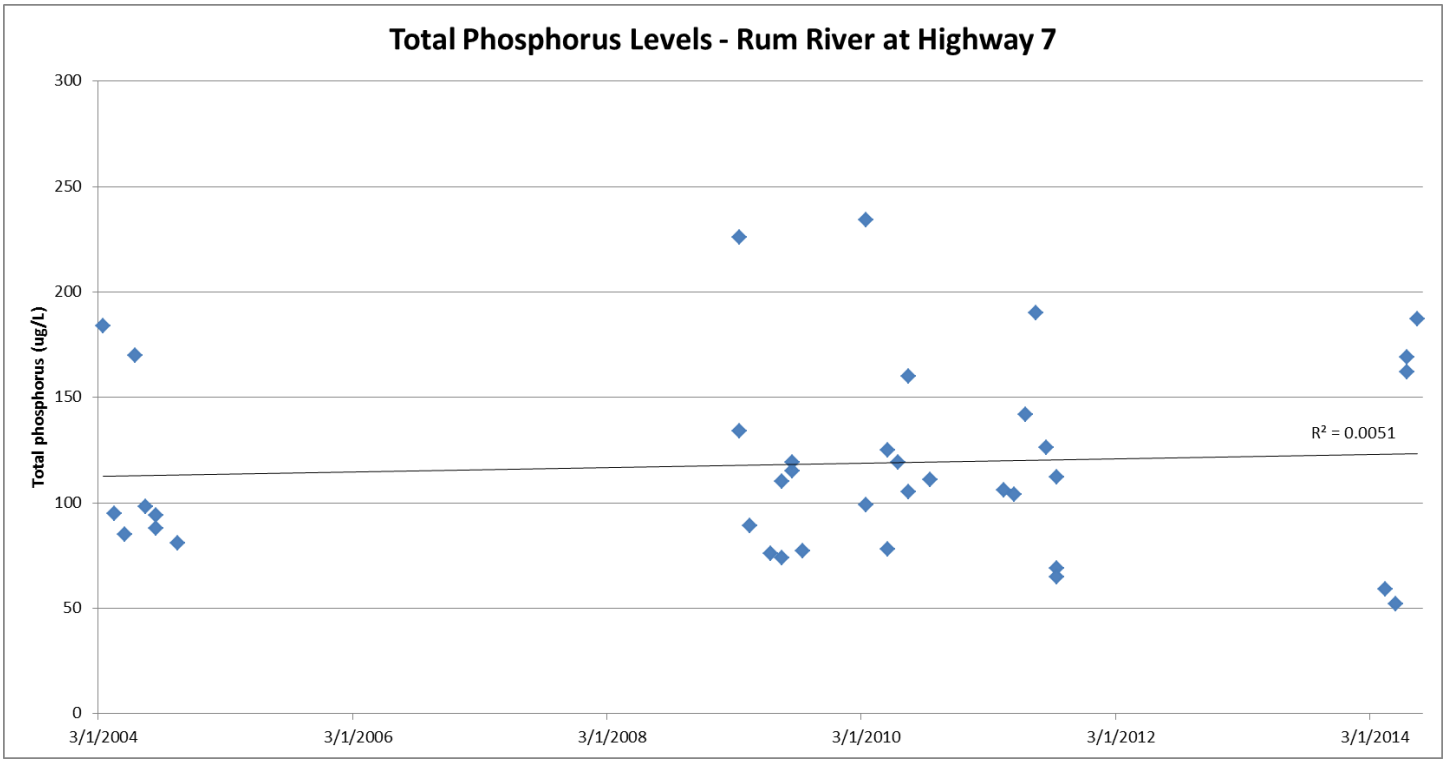




Did not use data from Cedar Creek at Fawn Lake Drive (last data was from 2006)

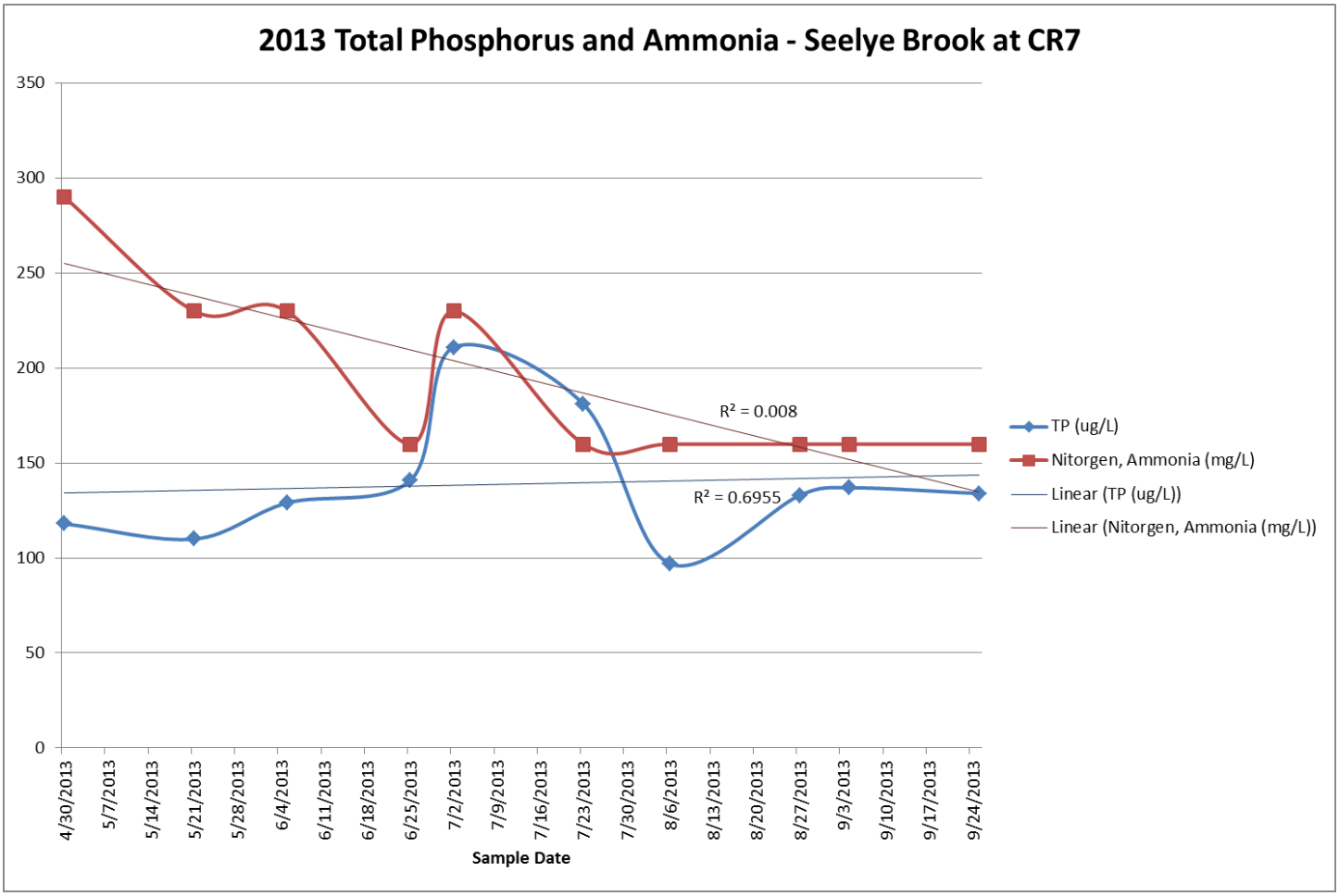
Did not use data from Cedar Creek at Sims Road (one year of data only -2006)

