

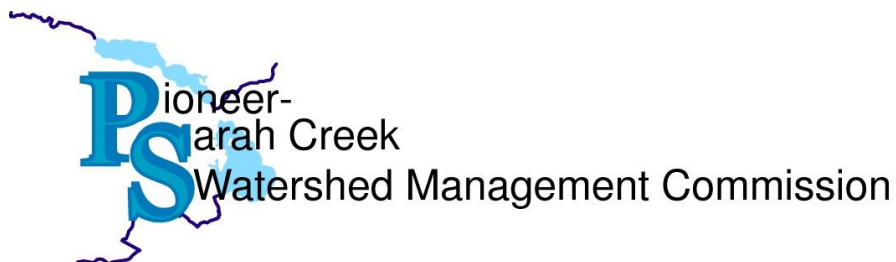
4th Generation Watershed Management Plan



Prepared for:
**Pioneer-Sarah Creek Watershed
Management Commission**

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December 2020



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Pioneer-Sarah Creek Watershed Management Commission Fourth Generation Watershed Management Plan Adopted December 17, 2020

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Abbreviations and Acronyms

BMP	Best Management Practice
BWSR	Board of Water and Soil Resources
chl- <i>a</i>	Chlorophyll- <i>a</i>
Commission	Pioneer-Sarah Creek Watershed Management Commission
DNR	Department of Natural Resources
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
F-IBI	Index of Biotic Integrity for Fish
HCEE	Hennepin County Environment and Energy
IBI	Index of Biotic Integrity
LA	Load Allocation
LGU	Local Government Unit
LWMP or LSMP	Local Water (or Stormwater) Management Plan
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MDNR or MnDNR	Minnesota Department of Natural Resources
M-IBI	Index of Biotic Integrity for Macroinvertebrates
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetland Inventory
NWS	National Weather Service
ppb	parts per billion (µg/L)
Plan	Watershed Management Plan
PSC WMC	Pioneer-Sarah Creek Watershed Management Commission
SAV	Submersed Aquatic Vegetation
SSTS	Subsurface Sewage Treatment Systems
SWPPP	Storm Water Pollution Prevention Program
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TRPD	Three Rivers Park District
TSS	Total Suspended Solids
µg/L	microgram per liter (ppb)
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WCA	Wetland Conservation Act
WLA	Wasteload Allocation
WMC	Watershed Management Commission
WMO	Watershed Management Organization

Executive Summary

This Watershed Management Plan (Plan) describes how the Pioneer-Sarah Creek Watershed Management Commission (PSC WMC) will manage activities in the watershed in the ten-year period 2021-2030.

The Pioneer-Sarah Creek Watershed Management Commission is a Watershed Management Organization (WMO) formed in 1984 using a Joint Powers Agreement (JPA) developed under authority conferred to the member communities by Minnesota Statutes 471.59 and 103B.201 through 103B.251. The watershed is 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 Hennepin County:

Cities	Area (sq mi)
Greenfield	21.32
Independence	29.72
Loretto	0.26
Maple Plain	0.76
Medina	7.52
Minnetrista	10.70
Total	70.28

The WMO is governed by a Board of Commissioners that is comprised of one member appointed from each community by their respective City Councils. The Commission's purpose is set forth in Minnesota Statutes 103B.210, 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.

Fourth Generation Watershed Management Plan

The Pioneer-Sarah Creek Watershed Management Commission initiated work on the Fourth Generation Plan in November 2019. The Plan includes a self-assessment and 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.

Third Generation Plan Self-Assessment

The Third Generation Plan extended from 2015 to 2020. The Commission has completed or is in ongoing implementation of nearly all the work plan activities and strategies identified in the Third Generation Plan. The most successful achievements over the past six years have been:

- Continued identification and implementation of projects and practices to reduce pollutant loading to the lakes and streams in the watershed.
- Lake Rebecca, originally listed as impaired in 2008 for nutrients, now meets phosphorus, chlorophyll-a, and Secchi depth standards and has been removed from the Impaired Waters list.
- Built a sense of Commission and City alignment, highlighted by partnerships that identified implementation projects and grant and cost share funding to complete projects.
- Enhanced the working relationship with the Hennepin County Rural Conservationists to enhance visibility and build ties with the agricultural community.
- The Plan set a goal of improving water quality in the lakes by 10% over the previous ten-year period. Table ES.1 shows change in water quality as measured by Secchi depth (SD) (clarity) and Total Phosphorus (TP) in 5 of the 9 lakes with enough data to perform a trend analysis. The improvement in TP in West Lake Sarah and North Whaletail and clarity in North Whaletail and Lake Ardmore is statistically significant. Independence and Hafften are also trending better.

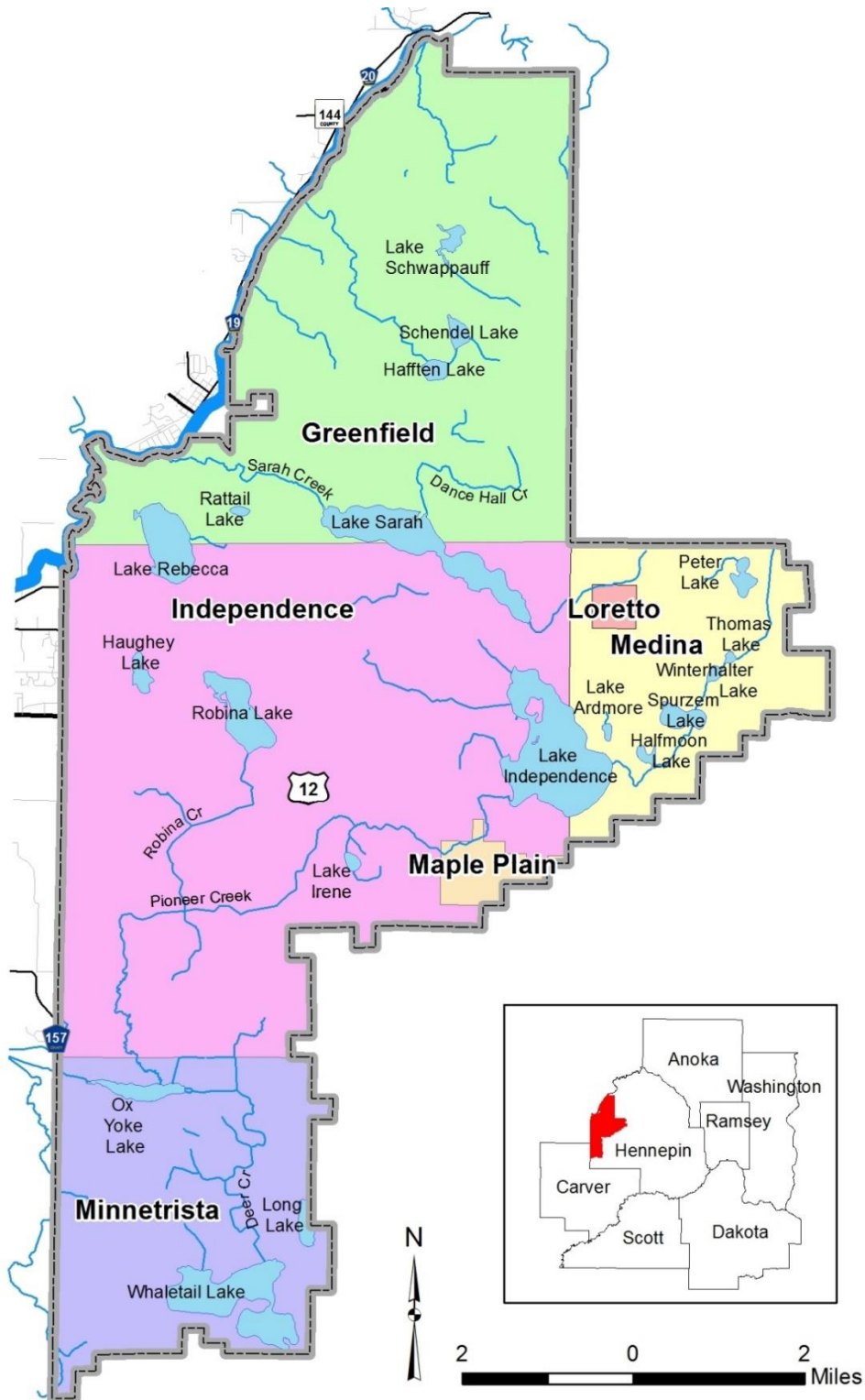
Table ES.1. Ten-year change in lake water quality.

Lake	SD Change*	TP Change*
Lake Ardmore	+28%	+9.5%
Hafften Lake	+23%	-15%
Lake Independence	+43%	-10%
Peter Lake	-3%	+24%
Lake Sarah-East	+36%	N/A
Lake Sarah-West	+38%	-18%
Spurzem Lake	+38%	N/C
North Whaletail	+16%	-23%
South Whaletail	+16%	-5%

*Note: a positive Secchi depth change is an improvement, while a negative TP change is an improvement. Values in **bold italic** are significant based on a Mann-Kendall trend analysis ($p=0.05$).

Areas where the Commission fell short include:

- No assessment of progress toward meeting Total Maximum Daily Load (TMDL) load reductions, Watershed Restoration and Protections Strategies (WRAPS) study, or water quality goals has been completed.
- Because much of the implementation opportunity in the watershed is on privately-owned property, there is heavy reliance on finding willing landowners. Additional implementation projects could have been completed had property owners been willing to participate.



- 33 Figure ES.1: Cities in the Pioneer-Sarah Creek watershed.

Fourth Generation Management Plan Issues and Priorities and Goals

The Commission and Citizen and Technical Advisory Committees identified the following issues and issue areas during the planning process:

- Impaired Waters Implementation
- Agricultural Community Outreach
- General Education and Outreach
- Effective Operations

The Pioneer-Sarah Creek watershed is primarily residential and agricultural in land use, with a very limited commercial and industrial tax base. Its financial capacity is limited, but the Commission has been successful at obtaining grants to supplement local funding sources, and at building partnerships to leverage resources. In implementing this Plan, the Commission will continue to work on identifying opportunities, securing grant and other funding, and working jointly with member cities, Hennepin County Environment and Energy (HCEE), the Three Rivers Park District (TRPD), public and private entities, and individual property owners to maximize the cost-effectiveness of implementation activities. The success of this Plan is dependent on continuing and expanding those partnerships and outside resources.

Through the identification of issues in the watershed, the PSC WMC developed the following priorities and goals to guide water resources planning and management functions.

FOURTH GENERATION MANAGEMENT PLAN PRIORITIES

1. Make systematic progress toward achieving lake water quality goals by 2030:
 - a. Delist South Whaletail Lake.
 - b. Protect Lake Rebecca so it continues to meet water quality standards.
 - c. Meet state water quality standards in the following lakes: Independence, Sarah, Spurzem, Half Moon, and Ardmore.
 - d. Achieve a 10% reduction in Total Phosphorus concentration in the other monitored lakes over the previous ten years.
2. Work in a coordinated way with urban and rural property owners, cities, lake associations, public and private entities, Hennepin County, and TRPD building partnerships to conserve our water and natural resources and deliver implementation projects
3. Raise the profile of the Commission across the watershed, within Hennepin County, the western Metro area, and the Crow River Watershed.
4. Serve as an informational and technical resource for the cities and the citizens and property owners in the watershed.

Executive Summary (con't)

Guided by the identification and prioritization of issues in the watersheds, the Commission has established goals that will guide activities over the coming decade.

Goal Area A. Water Quantity

- Goal A. 1. Maintain the post-development 2-year, 10-year, and 100-year peak rate of runoff at pre-development level for the critical duration precipitation event.
- Goal A. 2. Maintain the post-development annual runoff volume at pre-development volume.
- Goal A. 3. Prevent the loss of floodplain storage below the established 100-year elevation.

Goal Area B. Water Quality

- Goal B. 1. Protect Lake Rebecca and achieve delisting of South Whaletail Lake.
- Goal B. 2. Meet state standards in Spurzem, Half Moon, Ardmere, Independence and Sarah Lakes, making progress towards their removal from the list of Impaired Waters.
- Goal B. 3. Improve water quality in the impaired lakes by 10% over the average of the previous ten years by 2030.
- Goal B. 4. Maintain or improve water quality in the lakes and streams with no identified impairments.
- Goal B. 5. Conduct a TMDL/WRAPS progress review every five years.
- Goal B. 6. Foster implementation of Best Management Practices in the watershed through technical and financial assistance.

Goal Area C. Groundwater

- Goal C. 1. Promote groundwater recharge by requiring abstraction/infiltration of runoff from new development and redevelopment.
- Goal C. 2. Protect groundwater quality by incorporating wellhead protection study results into development and redevelopment Rules and Standards.

Goal Area D. Wetlands

- Goal D. 1. Preserve the existing functions and values of wetlands within the watershed.
- Goal D. 2. Promote the enhancement or restoration of wetlands in the watershed.

Goal Area E. Drainage Systems

- Goal E. 1. Continue current Hennepin County jurisdiction over county ditches in the watershed.

Goal Area F. Commission Operations and Programming

- Goal F. 1. Identify and operate within a sustainable funding level that is affordable to member cities.
- Goal F. 2. Foster implementation of TMDL and other implementation projects by sharing in their cost and proactively seeking grant funds.
- Goal F. 3. Operate a public education and outreach program prioritizing elected and appointed officials' education and building better understanding between all stakeholders.

- Goal F. 4. Operate a monitoring program sufficient to characterize water quantity and quality and biotic integrity in the watershed and to evaluate progress toward TMDL goals.
- Goal F. 5. Maintain rules and standards for development and redevelopment that are consistent with local and regional TMDLs, federal guidelines, source water and wellhead protection requirements, nondegradation, and ecosystem management goals.
- Goal F. 6. Serve as a technical resource for member cities and residents.

Implementation

This Fourth Generation Watershed Management Plan continues and expands activities that have been successful in the past and introduces some new activities, including the development of Lake Management Plans for key resources. The Commission's partnerships with HCEE and TRPD have led to successes such as the delisting of Lake Rebecca from the state's list of Impaired Waters.

Rules and Standards. In the Third Generation Plan the Commission updated stormwater management and water resources protection policies and standards for new development and redevelopment. These were compiled and codified into a Rules and Standards document. In general, those Rules and Standards apply to all development and redevelopment one acre or more in size and require at a minimum: no increase in pollutant loading or stormwater volume; no increase in the peak rate of runoff from the property; and the abstraction/infiltration of 1.1 inches of runoff from impervious surfaces. The Commission reviews 4-8 development projects per year for conformance with those Rules.

Monitoring Program. The monitoring program continues routine monitoring for flow and water quality on Pioneer and Sarah Creeks, with periodic monitoring on other smaller streams and tributaries on a rotating or as-needed basis. Five lakes – Independence, Sarah, both basins of Whaletail, and Little Long – have been classified by the Commission as “Sentinel Lakes,” and are monitored every year. Other lakes are monitored on a rotating basis.

Education and Outreach. The Commission has an Education and Outreach program that identifies stakeholder groups in the watershed and key education messages, and uses Web and social media, local newspapers and cable TV to share useful information. In recent years the Commission has partnered with Hennepin County rural conservationists and water resources specialists to expand outreach opportunities for rural and agricultural stakeholders. The Commission also participates in Metro-wide education and outreach initiatives such as Blue Thumb, Watershed Partners and Northland NEMO.