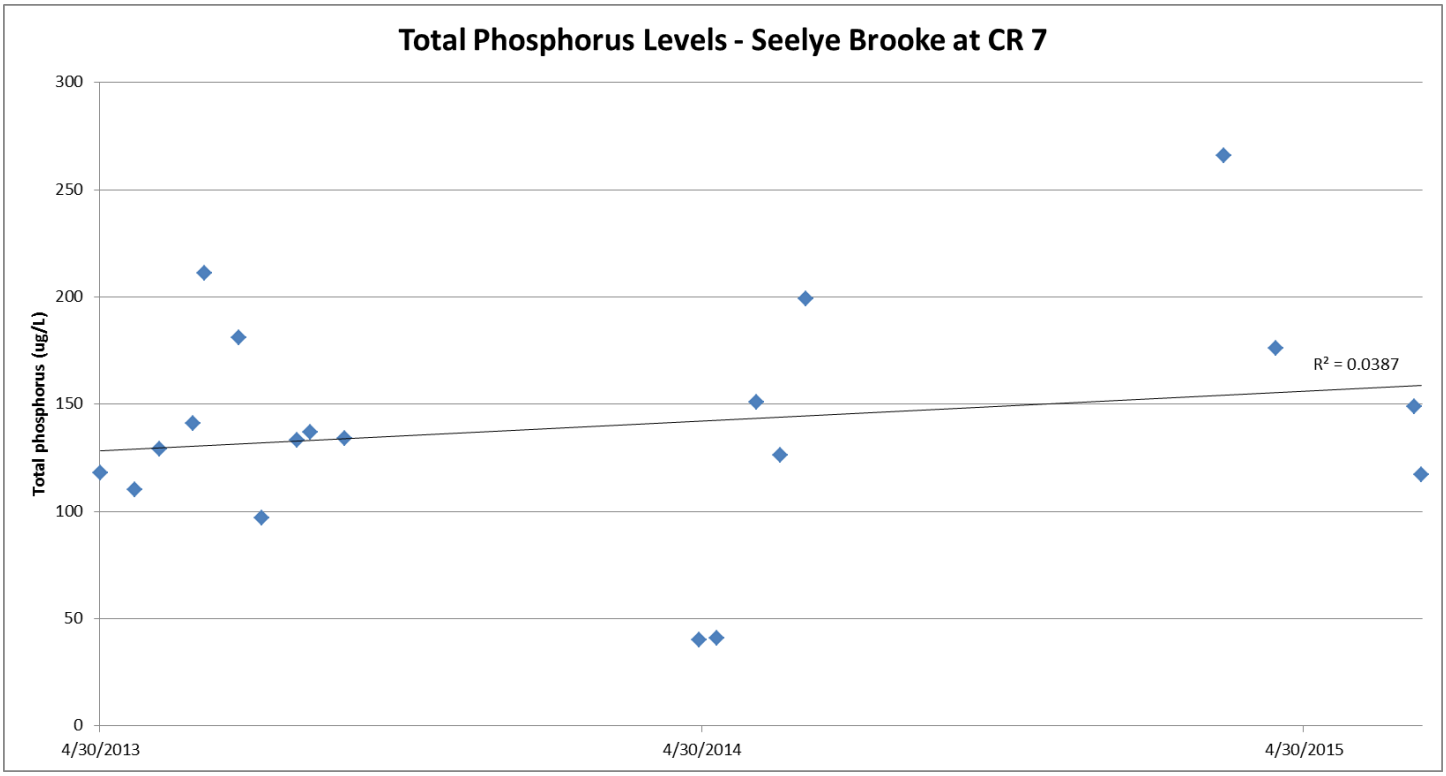


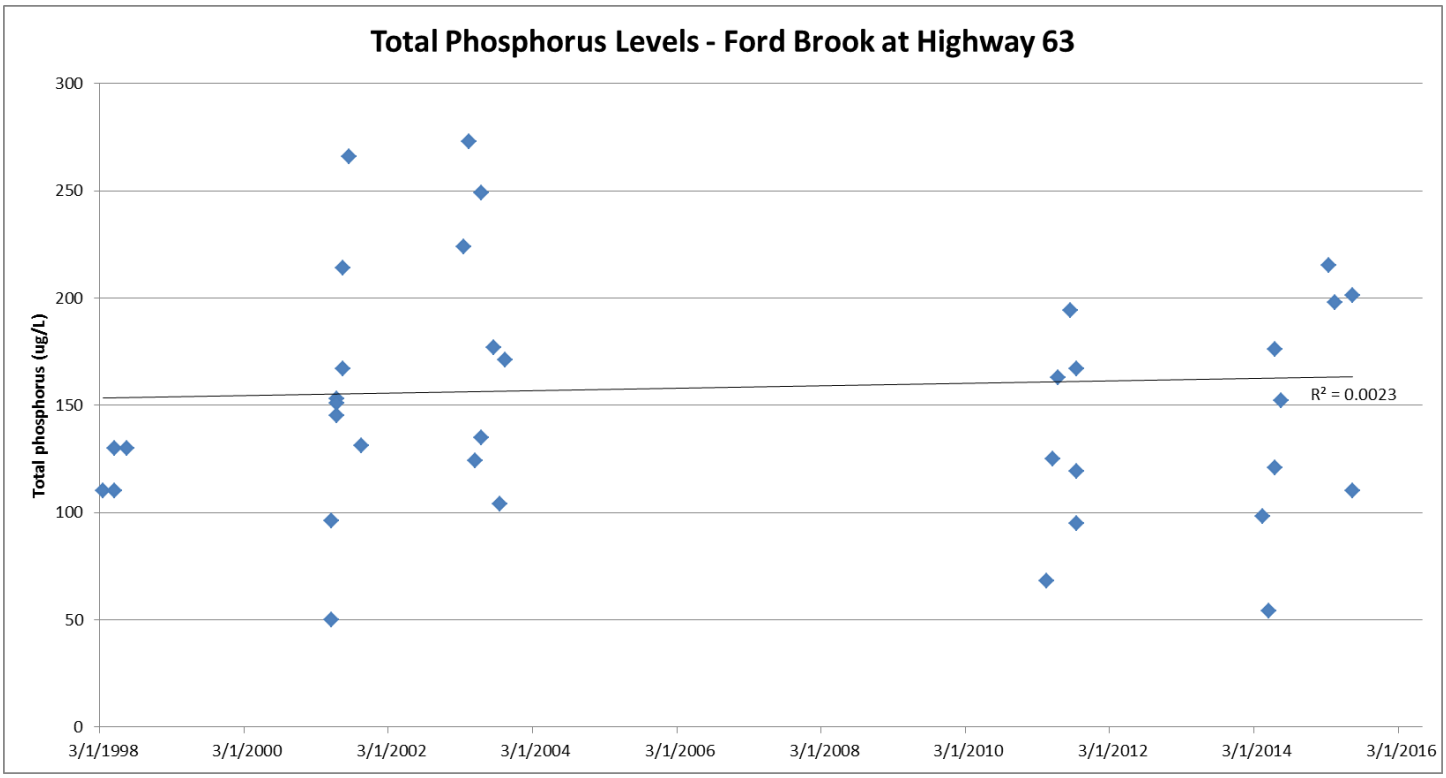


2015 data not yet available online

Did not use data from Rum River at 249th Street or Central Regional Park (one year of data only -1998)


2013 Total Phosphorus and Ammonia - Seelye Brook at CR7
350
300
250
200
150
100
50
0
4/30/2013
5/7/2013
5/14/2013
5/21/2013
5/28/2013
6/4/2013
6/11/2013
6/18/2013
6/25/2013
7/2/2013
7/9/2013
7/16/2013
7/23/2013
7/30/2013
8/6/2013
8/13/2013
8/20/2013
8/27/2013
9/3/2013
9/10/2013
9/17/2013
9/24/2013
Sample Date
R² = 0.008
R² = 0.6955
TP (ug/L)
Nitorgen, Ammonia (mg/L)
Linear (TP (ug/L))
Linear (Nitorgen, Ammonia (mg/L))


Total Phosphorus Levels - Seelye Brooke at CR 7
300
250
200
150
100
50
0
Total phosphorus (ug/L)
4/30/2013
4/30/2014
4/30/2015
R² = 0.0387


Total Phosphorus Levels - Ford Brook at Highway 63
Total phosphorus (ug/L)
300
250
200
150
100
50
0
3/1/1998
3/1/2000
3/1/2002
3/1/2004
3/1/2006
3/1/2008
3/1/2010
3/1/2012
3/1/2014
3/1/2016
R² = 0.0023

APPENDIX D

URRWMO Standards, Regulations, and Operations

URRWMO Standards Regulations and Operations

Appendix D

The URRWMO has established the following regulations and operations to manage water resources, which will affect the public, developers, member community staff and Councils within the URRWMO. The standards developed in this strategy outline specific elements that are required to be implemented through a program at the local level. The URRWMO reviews the implementation of this program with the member communities to determine compliance. Items are grouped into three categories: Development Standards, Local Surface Watershed Plan Standards, and Wetlands and Water Quality Standards.

A complete listing of the 'Water Quality Standards', 'Wetland Standards' and 'Stormwater Infiltration Standards' (adopted February 3rd, 2009) can be found on the URRWMO Website: http://www.urrwmo.org/watershed-management-plans-reports.html

Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Development Standards					
D-1 (L-4)	Applicability The URRWMO requires member communities to enforce all erosion and sedimentation control plans for all new developments and redevelopments one acre and larger in size.	Member communities, Developers			X
D-2	Peak Discharge Rate Control Future discharge rates from new development and redevelopment will, at a minimum, not exceed the existing discharge rates for the 2-, 10-, and 100-year events.	Member communities, Developers			X
D-3	Water Quality Treatment Treatment of storm water to NURP guidelines is required prior to storm water discharge to a lake, stream, or wetland and prior to discharge from the site as part of development. The NURP guidelines for the design of storm water treatment basins are as follows: a. A permanent pool ("dead storage") volume below the principal spillway (normal outlet) which shall be greater than or equal to the runoff from a 2.5-inch storm over the entire contributing drainage area assuming full development. In no case should the dead storage be less than 1800 cubic feet of storage below the outlet pipe for each acre that drains to the basin. b. A permanent pool average depth (basin volume/basin area) which shall be > 3 feet, with a maximum depth of < 10 feet. c. An emergency spillway (emergency outlet) adequate to control the one percent frequency/critical duration rainfall event.	Developers, Member communities			X

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Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Development Standards (cont.)					
D-3 (cont.)	Water Quality Treatment (cont.) d. Basin side slopes above the normal water level shall be no steeper than 4:1, and preferably flatter. A basin shelf with a minimum width of 10 feet and 1 foot deep below the normal water level is recommended to enhance wildlife habitat, reduce potential safety hazards, and improve access for long-term maintenance. e. To prevent short-circuiting, the distance between major inlets and the normal outlet shall be maximized. f. The URRWMO encourages storm water pond design to include habitat enhancement and aesthetic features of the pond. This includes providing upland buffers around the ponds, seeding the area with native vegetation, and designing the slopes flatter than 4:1. g. The URRWMO requires skimmers, submerged outlets, or other devices in the construction of new pond outlets and the addition of skimmers to existing systems whenever feasible and practical. The designs shall provide for skimmers that extend a minimum of 4 inches below the water surface and minimize the velocities of water passing under the skimmer to less than 0.5 feet per second for rainfall events having a 99% frequency.	Developers, Member communities			X

URRWMO Standards Regulations and Operations

Appendix D

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Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Development Standards (cont.)					
D-4	Infiltration and Volume Control For formally identified "special waters" as defined in the NPDES general stormwater permit for construction activities, the permanent stormwater management system must be designed such that the pre and post project runoff rate and volume from the 1 and 2 year 24 hour precipitation events remains the same. NPDES permit also requires that volume of water from a site can be released at no more than 5.66 cfs per acre of surface area of the pond. The URRWMO requires infiltration of treated storm water whenever a development or redevelopment project increases storm water volume runoff, provided that past and existing land use practices do not have a significant potential to contaminate the storm water runoff and the soil characteristics are suitable for infiltration. See also the adopted Infiltration Standards on the URRWMO website.	Developers, Member communities			X
D-5	Stormwater Conveyance Design a. The design of all major storm water storage facilities shall attempt to accommodate a critical duration event with a 1% chance of occurrence. b. New storm sewer systems shall be designed to accommodate discharge rates with a 10% chance of occurrence. The 10% storm event is defined as having an MSE 3 MN distribution of 4.21" of rainfall over a 24- hour period (based on NOAA 14 data) for Anoka County. c. Newly constructed storm water management ponds that are constructed as part of private development shall be placed in drainage and utility easements dedicated to the member community.	Developers, Member communities			X

URRWMO Standards Regulations and Operations

Appendix D

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Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Development Standards (cont.)					
D-6	Landlocked Basins Landlocked depressions that presently do not have a defined outlet and do not typically overflow may be allowed a positive outlet to protect adjacent properties. This outlet must be in conformance with an approved Local Plan, demonstrate that downstream properties are not adversely affected by the flows, and be in conformance with current wetland regulations. If an outlet is not available or provided for a landlocked basin, the area shall be modeled to accommodate a back-to-back 100- year, 24-hour rainfall event; and the 100-year, 10-day runoff event. The highest water elevation in the basin shall be the 100-year high-water level.	Member communities			X
D-7	New Development Draining Directly to Lake George Lake Goerge is a priority waterbody for the URRWMO. The Lake George Water Quality Improvement Assessment report indicates that under 2030 future land use conditions (assuming no BMPs are installed) the lake will see an 65% increase in TP. Therefore, any new development that drains directly to Lake George will require pre- and post- development TP and runoff volume and rates to be the same.	Member communities, Developers			X

URRWMO Standards Regulations and Operations

Appendix D

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Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Local Surface Water Management Plan Standards					
L-1	Each member community is responsible for developing, adopting, and implementing a local water resource management plan in conformance with Minnesota Rules 8410 and the URRWMO Plan.	Member communities			X
L-2	The URRWMO shall review local water management plans and evaluate their consistency with the Watershed Plan. All local water management plans shall be consistent with the URRWMO Watershed Management Plan. In cases where surface water impacts or the source of impacts transcend municipal boundaries, or the community is found to not be in compliance with this plan, the URRWMO shall review such problems and provide direction to member communities for resolution. Member communities shall have two years from the date of the Board of Water and Soil Resource's approval of this Plan to adopt their local water management plans.	Review, agencies, Member communities	X		X

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Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Local Surface Water Management Plan Standards (cont.)					
L-3	Member communities shall prepare and submit an annual status report to the URRWMO by June 1 of each year reviewing the status of their local plans, the status of the implementation of their plans, and a review of the implementation of the policies that are outlined in the URRWMO plan. This will be similar to the MS4 reports that some member communities are required to submit to the MPCA. Member communities shall prepare and submit an annual status report to the URRWMO by June 1 of each year reviewing the status of their local plans.	Member communities	X		X
L-4	The URRWMO requires member communities to enforce all erosion and sedimentation control plans for all new developments and redevelopments one acre and larger in size.	Developers, member communities			X
L-5	The URRWMO requires member communities to adopt an erosion and sediment control ordinance. The ordinance should require measures similar to those of the MPCA Best Management Practices (BMPs).	Member communities			X
L-6	The URRWMO shall require, in conformance with the MPCA NPDES rules, the submission and implementation of erosion and sediment control plans to the member community for the prevention of erosion and sedimentation from land disturbance activities of one acre or more in size. These plans shall conform to the general criteria set outlined in the Minnesota Pollution Control Agency "Protecting Water Quality in Urban Areas", Erosion Control Ordinance, and the NPDES Construction Site permit. http://www.pca.state.mn.us/publications/wq- strm2-51.doc	Member communities, developers			X

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Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Local Surface Water Management Plan Standards (cont.)					
L-7	All member communities within the URRWMO shall adopt a shoreland ordinance in compliance with Minnesota Rules, Chapter 6120.2500 through 6120.3900. This process should be completed in cooperation with the DNR.	Member communities, developers			X
L-8	a. The URRWMO requires member communities and involved agencies to manage the land use within the 100-year flood level as designated by the National Flood Insurance Program Flood Insurance Rate Maps (FIRM). b. If FIRM maps for a member community are not available or are inaccurate, the URRWMO shall require the regional (100- year) flood elevations for the area to be established by the member community or the proposer of land use alterations. c. The URRWMO shall prohibit encroachment into floodways. d. The lowest floor elevation of all development, including basements, shall be required to be at least 1 foot above the 100-year high water level or regional flood level for the adjacent water or wetland. e. All member communities shall adopt, as a minimum, a floodplain ordinance that conforms to Minnesota Rules, Chapter 6120.5000.	Member communities			X
L-9 (W-1)	The URRWMO will not undertake the Local Government Unit (LGU) role for implementation of Wetland Conservation Act (WCA) Rules. This responsibility will remain with the member communities or Mn/DOT.	Member communities, Mn/DOT			X (or Mn/DOT)
L-10	A wetland management plan is required to be developed by the member communities as part of their local water resource management plan.	Member communities	X		X
L-11	The URRWMO will require member communities to develop and implement wetland buffer standards.	Developers, Member communities	X		X

The URRWMO has established the following regulations and operations to manage water resources, which will affect the public, developers, member community staff and Councils within the URRWMO. The standards developed in this strategy outline specific elements that are required to be implemented through a program at the local level. The URRWMO reviews the implementation of this program with the member communities to determine compliance. Items are grouped into three categories: Development Standards, Local Surface Watershed Plan Standards, and Wetlands and Water Quality Standards.

A complete listing of the 'Water Quality Standards', 'Wetland Standards' and 'Stormwater Infiltration Standards' (adopted February 3rd, 2009) can be found on the URRWMO Website: http://www.urrwmo.org/watershed-management-plans-reports.html

Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Local Surface Water Management Plan Standards (cont.)					
L-12	The URRWMO will encourage member communities to develop spill prevention, control, and counter measure plans that are consistent with state and/or federal regulations such as Minnesota Statutes 115E and the Federal Oil Pollution Act 33USCA Sec. 2701-2761.	Member communities			X
L-13	The URRWMO requires that member communities eliminate illegal connections to each community's storm water conveyance system.	Member communities, public			X
L-14	The URRWMO requires that the design, installation and inspection of individual sewage treatment systems shall be in compliance with Minnesota Rules Chapter 7080 for all member communities.	Member communities, developers, residents			X
L-15	Each community will be responsible to perform maintenance measures to assure proper function of public drainage system, with the exception of County ditches.	Member communities			X
L-16	The URRWMO will require that member communities inspect storm water treatment basins at least every 5 years and sump catch basins/manholes every year. Maintenance shall be conducted as necessary. Maintenance activities undertaken by member communities shall be included in the annual report to the URRWMO.	Member communities			X
L-17	The URRWMO requires sweeping of urban section streets with curb and gutter once annually in all areas, and twice annually in priority areas. Priority areas shall be areas that drain directly to high public use water bodies and/or high quality wetlands without pretreatment of storm water runoff. Roadside ditches in rural areas will constitute treatment.	Member communities			X

URRWMO Standards Regulations and Operations

Appendix D

The URRWMO has established the following regulations and operations to manage water resources, which will affect the public, developers, member community staff and Councils within the URRWMO. The standards developed in this strategy outline specific elements that are required to be implemented through a program at the local level. The URRWMO reviews the implementation of this program with the member communities to determine compliance. Items are grouped into three categories: Development Standards, Local Surface Watershed Plan Standards, and Wetlands and Water Quality Standards.

A complete listing of the 'Water Quality Standards', 'Wetland Standards' and 'Stormwater Infiltration Standards' (adopted February 3rd, 2009) can be found on the URRWMO Website: http://www.urrwmo.org/watershed-management-plans-reports.html

Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Local Surface Water Management Plan Standards (cont.)					
L-18 (W-3)	The URRWMO will conduct water quantity and quality studies to understand baseline conditions and to periodically update the original database in order to set criteria and appropriately review the compliance of member communities with the existing plan criteria. Where problems are identified, the URRWMO will require member communities to conduct studies to understand the problem and to develop corrective management strategies.	Review agencies, Member communities, public	X	X	X
Wetlands and Water Quality Standards					
W-1 (L-9)	The URRWMO will not undertake the Local Government Unit (LGU) role for implementation of Wetland Conservation Act (WCA) Rules. This responsibility will remain with the member communities or Mn/DOT.	Member communities, Mn/DOT			X (or Mn/DOT)
W-2	The URRWMO defers the responsibility of working with the MPCA to develop Total Maximum Daily Load (TMDL) studies on the listed impaired waters in the watershed to the member communities who drain to impaired waters.	Member communities			X
W-3 (L-18)	The URRWMO will conduct water quantity and quality studies to understand baseline conditions and to periodically update the original database in order to set criteria and appropriately review the compliance of member communities with the existing plan criteria.	Review agencies, Member communities, public	X	X	X
W-4	The Anoka Conservation District shall act as a depository and coordinator for the collection of water quality data to assure consistency and comparability of data.	Review agencies, Member communities, public		X	
W-5	Wetland excavation for the enhancement of wildlife habitat will only be allowed if the project proposer applies for a permit through the member community and the excavation is in conformance with the Wetland Conservation Act as well as guidance from the Board of Water and Soil Resources, Department of Natural Resources, and US Army Corps of Engineers.	Member communities, public, developers		X	X

URRWMO Standards Regulations and Operations

Appendix D

The URRWMO has established the following regulations and operations to manage water resources, which will affect the public, developers, member community staff and Councils within the URRWMO. The standards developed in this strategy outline specific elements that are required to be implemented through a program at the local level. The URRWMO reviews the implementation of this program with the member communities to determine compliance. Items are grouped into three categories: Development Standards, Local Surface Watershed Plan Standards, and Wetlands and Water Quality Standards.

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Standard No.	Standards	Responsibility for Implementation			
		Target Audience	URRWMO	ACD (by Contract)	Member Community
Wetlands and Water Quality Standards (cont.)					
W-6	The URRWMO will not undertake the Local Government Unit (LGU) role for implementation of Wetland Conservation Act (WCA) Rules. This responsibility will remain with the member communities or Mn/DOT.	Member communities, Mn/DOT			X (or Mn/DOT)

APPENDIX E

Annual Activity Report to the URRWMO

Annual Activity Report

Upper Rum River

Watershed Management Organization

Submit to:
Upper Rum River WMO
19900 Nightingale Street NW
Cedar, MN 55011

Date Due:
Feb 15 report for the previous calendar year

Background

The URRWMO Watershed Management Plan sets minimum standards for protection and management of water resources. It allows member cities to accomplish many of these in a manner that best suits them. This report is a means for the URRWMO to monitor compliance and stay informed about issues in each member community. For communities, the report serves as a check-list of needed accomplishments.

Throughout this form, the Table Numbers in parentheses refer to the 2019 URRWMO Watershed Management Plan, where you can find more information pertinent to each section of this form.

Contact Information and Meeting Attendance

City: _____

Contact Person: _____

Phone #: _____

Reporting Year: _____ Date Submitted: _____

URRWMO Board Representative: _____

Board Rep. Email: _____

and dates of URRWMO Meetings Attended: _____

URRWMO Board Alternate: _____

Board Alt. Email: _____

and dates of URRWMO Meetings Attended: _____

Local Water Plan

Has your Local Water Plan been updated for compliance with the URRWMO Watershed Management Plan adopted in 2019?

The Plan requires all member communities to comply by 2020 (Table 5-3, Strategy ID #32)
Please review the Watershed Management Plan in its entirely, paying specific attention to timelines included within Table 5-3: URRWMO 2019-2028 Strategies and Implementation Schedule.

- ◯ Not Started — Anticipated Start/Completion Dates: _____
- ◯ Preparing — Anticipated Completion Date: _____
- ◯ Completed & Implementing — Completion Date: _____

Ordinances and Control Measures

The URRWMO Watershed Management Plan requires review of the following ordinances and regulatory controls -- and specifies minimum contents and standards. Please mark those that your City has adopted consistent with the URRWMO Plan and list the review date.

The Plan requires all member communities to review their ordinances by 2020 (Table 5-3)

	Ordinance	Review Date	Regulations/Minimum Standards URRWMO Goal & Strategy ID (Tables 4-1 and 5-3) Website for State Regulations
☐	Construction Site Erosion Control Ordinance		PCA Minimum Standards and those that appear in Appendix D of the URRWMO Plan Goal F.2; Strategy ID #23 https://www.pca.state.mn.us/sites/default/files/wq-strm2-80a.pdf
☐	Post-Construction Stormwater Management Ordinance Enforce rate control and infiltration requirements Enforce post development stormwater quality treatment practices		PCA Minimum Standards and those that appear in Appendix D of the URRWMO Plan Goal A.1, B.1, and B.2; Strategy IDs #1 and #6 https://www.pca.state.mn.us/sites/default/files/wq-strm2-80a.pdf
☐	Floodplain Management Ordinance		State Regulations Goal A.2; Strategy ID #3 https://www.dnr.state.mn.us/waters/watermgmt_section/floodplain/regulations.html
☐	Wetland Ordinance or Management Plan Local Government Unit (LGU) implement Wetland Conservation Act		Wetland Conservation Act Goal C.1; Strategy ID #18 http://www.bwsr.state.mn.us/wetlands/wca/CH8420-August2009.pdf
☐	Shoreland Management Ordinance		Minnesota's Shoreland Management Program Goal G.2; Strategy ID #25 https://www.dnr.state.mn.us/waters/watermgmt_section/shoreland/regulations.html
☐	Wellhead Protection Plan		Minnesota Wellhead Protection Rule Goal D.1; Strategy ID #20 https://www.pca.state.mn.us/water/wellhead-and-source-water-protection-programs

If available, please list the website links for any ordinances/plans below:
If your city does not have one or more of the above or they do not meet the minimum contents and standards, please describe the current plans to develop them.

Wetland Buffers

Note that the URRWMO Technical Advisory Committee (TAC) will discuss the URRWMO wetland buffer standards in 2020 (Table 5-3, Strategy ID #19). Any revisions to the standards will be distributed to member communities at that time.

Prior to the TAC meeting and any potential revisions to the wetland buffer standards, please refer to the Wetland Standards amended on February 3, 2009 as posted on the URRWMO website.
http://www.urrwmo.org/images/URRWMO/Plans_Reports/Amendment-Wetland%20Standards_final.pdf

What buffer widths has your city adopted for each of the URRWMO wetland classifications? See the aforementioned Wetland Standards for more specifics.

- ☐ High Priority Wetlands (URRWMO requires 25 ft minimum)
- ☐ Moderate Priority Wetlands (URRWMO requires 20 ft minimum)
- ☐ Low Priority Wetlands (URRWMO requires 15 ft minimum)
- ☐ Use Wetlands (no URRWMO minimum)

If your city standards are inconsistent with the URRWMO requirements, describe plans to address this:

Operations and Maintenance

The URRWMO requires cities to complete a physical inspection of all Best Management Practices (BMPs) and identify deficiencies and potential retrofits to improve performance. Complete the table below for each BMP managed by the City. Include additional tables/documentation if potential retrofits are identified.

The Plan requires all member communities to complete their inspections by 2021 (Table 5-3, Strategy ID #5)

BMP Name/ID	Notes	Date of Inspection	Potential Retrofit (Y/N)? If yes, please provide more details.

Operations and Maintenance

The URRWMO requires an inventory of all culverts within the WMO. Survey results, observations and recommendations for the entire WMO will be provided back to member communities and Anoka Conservation District upon completion of the inventory.

The Plan requires the culvert inventory to be completed by complete their inspections by 2022 (Table 5-3, Strategy ID #22)

☐ Has your city participated in the culvert inventory?

Anticipated Start/Completion Dates: _____

Operations and Maintenance

The URRWMO requires that the floodplain storage volumes are maintained to provide adequate conveyance for flood flows. Please document in the table below the volume of floodplain fill and compensatory storage excavated for projects completed within the reporting year.

The Plan requires documentation of floodplain fill on an annual basis (Table 4-1, Goal A.2)

Project Name	Project Location	Volume of Fill Placed	Compensatory Storage Excavated

Education and Outreach

The URRWMO operates a public education and outreach program. Please indicate each topic covered by educational materials disseminated by your city in the last year. This may have included newsletters, brochures, website postings, workshops or other education efforts aimed at fostering responsible water quality management practices among residents.

The Plan requires all member communities participate with education and outreach on an annual basis (Table 4-1 Goal H.3, Table 5-3, Strategy ID #24 and #29)

- ☐ Wetland Buffers
- ☐ Water Quality Monitoring
- ☐ Groundwater Protection
- ☐ Controlling invasive species
- ☐ Water Conservation
- ☐ Updates of URRWMO Projects
- ☐ Hazardous waste disposal
- ☐ Yard waste management
- ☐ Agricultural BMPs
- ☐ Pet waste disposal
- ☐ Activities of the URRWMO
- ☐ Summary of Subwatershed Assessment Studies (SWASs) within URRWMO

Estimate the number of residents receiving educational materials: _____

Have elected and appointed officials not on the URRWMO Board attended a URRWMO meeting? If yes, how many individuals/meetings? _____

Number of reports/summaries given to the member City Council on URRWMO activities. Please give the date of the Council meeting. _____

Signature

By typing or signing my name in the box below, I certify the above statements to be true and correct, to the best of my knowledge, and that information can be used for the purposes of processing the URRWMO Annual Report.

Name: _____

Title: _____

Date: _____

Summary of Wetland Inventory and Classification

Upper Rum River

Watershed Management Organization

Submit to:
Upper Rum River WMO
19900 Nightingale Street NW
Cedar, MN 55011

Date Due:
Feb 15
Submit with Annual Report to the URRWMO

Background

State Rule 8410.0060 requires the URRWMO to inventory the functional values of wetlands. The URRWMO will meet this requirement by keeping a record of wetlands inventoried through city permitting processes. Please fill out this form for each wetland inventories. Submit to the URRWMO with your annual report.