TMDL Implementation. The Commission was identified as being a partner in certain implementation activities in the lake and stream TMDLs and WRAPS in the watershed. Many of those activities are included in the monitoring, education and outreach, and Capital Improvement actions in this Plan.

Capital Improvement Program. The primary focus of the Commission's Capital Improvement Program (CIP) is to systematically make progress toward meeting TMDLs by focusing resources on one or two lakes at a time, periodically reviewing progress and updating realistic five to ten year working plans.

- *Lake Management Plans.* The Commission will prepare lake management plans for Lake Independence, Lake Sarah, and Lake Ardmore that will summarize progress toward their TMDLs and update models and data as necessary. The plans will focus on holistic, whole-lake ecological management that include actions to manage aquatic vegetation and fish communities and internal load in addition to watershed load reductions.
- *Subwatershed Assessments and Studies.* The Commission will complete subwatershed assessments and special studies that will identify cost-effective practices and projects. A priority for assessment is the area tributary to Spurzem Lake, which is tributary to Lake Independence.
- *Capital Projects.* The Commission will focus on subwatershed assessments and other studies and will prioritize cost-share in TMDL/WRAPS implementation projects, starting with Lake Independence and Lake Sarah. The Commission will annually solicit capital projects and cost-share activities from the member cities. The Commission will also consider a policy to supplement Hennepin County incentives for cost-share practices in priority areas.

Local and Watershed Plan Amendments

After final approval of the Plan, cities will update their Local Water Management Plans (LWMPs) as a part of their next Comprehensive Plans. These updates will be expected to include:

- Updated land use, hydrologic, and hydraulic data, and existing or potential water resource related problems that may have changed since the last LWMP.
- An explanation of how the member city will help to implement the actions set forth in the Commission's Plan.
- Action steps detailing how the member city will work to achieve the load reductions and other actions identified in and agreed to in TMDL Implementation Plans.
- Updated Implementation Plan identifying the specific structural, nonstructural, and programmatic solutions to the problems and issues identified in the LWMP.
- Set forth an implementation program including a description of adoption or amendment of official controls and local policies necessary to implement the Rules and Standards; programs; policies; a capital improvement plan; and estimates of cost and funding mechanisms.

This watershed management plan provides direction for PSC WMC activities through the year 2030. The Commissioners intend the Plan to provide a flexible framework for managing the watershed and, as such, may initiate amendments to this plan at any time. The Commission will annually review and refine the budget, monitoring program, education and outreach plan and Capital Improvement Program and may adopt plan amendments adding or revising proposed capital improvement projects or making other revisions to the Plan.

1.0 Introduction and Purpose

The cities of Independence, Minnetrista, Medina and the Hennepin Conservation District created the Pioneer Creek Watershed Management Commission on January 13, 1978. When the 1982 Surface Water Management Act required that all watersheds within the Metro area be governed by watershed management organizations, Greenfield requested that the Sarah Creek watershed be merged with Pioneer Creek to form a joint watershed management organization (WMO). The Pioneer-Sarah Creek Watershed Management Commission was officially established in December 1984 through a Joint Powers Agreement (JPA) signed by Corcoran, Greenfield, Independence, Loretto, Maple Plain, Medina, and Minnetrista, Watertown Township, and Hennepin Conservation District, under the authority conferred through Minnesota Statutes Chapters 471.59 and 103B.211. Since that time, Watertown Township and Corcoran left the Watershed Management Commission. The JPA governing the WMO is included in Appendix A.

The watershed is in the northwest portion of the Minneapolis-St. Paul seven county metropolitan area (Figure 1.1) in the Crow River basin of the Upper Mississippi River watershed. The Commission's purpose is set forth in Minnesota Statutes 103B.210, 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.

1.1 PREVIOUS GENERATION PLANS

The Commission adopted its First Generation Management Plan in July 1986, Second Generation Plan in June 2003, and Third Generation Plan in May 2015. The Third Generation Plan was amended three times between 2015 and 2020: once to conform the plan to Minnesota Rules Section 8410 revisions, and twice to revise the Capital Improvement Program (CIP). While not amending the plan, on August 22, 2019 the Commission relinquished its Wetlands Conservation Act (WCA) Local Government Unit (LGU) authority to the respective cities.

Table 1.1. Record of revisions to the Third Generation Watershed Management Plan.

Number	Type	Date of Adoption	Summary of Revisions
1	Minor	11/19/2015	Conform the plan to revisions in MR 8410
2	Minor	7/20/2017	Amend the CIP
3	Minor	6/21/2018	Amend the CIP



1.2 PLAN REQUIREMENTS

Minnesota Statutes 103B.201 to 103B.253 and Minnesota Rules Chapter 8410 specify the basic content of the watershed management plan. The plan must:

- Describe the existing physical environment and land use in the area, as well as the proposed environment, land use, and development outlined in existing local and metropolitan comprehensive plans.
- Present information on the hydrologic system and its components and potential problems related thereto.
- State objectives and policies including management principles, alternatives and modifications, water quality, and protection of natural characteristics.
- Set forth a management plan including the desired hydrologic and water quality conditions and significant opportunities for improvement.
- Describe the effect of the plan on existing drainage systems.
- Identify high priority areas for wetland preservation, enhancement, restoration, and establishment and describe conflicts with wetlands and land use in those areas.
- Describe conflicts between the watershed plan and existing plans of Local Governmental Units (LGUs).
- Set forth an implementation program consistent with the management plan that includes a capital improvement program, standards, and schedules for amending the comprehensive plan and official controls of LGUs in the watershed to bring conformance with the plan.
- Set out procedures and timelines for amending the plan.

1.3 PLAN ORGANIZATION

This plan is divided into four sections:

1 – Introduction and Purpose: Describes the authority and composition of the PSC WMC, the purpose of the Surface Water Management Act and the components of this watershed management plan.

2 – Inventory and Condition Assessment: A thorough physical inventory of the watershed was completed for the Third Generation Plan and is summarized but not reproduced here. However, new information regarding current and planned land use and updated information on the lakes, streams, and wetlands in the watersheds is presented.

3 – Watershed Organization and Operations: This section provides information about the Commission, how it is organized, its history, and its responsibilities, and discusses ongoing operations. This section also provides an evaluation of the successes of the Third Generation Plan and the areas where the Commission may have fallen short of its goals for the 2015-2020 period.

4 – Implementation Plan: This section sets forth the goals the Commission will work to achieve in the ten-year period covered by this Plan, and descriptions of the Commission's proposed operating programs, the Capital Implementation Program, and a discussion of implementation costs and financing. It also discusses the methods by which the Commission will evaluate progress towards achieving the goals set forth in the Plan, the process that will be followed should this Plan need to be Amended, and the requirements for Local Stormwater Management Plans prepared by the member cities in the watershed.

2.0 Inventory and Condition Assessment

This section documents existing conditions and resource characteristics within the Pioneer-Sarah Creek watersheds. Where the Third Generation Watershed Management Plan included a detailed inventory of conditions, that data is not repeated here. A summary of that information is provided for context, with new or updated information presented in more detail.

The Physical Environment subsection describes the watershed's physical setting, geology and geomorphology, soils, and water resources. The Biological Environment subsection describes vegetation, biodiversity and native communities, unique features, and the biology of lakes and streams. The subsection Human Environment describes land use and growth patterns, recreational resources, and potential environmental hazards. The lakes, streams, and wetlands in the watershed are described in the Water Resources section.

2.1 WATERSHED PHYSICAL ENVIRONMENT

2.1.1 Location

The Pioneer-Sarah Creek watershed covers just over 70 square miles in west-central Hennepin County. There are six municipalities with land in the watershed (Figure 1.1, Table 2.1).

Table 2.1. Cities in the Pioneer-Sarah Creek watershed.

Cities	Area (sq mi)	% of City in Watershed
Greenfield	21.32	100%
Independence	29.72	86
Loretto	0.26	100
Maple Plain	0.76	71
Medina	7.52	28
Minnetrista	10.70	33
Total	70.28	

2.1.2 Topography and Drainage

The drainage pattern in the watershed is typical of a glaciated morainic area- gently rolling with low, round-top hills and numerous small wetlands in low areas. The southern watershed drains through Pioneer Creek to Ox Yoke and Rice Lakes to the South Fork Crow River, while the central watershed drains through Sarah Creek to the Crow River. The northern watershed drains through several small channels to the Crow River. Portions of the Pioneer Creek drainage area are in Wright and Carver Counties, outside the legal boundary of the watershed. Figure 2.1 shows the major watershed drainage features, including subwatershed boundaries, lakes, streams, and ditches.

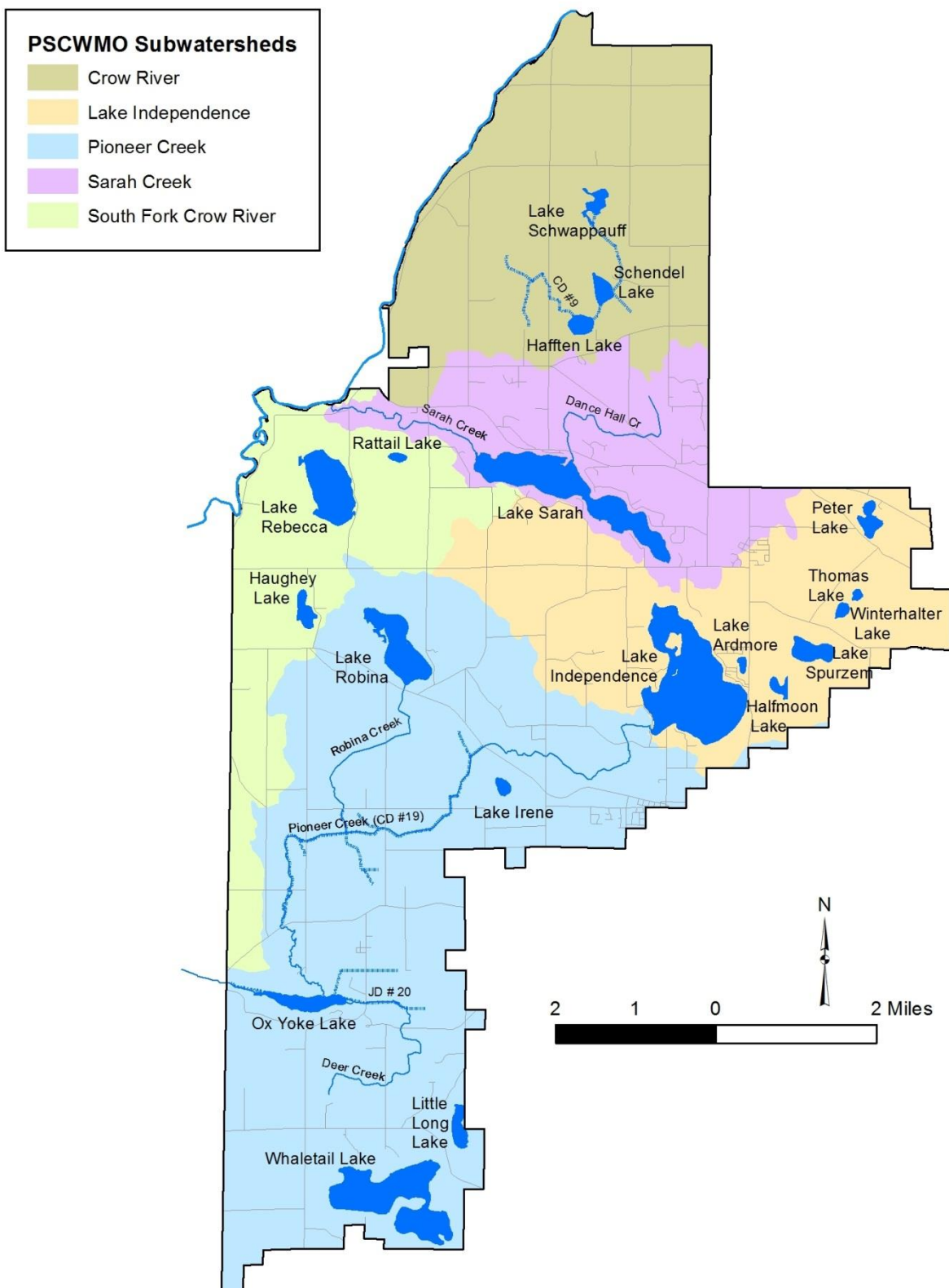


Figure 2.1. Pioneer-Sarah Creek watershed drainage systems.

Source: Minnesota DNR.

2.1.3 Climate

The climate is predominately continental. Sitting close to the middle of North America, the weather in the watershed can vary widely and rapidly. Both temperature and precipitation can change abruptly. In an average year, around 30 inches of precipitation falls on the watershed. Winter snowfall averages about 46 inches. Snow generally stays on the ground from mid-December to April. Snow and rainfall data for the watershed is obtained at weather stations in Minneapolis and Rockford. The 30-year precipitation and temperature normals by month can be found in the Third Generation Plan. The State Climatology Office has [identified](#) a change in precipitation patterns in Minnesota over the past few decades, with increased rainfall in the spring and late summer, and shorter, more intense rain events. The MPCA [reports](#) that these changes could increase the risk of flooding, erosion, and sedimentation affecting lakes, streams, and rivers. Average temperatures have also been observed to be increasing, as are the number of days with high humidity. These could lead to more frequent or stronger algal blooms in lakes, affecting fish and other wildlife.

2.1.4 Soils

Most of the watershed's upland area is composed of well-drained soils. Texture is generally loamy or sandy with scattered organic or marsh soils areas. These soils have moderate to minimum infiltration rates ranging from 0.15 to 0.30 inches per hour when thoroughly wetted. Wind erodibility is also generally low to moderate. Highly to moderately permeable soils dominate the watershed, as indicated by the large areas covered by soil hydrologic group B (Figure 2.2). Soil hydrologic group characteristics can be found in the [Minnesota Stormwater Manual](#).

The soils information in Figure 2.2 is provided for use in describing the general characteristics of the major soil associations for summary purposes. The Hennepin County Soil Survey or on-site soil borings should be consulted for site-specific information.

2.1.5 Geology and Geomorphology

The bedrock underlying the watershed is generally St. Lawrence and Franconia Formation sandstone and shale 150 to 250 feet below the surface. The surficial geology of the watershed is generally loamy glacial till, with the central watershed around Lakes Independence and Sarah tending more toward clayey till (Balaban 1989).

Two major geomorphic regions are found in the watershed: the Lonsdale-Lerdal Till Region in the eastern half and the Waconia-Waseca Moraine along the west. A small area in the northeastern watershed in the City of Greenfield lies within the Emmons-Faribault moraine. Lonsdale-Lerdal Till areas are characterized by circular, broad, level-topped hills with smooth sides. Soils are generally well-drained, but clayey deposits are common on top of the hills. Many small streams end in depressions or lakes. The lower elevations are interspersed with closed depressions containing lakes and wetlands. The Waconia-Waseca Moraine region is very similar to Lonsdale-Lerdal, without the characteristic clayey sediment deposits on hilltops (University of Minnesota 1975). More information can be found in the Third Generation Plan and in the [Hennepin County Geologic Atlas](#).