Location

City: _____

Town/Range/Section: _____

Attach a map indicating the wetland location. A screen capture from an online mapping application (e.g. Google, Anoka County GIS website, etc.) is appropriate. Include an aerial image and adjacent road names for context with a clear indication of the wetland location.

Description

Delineated Wetland Size (Acres): _____

Wetland Type: _____

MnRAM Wetland Function and Value Results

Indicate MnRAM score: ◌ Excellent ◌ High ◌ Medium ◌ Low

Water Quality Treatment: ☐ Downstream Water Quality Protection ☐ Maintenance of wetland water quality

Wildlife Habitat: Vegetative diversity/integrity ☐ Maintenance of characteristic wildlife habitat structure ☐ Maintenance of characteristic amphibian habitat ☐

Scores for all other wetland functions and values are not required, but may be included if available

Classification

Wetland Classification Determination: High Priority Wetland ◌ Moderate Priority Wetland ◌ Low Priority Wetland ◌ Use Wetland ◌

APPENDIX F

URRWMO Guidance Documents Adopted by Reference

URRWMO Guidance Documents Adopted by Reference

Appendix F

Guidance documents help the URRWMO prioritize and select projects that advance the goals outlined within this plan. The URRWMO has adopted by reference all of the guidance documents within Appendix F. When future guidance documents are completed or existing guidance documents are updated, the URRWMO Board will take action to formally adopt each guidance document and amend this plan (following Minnesota Rules 8410.0140 Subp. 2) and update Appendix F to identify all guidance documents adopted by the URRWMO.

All Guidance Documents's will clearly describe the project(s), the measureable goals to be achieved, the estimated total project cost. Ideally, gudiance documents will also include the URRWMO's cost, any outside funding sources, and the project partners.

Adoption Date	Guidance Document Name	Description	Weblink
Dec-18	Lake George Water Quality Improvement Assessment Phase 1: Lakeshed Analysis	Monitoring in Lake George has revealed declining water quality trends. The ACD is finalizing a diagnostic study of potential water quality improvement projects around the lake. The project prioritization is still ongoing at this time, but possible projects will include: • Iron enhanced sand bench within the Lake George Regional Park • Replace/repair Ditch 19 weir. • Numerous lakeshore restorations. • Wetland restorations, primarily north of the lake. • Prevent increases in stormwater inflow to the lake by: o Requiring retention of stormwater in new developments. o Keeping landlocked areas landlocked. o Consider MIDS or similar stormwater standards within the lake's watershed. o Ensure culverts are replaced with culverts of the same size and elevation. o Minimize ditch cleaning that enhances water delivery to the lake.	http://www.urrwmo.org/
Dec-18	Rum River Field Assessment	Portions of the Rum River are experiencing significant bank erosion, which leads to reduced water quality. Some bank erosion is natural, but healthy levels of erosion are relatively slow and on a small scale in stable river system. Erosion can be accelerated by a variety of factors and result in higher sediment loads within the stream. ACD conducted a streambank inventory in 2017 and another in 2018 to identify sites with high levels of erosion, and soliciting interest from private landowners to participate in future projects.	http://www.urrwmo.org/

URRWMO Guidance Documents Adopted by Reference

Appendix F

Guidance documents help the URRWMO prioritize and select projects that advance the goals outlined within this plan. The URRWMO has adopted by reference all of the guidance documents within Appendix F. When future guidance documents are completed or existing guidance documents are updated, the URRWMO Board will take action to formally adopt each guidance document and amend this plan (following Minnesota Rules 8410.0140 Subp. 2) and update Appendix F to identify all guidance documents adopted by the URRWMO.

All Guidance Documents's will clearly describe the project(s), the measureable goals to be achieved, the estimated total project cost. Ideally, gudiance documents will also include the URRWMO's cost, any outside funding sources, and the project partners.

Adoption Date	Guidance Document Name	Description	Weblink
Dec-18	City of St. Francis Stormwater Retrofit Analysis	The City of St. Francis coordinated with ACD to conduct a city-wide stormwater BMP retrofit analysis. The report identified and ranked seventeen (17) water quality improvement projects all of which drain to the Rum River. Projects were ranked by nutrient reduction (TP and TSS) and also assigned an estimated project cost and annual maintenance fees. This allows for project prioritization on a rating scale (e.g. $ per lb TP removed per year). Since all of the BMPs drain to the Rum River, these projects would provide a water quality benefit to all of the communities downstream.	http://www.urrwmo.org/

Locations of future Subwatershed Assessment Studies (SWAS) will be recommended by the TAC and selected by the URRWMO Board with consideration of these priority subwatersheds:

Highest priority
Rum River direct drainage (minor watershed #21095)
Pickerel Lake
Ford Brook

Medium priority
Seelye Brook
East Twin Lake
Others as recommended by the TAC

If future subwatersheds are identified by the TAC for SWAS, the URRWMO can amend this plan (following Minnesota Rules 8410) and update Appendix F with the priority subwatersheds.

APPENDIX P

Upper Rum River Watershed Management Organization
Wetland Standards

Upper Rum River Watershed Management Organization (URRWMO) Watershed Management Plan

Wetland Standards

The following standards were recommended by a Technical Advisory Committee (TAC) including representation from each URRWMO member city. Each member community must update their local water plan and ordinances for consistency with this amendment within two years of the effective date.

Date of URRWMO Board Approval of Wetland Standards: September 1, 2020

Effective date: _____ (date of URRWMO plan amendment)

Goals:

- Filter runoff through a vegetated buffer.
- Prevent disturbance within the wetland.

Standards:

- **Applicability:** These standards apply to:
  - Subdivision or development of three or more lots OR
  - >1 ac disturbance creating new impervious surfaces.
- **Buffer width**: A minimum 16.5 ft perennially vegetated buffer is required at the wetland boundary. Note that a 50 ft perennial vegetated buffer is required by State law for public waters.
- **Protections during construction:** The delineated wetland, but not necessarily the buffer area, must be protected during construction with appropriate perimeter erosion control.
- **Buffer seeding:** Any areas where vegetation is removed in the buffer area during construction must be reseeded with a native seed mix, and the applicant is responsible for maintenance or reseeding for 3 years through a legally enforceable agreement with the city/township. These requirements do not apply if the buffer area vegetation is not disturbed during construction.
- **Buffer vegetation:** Buffer shall be a perennial, unmowed vegetation creating continuous cover. Existing vegetation may be used.

- **Buffer within an easement:** For subdivisions of 3 or more lots, the buffer shall be within a drainage and utility easement with the community's restrictions on structures and other activities in a drainage and utility easement.
- **Buffer averaging:** For linear projects such as roadways or other special circumstances as determined by the city, the buffer width may vary if it achieves the minimum width on average.
- **Stormwater discharge to wetlands:** Discharged stormwater must be treated to URRWMO stormwater standards.
- **Water level bounce:** Allowable water level bounce in wetlands must follow MPCA guidance document - *Stormwater and Wetlands: Planning and Evaluation Guidelines for Addressing Potential Impacts of Urban Stormwater and Snowmelt Runoff on Wetlands*," Minnesota Pollution Control Agency 1997, or subsequent updates.
- **Variances:** Buffer variances may be granted in any of the following conditions:
    - Small wetlands where the entire wetland area is less than or equal to the area of wetland impact allowed without replacement as *de minimis* under the MN Wetland Conservation Act. It is acceptable to have no buffers in these cases.
    - Part of the required buffer is outside of the wetland's watershed. Due to topography near the wetland, runoff flows away from and never enters the wetland through surface flows. Variances should only be for that portion of the buffer that would be outside of the wetland's watershed.
    - If drainage is redirected to an area where a buffer is feasible.
    - If the site is not generating stormwater or is using storm water minimizing techniques that also provide habitat value such as rain gardens, vegetated swales, and other Best Management Practices (BMP's) replace the functions of buffers.
    - If the applicant is protecting additional upland, beyond that required by other ordinances or control measures, to connect existing wildlife habitat.
    - Undue hardship, as defined in MN Statutes 462.357, subd. 6, subpart 2.
    - Others as determined by the permitting authority.
    - Roads and other linear projects, except those created as part of new residential or commercial developments.

APPENDIX Q

Shoreland Zoning
Ordinance 92-35

ORDINANCE 92-35

AN ARTICLE RELATING TO SHORELAND ZONING, REPLACING ARTICLE 12-1200.D. OF THE HAM LAKE CITY CODE.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF HAM LAKE, ANOKA COUNTY, MINNESOTA, AS FOLLOWS:

ARTICLE 12-1200.D. OF THE HAM LAKE CITY CODE IS REPEALED, TO BE REPLACED BY THE FOLLOWING NEW ARTICLE 12-1200.D.

SECTION 12-1.0 - STATUTORY AUTHORIZATION AND POLICY

12-1.1 Statutory Authorization

This shoreland ordinance is adopted pursuant to the authorization and policies contained in Minnesota Statutes, Chapter 103F, Minnesota Regulations, Parts 6120.2500 - 6120.3900, and the planning and zoning enabling legislation in Minnesota Statutes, Chapter 462.

12-1.2 Policy

The uncontrolled use of shorelands of the City of Ham Lake, Minnesota affects the public health, safety and general welfare not only by contributing to pollution of public waters, but also by impairing the local tax base. Therefore, it is in the best interests of the public health, safety and welfare to provide for the wise subdivision, use and development of shorelands of public waters. The Legislature of Minnesota has delegated responsibility to local governments of the state to regulate the subdivision, use and development of the shorelands of public waters and thus preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of waters and related land resources. This responsibility is hereby recognized by the City of Ham Lake.

SECTION 12-2.0 GENERAL PROVISIONS AND DEFINITIONS

12-2.1 Jurisdiction

The provisions of this ordinance shall apply to the shorelands of the public water bodies as classified in Section 4.0 of this ordinance.

12-2.2 Compliance

The use of any shoreland of public waters; the size and shape of lots; the use, size, type and location of structures on lots; the installation and maintenance of water supply and waste treatment systems, the grading and filling of any shoreland area; the cutting of shoreland vegetation; and the subdivision of land shall be in full compliance with the terms of this ordinance and other applicable regulations.

12-2.3 Enforcement

The Zoning Officer is responsible for the administration and enforcement of this ordinance. Any violation of the provisions of this ordinance or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with grants of variances or conditional uses) shall constitute a misdemeanor and shall be punishable as defined by law. Violations of this ordinance can occur regardless of whether or not a permit is required for a regulated activity pursuant to Section 12-3.1 of this ordinance.

12-2.4 Interpretation

In their interpretation and application, the provisions of this ordinance shall be held to be minimum requirements and shall be liberally construed in favor of the governing body and shall not be deemed a limitation or repeal of any other powers granted by State Statutes.

12-2.5 Severability

If any section, clause, provision, or portion of this ordinance is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this ordinance shall not be affected thereby.

12-2.6 Abrogation and Greater Restrictions

It is not intended by this ordinance to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance imposes greater restrictions, the provisions of this ordinance shall prevail. All other ordinances inconsistent with this ordinance are hereby repealed to the extent of the inconsistency only.

12-2.7 Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the same meaning as they have in common usage and so as to give this ordinance its most reasonable application. For the purpose of this ordinance, the words "must" and "shall" are mandatory and not permissive. All distances, unless otherwise specified, shall be measured horizontally.

12-2.711 **Accessory structure or facility.** "Accessory

structure" or "facility" means any building or improvement subordinate to a principal use which, because of the nature of its use, can reasonably be located at or greater than normal structure setbacks.

12-2.712 **Bluff.** "Bluff" means a topographic feature such as a hill, cliff, or embankment having the following characteristics (an area with an average slope of less than 18 percent over a distance for 50 feet or more shall not be considered part of the bluff):

(1) Part or all of the feature is located in a shoreland area;

(2) The slope rises at least 25 feet above the ordinary high water level of the waterbody;

(3) The grade of the slope from the toe of the bluff to a point 25 feet or more above the ordinary high water level averages 30 percent or greater; and

(4) The slope must drain toward the waterbody.

12-2.713 **Bluff impact zone.** "Bluff impact zone" means a bluff and land located within 20 feet from the top of a bluff.

12-2.714 **Boathouse.** "Boathouse" means a structure designed and used solely for the storage of boats or boating equipment.

12-2.715 **Building line.** "Building line" means a line parallel to a lot line or the ordinary high water level at the required setback beyond which a structure may not extend.

12-2.716 **Commercial use.** "Commercial use" means the principal use of land or buildings for the sale, lease, rental, or trade of products, goods, and services.

12-2.717 **Commissioner.** "Commissioner" means the commissioner of the Department of Natural Resources.