Hydrologic Soil Group

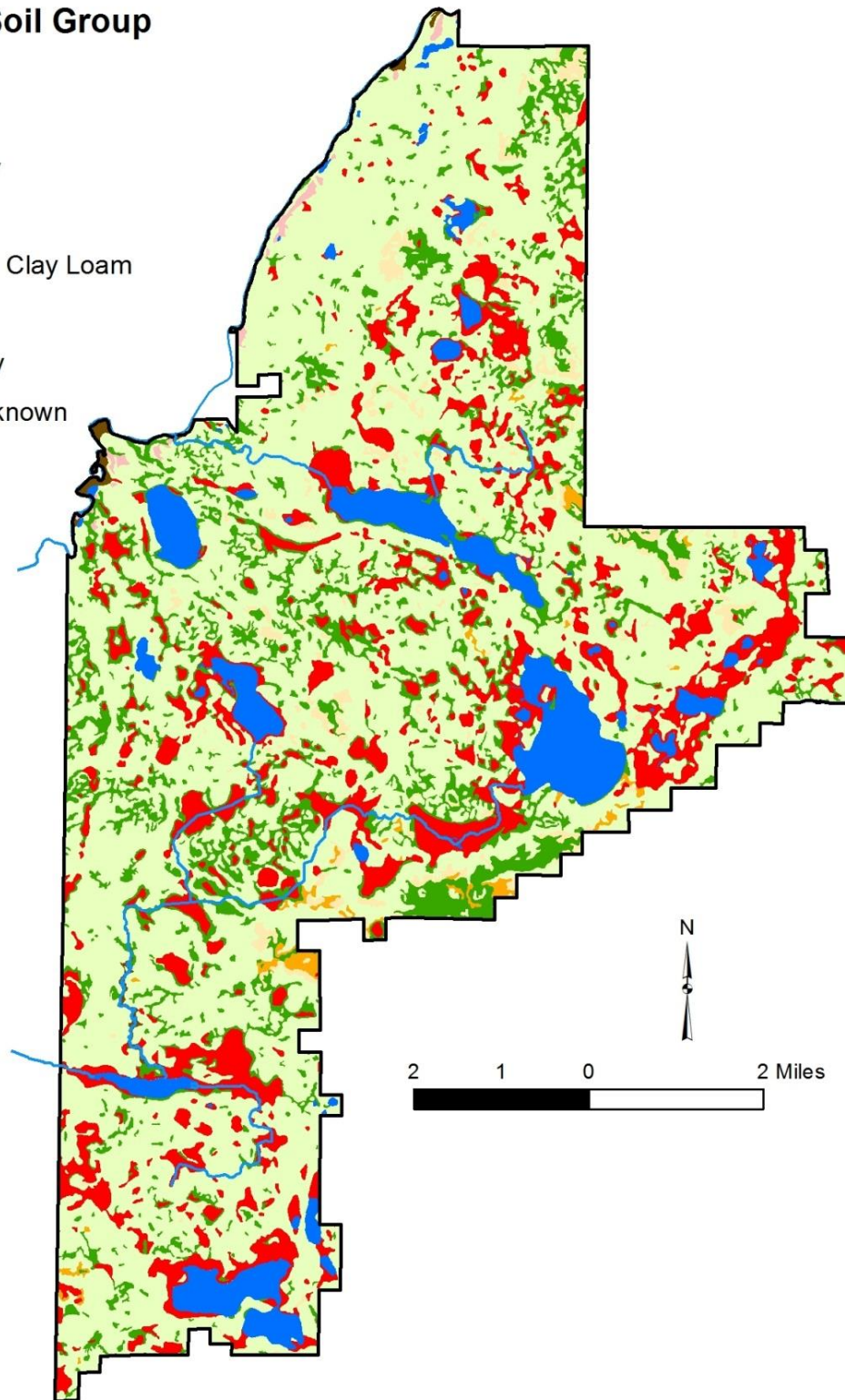


Figure 2.2. Soils by Hydrologic Soil Group classification

Source: USDA NRCS SSURGO.

2.2 WATERSHED BIOLOGICAL ENVIRONMENT

2.2.1 Vegetation

Prior to settlement by Europeans in the mid-19th century, vegetation in the watershed was maple-basswood forest (big woods) with areas of wet prairie. Since then the area has been used for urban uses and agriculture and only a few remnants of that vegetation remain, mostly within regional parks. The Department of Natural Resources (DNR) and the Minnesota Biological Survey (MBS) have identified those locations with intact native plant communities, and those with biodiversity significance (see Figure 2.3).

2.2.2 Fish and Wildlife

Fishing is possible on many of the lakes in the watershed. Whaletail, Little Long, Independence, Sarah, Spurzem, Rebecca, and Hafften all have public boat launches. Carry-in accesses are at Half Moon Lake and the Crow River. Little Long Lake and Lake Independence are regularly stocked with fish by the DNR. The Commission has not conducted any fish surveys on the lakes in the watershed. Consult the [DNR Lakefinder](#) to find the latest DNR fish survey information for each lake. There is one DNR Wildlife Management Area in the watershed: the Robina Lake WMA, nearly 200 acres of wetland west of Robina Lake and north of Highway 12. This WMA is open to the public for hunting.

2.2.3 Threatened and Endangered Species

The DNR Natural Heritage and Nongame Research Program maintains a database of observations of rare plant and animal species compiled from historical records from museum collections and published information supplemented with data from years of field work. More detail and plant community information can be found in the Third Generation Plan.

2.2.4 Aquatic Invasive Species

Five lakes in the watershed have been determined by the DNR to be infested with Eurasian watermilfoil, an invasive exotic plant species: Independence, Rebecca, Little Long, Sarah, and Whaletail. TRPD discovered zebra mussels at the public boat access on Lake Independence in 2014. The DNR and TRPD have conducted annual lake wide surveys throughout the lake to monitor the spread of zebra mussels in Lake Independence.

2.2.5 Unique Features and Scenic Areas

The Pioneer-Sarah Creek watershed has many natural areas, water resources, and regional and local parks. Some of these areas contain rare and endangered species and special habitats. Natural communities identified by the Minnesota Biological Survey within the watershed include federally or state-listed plants and animals, as well as previously state-listed plants and animals. The natural communities and rare species identified are mainly concentrated within the Lake Rebecca and Baker Park Reserves, and around Little Long Lake and Lake Independence.

MBS Sites of Biodiversity Significance

- High
- Moderate

Native Plant Community

- Cattail - Sedge Marsh (Northern)
- Sedge Meadow
- Southern Mesic Maple-Basswood Forest
- Sugar Maple - Basswood - (Bitternut Hickory) Forest
- Sugar Maple Forest (Big Woods)
- Tamarack Swamp (Southern)
- Willow - Dogwood Shrub Swamp
- Regionally Significant Ecological Areas
- Regional Parks
- DNR Wildlife Management Areas

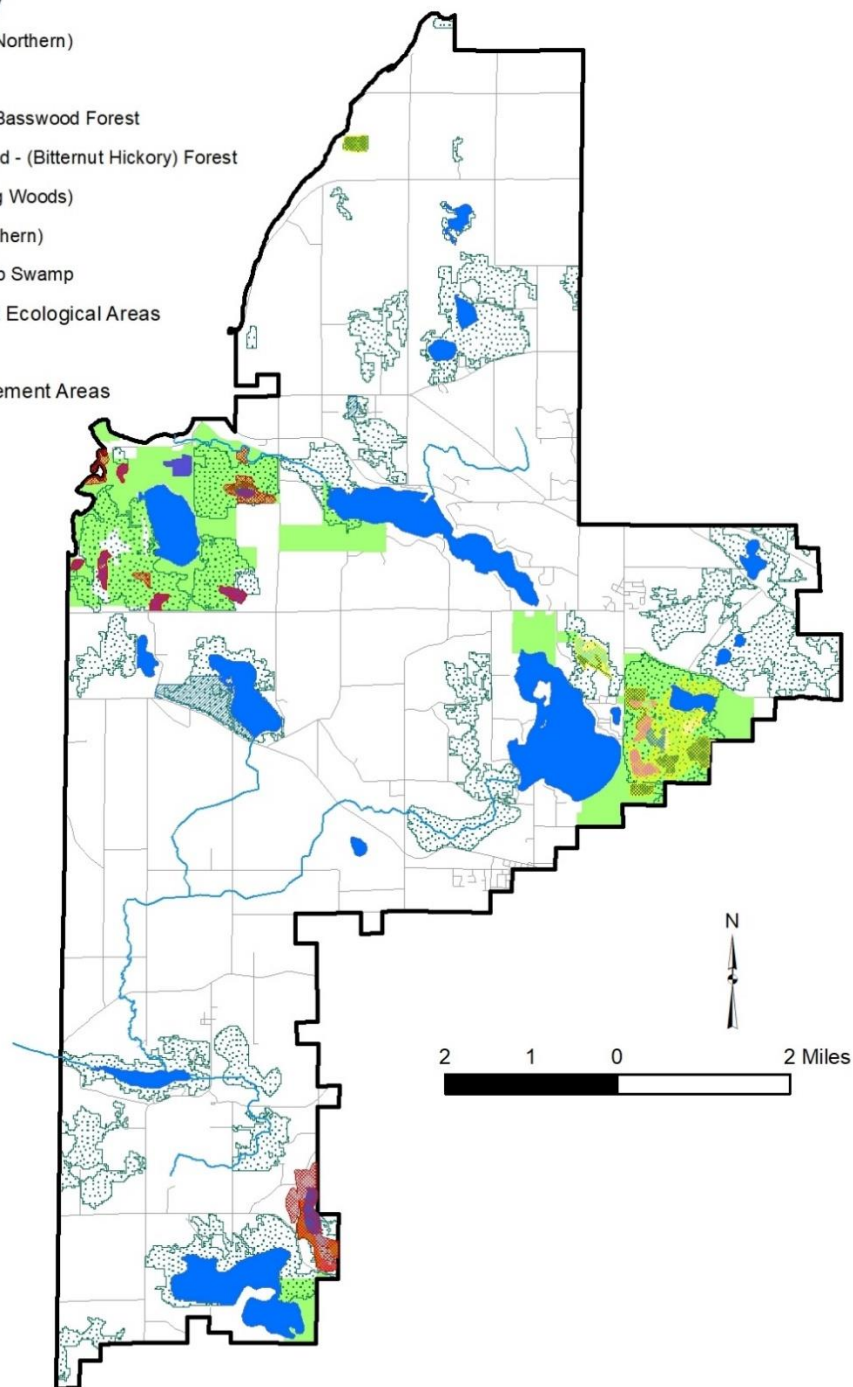


Figure 2.3. Sites of ecological diversity and significance.

Source: Minnesota County Biologic Survey (MCBS), Minnesota DNR.

2.3 WATERSHED HUMAN ENVIRONMENT

Native Americans were the first settlers in the Pioneer-Sarah Creek watershed. Notes from the 1856 Public Land Survey indicate that the area was heavily timbered with oak, sugar maple, basswood, ironwood, and hickory, with numerous boggy tamarack swamps. The lakes, it was noted, “abound with fine fish.” The surveyors noted only a few streams aside from the Crow River, describing the streams as “...such as flow in and out of lakes.” By the time the Public Land Survey was conducted, white settlers had arrived and land was already being claimed. By the turn of the 20th century, Lake Sarah had become well-known as a resort lake. Numerous orchards grew apples, strawberries, blackberries, currents, and gooseberries. The market began declining after World War I, but there are still several orchards in the watershed.

Within the watershed, Loretto and Maple Plain continue to be the population and commerce centers. Residential development is clustered around the lakes and in small, large-lot developments.

2.3.1 Land Use and Population

The predominant land use in the watersheds is Undeveloped, a category which includes undevelopable wetlands and grasslands in addition to lands that are currently vacant and developable (Figure 2.4 and Table 2.2). One third of the watershed is classified as agricultural. Developed land uses cover about ten percent of the watershed, with more intensive uses clustered along Highways 19 and 55 near Loretto and Rockford, and Highway 12 in Maple Plain and Independence. The only areas within the existing Metropolitan Urban Service Area (MUSA) are located along Highways 12, 19, and 55. Parcels outside the MUSA rely on Individual Sewage Treatment Systems for their sanitary sewer services. Population has grown from the approximately 9,520 persons counted in the 2000 Census to an estimated 9,795 persons counted in the 2010 Census.

Areas of projected urban growth are shown on Figure 2.5. This data was compiled by the Metropolitan Council from cities’ most recent Comprehensive Plans and represents cities’ planned 2040 land use. Most of the projected growth is expected to be in the existing developed corridors, with a mix of development at different densities, and to include residential, commercial, and industrial uses.

Table 2.2. 2016 land use in the Pioneer-Sarah Creek watershed.

Land Use	Area (acres)	%
Undeveloped	15,723	35%
Agricultural	14,932	33%
Park, Recreational, or Preserve	4,422	10%
Single Family	4,238	9%
Open Water	3,533	8%
Farmstead	601	1%

Land Use	Area (acres)	%
Golf Course	598	1%
Industrial and Utility	352	1%
Commercial	160	0%
Institutional	154	0%
Multifamily	18	0%
Highway	258	1%
Total	44,990	100%

Source: Metropolitan Council from city Comprehensive Plans and aerial photo interpretation.

2.3.2 Water-Based Recreation

The Baker Park Reserve abuts the shoreline of Lake Independence; Spurzem and Half Moon Lakes are also located in the Park Reserve. Lake Rebecca is in the Lake Rebecca Park Reserve, which also includes the Lake Sarah Dog Off-leash Area. Both park reserves have boat launches, fishing piers, and swimming beaches that are heavily used. Public boat launches are available on several other lakes (see Figure 2.6). Other TRPD regional park facilities include Gale Woods Farm on Whaletail Lake and Kingswood Park on Little Long Lake. The latter park includes access to the lake's two-story warm and cold-water fishery as well as a tamarack bog and pristine, high quality aquatic and upland areas.

On the north end of Lake Independence, the YMCA operates Camp Ihduhapi, which provides traditional (camping, fishing, canoeing) and specialty summer camp experiences for youth ages 8-14 as well as adult retreats and meetings. Also on the north side of the lake is Vinland National Center, which treats individuals with cognitive disabilities and chemical and behavioral health needs. Aquatic recreation is offered as a complementary care service.

2.3.3 Potential Environmental Hazards

Groundwater connections, hazardous waste, leaking above- and below-ground storage tanks, and feedlots can be potential sources of surface and groundwater contamination. The Minnesota Pollution Control Agency (MPCA) maintains a current on-line mapping tool with information about air quality, hazardous waste, remediation, solid waste, tanks and leaks, and water quality. This tool is available at <http://www.pca.state.mn.us/udgx680>.