12-2.718 **Conditional use.** "Conditional use" means a land use or development as defined by ordinance that would not be appropriate generally but may be allowed with appropriate restrictions as provided by official controls upon a finding that certain conditions as detailed in the zoning ordinance exist, the use or development conforms to the comprehensive land use plan of the community, and the use is compatible with the existing neighborhood.

12-2.719 **Deck.** "Deck" means a horizontal, unenclosed platform with or without attached railings, seats, trellises, or other features, attached or functionally related to a principal use or site and at any point extending more than three feet above ground.

12-2.720 **Dwelling site.** "Dwelling site" means a designated location for residential use by one or more persons using temporary or movable shelter, including camping and recreational vehicle sites.

12-2.721 **Dwelling unit.** "Dwelling unit" means any structure or portion of a structure, or other shelter designed as short- or long-term living quarters for one or more persons, including rental or timeshare accommodations such as motel, hotel, and resort rooms and cabins.

12-2.722 **Extractive use.** "Extractive use" means the use of land for surface or subsurface removal of sand, gravel, rock, industrial minerals, other nonmetallic minerals, and peat not regulated under Minnesota Statutes, sections 93.44 to 93.51.

12-2.723 **Forest land conversion.** "Forest land conversion" means the clear cutting of forested lands to prepare for a new land use other than reestablishment of a subsequent forest stand.

12-2.724 **Hardship.** "Hardship" means the same as that term is defined in Minnesota Statutes, Chapter 462.

12-2.725 **Height of building.** "Height of building" means the vertical distance between the highest adjoining ground level at the building or ten feet above the lowest ground level, whichever is lower, and the highest point of a flat roof or average height of the highest gable of a pitched or hipped roof.

12-2.726 **Industrial use.** "Industrial use" means the use of land or buildings for the production, manufacture, warehousing, storage, or transfer of goods, products, commodities, or other wholesale items.

12-2.727 **Intensive vegetation clearing.** "Intensive vegetation clearing" means the complete removal of trees or shrubs in a contiguous patch, strip, row, or block.

12-2.728 **Lot.** "Lot" means a parcel of land designated by plat, metes and bounds, registered land survey, auditors plot, or other accepted means and separated from other parcels or portions by said description for the purpose of sale, lease, or separation.

12-2.729 **Lot width.** "Lot width" means the shortest distance between lot lines measured at the midpoint of the building line.

12-2.730 **Nonconformity.** "Nonconformity" means any legal use, structure or parcel of land already in existence, recorded, or authorized before the adoption of official controls or amendments thereto that would not have been permitted to become established under the terms of the official controls as now written, if the official controls had been in effect prior

to the date it was established, recorded or authorized.

12-2.731 **Ordinary high water level.** "Ordinary high water level" means the boundary of public waters and wetlands, and shall be an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high water level is the elevation of the top of the bank of the channel. For reservoirs and flowages, the ordinary high water level is the operating elevation of the normal summer pool.

12-2.732 **Public waters.** "Public waters" means any waters as defined in Minnesota Statutes, section 105.37, subdivisions 14 and 15.

12-2.733 **Semipublic use.** "Semipublic use" means the use of land by a private, nonprofit organization to provide a public service that is ordinarily open to some persons outside the regular constituency of the organization.

12-2.734 **Sensitive resource management.** "Sensitive resource management" means the preservation and management of areas unsuitable for development in their natural state due to constraints such as shallow soils over groundwater or bedrock, highly erosive or expansive soils, steep slopes, susceptibility to flooding, or occurrence of flora or fauna in need of special protection.

12-2.735 **Setback.** "Setback" means the minimum horizontal distance between a structure, sewage treatment system, or other facility and an ordinary high water level, sewage treatment system, top of a bluff, road, highway, property line, or other facility.

12-2.736 **Sewage treatment system.** "Sewage treatment system" means a septic tank and soil absorption system or other individual or cluster type sewage treatment system as described and regulated in Section 12-5.8 of this ordinance.

12-2.737 **Sewer system.** "Sewer system" means pipelines or conduits, pumping stations, and force main, and all other construction, devices, appliances, or appurtenances used for conducting sewage or industrial waste or other wastes to a point of ultimate disposal.

12-2.738 **Shore impact zone.** "Shore impact zone" means land located between the ordinary high water level of a public water and a line parallel to it at a setback of 50 percent of the structure setback.

12-2.739 **Shoreland.** "Shoreland" means land located within the following distances from public waters: 1,000 feet from the ordinary high water level of a lake, pond, or flowage; and

300 feet from a river or stream, or the landward extent of a floodplain designated by ordinance on a river or stream, whichever is greater. The limits of shorelands may be reduced whenever the waters involved are bounded by topographic divides which extend landward from the waters for lesser distances and when approved by the commissioner.

12-2.740 **Significant historic site.** "Significant historic site" means any archaeological site, standing structure, or other property that meets the criteria for eligibility to the National Register of Historic Places or is listed in the State Register of Historic Sites, or is determined to be an unplatted cemetery that falls under the provisions of Minnesota Statutes, Section 307.08. A historic site meets these criteria if it is presently listed on either register or if it is determined to meet the qualifications for listing after review by the Minnesota state archaeologist or the director of the Minnesota Historical Society. All unplatted cemeteries are automatically considered to be significant historic sites.

12-2.741 **Steep slope.** "Steep slope" means land where agricultural activity or development is either not recommended or described as poorly suited due to slope steepness and the site's soil characteristics, as mapped and described in available county soil surveys or other technical reports, unless appropriate design and construction techniques and farming practices are used in accordance with the provisions of this ordinance. Where specific information is not available, steep slopes are lands having average slopes over 12 percent, as measured over horizontal distances of 50 feet or more, that are not bluffs.

12-2.742 **Structure.** "Structure" means any building or appurtenance, including decks, except aerial or underground utility lines, such as sewer, electric, telephone, telegraph, gas lines, towers, poles, and other supporting facilities.

12-2.743 **Subdivision.** "Subdivision" means land that is divided for the purpose of sale, rent, or lease, including planned unit developments.

12-2.744 **Surface water-oriented commercial use.** "Surface water-oriented commercial use" means the use of land for commercial purposes, where access to and use of a surface water feature is an integral part of the normal conductance of business. Marinas, resorts, and restaurants with transient docking facilities are examples of such use.

12-2.745 **Toe of the bluff.** "Toe of the bluff" means the lower point of a 50-foot segment with an average slope exceeding 18 percent.

12-2.746 **Top of the bluff.** "Top of the bluff" means the higher point of a 50-foot segment with an average slope exceeding 18 percent.

12-2.747 **Variance.** "Variance" means the same as that term is defined or described in Minnesota Statutes, Chapter 462.

12-2.748 **Water-oriented accessory structure or facility.** "Water-oriented accessory structure or facility" means a small, above ground building or other improvement, except stairways, fences, docks, and retaining walls, which, because of the relationship of its use to a surface water feature, reasonably needs to be located closer to public waters than the normal structure setback. Examples of such structures and facilities include boathouses, gazebos, screen houses, fish houses, pump houses, and detached decks.

12-2.749 **Wetland.** "Wetland" means a surface water feature classified as a wetland in the United States Fish and Wildlife Service Circular No. 39 (1971 edition).

SECTION 12-3.0 - ADMINISTRATION

12-3.1 Permits Required

12-3.11 A permit is required for the construction of buildings or building additions (and including such related activities as construction of decks and signs), the installation and/or alteration of sewage treatment systems, and those grading and filling activities not exempted by Section 12-5.3 of this ordinance. Application for a permit shall be made to the Zoning Officer on the forms provided. The application shall include the necessary information so that the Zoning Officer can determine the site's suitability for the intended use and that a compliant sewage treatment system will be provided.

12-3.12 A permit authorizing an addition to an existing structure which may increase the amount of effluent entering an existing identified non-conforming sewage treatment system shall stipulate that an identified nonconforming sewage treatment system, as defined by Section 12-5.8, shall be reconstructed or replaced in accordance with the provisions of this ordinance.

12-3.2 Certificate of Zoning Compliance

The Zoning Officer shall issue a certificate of zoning compliance for each activity requiring a permit as specified in Section 12-3.1 of this ordinance. This certificate will specify that the use of land conforms to the requirements of this ordinance. Any use, arrangement, or construction at variance with that authorized by permit shall be deemed a violation of this ordinance and shall be punishable as provided in Section 12-2.3 of this ordinance.

12-3.3 Variances

12-3.31 Variances may only be granted in accordance with Minnesota Statutes, Chapter 462, as applicable. A variance may not circumvent the general purposes and intent of this

ordinance. No variance may be granted that would allow any use that is prohibited in the zoning district in which the subject property is located. Conditions may be imposed in the granting of a variance to ensure compliance and to protect adjacent properties and the public interest. In considering a variance request, the City Council must also consider whether the property owner has reasonable use of the land without the variance, whether the property is used seasonally or year-round, whether the variance is being requested solely on the basis of economic considerations, and the characteristics of development on adjacent properties.

12-3.32 The City Council shall hear and decide requests for variances in accordance with the rules that it has adopted for the conduct of business. When a variance is approved after the Department of Natural Resources has formally recommended denial in the hearing record, the notification of the approved variance required in Section 12-3.42 below shall also include the board of adjustment's summary of the public record/testimony and the findings of facts and conclusions which supported the issuance of the variance.

12-3.33 For existing developments, the application for variance must clearly demonstrate whether a conforming sewage treatment system is present for the intended use of the property. The variance, if issued, must require reconstruction of a nonconforming sewage treatment system, if the activity for which the variance is needed will result in additional effluent entering such an existing non-conforming sewage treatment system.

12-3.4 Notification to the Department of Natural Resources

12-3.41 Copies of all notices of any public hearings to consider variances, amendments, or conditional uses under local shoreland management controls must be sent to the commissioner or the commissioner's designated representative and postmarked at least ten days before the hearings. Notices of hearings to consider proposed subdivisions/plats must include copies of the subdivision/plat.

12-3.42 A copy of approved amendments and subdivisions/plats, and final decisions granting variances or conditional uses under local shoreland management controls must be sent to the commissioner or the commissioner's designated representative and postmarked within ten days of final action.

12-4.0 - SHORELAND CLASSIFICATION SYSTEM AND LAND USE DISTRICTS

12-4.1 Shoreland Classification System

The public waters of Ham Lake have been classified below consistent with the criteria found in Minnesota Regulations, Part 6120.3300, and the Protected Waters Inventory Map for Anoka County, Minnesota.

12-4.11 The shoreland area for the waterbodies listed in

sections 12-4.12 shall be as defined in section 12-2.744 and as shown on the Official Zoning Map.

12-4.12 Lakes

A. Natural Environment Lakes	Protected Waters Inventory I.D.#
Little Coon Lake	2-48W
Mallard Lake	2-49W
Sec. 9	2-51W
Sec. 30 & 31	2-74W

B. Recreational Development Lakes	Protected Waters Inventory I.D.#
Lake Netta	2-52P
Ham Lake	2-53P

C. General Development Lakes	Protected Waters Inventory I.D.#
Coon Lake	2-42P

12-4.2 Land Use District Descriptions

12-4.21 All land adjacent to any natural environment lake, recreational lake, or general development lake shall be classified as C-A (Conservation/Agriculture), RS-1 (Residential Shoreland-1), RS-2 (Residential Shoreland -2), ML-PUD (Marginal Land Planned Unit Development) as those classifications are established by Article 9 of the Ham Lake City Code. Uses permitted in such zoning districts shall be as prescribed in Article 9. Areas which meet the definition of "Shoreland" as found in Article 12-2.743, but which are not zoned RS-1, RS-2, C-A or ML-PUD, shall be subject to the restrictions and conditions of this Article 12.

12-5.0 - ZONING AND WATER SUPPLY/SANITARY PROVISIONS

12-5.1 Lot Area and Width Standards

The lot area (in square feet) and lot width standards (in feet) for single family dwellings shall be the same as for R-1 Single Family Residential as found in Table 9-2 of Article 9 of the Ham Lake City Code, for RS-1 and RS-2 zones. For C-A and ML-PUD zones, the standards found in Table 9-2 of Article 9 for those classifications shall apply.

12-5.2 Placement, Design, and Height of Structures.

12-5.21 Placement of Structures on Lots. When more than one

setback applies to a site, structures and facilities must be located to meet all setbacks. Where structures exist on the adjoining lots on both sides of a proposed building site, structure setbacks may be altered without a variance to conform to the adjoining setbacks from the ordinary high water level, provided the proposed building site is not located in a shore impact zone or in a bluff impact zone. Structures shall be located as follows.

A. Structure and On-site Sewage System Setbacks (in feet) from Ordinary High Water Level*.

Classes of Public Waters	Setbacks* Structures Unsewered	Structures Sewered	Sewage Treatment System
Lakes			
Natural Environment	150	150	150
Recreational Development	100	75	75
General Development	75	50	50

*One water-oriented accessory structure designed in accordance with Section 12-5.22 of this ordinance may be set back a minimum distance of ten (10) feet from the ordinary high water level.

B. Additional Structure Setbacks. The following additional structure setbacks apply, regardless of the classification of the waterbody:

Setback From:	Setback (in feet)
(1) top of bluff;	30
(2) unplatted cemetery;	50
(3) right-of-way line of federal, state, or county highway; and	50
(4) right-of-way line of town road, public street, or other roads or streets not classified.	20

C. Bluff Impact Zones. Structures and accessory facilities, except stairways and landings, must not be placed within

bluff impact zones.

D. Uses Without Water-oriented Needs. Uses without water-oriented needs must be located on lots or parcels without public waters frontage, or, if located on lots or parcels with public waters frontage, must either be set back double the normal ordinary high water level setback or be substantially screened from view from the water by vegetation or topography, assuming summer, leaf-on conditions.

12-5.22 Design Criteria For Structures.

A. High Water Elevations. Structures must be placed in accordance with any floodplain regulations applicable to the site. Where these controls do not exist, the elevation to which the lowest floor, including basement, is placed or flood-proofed must be determined as follows:

(1) for lakes, by placing the lowest floor at a level at least three feet above the highest known water level, or three feet above the ordinary high water level, whichever is higher;

(2) water-oriented accessory structures may have the lowest floor placed lower than the elevation determined in this item if the structure is constructed of flood-resistant materials to the elevation, electrical and mechanical equipment placed above the elevation and, if long duration flooding is anticipated, the structure is built to withstand ice action and wind-driven waves and debris.

B. Water-oriented Accessory Structures. Each lot may have one water-oriented accessory structure not meeting the normal structure setback in Section 12-5.21 of this ordinance if this water-oriented accessory structure complies with the following provisions:

(1) the structure or facility must not exceed ten feet in height, exclusive of safety rails, and cannot occupy an area greater than 250 square feet. Detached decks must not exceed eight feet above grade at any point;

(2) the setback of the structure or facility from the ordinary high water level must be at least ten feet;

(3) the structure or facility must be treated to reduce visibility as viewed from public waters and adjacent shorelands by vegetation, topography, increased setbacks or color, assuming summer, leaf-on conditions;

(4) the roof may be used as a deck with safety rails, but must not be enclosed or used as a storage area;

(5) the structure or facility must not be designed or used for human habitation and must not contain water supply or sewage treatment facilities; and

(6) as an alternative for general development and recreational development waterbodies, water-oriented accessory structures used solely for watercraft storage, and including storage of related boating and water-oriented sporting equipment, may occupy an area up to 400 square feet provided the maximum width of the structure is 20 feet as measured parallel to the configuration of the shoreline.

C. Stairways, Lifts, and Landings. Stairways and lifts are the preferred alternative to major topographic alterations for achieving access up and down bluffs and steep slopes to shore areas. Stairways and lifts must meet the following design requirements:

(1) stairways and lifts must not exceed four feet in width on residential lots. Wider stairways may be used for commercial properties, public open-space recreational properties, and planned unit developments;

(2) landings for stairways and lifts on residential lots must not exceed 32 square feet in area. Landings larger than 32 square feet may be used for commercial properties, public open-space recreational properties, and planned unit developments;

(3) canopies or roofs are not allowed on stairways, lifts, or landings;

(4) stairways, lifts, and landings may be either constructed above the ground on posts or pilings, or placed into the ground, provided they are designed and built in a manner that ensures control of soil erosion;

(5) stairways, lifts, and landings must be located in the most visually inconspicuous portions of lots, as viewed from the surface of the public water assuming summer, leaf-on conditions, whenever practical; and

(6) facilities such as ramps, lifts, or mobility paths for physically handicapped persons are also allowed for achieving access to shore areas, provided that the dimensional and performance standards of subitems (1) to (5) are complied with in addition to the requirements of Minnesota Regulations, Chapter 1340.

D. Significant Historic Sites. No structure may be placed on a significant historic site in a manner that affects the values of the site unless adequate information about the site has been removed and documented in a public repository.

E. Steep Slopes. The Zoning Officer must evaluate possible soil erosion impacts and development visibility from public waters before issuing a permit for construction of sewage treatment systems, roads, driveways, structures, or other improvements on steep slopes. When determined necessary, conditions must be attached to issued permits to prevent erosion and to preserve existing vegetation screening of structures, vehicles, and other facilities as viewed from the surface of public waters, assuming summer, leaf-on vegetation.

12-5.23 Height of Structures. All structures in residential districts, except churches and nonresidential agricultural structures, must not exceed 25 feet in height.

12-5.3 Shoreland Alterations

Alterations of vegetation and topography will be regulated to prevent erosion into public waters, fix nutrients, preserve shoreland aesthetics, preserve historic values, prevent bank slumping, and protect fish and wildlife habitat.

12-5.31 Vegetation Alterations.

A. Vegetation alteration necessary for the construction of structures and sewage treatment systems and the construction of roads and parking areas regulated by Section 12-5.4 of this ordinance are exempt from the vegetation alteration standards that follow.

B. Removal or alteration of vegetation, except for agricultural and forest management uses as regulated in Sections 12-5.62 and 12-5.63, respectfully, is allowed subject to the following standards:

(1) Intensive vegetation clearing within the shore and bluff impact zones and on steep slopes is not allowed. Intensive vegetation clearing for forest land conversion to another use outside of these areas is allowable as a conditional use if an erosion control and sedimentation plan is developed and approved by the soil and water conservation district in which the property is located.

(2) In shore and bluff impact zones and on steep slopes, limited clearing of trees and shrubs and cutting, pruning, and trimming of trees is allowed to provide a view to the water from the principal dwelling site and to accommodate the placement of stairways and landings, picnic areas, access paths, livestock

watering areas, beach and watercraft access areas, and permitted water-oriented accessory structures or facilities, provided that:

(a) the screening of structures, vehicles, or other facilities as viewed from the water, assuming summer, leaf-on conditions, is not substantially reduced;

(b) along rivers, existing shading of water surfaces is preserved; and

(c) the above provisions are not applicable to the removal of trees, limbs, or branches that are dead, diseased, or pose safety hazards.

12-5.32 Topographic Alterations/Grading and Filling.

A. Grading and filling and excavations necessary for the construction of structures, sewage treatment systems, and driveways under validly issued construction permits for these facilities do not require the issuance of a separate grading and filling permit. However, the grading and filling standards in this Section must be incorporated into the issuance of permits for construction of structures, sewage treatment systems, and driveways.

B. Public roads and parking areas are regulated by Section 12-5.4 of this ordinance.

C. Notwithstanding Items A. and B. above, a grading and filling permit will be required for:

(1) the movement of more than ten (10) cubic yards of material on steep slopes or within shore or bluff impact zones; and

(2) the movement of more than 50 cubic yards of material outside of steep slopes and shore and bluff impact zones.

D. The following considerations and conditions must be adhered to during the issuance of construction permits, grading and filling permits, conditional use permits, variances and subdivision approvals:

(1) Grading or filling in any type 2, 3, 4, 5, 6, 7, or 8 wetland must be evaluated to determine how extensively the proposed activity would affect the following functional qualities of the wetland*:

(a) sediment and pollutant trapping and retention;

(b) storage of surface runoff to prevent or reduce

flood damage;

(c) fish and wildlife habitat;

(d) recreational use;

(e) shoreline or bank stabilization; and

(f) noteworthiness, including special qualities such as historic significance, critical habitat for endangered plants and animals, or others.

*This evaluation must also include a determination of whether the wetland alteration being proposed requires permits, reviews, or approvals by other local, state, or federal agencies such as a watershed district, the Minnesota Department of Natural Resources, or the United States Army Corps of Engineers. The applicant will be so advised.

(2) Alterations must be designed and conducted in a manner that ensures only the smallest amount of bare ground is exposed for the shortest time possible;

(3) Mulches or similar materials must be used, where necessary, for temporary bare soil coverage, and a permanent vegetation cover must be established as soon as possible;

(4) Methods to minimize soil erosion and to trap sediments before they reach any surface water feature must be used;

(5) Altered areas must be stabilized to acceptable erosion control standards consistent with the field office technical guides of the local soil and water conservation districts and the United States Soil Conservation Service;

(6) Fill or excavated material must not be placed in a manner that creates an unstable slope;

(7) Plans to place fill or excavated material on steep slopes must be reviewed by qualified professionals for continued slope stability and must not create finished slopes of 30 percent or greater;

(8) Fill or excavated material must not be placed in bluff impact zones;

(9) Any alterations below the ordinary high water level of public waters must first be authorized by the commissioner under Minnesota Statutes, Section 103G.245;

(10) Alterations of topography must only be allowed if

they are accessory to permitted or conditional uses and do not adversely affect adjacent or nearby properties; and

(11) Placement of natural rock riprap, including associated grading of the shoreline and placement of a filter blanket, is permitted if the finished slope does not exceed three feet horizontal to one foot vertical, the landward extent of the riprap is within ten feet of the ordinary high water level, and the height of the riprap above the ordinary high water level does not exceed three feet.

E. Connections to public waters. Excavations where the intended purpose is connection to a public water, such as boat slips, canals, lagoons, and harbors, must be controlled by local shoreland controls. Permission for excavations may be given only after the commissioner has approved the proposed connection to public waters.

12-5.4 Placement and Design of Roads, Driveways, and Parking Areas

12-5.41 Public and private roads and parking areas must be designed to take advantage of natural vegetation and topography to achieve maximum screening from view from public waters. Documentation must be provided by a qualified individual that all roads and parking areas are designed and constructed to minimize and control erosion to public waters consistent with the field office technical guides of the local soil and water conservation district, or other applicable technical materials.

12-5.42 Roads, driveways, and parking areas must meet structure setbacks and must not be placed within bluff and shore impact zones, when other reasonable and feasible placement alternatives exist. If no alternatives exist, they may be placed within these areas, and must be designed to minimize adverse impacts.

12-5.43 Public and private watercraft access ramps, approach roads, and access-related parking areas may be placed within shore impact zones provided the vegetative screening and erosion control conditions of this subpart are met. For private facilities, the grading and filling provisions of Section 12-5.32 of this ordinance must be met.

12-5.5 Stormwater Management.

The following general and specific standards shall apply:

12-5.51 General Standards:

A. When possible, existing natural drainageways, wetlands, and vegetated soil surfaces must be used to convey, store, filter, and retain stormwater runoff before

discharge to public waters.

B. Development must be planned and conducted in a manner that will minimize the extent of disturbed areas, runoff velocities, erosion potential, and reduce and delay runoff volumes. Disturbed areas must be stabilized and protected as soon as possible and facilities or methods used to retain sediment on the site.

C. When development density, topographic features, and soil and vegetation conditions are not sufficient to adequately handle stormwater runoff using natural features and vegetation, various types of constructed facilities such as diversions, settling basins, skimming devices, dikes, waterways, and ponds may be used. Preference must be given to designs using surface drainage, vegetation, and infiltration rather than buried pipes and man-made materials and facilities.

12-5.52 Specific Standards:

A. Impervious surface coverage of lots must not exceed 25 percent of the lot area.

B. When constructed facilities are used for stormwater management, documentation must be provided by a qualified individual that they are designed and installed consistent with the field office technical guide of the local soil and water conservation districts.

C. New constructed stormwater outfalls to public waters must provide for filtering or settling of suspended solids and skimming of surface debris before discharge.

12-5.6 Special Provisions for Commercial, Industrial, Public/Semipublic, Agricultural, Forestry and Extractive Uses and Mining of Metallic Minerals and Peat.

12-5.61 Standards for Commercial, Industrial, Public, and Semipublic Uses.

A. Surface water-oriented commercial uses and industrial, public, or semipublic uses with similar needs to have access to and use of public waters may be located on parcels or lots with frontage on public waters. Those uses with water-oriented needs must meet the following standards:

(1) in addition to meeting impervious coverage limits, setbacks, and other zoning standards in this ordinance, the uses must be designed to incorporate topographic and vegetative screening of parking areas and structures;

(2) uses that require short-term watercraft mooring for patrons must centralize these facilities and design

them to avoid obstructions of navigation and to be the minimum size necessary to meet the need; and

(3) uses that depend on patrons arriving by watercraft may use signs and lighting to convey needed information to the public, subject to the following general standards:

(a) no advertising signs or supporting facilities for signs may be placed in or upon public waters. Signs conveying information or safety messages may be placed in or on public waters by a public authority or under a permit issued by the county sheriff;

(b) signs may be placed, when necessary, within the shore impact zone if they are designed and sized to be the minimum necessary to convey needed information. They must only convey the location and name of the establishment and the general types of goods or services available. The signs must not contain other detailed information such as product brands and prices, must not be located higher than ten feet above the ground, and must not exceed 32 square feet in size. If illuminated by artificial lights, the lights must be shielded or directed to prevent illumination out across public waters; and

(c) other outside lighting may be located within the shore impact zone or over public waters if it is used primarily to illuminate potential safety hazards and is shielded or otherwise directed to prevent direct illumination out across public waters. This does not preclude use of navigational lights.