2016 Land Use

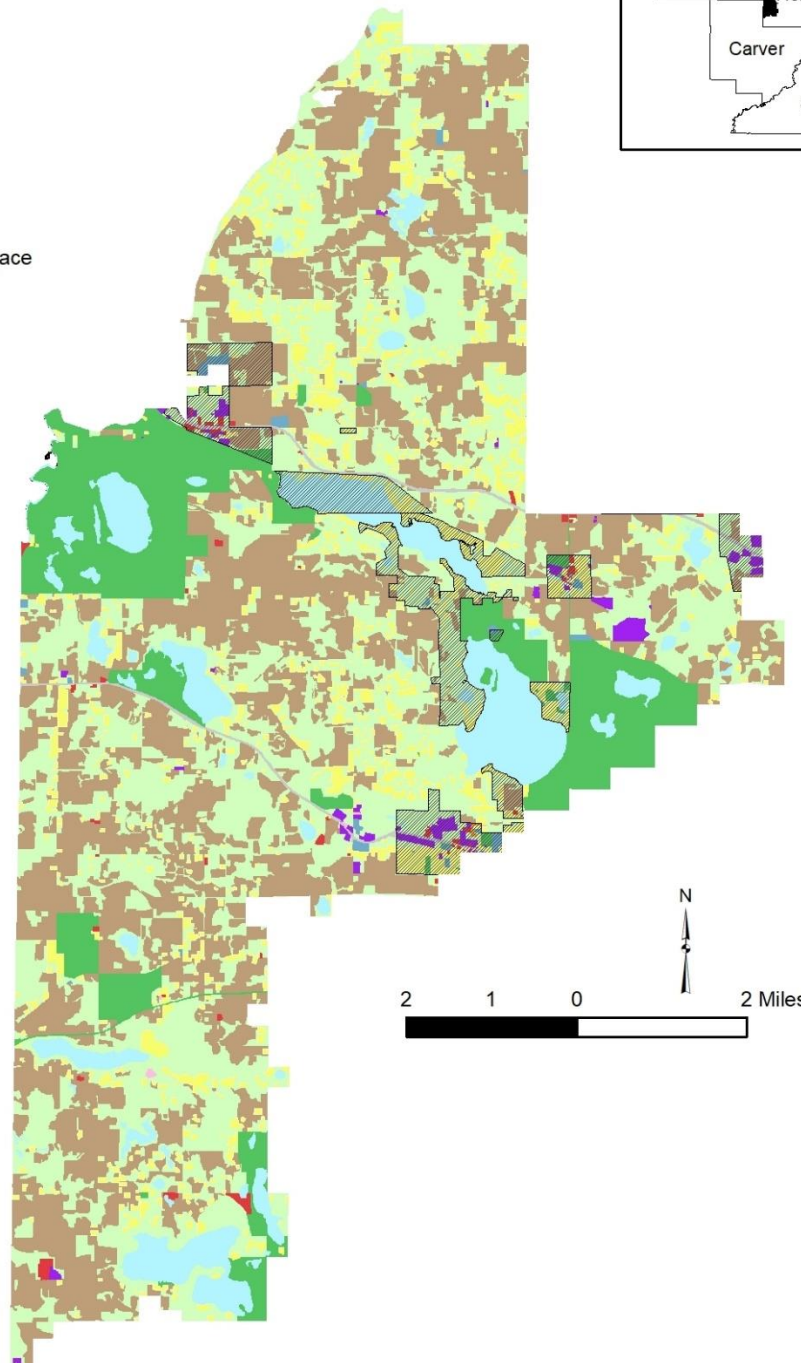
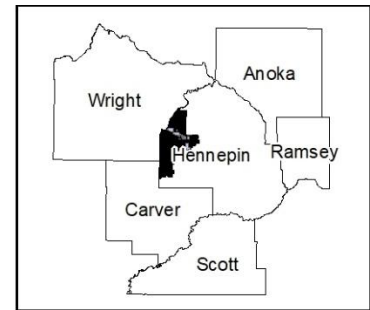


Figure 2.4. 2016 land use in the Pioneer-Sarah Creek watershed.

Source: Metropolitan Council.

2040 Planned Land Use

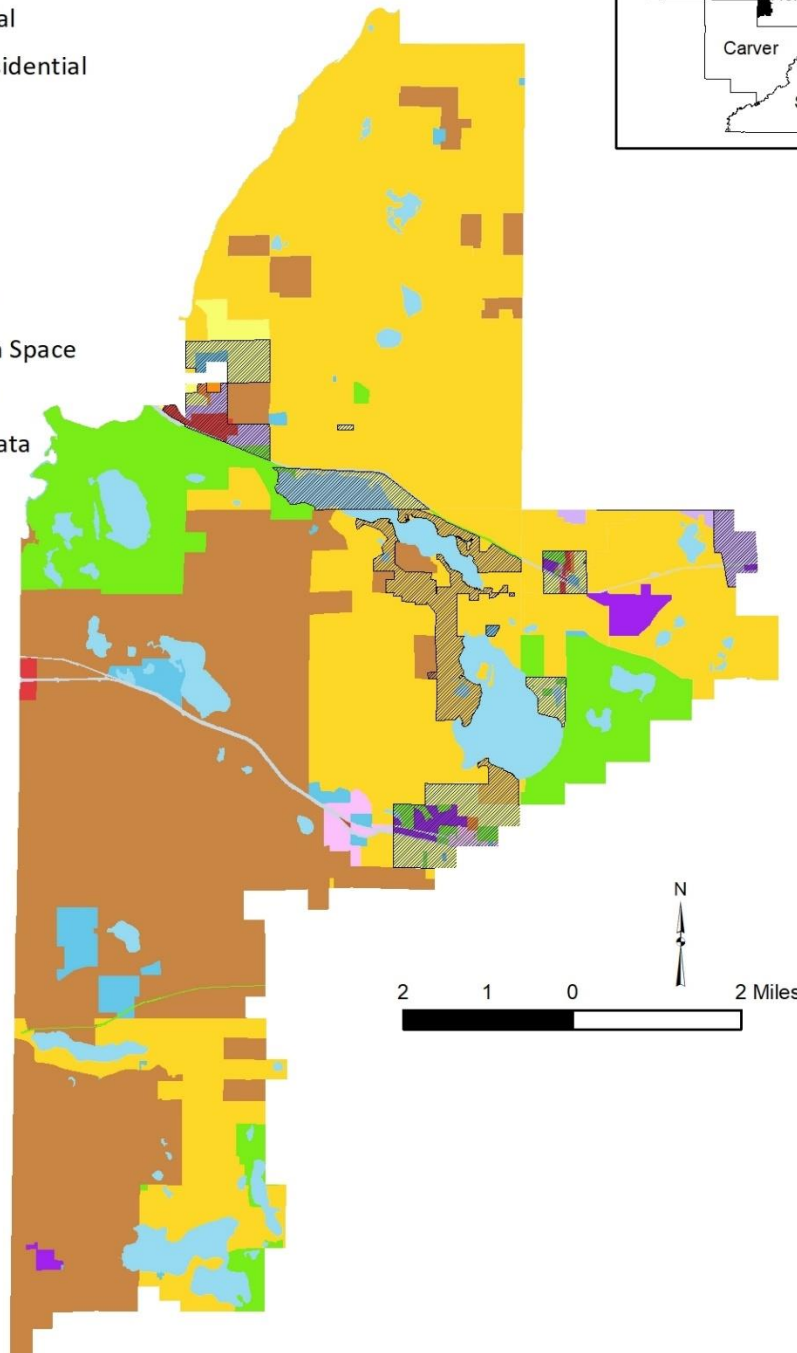
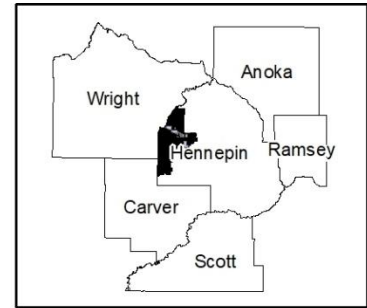


Figure 2.5. Planned 2040 land use in the Pioneer-Sarah Creek watershed.

Source: Metropolitan Council.

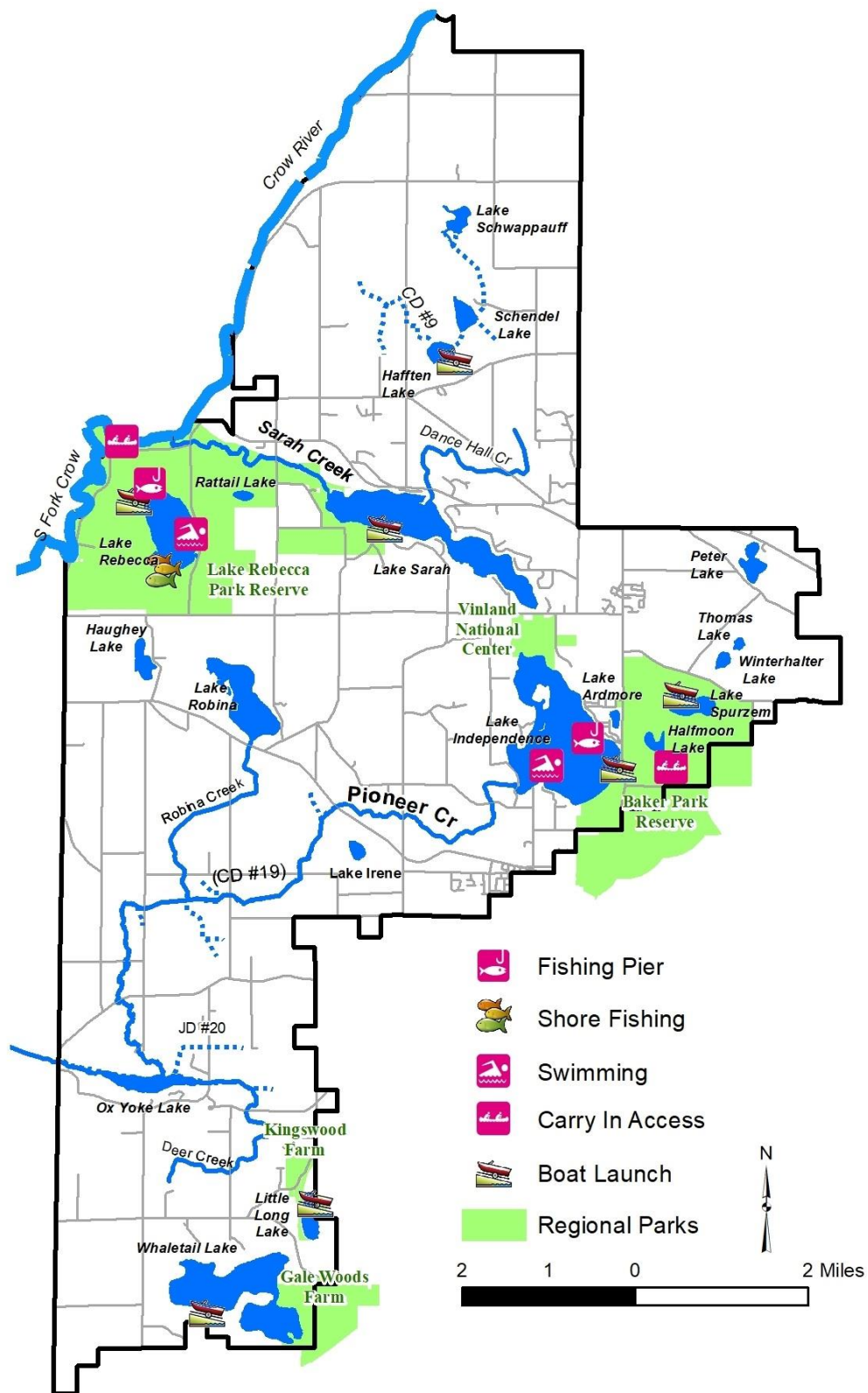


Figure 2.6. Water-based recreation in the Pioneer-Sarah Creek watershed.

Source: Minnesota DNR, TRPD.

2.4 WATERSHED WATER RESOURCES

2.4.1 Lakes

There are nineteen lakes in the watershed. Thomas and Robina Lakes are classified as wetlands. The DNR lake number and shoreland classification, lake morphometry, and water quality data are shown in Table 2.4. The lakes in the watershed are shown on Figure 2.7. Minnesota's standards for lake water quality vary depending on the depth classification of the lake (Table 2.3). Shallow lakes have a maximum depth of 15 feet or less or have 80% or more of the lake area shallow enough to support emergent and submerged rooted aquatic plants. More information about the lakes can be found online at the DNR's LakeFinder website: dnr.state.mn.us/lakefind/index.html.

Table 2.3. Water quality standards for lakes in the North Central Hardwood Forest Ecoregion.

Parameters	Shallow Lakes	Deep Lakes
Total Phosphorus (TP) (µg/L)	≤60	≤40
Chlorophyll- <i>a</i> (chl- <i>a</i>) (µg/L)	≤20	≤14
Secchi Depth transparency (SD) (meters)	≥1.0	≥1.4

Table 2.4. Characteristics of lakes in the Pioneer-Sarah Creek watershed (2009-2018).

Lake	DNR ID#	Surface Area (ac)	Max Depth (ft)	Depth Class	DNR Class	Summer Average			Years of Data
						TP (µg/L)	Chl- <i>a</i> (µg/L)	SD (m)	
Lake Ardmore	27-0153-00	13	20	Deep	RD	263	78	0.7	7
Hafften Lake	27-1999-00	37	44	Deep	NE	47	23	1.3	4
Halfmoon Lake	27-0152-00	30	26	Deep	NE	147	53	1	10
Haughey Lake	27-0187-00	54	23	Shallow	NE	326	46	1.3	10
Lake Independence	27-0176-00	832	58	Deep	RD	52	25	2.3	9
Irene Lake	27-0189-00	19.1	N/A	Shallow	RD	155	58	0.9	2
Little Long Lake	27-0179-00	69	76	Deep	RD	15	6	4.9	8
Ox Yoke Lake	27-0178-00	93	4	Shallow	NE	N/A	N/A	0.8	9
Peter Lake	27-0147-00	53	68	Deep	RD	46	22	3.1	5
Rattail Lake	27-0200-00	12	63	Deep	NE	53	24	2	6
Lake Rebecca	27-0192-00	263	30	Deep	NE	47	21	1.9	9
Lake Robina	27-0188-00	234	N/A	Wetland	RD	134	71	0.8	2
Lake Sarah-East	27-0191-01	541	59	Deep	RD	87	48	1.0	10
Lake Sarah-West	27-0191-02	40	N/A	N/A	NE	87	44	1.6	10
Schendel Lake	27-0196-00	40	29	Deep	NE	N/A	N/A	N/A	0
Schwappauff Lake	27-0194-00	40	N/A	N/A	NE	48	12	1.3	2
Spurzem Lake	27-0149-00	82	38	Deep	NE	151	54	1.6	9
Thomas Lake	27-0501W	9	N/A	Wetland	-	N/A	N/A	N/A	0
North Whaletail	27-0184-01	498	22	Shallow/Deep	RD	65	27	0.83	10
South Whaletail	27-0184-02					55	26	1.3	9
Winterhalter Lake	27-0148-00	13	27	Deep	NE	N/A	N/A	N/A	0

Sources: Minnesota DNR, MPCA EQuIS.