B. Uses without water-oriented needs must be located on lots or parcels without public waters frontage, or, located on lots or parcels with public waters frontage, must either be set back double the normal ordinary high water level setback or be substantially screened from view from the water by vegetation or topography, assuming summer, leaf-on conditions.

12-5.62 Agriculture Use Standards.

A. General cultivation farming, grazing, nurseries, horticulture, truck farming, sod farming, and wild crop harvesting are permitted uses if steep slopes and shore and bluff impact zones are maintained in permanent vegetation or operated under an approved conservation plan (Resource Management Systems) consistent with the field office technical guides of the local soil and water conservation districts or the United States Soil

Conservation Service, as provided by a qualified individual or agency. The shore impact zone for parcels with permitted agricultural land uses is equal to a line parallel to and 50 feet from the ordinary high water level.

B. Animal feedlots must meet the following standards:

(1) new feedlots must not be located in the shoreland of watercourses or in bluff impact zones and must meet a minimum setback of 300 feet from the ordinary high water level of all public waters basins; and

(2) modifications or expansions to existing feedlots that are located within 300 feet of the ordinary high water level or within a bluff impact zone are allowed if they do not further encroach into the existing ordinary high water level setback or encroach on bluff impact zones.

12-5.63 Forest Management Standards. The harvesting of timber and associated reforestation must be conducted consistent with the provisions of the Minnesota Nonpoint Source Pollution Assessment-Forestry and the provisions of Water Quality in Forest Management "Best Management Practices in Minnesota."

12-5.64 Extractive Use Standards.

A. Site Development and Restoration Plan. An extractive use site development and restoration plan must be developed, approved, and followed over the course of operation of the site. The plan must address dust, noise, possible pollutant discharges, hours and duration of operation, and anticipated vegetation and topographic alterations. It must also identify actions to be taken during operation to mitigate adverse environmental impacts, particularly erosion, and must clearly explain how the site will be rehabilitated after extractive activities end.

B. Setbacks for Processing Machinery. Processing machinery must be located consistent with setback standards for structures from ordinary high water levels of public waters and from bluffs.

12-5.65 Mining of Metallic Minerals and Peat. Mining of metallic minerals and peat, as defined in Minnesota Statutes, sections 93.44 to 93.51, shall be a permitted use provided the provisions of Minnesota Statutes, sections 93.44 to 93.51, are satisfied.

12-5.7 Conditional Uses

Conditional uses allowable within shoreland areas shall be subject to the review and approval procedures, and criteria

and conditions for review of conditional uses established community-wide. The following additional evaluation criteria and conditions apply within shoreland areas:

12-5.71 Evaluation criteria. A thorough evaluation of the waterbody and the topographic, vegetation, and soils conditions on the site must be made to ensure:

(1) the prevention of soil erosion or other possible pollution of public waters, both during and after construction;

(2) the visibility of structures and other facilities as viewed from public waters is limited;

(3) the site is adequate for water supply and on-site sewage treatment; and

(4) the types, uses, and numbers of watercraft that the project will generate are compatible in relation to the suitability of public waters to safely accommodate these watercraft.

12-5.72 Conditions attached to conditional use permits. The City Council upon consideration of the criteria listed above and the purposes of this ordinance, shall attach such conditions to the issuance of the conditional use permits as it deems necessary to fulfill the purposes of this ordinance. Such conditions may include, but are not limited to, the following:

(1) increased setbacks from the ordinary high water level;

(2) limitations on the natural vegetation to be removed or the requirement that additional vegetation be planted; and

(3) Special provisions for the location, design, and use of structures, sewage treatment systems, watercraft launching and docking areas, and vehicle parking areas.

12-5.8 Water Supply and Sewage Treatment

12-5.81 Water Supply. Any public or private supply of water for domestic purposes must meet or exceed standards for water quality of the Minnesota Department of Health and the Minnesota Pollution Control Agency.

12-5.82 Sewage treatment. Any premises used for human occupancy must be provided with an adequate method of sewage treatment, as follows:

A. Publicly-owned sewer systems must be used where available.

B. All private sewage treatment systems must meet or exceed

the Minnesota Pollution Control Agency's standards for individual sewage treatment systems contained in the document titled, "Individual Sewage Treatment Systems Standards, Chapter 7080", a copy of which is hereby adopted by reference and declared to be a part of this ordinance.

C. On-site sewage treatment systems must be set back from the ordinary high water level in accordance with the setbacks contained in Section 5.21 of this ordinance.

D. All proposed sites for individual sewage treatment systems shall be evaluated in accordance with the criteria in subitems (1)-(4). If the determination of a site's suitability cannot be made with publicly available, existing information, it shall then be the responsibility of the applicant to provide sufficient soil boring and percolation tests from on-site field investigations.

Evaluation criteria:

(1) depth to the highest known or calculated ground water table or bedrock;

(2) soil conditions, properties, and permeability;

(3) slope;

(4) the existence of lowlands, local surface depressions, and rock outcrops;

E. Nonconforming sewage treatment systems shall be regulated and upgraded in accordance with section 12-6.3 of this ordinance.

SECTION 12-5.9 DISCHARGE OF FIREARMS

The discharge of firearms within any land area inside a Shore Impact Zone (see Article 12-2.738), or upon or over the surface of any water within the normal high water mark of Ham Lake, Coon Lake, Lake Netta, or Little Coon Lake, is prohibited.

SECTION 12-6.0 NONCONFORMITIES

All legally established nonconformities as of the date of this ordinance may continue, but they will be managed according to applicable state statutes and other regulations of this community for the subject of alterations and additions, repair after damage, discontinuance of use, and intensification of use; except that the following standards will also apply in shoreland areas:

12-6.1 Construction on nonconforming lots of record.

A. Lots of record in the office of the county recorder on the date of enactment of local shoreland controls that do

not meet the requirements of Section 12-5.1 of this ordinance may be allowed as building sites without variances from lot size requirements provided the use is permitted in the zoning district.

B. A variance from setback requirements must be obtained before any use, sewage treatment system, or building permit is issued for a lot. In evaluating the variance, City Council shall consider sewage treatment and water supply capabilities or constraints of the lot and shall deny the variance if adequate facilities cannot be provided.

12-6.2 Additions/expansions to nonconforming structures.

A. All additions or expansions to outside dimensions of an existing non-conforming structure must meet the conditions for non-conforming uses as found in Article 9 of the Ham Lake City Code.

B. Deck additions may be allowed without a variance to a structure not meeting the required setback from the ordinary high water level if all of the following criteria and standards are met.

(1) the structure existed on the date the structure setbacks were established;

(2) a thorough evaluation of the property and structure reveals no reasonable location for a deck meeting or exceeding the existing ordinary high water level setback of the structure;

(3) the deck encroachment toward the ordinary high water level does not exceed 15 percent of the existing setback of the structure from the ordinary high water level or does not encroach closer that 30 feet, whichever, is more restrictive; and

(4) the deck is constructed primarily of wood, and is not roofed or screened.

12-6.3 A sewage treatment system not meeting the requirements of Section 12-5.8 of this ordinance must be upgraded, at a minimum, at any time a permit or variance of any type is required for any improvement on,or use of, the property under circumstances where the new activity will result in increased effluent entering the non-conforming sewage treatment system. For the purposes of this provision, a sewage treatment system shall not be considered nonconforming if the only deficiency is the sewage treatment system's improper setback from the ordinary high water level.

SECTION 12-7.0 SUBDIVISION/PLATTING PROVISIONS

12-7.11 Land Suitability. Each lot created through new

subdivision, including marginal planned unit developments authorized under Article 9 of the Ham Lake City Code, must be suitable in its natural state for the proposed used with minimal alteration. Suitability analysis by the local unit of government shall consider susceptibility to flooding, existence of wetlands, soil and rock formations with severe limitations for development, severe erosion potential, steep topography inadequate water supply or sewage treatment capabilities, near-shore aquatic conditions unsuitable for water-based recreation, important fish and wildlife habitat, presence of significant historic sites, or any other feature of the natural land likely to be harmful to the health, safety, or welfare of future residents of the proposed subdivision or of the community.

12-7.12 Consistency with other controls. Subdivisions must conform to all official controls of this community. A subdivision will not be approved where a later variance from one or more standards in official controls would be needed to use the lots for their intended purpose. In areas not served by publicly owned sewer and water systems, a subdivision will not be approved unless domestic water supply is available and a sewage treatment system consistent with Sections 12-5.2 and 12-5.8 can be provided for every lot. Each lot shall meet the minimum lot size and dimensional requirements of Section 12-5.1, including at least a minimum contiguous lawn area, that is free of limiting factors sufficient for the construction of two standard soil treatment systems. Lots that would require use of holding tanks must not be approved.

12-7.13 Information requirements. Sufficient information must be submitted by the applicant for the community to make a determination of land suitability. The information shall include at least the following:

(1) topographic contours at ten-foot intervals or less from United States Geological Survey maps or more accurate sources, showing limiting site characteristics;

(2) the surface water features required in Minnesota Statutes, Section 505.02, subdivision 1, to be shown on plats, obtained from United States Geological Survey quadrangle topographic maps or more accurate sources;

(3) adequate soils information to determine suitability for building and on-site sewage treatment capabilities for every lot from the most current existing sources or from field investigations such as soil boring, percolation tests, or other methods;

(4) information regarding adequacy of domestic water supply; extent of anticipated vegetation and topographic alterations; near-shore aquatic conditions, including depths, types of bottom sediments, and aquatic vegetation; and proposed methods for controlling stormwater runoff and erosion, both during and after

construction activities;

(5) location of 100-year flood plain areas and floodway districts from existing adopted maps or data; and

(6) a line or contour representing the ordinary high water level, the "toe" and the "top" of bluffs, and the minimum building setback distances from the top of the bluff and the lake or stream.

12-7.14 Dedications. When a land or easement dedication is a condition of subdivision approval, the approval must provide easements over natural drainage or ponding areas for management of stormwater and significant wetlands.

12-7.15 Platting. All subdivisions that create five or more lots or parcels that are 2-1/2 acres or less in size shall be processed as a plat in accordance with Minnesota Statutes, Chapter 505. No permit for construction of buildings or sewage treatment systems shall be issued for lots created after these official controls were enacted unless the lot was approved as part of a formal subdivision.

12-7.16 Controlled Access or Recreational Lots. Lots intended as controlled accesses to public waters or for recreational use areas for use by nonriparian lots within a subdivision must meet or exceed the sizing criteria in Section 5.14 of this ordinance.

12-7.17 Applicability to Plats in Process. Any plat on marginal planned unit development which has been presented for sketch plan approval prior to the effective date of this ordinance shall be governed by the shoreland zoning and subdivision standards in effect as of the date of sketch plan presentation.

Presented to the Ham Lake City Council on November 2, 1992 and adopted on November 16, 1992.

William A. Nelson
Mayor

Doris A. Nivala
City Administrator/Clerk/Treasurer

APPENDIX R

Unsuitable Soils
Ordinance 99-16

Ordinance 99-16

An ordinance relating to separation standards between unsuitable soils and certain on-site sewer systems and other structures; amending portions of Article 10 of the Ham Lake City Code.

Be it ordained by the City Council of the City of Ham Lake, Anoka County, Minnesota, as follows:

The following amendments are made to Article 10 of the Ham Lake City Code:

I. Article 9-130.15 is repealed and replaced by the following language:

"10-220.23 Livability Area

Livability Area shall be as defined in Article 10-540.5."

II. Article 10-220.23 is repealed and replaced by the following language:

"10-220.23 Livability Area

Livability Area shall be as defined in Article 10-540.5."

III. The references in Articles 9-1340(C) and 9-1440(F)(1)(a) of this code to Article 10-220.23 shall be amended to reference Article 10-540.5.

IV. Article 10-540.51 is amended by adding the following definitions as subsections (f) and (g):

f. Unsuitable Soils - shall be as defined in Article 11-450.1(D).

g. Final Dwelling Elevation - the elevation at the point where the finished lot grade meets a point on the concrete wall of the basement, at the location closest to the roadway from which the lot takes access to a public road.

h. Building Pad – an area of 10,000 square feet or more, outside of the 10,000 square foot area referenced in Article 10-540.2 (a), which will be used for construction of a dwelling unit.