NE = Natural Environment; RD = Recreational Development (Shoreland Management Classification)

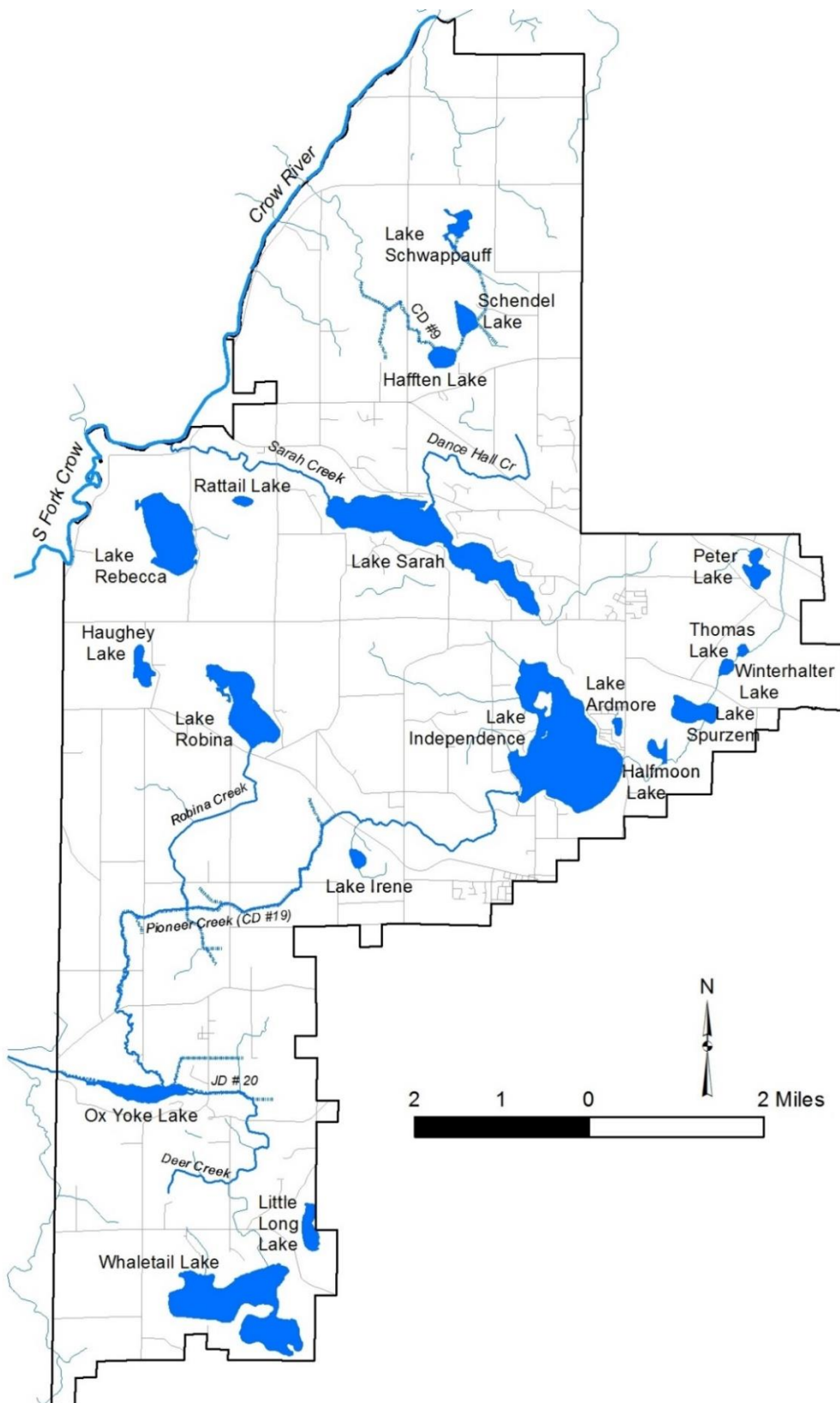


Figure 2.7. Major lakes and streams in the Pioneer-Sarah Creek watershed.

Source: Minnesota DNR, except ditches from Hennepin County.

Impaired Lakes. Eleven of the lakes in the watershed have been designated by the MPCA and Environmental Protection Agency (EPA) as Impaired Waters and are listed on the state's draft 2020 303(d) list for not meeting state nutrient concentration standards (Table 2.5 and Figure 2.8). In 2018 the MPCA removed, or delisted Lake Rebecca based on its improved water quality. Nutrient TMDLs and Implementation Plans have been completed for these lakes. The TMDLs and a 2017 Watershed Restoration and Protection Strategies (WRAPS) include strategies for protecting and improving all the lakes in the watershed. Nine of the listed nutrient impaired lakes as well as North and South Little Long have been listed as Impaired Waters for mercury in fish tissue. The MPCA has completed a statewide TMDL for those impairments. Lake Sarah was added to the Impaired Waters list in 2020 for exhibiting an impaired fish community.

Table 2.5. Impaired lakes in the Pioneer-Sarah Creek watershed.

Lake	DNR Lake #	Affected Use	Pollutant	TMDL Approved
Lake Sarah-East Lake Sarah-West	27-0191-01 27-0191-02	Aquatic consumption Aquatic recreation Aquatic life	Mercury FT ¹ Nutrients FishBio ¹	2007 2011 Not started
Lake Rebecca	27-0192-00	Aquatic consumption Aquatic recreation	Mercury FT Nutrients	2008 Delisted 2018
Lake Independence	27-0175-00	Aquatic consumption Aquatic recreation	Mercury FT Nutrients	2007 2007
North Whaletail	27-0184-01	Aquatic consumption Aquatic recreation	Mercury FT Nutrients	2013 2017
South Whaletail	27-0184-02	Aquatic consumption Aquatic recreation	Mercury FT Nutrients	2013 2017
Spurzem Lake	27-0149-00	Aquatic consumption Aquatic recreation	Mercury FT Nutrients	2007 2017
Half Moon Lake	27-0152-00	Aquatic consumption Aquatic recreation	Mercury FT Nutrients	2013 2017
Hafften Lake	27-0199-00	Aquatic consumption Aquatic recreation	Mercury FT Nutrients	Target 2025 2015
North Little Long	27-0179-01	Aquatic consumption	Mercury FT	2007
South Little Long	27-0179-02	Aquatic consumption	Mercury FT	2007
Peter Lake-North Bay	27-0147-02	Aquatic recreation	Nutrients	2017
Lake Irene	27-0189-00	Aquatic recreation	Nutrients	Target 2026
Lake Ardmore	27-0153-00	Aquatic recreation	Nutrients	2017

¹ "FT" means mercury in fish tissue. FishBio means fisheries bioassessment.

Source: Minnesota Pollution Control Agency.

2.4.2 Streams

The watershed is drained by two stream systems. Spurzem Creek flows through several small lakes to Lake Independence (Figure 2.7). Pioneer Creek flows out of Lake Independence southwest to Ox Yoke Lake. As it flows out of Ox Yoke Lake, it crosses the watershed legal boundary into Carver and Wright Counties, where it discharges into the South Fork of the Crow River. Two other small streams, Robina Creek and Deer Creek are tributary to Pioneer Creek. Sarah Creek is the outlet of the Lake Sarah drainage area, which flows to the Crow River. Dance Hall Creek is the primary tributary in this subwatershed. In the north, several small channels drain directly to the Crow River.

Table 2.6. Stream characteristics in the Pioneer-Sarah Creek watershed.

Stream	Length (mi)	Stream	Length (mi)
Pioneer Creek	8.77	Sarah Creek	2.48
Robina Creek	2.66	Dancehall Creek	2.53
Deer Creek	3.97		

Source: Minnesota DNR.

Stream Conditions. A limited amount of data is available to evaluate stream condition. Two sites on Pioneer Creek have been monitored since 2009, one at the CR 90 crossing at the outlet of a large flow-through wetland, and one further downstream at the Copeland Road crossing. Both sites show elevated levels of total phosphorus across all flow regimes, and elevated total suspended solids during high-flow events. Monitoring data shows elevated *E. coli* levels and low dissolved oxygen readings. One site on Sarah Creek has been monitored since 2009, with similar results. More data is available in the Commission's Annual Reports.

Impaired Streams. Sarah Creek, the Crow River, and the South Fork of the Crow River have been designated by the MPCA and the EPA as Impaired Waters and are listed on the state's impaired Waters list for not meeting water quality standards as shown in Table 2.7 and Figure 2.8. The 2017 WRAPS included TMDLs and implementation actions for Pioneer, Sarah, Deer, and Unnamed Creeks while the Crow River and South Fork Crow were assessed in their respective WRAPS studies.

Table 2.7. Impaired streams in the Pioneer-Sarah Creek watershed.

Stream	Stream AUID #	Affected Use	Pollutant	TMDL Approved
Sarah Creek	07010204-628	Aquatic recreation	<i>E. coli</i>	2017
Pioneer Cr	07010205-653	Aquatic life/ Aquatic recreation	<i>E. coli</i> DO	2017 Target 2026
Pioneer Cr	07010205-654	Aquatic Life	F-IBI ¹ , M-IBI ¹	Target 2026
Deer Creek	07010205-594	Aquatic life/ Aquatic recreation	<i>E. coli</i> DO	2017 Target 2026
Unnamed Creek*	07010205-593	Aquatic life/ Aquatic recreation	<i>E. coli</i> DO	2017 Target 2026
Crow River	07010204-502	Aquatic life/ Aquatic recreation	F-IBI ¹ , M-IBI ¹ , turbidity, fecal coliform	Fecal coliform & turbidity in 2013 N Fork WRAPS; others target 2026
South Fork Crow River	07010205-508	Aquatic consumption/ Aquatic life/recreation	F-IBI ¹ , M-IBI ¹ , Mercury FT ² , fecal coliform, turbidity, nutrients	Fecal coliform & turbidity in 2019 S Fork WRAPS; others target 2026

*Unnamed Creek is within the Pioneer Creek hydrologic boundary but outside the legal boundary.

¹ Index of Biotic Integrity. A measure of the quantity and quality of aquatic life. M-IBI denotes macroinvertebrate impairment and F-IBI denotes fish impairment.

² "FT" means mercury in fish tissue.

Source: Minnesota Pollution Control Agency.

2020 Impaired Streams

- Fecal Coliform; Fish; Inverts; Nutrients; Mercury; Turbidity
- Fecal Coliform; Fish; Inverts; Nutrients; Turbidity
- Fish; Inverts
- DO; E.coli
- E.coli

2020 Impaired Lakes

- Nutrients
- Mercury
- Nutrients and Mercury
- Fish, Nutrients, and Mercury

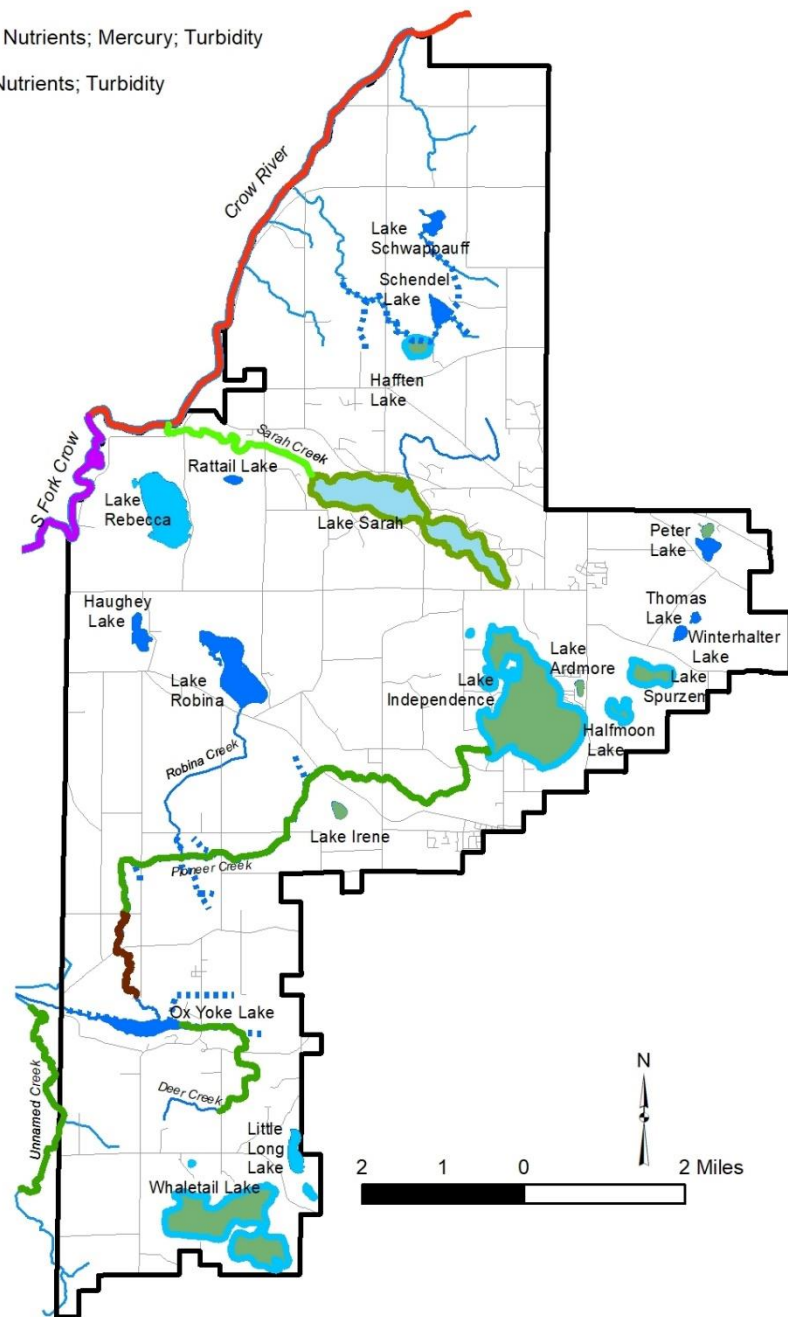


Figure 2.8. 2020 impaired lakes and streams.

Source: Minnesota Pollution Control Agency draft 2020 303(d) list.

2.4.3 Ditches

There are several county ditches in the watershed (Figure 2.7). Pioneer Creek between Highway 12 and Watertown Road and several lateral ditches, including parts of Robina Creek, are under the ditch authority of Hennepin County as County Ditch #19. County Ditch #9 connects and outlets three small lakes in the northern watershed. Part of Deer Creek, several laterals and Pioneer Creek downstream of Ox Yoke Lake cross county lines and are designated Judicial Ditch #20.

2.4.4 Wetlands

The US Fish and Wildlife Service compiled wetland maps from aerial photo interpretation as part of the National Wetland Inventory (NWI). Wetland scientists use two common classification schemes to identify wetland type – the US Fish and Wildlife Service’s “Circular 39” system, and a classification system developed by Cowardin et al. for the Fish and Wildlife Service, commonly referred to as the Cowardin system. The Circular 39 system was originally developed as a means for classifying wetlands for waterfowl habitat purposes. Nine of the Circular 39 freshwater wetland types are found in Minnesota. The Cowardin scheme is a hierarchical classification based on landscape position, substrate, flooding regime, and vegetation. While the Cowardin scheme has been officially adopted by the Fish and Wildlife Service and other agencies, the Circular 39 system is still commonly used because of its simplicity and ease of use. According to the NWI, wetlands, including lakes, cover approximately 27 percent of the watershed’s surface (Table 2.8 and Figure 2.9). The NWI map is not considered definitive. A delineation of wetland boundaries is required to be completed any time development or other impacts may occur near or in a wetland.

Table 2.8. NWI wetland area by type in the Pioneer-Sarah Creek watershed.

Circular 39 Type	Acres	Percent	Cowardin Type	Acres	Percent
1 - Seasonally Flooded	4,218	9.4	Emergent (EM)	6,883	15.3
2 - Wet Meadow	44	0.1	Forested (FO)	1,210	2.7
3 - Shallow Marsh	3,681	8.2	Scrub-shrub (SS)	480	1.1
4 - Deep Marsh	331	0.7	Unconsolidated Bottom (UB)	3,132	7.0
5 - Shallow Open Water	3,266	7.3	Aquatic Bed (AB)	534	1.2
6 - Shrub Swamp	476	1.1	Upland	32,741	72.8
7 - Wooded Swamp	122	0.3	Grand Total	44,980	100.0
8 - Bogs	21	<0.1			
90- Riverine	566	0.2			
Upland	32,126	72.8			
Grand Total	44,980	100.0			

Source: Minnesota DNR, 2013 NWI Update East-Central Minnesota.