V. Article 10-540.53 is hereby repealed, to be replaced by the following Article 10-540.2:

10-540.53 Livability Standards

All residential lots shall contain at least 32,000 square feet of land which meets the following criteria:

a. At least 10,000 square feet must contain Undisturbed Soil (exclusive of right-of-way or other public easement), and must be permanently reserved for the original Individual Sewage

Treatment System (ISTS) and at least one future replacement ISTS. There shall be at least one foot of separation between the bottom elevation of drainfield area and Unsuitable Soils for Standard Septic Systems.

b. An additional 12,000 square feet must be contiguous, but not necessarily undisturbed soil, and at an elevation sufficiently above Unsuitable Soils to be compatible with the usage intended for the area. For the Building Pad, the bottom of the lowest floor elevation must be at least one foot above Unsuitable Soils.

c. The Final Dwelling Elevation must be at least one foot above the elevation of the nearest curb line of the travelled portion of the public road from which the dwelling takes access.

d. The Building Pad must contain at least 4 feet of separation between finished lot grade and unsuitable soils.

IV. Article 10-550.1 is repealed, to be replaced by the following Article 10-550.1:

10-550.1 Floodplain Encroachment and Easement Dedication

No septic tank shall be located within the contour of any 100-year Floodplain. No portion of any drainfield of any Standard Septic System shall be located within the contour of any 10-year Floodplain, provided, that on a case-by-case basis, supported by adequate engineering evidence, certain experimental or wetland discharge systems may have drain facilities located within the 100 - year or the 10-year Floodplains.

All plats shall dedicate permanent drainage and utility easement at the 10-year Floodplain contour, and a secondary drainage easement at the 100-year Floodplain. The property owner may utilize the secondary drainage easement for drainfields for Standard Septic Systems, and for such other purposes as do not interfere with drainage or pose any threat to public health, safety or welfare.

Presented to the Ham Lake City Council on June 21, 1999 and adopted by a unanimous vote of the Ham Lake City Council this 2nd day of August, 1999.

Gary Kirkeide, Mayor

Doris Nivala, Administrator

APPENDIX S

SSTS
Ordinance 14-07

ORDINANCE NO. 02-26

An Ordinance amending Article 10-302 and 11-450 relating to Individual Sewage Treatment Systems (ISTS).

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF HAM LAKE, ANOKA COUNTY, MINNESOTA, AS FOLLOWS:

Article 10-302 subsection G is changed to subsection F to read as follows:

F. Exception to Soils Condition

If the requirements of Article 10-202(B)(iii) cannot be met in regard to the possible usage of a Standard System ISTS for any lot or lots in a proposed subdivision, by reason of the soils having been disturbed or compacted by activities which pre-dated the subdivision application, and which conditions were not caused by or at the direction of the subdivider, the City Council may waive the requirement that the ISTS be constructed on Undisturbed Soils, and may allow the usage of "Other Systems" as that term is defined in Article 11-450.1(F) of this Code, provided, that under no circumstances (excepting developments which were significantly advanced in the planning process as of the effective date of this ordinance and for which final plat approval is given prior to June, 2003) shall an ISTS be permitted under conditions where there is less than one foot of separation between unsuitable soils and the top elevation of suitable soils which existed under natural conditions prior to development, meaning soils which were not transported to the site or placed as a result of grading. Where "Other" systems are so permitted, it shall be the obligation of the lot owner to provide actual field designs for each such proposed system, prepared by a qualified ISTS designer, prior to obtaining a building permit. The design standards shall be as directed by the City's Building Official. Where an "Other" system is allowed, upon recommendation of the City's Building Official, the ISTS area needs to be of sufficient size to accommodate two systems or contain at least 7,500 square feet whichever is greater. When an "Other System" is proposed, the design must include the concept of "time-dosing", meaning a periodic distribution of effluent which is electronically controlled.

Article 11-450.5 A. and D. are hereby repealed, to be replaced by the following:

11-450.5 Types of ISTS Permitted

A. Vacant Residential Land

For land which is not currently being used for residential purposes, meaning parcels which do not presently have an ISTS, including new residential development, the preferred type of ISTS shall be a Standard System. If the

provisions of Article 10-302(F) are met, an "Other" system may be used for such lots.

D. Design Criteria and Permit

No Performance System using Gravelless Drainfield Pipe and no Warrantied System, as those terms are defined in MPCA 7080.0020, subparts 17(b) and 51(a), respectively, shall be permitted. All "Other" Systems and permitted Performance Systems shall be so designed, in the judgment of the City's Building Official, so as to pose no threat of groundwater contamination. In addition, the effluent from these systems shall meet the criteria displayed in tables for separation reductions and size reduction which are established and made available from time to time by the City's Building Official. Where an "Other" System or a Performance System is allowed, upon recommendation of the City's Building Official, the ISTS area needs to be of sufficient size to accommodate two systems or contain at least 7,500 square feet whichever is greater.

Presented to the Ham Lake City Council on November 4, 2002 and adopted by a unanimous vote on November 18, 2002.

Gary Kirkeide, Mayor

Doris A. Nivala, Administrator

APPENDIX T

Wetland Exemption (De Minimis) Calculation Sheet

Board of Water and Soil Resources

Wetland Conservation Act Rule Amendments
August 2007

De minimis Exemption
(Minnesota Rule 8420.0115, subpart 9)

Area (s)	Wetland Types	Shoreland Zone	Conditions	De minimus Amounts
>80% (including Isanti County)	1, 2, 6 or 7	Outside	▪ Not White Cedar & Tamarack	10,000 sq. ft.
		Inside	▪ Not White Cedar & Tamarack ▪ Outside Bldg. Setback Zone	400 sq. ft (LGU may increase to 1,000 if no surficial connection)
			▪ Inside Bldg. Setback Zone	20 sq. ft.
	3, 4, 5, 8 (and White Cedar & Tamarack)		▪ Outside Bldg. Setback Zone	100 sq. ft.
			▪ Inside Bldg. Setback Zone	20 sq.ft.
50-80% (Outside of the 11-County Metropolitan Area)	1, 2, 6 or 7	Outside	▪ Not White Cedar & Tamarack	5,000 sq.ft.
		Inside	▪ Not White Cedar & Tamarack ▪ Outside Bldg. Setback Zone	400 sq.ft.
			▪ Inside Bldg. Setback Zone	20 sq. ft.
	3, 4, 5, 8 (and White Cedar & Tamarack)		▪ Outside Bldg. Setback Zone	100 sq. ft.
			▪ Inside Bldg. Setback Zone	20 sq. ft.
< 50% (Outside of the 11-County Metropolitan Area)	1, 2, or 6	Outside		2,000 sq. ft.
		Inside	▪ Outside Bldg. Setback Zone	400 sq. ft.
	7		▪ Outside Bldg. Setback Zone	100 sq. ft.
	3, 4, 5, 8 (and White Cedar & Tamarack)		▪ Outside Bldg. Setback Zone	100 sq. ft.
			▪ Inside the Bldg Setback Zone	20 sq. ft.

- The above applies if the landowner owns the entire wetland basin.
- If the landowner does not own the entire basin, the landowner's De minimus is based on 5% of the wetland area owned.
- This exemption may not be combined with another exemption on a project.
- Property may not be subdivided solely to increase the amounts listed in A.

11-County Metropolitan Area

(Counties of: Anoka, Carver, Chisago, Dakota, Hennepin, Isanti, Ramsey, Scott, Sherburne, Washington, and Wright.)

Area(s)	Wetland Types	Shoreland Zone	Conditions	De minimus Amounts
50-80% (Inside of the 11-County Metropolitan Area)	1, 2, 6 or 7	Outside	▪ Not White Cedar & Tamarack	2,500 sq.ft.
		Inside	▪ Not White Cedar & Tamarack ▪ Outside Bldg. Setback Zone	400 sq.ft.
			▪ Inside Bldg. Setback Zone	20 sq. ft.
	3, 4, 5, 8 (and White Cedar & Tamarack)		▪ Outside Bldg. Setback Zone	100 sq. ft.
			▪ Inside Bldg. Setback Zone	20 sq. ft.
< 50% (Inside of the 11-County Metropolitan Area)	1, 2, or 6	Outside		1,000 sq. ft.
		Inside	▪ Outside Bldg. Setback Zone	400 sq. ft.
	7		▪ Outside Bldg. Setback Zone	100 sq. ft.
	3, 4, 5, 8 (and White Cedar & Tamarack)		▪ Outside Bldg. Setback Zone	100 sq. ft.
			▪ Inside the Bldg Setback Zone	20 sq. ft.

- The above applies if the landowner owns the entire wetland basin.
- If the landowner does not own the entire basin, the landowner's De minimus is based on 5% of the wetland area owned.
- This exemption may not be combined with another exemption on a project.
- Property may not be subdivided solely to increase the amounts listed in A.

Minnesota Wetland Conservation Act
De Minimis Calculation Worksheet

1) Determine the appropriate Circ. 39 wetland type for all wetlands proposed to be impacted by the project, based on predominance of hydrology. For wetlands >40 acres, wetland type may be determined by the deepest water regime, in the basin, and within a 300-foot radius of the proposed impact area. (Note: use a single Circ. 39 Wetland Type for each wetland)

Impact wetland 1: _____ Impact wetland 2: _____ Impact wetland 3: _____ Impact wetland 4: _____

2) Determine the pre-project size of the wetland(s) (as of January 1, 1992) within the project property that are proposed to be impacted by the project. (Note: 1 acre = 43,560 square feet)

Total Wetland Area _____ ft^2 **5% of the Total Wetland Area: _____ ft^2**

3) Determine the applicable de minimis exemption amount for the project from either a) or b) below. ***If more than one de minimis amount is applicable to the project, the exemption amount is the lesser of these.***

a) For projects where all wetlands proposed to be impacted are under single ownership and entirely within the project property, the applicable de minimis exemption amount is determined using the following table.

Wetland Type (circular 39)	Shoreland Class	Pre-Statehood Wetland Area	De Minimis Amount (3)
1, 2, 6, or 7* *(excluding white cedar and tamarack wetlands)	Non-Shoreland	> 80% (1)	10,000 ft^2
		50 – 80% (1)	5,000 ft^2
		< 50% (1)	2,000 ft^2
1, 2, 6, or 7* *(excluding white cedar and tamarack wetlands)	Shoreland-Outside Building Setback	Any	400 ft^2 (4)
7* (white cedar and tamarack wetlands only)	Shoreland-Outside Building Setback	Any	100 ft^2
3, 4, 5, or 8	Shoreland-Outside Building Setback	Any	100 ft^2
Any Wetland Type	Shoreland-Inside Building Setback	Any	20 ft^2
1, 2, 6, or 7* *(excluding white cedar and tamarack wetlands)	Non-Shoreland	> 80% (2)	10,000 ft^2
		50 – 80% (2)	2,500 ft^2
		< 50% (2)	1,000 ft^2

(1) Outside of the 11-county metropolitan area: Counties of Anoka, Carver, Chisago, Dakota, Hennepin, Isanti, Ramsey, Scott, Sherburne, Washington, and Wright
(2) Inside the 11-County Metropolitan Area
(3) If more than one de minimis amount is applicable to the project, the exemption is the lesser of these
(4) Can be increased to 1000 ft^2 by LGU's in >80% areas for certain types of wetlands

b) For projects where any wetlands proposed to be impacted extend outside of the project property (multiple landowners), the applicable de minimis exemption amount is the ***lesser of*** the following:

i. The amount identified in the above table,
ii. 5% of the total wetland area within the project property, but in no case less than 400 ft^2.

De Minimis Exemption Amount _____ ft^2

4) Determine the cumulative impacts (previous and proposed) to the landowner's portion of the wetland since January 1, 1992:

Previous exempt impacts (from all projects)		_____ ft^2
Current proposed impacts	+	_____ ft^2
Cumulative Impacts	=	_____ **ft^2**

5) Is the applicable de minimis exemption amount (3) greater than, or equal to, the cumulative impacts (4)?

☐ **Yes** If yes, then the de minimis exemption can be claimed for the project and the proposed impacts can occur without a replacement plan for wetlands.

☐ **No** If no, then the de minimis exemption cannot be claimed for the project.

NOTE: If, at any time, total project impacts exceed the applicable de minimis exemption amount, this exemption is no longer valid and all wetland impacts associated with the project are subject to the replacement plan provisions of the Wetland Conservation Act (8420.0500 to 8420.0630).