NWI Wetlands

Circular 39 Classification

- Seasonally Flooded (Type 1)
- Wet Meadow (Type 2)
- Shallow Marsh (Type 3)
- Deep Marsh (Type 4)
- Shallow Open Water (Type 5)
- Shrub Swamp (Type 6)
- Woodland Swamp (Type 7)
- Bog (Type 8)
- Riverine Systems

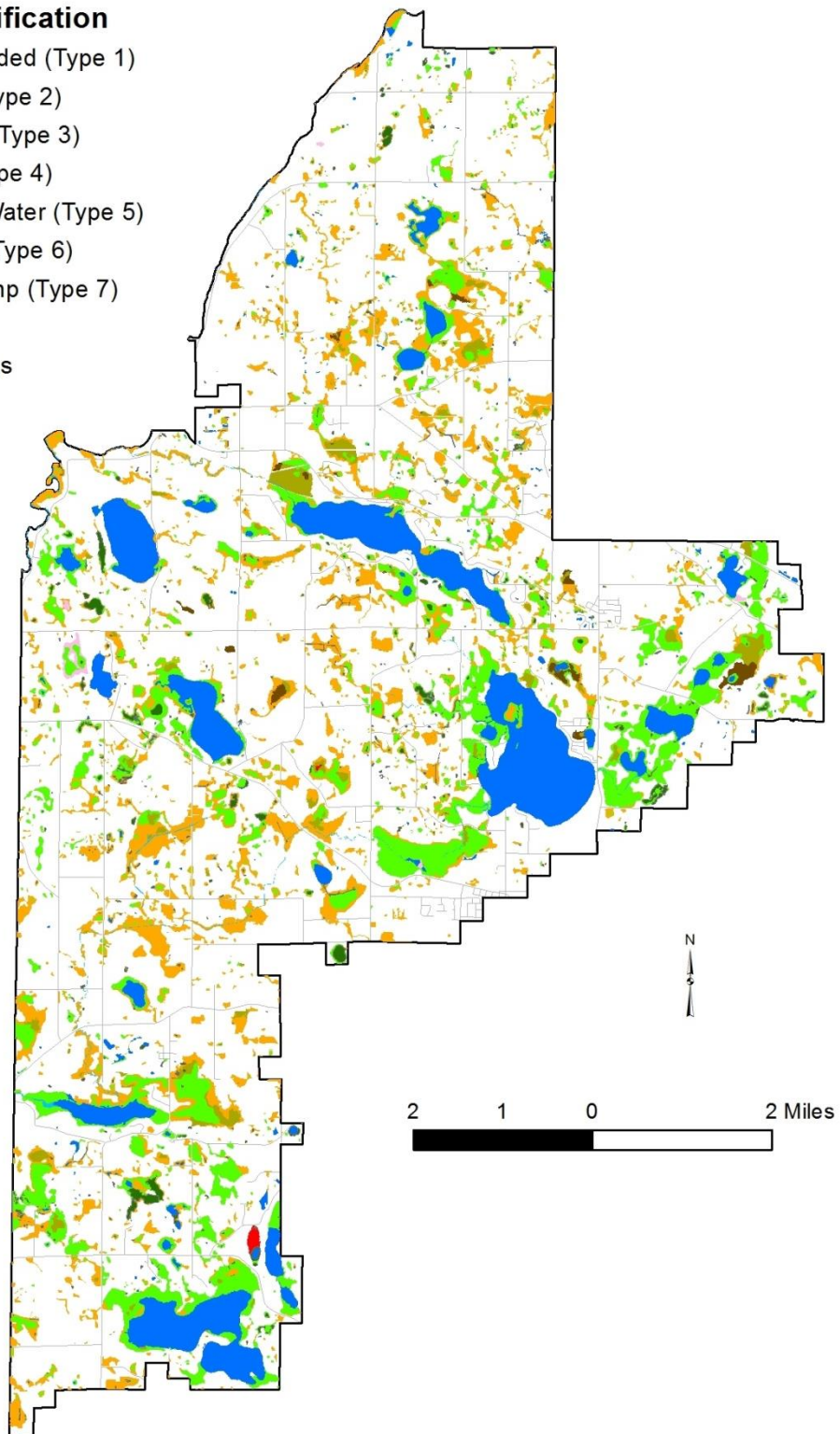


Figure 2.9. National Wetlands Inventory wetlands in the Pioneer-Sarah Creek watershed.

Source: Minnesota DNR, 2013 NWI Update East-Central Minnesota.

2.4.5 Public Waters

State statutes classify certain waterbodies as Waters of the State and the DNR maintains maps and lists on the Public Waters Inventory (PWI). Public Waters wetlands include all type 3, type 4, and type 5 wetlands (as defined in U.S. Fish and Wildlife Service Circular No. 39, 1971) that are 10 acres or more in size in unincorporated areas or 2.5 acres or more in size in incorporated areas. Public watercourses are defined as natural and altered watercourses with a total drainage area greater than two square miles or natural. Work within PWI waterbodies is regulated by the DNR. Public waters wetlands and watercourses information can be found in the Third Generation Plan.

2.4.6 Floodplain

Flooding effects may range from personal nuisance to property damage or loss to injury or death. Floodplain areas flood most often and severely. Land use regulations define the floodplain as the area covered by the flood that has a one percent chance of occurring each year, also known as the 100-year flood. The floodplain is divided into two zoning districts: the floodway and flood fringe. The floodway includes the river channel and nearby land areas which must remain open to discharge the 100-year flood. The flood fringe, while in the flood plain, lies outside the floodway. Regulations usually allow development in the flood fringe but require flood-proofing or raising to the legal flood protection elevation and providing compensating storage.

In 1968, Congress created the National Flood Insurance Program (NFIP) to make flood insurance available to property owners at federally subsidized rates. The NFIP required communities to adopt local laws to protect lives and future development from flooding. FEMA notifies communities by issuing a Flood Hazard Boundary Map (FHBM). This map shows the approximate boundaries of the community's 100-year flood plain. Each of the communities in the Pioneer-Sarah Creek watershed has a Flood Insurance Study (FIS). Flood maps are available at each City Hall, at HCEE, and online at gis.hennepin.us/naturalresources/map/default.aspx.

2.4.7 Groundwater

Much of the watershed is underlain by loamy and clayey glacial till, and groundwater is less vulnerable to contamination because the unsorted sediment with grains of different sizes is more closely packed together with less void space than sediments comprised of particles of more uniform size. However, the Crow River corridor is underlain with sand, loamy sand, and gravel outwash and is very highly sensitive to potential pollution. Wetlands and areas near wetlands and lakes are moderately susceptible to contamination due to the proximity to the water table.

Cities that provide municipal water from groundwater have completed Wellhead Protection Studies, which model groundwater flow and identify Wellhead Protection Areas that should be managed to reduce the risk of contamination of groundwater. Emergency Response Areas show where immediate action should be taken to clean up spills of contaminants to protect groundwater. More information is available from the respective cities and at mda.state.mn.us/protecting/waterprotection/waterprotectionmapping.

3.0 Watershed Organization and Operations

This section describes how the Pioneer-Sarah Creek Watershed Management Commission is organized, its purpose and authorities, and its various operating programs under its current Watershed Management Plan. The section concludes with an assessment of progress towards meeting the goals in the current watershed management plan.

3.1 PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION

3.1.1 Purpose and Authority

The Pioneer Creek Watershed Management Commission was formed in 1978 using a Joint Powers Agreement (JPA) developed under authority conferred to the member communities by Minnesota Statutes 471.59. In 1982 the City of Greenfield requested that the Sarah Creek watershed be merged with Pioneer Creek to form a joint watershed management organization. In December 1984, the Pioneer-Sarah Creek Watershed Management Commission (PSC WMC) was officially established under the authority of MS 103B.201 through 103B.251 by a JPA signed by Corcoran, Greenfield, Independence, Loretto, Maple Plain, Medina, and Minnetrista, Watertown Township, and Hennepin Conservation District. Since that time, Watertown Township and Corcoran left the Commission.

The Commission's purpose is set forth in Minnesota Statutes 103B.210, Metropolitan Surface Water Planning, which codified the Metropolitan Surface Water Management Act of 1982. Minnesota Statutes 103B.231 and Minnesota Rules 8410 establish requirements for watershed management plans within the Twin Cities Metro Area. The law requires the plan to focus on:

- (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.

3.1.2 Governance

The Pioneer-Sarah Creek Watershed Management Commission is governed by a six-member board comprised of representatives who are appointed by each City Council for a term determined by the city. The Commission meets monthly, holding a meeting on the third Thursday of each month. Meetings are open to the public. The JPA setting forth the authorities granted to the Commission is included in Appendix A.

3.2 RESPONSIBILITIES

3.2.1 Commission

A Board of Commissioners has been established as the governing body of the Commission. A Technical Advisory Committee (TAC) comprised of member city staff designees meets as requested by the Commission.

Operating expenses are funded through an annual apportionment to each city based on their proportionate share of taxable market value or real property within the watershed. These expenses include the cost of contractual engineering, administrative, and legal services; programs such as water quality monitoring, public information and education, and special studies; and matching funds for grant-funded projects and studies. The mechanisms for funding capital improvements are identified in the current JPA and in policies adopted by the Commission.

The Commission cannot directly levy taxes or special assessments but has the ability to assess members who subsequently decide how they want to generate the funds. Options available to the members include *ad valorem* tax, creation of a watershed management tax district, special assessments, or Chapter 444 storm sewer utility financing. The Commission may also request bonding from Hennepin County. The Commission has adopted a policy to participate in 25 percent of the cost of a qualifying project.

3.2.2 Relationship to Other Agencies

Cities. Member cities all have approved stormwater management plans that assist the Commission in implementing the Third Generation Watershed Management Plan. The cities have in place ordinances codifying the Commission's development rules and standards, including stormwater management, erosion control, and wetland and floodplain management. City stormwater management programs vary by community, depending on fiscal capacity, degree of development, and water resources.

All the member cities except Greenfield are National Pollutant Discharge Elimination System (NPDES) Municipal Separate Small Storm Sewer Systems (MS4s) and have approved NPDES permits and Stormwater Pollution Prevention Programs (SWPPPs) that include numerous activities to manage stormwater and prevent water resource degradation. Those SWPPPs also contain TMDL implementation actions to reduce pollutant loading and manage the rate and volume of stormwater runoff.

The JPA does not authorize the Commission to undertake capital improvement projects. The Commission may order capital projects for construction by member cities, often as regional projects which several cities may cooperatively agree to construct and fund. In addition to Commission projects member cities may undertake projects, such as including Best Management Practices (BMPs) in routine street reconstruction projects.

Member cities also engage in various water management-related activities such as Adopt-A-Park programs, urban forestry and Arbor Day activities, promotion of recycling and composting, and environmental education published in the city newsletter and website. In many cities the Park and Recreation Commission or some other Commission is charged with providing advice to the City Council on environmental matters, including watershed related matters.

Hennepin County Environment and Energy (HCEE) operates several programs to conserve natural and water resources in the county. Educational and outreach services are focused on proper lawn and garden care, proper use of herbicides and pesticides, and composting; assistance to communities in identifying and conserving high-value natural resources; promotion of and assistance with agricultural BMPs; and managing public accesses to water resources. HCEE also participates in the education and outreach programming coordinated by the West Metro Water Alliance (WMWA) consortium of watershed management organizations in the county.

In addition, HCEE operates volunteer education and monitoring programs, including the RiverWatch stream macroinvertebrate monitoring program for elementary and secondary school students, and the Wetland Health Program (WHEP), a program for adult volunteers. HCEE is also responsible for administration and implementation of the Minnesota Wetlands Conservation Act and of cost-share conservation programs that financially assist landowners with the protection of their land, as well as administration of conservation easements.

Three Rivers Park District (TRPD). TRPD is a special park district created by the state legislature in 1957. The District owns over 27,000 acres of parks and trails in Hennepin, Carver, Dakota, Scott, and Ramsey Counties, and operates 20 parks and ten regional trails. TRPD stewards 43 lakes, more than 30 miles of rivers and streams and over 8,000 acres of wetlands, as well as prairie habitat, forest and woodlands, and conservation areas. In addition to natural resources conservation, TRPD provides a wealth of recreation and education opportunities. TRPD staff work closely with the PSCWMO to manage the lakes, streams, and wetlands in the two Regional Park Reserves and the Gale Woods Farm and Kingswood Park Special Recreation Features.

Metropolitan Council. The Metropolitan Council's *Water Resources Management Policy Plan* spells out a wide range of programs and activities undertaken by a variety of governmental and private agencies for management of water resources in the Metro area. Among the many programs and activities are several of particular interest to the Commission: the development of targeted watershed pollutant loads; review of watershed and local water plans and comprehensive plans for consistency with Metro goals and objectives; grant programs; the Citizens' Assisted Lake Monitoring Program (CAMP); and the Environmental Information Management System. The Pioneer-Sarah Creek Commission has partnered with the Metropolitan Council's CAMP program since 2005 to support citizen volunteer lake water quality monitoring.

Minnesota Pollution Control Agency (MPCA). The MPCA operates several programs applicable to watershed planning. The MPCA monitors water quality, sets standards, and implements various controls. Of interest are the NPDES program and implementation of the Clean Water Act. The MPCA manages the NPDES Phase I construction and industrial stormwater discharge permitting.

MPCA also manages the NPDES Phases I and II permitting for municipal separate storm sewer systems (MS4s). Hennepin County and MnDOT are also MS4s with conveyances in Pioneer-Sarah Creek watershed, although many of those conveyances in the watershed are outside the Census Urban Area Boundary and are thus not regulated under NPDES.

The MPCA implements the Clean Water Act's requirement that states adopt water quality standards to protect the nation's waters. The EPA and MPCA require managers of water resources that fail to meet these established standards to prepare TMDL studies identifying the source of the pollutant and a plan for bringing the water resource into compliance.

The Commission worked closely with the MPCA and received funding to complete TMDLs and Implementation Plans on Lake Independence and Lake Sarah, as well as the WRAPS study for several lake and stream impairments in the watershed.

Board of Water and Soil Resources (BWSR). The board is the state's administrative agency for 90 soil and water conservation districts, 46 watershed districts, 23 metropolitan watershed management organizations, and 80 county water managers. BWSR's core functions include implementing the state's soil and water conservation policy, comprehensive local water management, and the WCA. BWSR periodically assesses watershed organizations as part of its Performance Review and Assistance Program (PRAP).

BWSR wetland specialists participate in Technical Evaluation Panels in the watersheds to assess potential wetland impacts and mitigation strategies. BWSR also periodically audits the Commission to assure that WCA is being administered properly. Finally, BWSR is the implementation agency for the Clean Water Funds grant program funded by the Clean Water, Land, and Legacy Amendment.

Minnesota Department of Health (MDH). The Environmental Health Division of the MDH operates many programs of interest to the Commission. Programs include Drinking Water Protection, Wellhead Protection, Lake and Fish Monitoring (in partnership with DNR/MPCA), Environmental Health Services, Health Risk Assessment, Site Assessment, and Consultation and Well Management.

Minnesota Department of Natural Resources (DNR). The DNR manages and protects the state's natural resources and operates numerous programs. The department provides technical assistance and information regarding best management practices, natural resource management, incorporating natural resource conservation in land use planning, and lakescaping.

The Fisheries Division monitors and improves fisheries within the state including many of the lakes within the watershed. It also promotes fishing opportunities and provides grants to assist in the construction of fishing piers. The Ecological and Water Resources (EWR) Division focuses on an overarching vision of "Healthy Watersheds throughout Minnesota." "Healthy Watersheds" include: 1) sustainable quantities and qualities of water; 2) sustainable levels of biodiversity; 3) well-functioning ecosystem services; and 4) sustainable and vibrant natural resource economies and recreational opportunities. The EWR Division also provides the following services:

- It maintains an inventory of public waters and operates permit programs for working in public waters or for appropriating public waters;
- Oversees the state's floodplain management program;
- Provides local stewardship by coordinating the Mississippi River Critical Area and MNRAA programs and the Shoreland Management program;
- Collects, analyzes, and provides ecological information, including:
 - Location and management of rare resources (endangered and threatened species, critical habitats, high quality natural communities);
 - Management of harmful exotic species, fish and wildlife diseases, and negative environmental impacts of human development;
 - Management and restoration of important ecological processes in river systems and key natural areas; and
 - Development of information about Minnesota's ecosystems and their significance to a sustainable quality of life.

The DNR's webpage at dnr.state.mn.us/lakefind/index.html is LakeFinder, a DNR supported tool that combines information from various DNR Divisions, as well as other state agencies, such as MPCA (water quality) and MDH (fish consumption). This tool contains data for more than 4,500 lakes and rivers throughout Minnesota.

Minnesota Department of Agriculture. The MDA is statutorily responsible for the management of pesticides and fertilizer other than manure to protect water resources. The MDA implements a wide range of protection and regulatory activities to ensure that pesticides and fertilizer are stored, handled, applied and disposed of in a manner that will protect human health, water resources and the environment. The MDA works with the University of Minnesota to develop pesticide and fertilizer BMPs to protect water resources, and with farmers, crop advisors, farm organizations, other agencies and many other groups to educate, promote, demonstrate and evaluate BMPs, to test and license applicators, and to enforce rules and statutes. The MDA has broad regulatory authority for pesticides and has authority to regulate the use of fertilizer to protect groundwater.

3.3 OPERATIONS

This section describes the current programs operated by the Commission.

3.3.1 Education and Outreach

The Commission initially established an Education Program as part of its Third Generation Plan. The Commission later joined the joint Education and Public Outreach Committee (EPOC) of the Bassett Creek, Elm Creek, Shingle Creek and West Mississippi Commissions and Blue Thumb. These organizations, along with TRPD, HCEE and the Freshwater Society, then formally formed the West Metro Water Alliance (WMWA) and developed the West Metro Education and Outreach Plan (EOP) to guide shared activities. The Commission has participated in WMWA in past years but is not a current member.

Details regarding the education and outreach activities may be found in the Commission’s Annual Report. Some highlights over the past six years are:

- Maintained a website - pioneersarahcreek.org - to provide news to residents of the watershed and beyond. The Watershed Management Plan, monthly meeting materials, project reviews, Annual Reports, water monitoring results, and other watershed-related information are posted there. In addition, from time to time, news releases are provided to the member cities and their official newspapers for publication.
- Maintained a Facebook social media account to share timely information about the watershed and its resources and to share other water and natural resources information.
- The Commission participates in HCEE’s Wetland Health Evaluation Program (WHEP), which is a citizen volunteer wetland monitoring program. This program educates volunteers about wetland ecology and quality and provides valuable planning information to the Commission and other interested parties.
- The Commission partnered with the Hennepin County Ag Specialist to conduct a Horse Stable Redesign for Water Quality and Animal Health Field Day to demonstrate best practices for water quality on agricultural sites.
- Over the course of the Third Generation Plan the Commission began to work more closely with Hennepin County Rural Conservationist and water resources staff to provide targeted education and outreach, both to the residents of the watershed and to the Commissioners.

3.3.2 Monitoring Program

Minnesota Administrative Rule 8410.0100 Subp. 5 requires watershed management organizations to conduct monitoring programs “capable of producing accurate data to the extent necessary to determine whether the water quality and quantity goals of the organization are being achieved.”

The Commission publishes monitoring data in its Annual Report which presents data from the current year as well as water quality and quantity trends. That trend data is included in this Plan in Appendix B. The following are short descriptions of the current monitoring program.

Stream Monitoring. The Commission began monitoring water quality and streamflow in 1996 through the Metropolitan Council’s Watershed Outlet Monitoring Program (WOMP); however, after a few years that monitoring was discontinued for budgetary reasons until the Commission started monitoring again in 2009. The Commission contracts with TRPD to monitor streams, and Typically one or two sites on Pioneer Creek- the crossings at Copeland Road and Pagenkopf Road in Independence, and on Sarah Creek site at the County Road 92 crossing just south of TH 55 are monitored for continuous flow. Other stream sites may be monitored for flow and water quality to obtain data for lake response modeling.

Lake Monitoring. The Commission contracts with TRPD to annually monitor Sentinel Lakes: Lake Independence, Lake Sarah, Whaletail Lake, and Little Long Lake. Parameters monitored typically include total phosphorus, soluble reactive phosphorus, total nitrogen, Secchi depth, and

chlorophyll-a. In addition, two to three lakes are monitored each year by TRPD and by volunteers through the Citizen Assisted Monitoring program (CAMP.)

Biologic Monitoring. High school volunteers coordinated by HCEE perform stream macroinvertebrate monitoring. Students from Rockford High School and West Lutheran High School have in the past monitored sites on Pioneer Creek and the Crow River, however, not in recent years. Two or three wetland sites are monitored each year by citizen volunteers through HCEE's RiverWatch program.

3.3.3 Rules and Standards and Project Reviews

The Commission does not issue permits but does require development and redevelopment projects to meet requirements for runoff rate control and water quality treatment. Those requirements as well as others relating to wetlands, floodplains, erosion control, buffers, and stream crossings are set forth in the Third Generation Plan, and generally call for no net increase in pollutant loads from pre-development to post-development condition through the abstraction of 1.1" of runoff or BMPs and no increase in the rate of runoff for the 2-, 10-, and 100-year events. Through 2019 the Commission acted as the LGU for WCA administration for Greenfield, Loretto, and Maple Plain, but as of January 1, 2020 no longer serves as LGU for any member cities.

Development and redevelopment projects that meet certain size and other criteria are required to incorporate into their developments BMPs sufficient to meet the Commission's standards. Engineering plans, hydrologic calculations, wetland delineations, and other supporting material are submitted to the Commission's technical services consultant, who conducts a Project Review and discusses the proposal and any necessary revisions with the developer. Findings are summarized in a report to the Commission, which will either approve the plans as submitted or suggest minor modifications or will reject the plans. Table 3.1 summarizes the project reviews that have been completed during 2015-2019. These project reviews include private development and redevelopment as well as public projects such as street and highway projects.

Table 3.1. Project reviews, 2015 - 2019.

Year	Project Reviews	Wetland Only
2015	6	3
2016	4	5
2017	4	3
2018	6	11
2019	7	2
TOTAL	27	24

3.3.4 Administration

Administration includes preparing for and attending routine and special meetings; taking minutes and record keeping; grant writing; correspondence; filing; and annual and financial reporting.

Administrative and technical consulting staff also administers grants on behalf of the Commission: completing work plans, preparing interim and final reports, and preparing invoices.

3.4 ASSESSMENT OF THIRD GENERATION MANAGEMENT PLAN PERFORMANCE

As part of the Fourth Generation Management Plan, the Commission conducted a self-assessment to identify achievements and areas that realized less success. Commissioners, contracted staff, stakeholder partners, and members of the public reflected on accomplishments during the Third Generation Plan period and how that might inform the next generation plan.

Each year the Commission establishes a Work Plan setting forth the strategies and actions it will pursue to make progress towards meeting the Management Plan goals. Each year's Annual Report then summarizes the actions taken and results achieved.

3.4.1 Successes

The Commission has completed or is in ongoing implementation of nearly all the work plan activities and strategies identified in the Third Generation Plan as detailed in Table 3.2 below. The most successful achievements over the past six years have been:

- Completed and began implementation of the watershed-wide TMDL and WRAPS studies. Three community conversations were held to gather input and comments.
- The Commission established a process to annually review projects submitted to the CIP, and each year sets aside funds to share in the cost of those projects.
- One of the priorities of the Commission was to complete subwatershed assessments (SWAs), or detailed studies of potential implementation projects. In 2014 the City of Independence completed a SWA to identify options for stormwater retrofit in the Lake Independence and Lake Sarah subwatershed portions of the city. The Commission completed SWAs in the Dance Hall Creek, Baker Park Reserve Campground Ravine Area, and Lake Ardmore Area subwatersheds. Some of the projects identified, such as the Baker Park Ravine Stabilization and Lake Ardmore projects, have since been or will be implemented, while others require additional exploration to find landowners willing to consider improvements.
- Built a sense of Commission and City alignment, highlighted by partnerships that identified TMDL implementation projects and grant and cost share funding to complete projects in the Lake Ardmore area and the Baker Park Ravine Stabilization.
- Enhanced the working relationship with the Hennepin County Rural Conservationists to enhance visibility, build ties with the agricultural community, and promote BMPs in priority areas.
- Continued fruitful partnerships with lake associations to complete curly-leaf pondweed treatment on Lake Sarah and to rebuild the Lake Independence outlet weir.
- The Commission adopted a Livestock Management Policy model ordinance which was subsequently adopted by three cities. An additional city considers these operations on a case by

case basis via Conditional Use Permits, while the remaining two do not have any animal operations within their limits.

- The Commission established and continues a routine monitoring program for priority lakes in the watershed, and water quality and flow in Pioneer Creek.
- Partnered with the Hennepin County Ag Specialist to conduct a Horse Stable Redesign for Water Quality and Animal Health Field Day to demonstrate best practices for water quality.
- In 2018, BWSR completed a Performance Review and Assistance Program (PRAP) assessment of the Commission and its operations. Generally, the audit found that the Commission complied with nearly all the major performance standards for administrative, planning, and communication practices and was making progress implementing the Management Plan. BWSR made recommendations related to Commissioner training, improved data accessibility, and more detailed biennial progress reviews, which the Commission implemented.
- Lake Rebecca, which was originally listed as impaired in 2008 for nutrients, is now meeting phosphorus, chlorophyll-a, and Secchi depth standards and has been delisted from the 303(d) list.
- The Third Generation Plan established a goal of improving water quality by 10% over the previous ten-year period. Table 3.2 shows there appears to have been an improvement in water quality as measured by Secchi depth (clarity) and TP in five of the 9 lakes with monitoring data sufficient to perform a trend analysis. There has been a statistically significant improvement in TP in West Lake Sarah and North Whaletail and clarity in North Whaletail and Lake Ardmore. Independence and Haften are trending better.

Table 3.2. Ten-year change in lake water quality.

Lake	SD Change*	TP Change*
Lake Ardmore	+28%	+9.5%
Haften Lake	+23%	-15%
Lake Independence	+43%	-10%
Peter Lake	-3%	+24%
Lake Sarah-East	+36%	N/A
Lake Sarah-West	+38%	-18%
Spurzem Lake	+38%	N/C
North Whaletail	+16%	-23%
South Whaletail	+16%	-5%

*Note: a positive Secchi Depth change is an improvement, while a negative TP change is an improvement. Values in **bold italic** are significant based on a Mann-Kendall trend analysis ($p=0.05$).

3.4.2 Areas for Improvement

Areas that fell short of Third Generation expectations or which could be improved include:

- While the BWSR PRAP found the Commission generally making progress, comments submitted by stakeholders surveyed during the assessment suggest that the Commission could be more proactive at undertaking projects and actions and at reaching out to the wider watershed community.

- The Technical Advisory Committee (TAC) does not meet regularly – typically only once or twice a year to help review and revise the CIP. The stakeholders working in the watershed such as HCEE, TRPD, Extension, the DNR, and the cities tend to work independently, and could benefit from a clear framework and roles and common goals.
- No assessment of progress toward meeting TMDL load reduction or water quality goals has been completed. TMDL modeling could be updated based on more recent and more complete data, including sediment core analysis and the Implementation Plans revisited.
- Because much of the implementation opportunity in the watershed is on privately-owned property,
- Outside of the lakeshore property owners there continues to be a lack of visibility and knowledge about the Commission and its role, water quality, and needs and opportunities. There is limited general education and outreach to the residents and property owners in the watershed aside from the website and social media.
- Identifying more robust CIP funding sources and grant opportunities.
- There is some concern about continuity in Commissioners and the level of history and technical knowledge that needs to be developed to be effective as a Commissioner. Some of the cities appoint City Council members on a rotating basis. Just when the Commissioner feels like they are up to speed, they are rotated off the Commission and a new Council member takes their place. The Commission has sponsored City Council participation in NEMO workshops when those are available.

3.4.3 TMDL Implementation

The Commission was identified as being a partner in certain implementation activities in the TMDLs and WRAPS. As noted below, several of these actions are incorporated into this Plan as part of the monitoring plan, education and outreach plan, operations, special studies, CIP cost sharing, and rules and standards. Many of these strategies will require further study and review prior to potential implementation. Actions taken to date are shown in *italics*.

Lake Independence TMDL Implementation Plan Actions:

- Identify and prioritize significant erosion potential areas within the lakeshed. *The City of Independence partnered with HCEE and Metro Conservation Districts to complete a subwatershed assessment of its portion of the Lake Independence drainage area, including potential erosion areas. The CIP includes funding to complete high-priority projects.*
- Design and implement cropland BMPs to reduce agricultural phosphorus inputs to the lake. *The Commission has worked with HCEE, U of M Extension, and other interested parties on outreach to agricultural landowners. This Plan's CIP includes funding to complete high-priority projects.*
- Cooperate with the cities of Medina and Independence to develop a manure hauling and disposal service to assist landowners with manure management. *HCEE continues to investigate the possibility of such a cooperative service but there are several hurdles to overcome that may make this infeasible.*

- Identify potential animal waste nutrient control project sites, and work with landowners to inform them of funding and projects that they can initiate to benefit the lake and their properties. *The Commission will work with HCEE, U of M Extension, and other interested parties on outreach to agricultural landowners. This Plan's CIP includes funding to complete high-priority projects.*
- Construct urban BMPs within the watershed and on the shoreline of Lake Independence to reduce phosphorus inflows. *The City of Independence partnered with HCEE and Metro Conservation Districts to complete a subwatershed assessment of its portion of the Lake Independence drainage area, the Lake Ardmore Area, and the Baker Park Ravine area, including potential urban BMPs. Projects were completed or will be completed from the Lake Ardmore SWA and the Baker Park Ravine Stabilization Project was completed in winter 2019-2020. This Plan's CIP includes funding to complete high-priority projects.*

Lake Sarah TMDL Implementation Plan Actions:

- Lead a detailed assessment of specific opportunities for small scale land treatment practices to achieve phosphorus load reduction. *The City of Independence partnered with HCEE and Metro Conservation Districts to complete a subwatershed assessment of its portion of the Lake Sarah drainage area.*
- Lead a feasibility study to evaluate alternatives for constructing regional treatment facilities to reduce loadings from the Dance Hall Creek subwatershed. *The City of Greenfield partnered with TRPD to complete a similar assessment in the Dance Hall Creek subwatershed to Lake Sarah. This Plan's CIP includes funding to complete high-priority projects that may be identified in that assessment.*
- Lead and help finance the effort to implement curlyleaf pondweed management, with the Lake Sarah Improvement Association (LSIA) providing coordinating services with lakeshore owners as well as financial support. *The Commission has shared in the cost of this treatment.*
- Lead the effort to implement a potential alum treatment of the lake once watershed controls have been largely completed. *This action may be considered later in the scope of this Plan.*

Hafften Lake TMDL WRAPS Actions:

The North Fork Crow River Bacteria, Nutrients, and Turbidity TMDL and the accompanying WRAPS included source assessment, modeling, load reductions, and implementation actions for Hafften Lake. The primary sources of nutrients to Hafften are inflow from Schendel Lake and from internal sediment release. The TMDL requires a 34% TP load reduction, almost entirely from internal load. No specific actions were assigned to the PSCWMO in the WRAPS. Internal load control was assigned to either the SWCD or the lake association. General watershed load reductions were also assigned to the SCWD or the NRCS. To date, the Commission has not undertaken any implementation actions.

Pioneer-Sarah Creek Watershed TMDL and WRAPS Actions:

This 2017 TMDL addressed nutrient impairments in Peter, Spurzem, Ardmore, Halfmoon, North Whaletail and South Whaletail Lakes and *E. coli* impairments on Pioneer, Sarah, Deer, and Unnamed Creeks, including TP and *E. coli* load reductions. The study also evaluated dissolved oxygen (DO) impairments in Pioneer, Unnamed, and Deer Creeks. No load reductions were established for those impairments at that time.

Several generalized actions were assigned to the Commission in the WRAPS, typically in partnership with HCEE and the cities. These include:

- Improve fertilizer and manure application management
- Eliminate livestock traffic through waterways
- Improve urban/suburban stormwater management
- Improve upland urban and agricultural surface runoff controls and management
- Determine influence of wetlands on nutrient loading
- Reduce livestock bacteria in surface runoff
- Improve quality of upstream lake(s)
- Wetland restorations
- In-channel restoration
- Improve education and outreach
- Improve coordination/collaboration
- Implement/review policies and rules

The Commission was identified as having a supplemental role in internal load management on South Whaletail, Ardmore, Half Moon, Spurzem, Peter Lakes.

Two lakes, Lake Rebecca and Little Long, are Protection lakes, and the Commission is assigned the following actions in partnership with HCEE and TRPD:

- Continue to reduce watershed pollutant loadings
- Monitoring
- Internal load assessment and control

The 2017-2019 Lake Independence Carp Study Phases 1 and 2 tracked carp in Lake Independence and back into Lake Ardmore and the Spurzem Lake chain.

Table 3.3. Actions completed during the Third Generation Plan period.

#	Problem or Issue	Actions in 3 rd Generation Plan	Completed 2014 - 2020
<i>Funding and Financial Stability</i>			
1.1	TMDLs completed and underway have or will identify very significant load reductions to be made in order to achieve state water quality standards. This will increase pressure on the member cities to fund water quality improvements on an ongoing basis. Is there adequate funding for implementation?	The Commission's General Fund budget includes funds to complete BMP assessments and feasibility studies, and to cost share in small projects. The Plan states that for certain projects it may use the statutory authority for joint powers WMOs to request Hennepin County to levy an ad valorem tax to fund part or all of a capital project.	Two subwatershed assessments and an additional SWA/feasibility study have been completed. The Commission annually sets aside funds in the budget to share in 10% of the cost of projects. The Commission discussed but elected not to use the county levy authority for any capital projects.
1.2	Should the Commission continue to share in the cost of implementation projects with cities, and at what level?	See 1.1 above.	See above.
1.3	Identify a sustainable funding level and sources that minimize impacts to city levies.	See 1.1 above.	See above.
<i>Information, Knowledge, and Commitment</i>			
2.1	Many City staff and elected officials do not see the Commission as a policy leader or watershed issues as a priority.	The Plan includes a high priority action to sponsor workshops such as NEMO for all municipal officials in the watershed. The Implementation Plan includes Commission actions to become a more active technical resource: completing BMP assessments, leading feasibility studies, and providing education and outreach services.	The Commission has sponsored City Council participation in NEMO workshops when those are available and has gotten some participation. The Commission is becoming more technically active with SWAs and considering small BMP projects. However, there has been limited general education and outreach to residents.
2.2	Lack of information on water quality issues and actions individual property owners can take. Continue to enhance communication with City Councils, advisory commissions, lake associations, youth and scouting groups, schools, etc. Look for opportunities to use social media, technology, and other resources to garner input and feedback.	The Commission will convene Citizen Advisory Committees as needed to advise the Commission and to assist in program development and implementation. The Commission will also participate with collaborative groups to pool resources to undertake activities in a cost-effective manner.	The Commission has not convened a Citizens Advisory Committee. The Commission is a member of Watershed Partners but is no longer a member of the West Metro Water Alliance (WMWA). Recently the Commission began partnering with the HCEE rural conservationists on outreach.

#	Problem or Issue	Actions in 3 rd Generation Plan	Completed 2014 - 2020
2.3	Various stakeholders, such as lakeshore owners and agriculture operators, have different, often conflicting opinions on water quality issues, leading to acrimony and finger-pointing.	The Plan will focus on providing opportunities for bridge-building between stakeholders with sometimes competing ideas and interests, such as lakeshore owners and agricultural operators.	As part of the watershed wide TMDL and WRAPS studies, the Commission sponsored three Community Conversations that brought together various stakeholders. Minimal additional outreach has occurred since then.
<i>Data Availability</i>			
3.1	Implementation of TMDLs will require more routine lake and stream monitoring data and other programmatic activities such as volunteer lake and stream monitoring.	This Plan includes an expanded monitoring program that includes routine stream and sentinel lake monitoring, and periodic monitoring of other resources on a rotating and as-need basis.	The Commission has implemented the routine lake and stream monitoring program set forth in the 3 rd Gen plan. However, the monitoring data and lake report cards available on the Commission's website are years out of date.
3.2	Lack of information about the wetlands in the watershed.	The Plan requires that a functions and values assessment using the most recent version of the MnRAM protocol be submitted with a project review when wetland impacts are proposed.	The Commission requires a functions and values assessment when potential wetland impacts are proposed.
<i>Other Issues</i>			
4.1	TMDLs have been completed and a WRAPS is in progress that identify load reduction and water quality protection activities. There is no timeline and no benchmarks established to evaluate progress.	The Commission will work together with the MPCA and stakeholders as part of the WRAPS process to develop an evaluation process and timeline.	The Commission has not yet completed an assessment of progress towards meeting the TMDL load reduction and water quality goals.
4.2	State and regional TMDLs and other state or regional policy changes such as revised or new water quality standards may impact management requirements.	The Commission will continue to monitor information about state and regional TMDLs and other water resources policies and adjust policies and actions as necessary.	The Commission is aware of new impairments in the watershed: Lake Irene nutrient impairment and Lake Sarah fish impairment.
4.3	The Commission, other agencies, and member cities need to work in partnership to meet common goals, pooling resources and technical capabilities.	The Implementation Plan includes Commission actions to become a more active technical resource: completing BMP assessments, leading feasibility studies, and providing education and outreach services. The Commission also intends to partner with groups such as the West Metro Water Alliance (WMWA) to gain access to shared resources.	The Commission has become more active at partnering with cities and HCEE to complete SWAs and feasibility studies as well as obtaining grants. The Commission was briefly a member of WMWA but withdrew from the consortium for budget reasons.

#	Problem or Issue	Actions in 3 rd Generation Plan	Completed 2014 - 2020
4.4	Recent years have seen changes in frequency, intensity, and duration of storm events.	The Commission will continue to monitor information about climate change impacts and make adjustments to policies and actions as necessary.	The Rules and Standards for Development and Redevelopment adopted in the Third Generation Plan incorporated the most recent Atlas 14 updated rainfall frequency depths and intensity distribution curves.

4.0 Implementation Plan

This Plan section discusses the problems and issues that were identified during the Plan development process, and the goals and actions the Commission will pursue to address them. Each of the operating programs were reviewed during the planning process, and modifications to the monitoring plan, education program, and development rules and standards are described in this section and presented in more detail in appendices. This section includes a cost estimate for operations over the coming ten year period and the estimated member assessments, and a Capital Improvement Program of potential capital projects and special studies. Finally, this section concludes by summarizing the requirements for member city local water management plans and procedures for amending this Plan.

4.1 ASSESSMENT OF PROBLEMS AND ISSUES

4.1.1 Problem and Issue Identification

At the start of the planning process the Commission and TAC identified problems and issues confronting water resources management in the watershed. Table 4.1 shows the problems/issues in four general categories, in no order of priority.

Table 4.1. Problems and issues identification.

#	Problem or Issue	Discussion
<i>Impaired Waters Implementation</i>		
1.1	Have not yet completed a review of progress toward meeting the Lake Independence and Sarah TMDLs.	Follow-up monitoring, including sediment coring, on Lake Independence suggest the load partitioning between internal and external sources may need to be revised.
1.2	Some of the lakes require significant internal load management such as alum treatment, rough fish and submersed aquatic vegetation (SAV) management.	Alum treatments can be very cost-effective and provide long lasting improvements but are very expensive.
1.3	The stream TMDLs suggest that manure management practices and Subsurface Sewage Treatment Systems (SSTS) issues may be contributing to the bacteria impairments on the streams.	This is an opportunity to partner with HCEE on targeted outreach and management.
1.4	Have not identified a process for evaluating progress toward the other lake and stream TMDLs.	Need to periodically “check in” on progress and reevaluate strategies based on the most current data.

#	Problem or Issue	Discussion
1.5	Lack of a directed framework to guide progress – no commonality of goals, approach, or sense of team effort between the stakeholders.	Cities don't participate in TAC meetings since most of their staff is contracted and they haven't seen the value. Without participation, projects aren't identified / implemented, and the cities don't understand the Commission's role and priorities. Commission needs a framework for improving engagement with cities identify municipal resources to improve coordination and implementation.
1.6	BMP implementation is highly reliant on partnering with willing landowners	Opportunity to partner with HCEE to leverage federal (NRCS and EQIP) and state (Clean Water Fund) dollars to make implementation more feasible for the landowners.
1.7	Rather than focus solely on achieving numerical pollutant load reductions, manage lakes and streams holistically for a healthy aquatic ecosystem.	Develop lake management plans that systematically address internal load and fish and aquatic vegetation community management as well as watershed load reductions.
Agricultural Community Outreach		
2.1	There is a need for significant nutrient and bacterial load reductions in the agricultural areas of the watershed, but there are limited specific projects or strategies identified.	Focus efforts on "hot spots," or potential high-loading areas and act fast when opportunities arise. There is a need to build trust and momentum with landowner's in the watershed.
2.2	There is an opportunity to work more in partnership with HCEE to prioritize and incentivize conservation projects.	Focus on implementing cost-effective structural practices and increasing adoption of management practices such as soil health and cover crops.
2.3	Investigate and grow public-private partnerships to leverage resources and expertise.	Specifically, where there is common benefit, i.e. for private organizations to substantiate sustainability initiatives and for the Commission and its partners to implement conservation.
General Education and Outreach		
3.1	There is limited education and outreach. The Commission's 3rd Generation Plan set forth education and outreach goals and strategies for elected officials, cities, citizens, etc., but little has been accomplished.	There is a desire to work more with students and the schools.
3.2	Need for ongoing commissioners and council member education so they can pass along that knowledge to the public.	Continue to work with education and outreach partners and seek out additional opportunities.
3.3	Little private landowner outreach and engagement except for the lake associations.	This is an opportunity to partner with HCEE on targeted outreach and management.
Effective Operations		
4.1	Operating budget constraints affect the outreach and engagement staff can perform.	Reinforces the need to establish and build on partnerships
4.2	There is a need for ongoing, continuous Commissioner education and development so they can effectively serve as Commissioners.	There is a steep learning curve for new Commissioners.

4.1.2 Identification of Priority Issues

Identification of priority issues was completed through ongoing discussions with the Commissioners and Technical Advisory Committee. Based on input from the Commissioners, TAC, and member city staff, the following issues have been identified as a high priority for this Management Plan.

FOURTH GENERATION MANAGEMENT PLAN PRIORITIES

1. Make systematic progress toward achieving lake water quality goals by 2030:
 - a. Delist South Whaletail Lake.
 - b. Protect Lake Rebecca so it continues to meet water quality standards.
 - c. Meet state water quality standards in the following lakes: Independence, Sarah, Spurzem, Half Moon, and Ardmore.
 - d. Achieve a 10% reduction in TP concentration in the other monitored lakes over the previous ten years.
2. Work in a coordinated way with urban and rural property owners, cities, lake associations, public and private entities, Hennepin County, and TRPD building partnerships to conserve our water and natural resources and deliver implementation projects.
3. Raise the profile of the Commission across the watershed, within Hennepin County, the western Metro area, and the Crow River Watershed.
4. Serve as an informational and technical resource for the cities and the citizens and property owners in the watershed.

4.2 FOURTH GENERATION MANAGEMENT GOALS AND ACTIONS

Guided by the identification and prioritization of issues in the watersheds, the Commission has developed goals that will guide activities over the coming decade. These goals were derived from the Gaps Analysis and a review of the accomplishments and unfinished business from the Third Generation Plan; discussions with Commissioners, Technical Advisory Committee members, state agency and city and county staff; and public input.

The framework to achieve these goals is set forth in the Implementation Plan and Capital Improvement Program detailed in the following sections and Appendix E. Member cities supplement and complement these actions with additional policies and programs tailored to their unique priorities and needs. The philosophy of the JPA and this Plan is that the management plan establishes certain common goals and standards for water resources management in the watershed, agreed to by the member cities, and implemented by those cities by activities at both the Commission and local levels. Successful achievement of the goals in this Plan is dependent on those member cities and their dedication to this effort.

4.2.1 Water Quantity

A statutory responsibility of watershed management organizations is to prevent and mitigate flooding. This Plan accomplishes this by ensuring that development and redevelopment does not

create excessive new volumes and rates of runoff that may cause downstream flooding and channel erosion. A second responsibility is promoting groundwater recharge, which impacts stream baseflow and lake levels, and maintaining adequate hydrology to wetlands. As noted in section 2.1.3 above state agencies have reported increasingly frequent, heavy precipitation events as well as increasingly frequent freeze/thaw cycles during the wintertime. Both patterns may exacerbate flooding and other related water quantity concerns, straining member communities into the future. The Fourth Generation management goals for water quantity are focused on maintaining the current flood profiles of the creeks and tributaries and considering impacts of changing precipitation patterns on the Commission's future mission and activities.

Goal Area A. Water Quantity

- Goal A.1. Maintain the post-development 2-year, 10-year, and 100-year peak rate of runoff at pre-development level for the critical duration precipitation event.
- Goal A.2. Maintain the post-development annual runoff volume at pre-development volume.
- Goal A.3. Prevent the loss of floodplain storage below the established 100-year elevation.

Water Quantity Actions:

- a. The Commission shall maintain Rules and Standards requiring development and redevelopment meeting certain criteria to meet runoff rate control and runoff volume and infiltration requirements.
- b. The Commission will work with state, regional, county, member city and other partners to better understand the impacts of changing precipitation and temperature patterns and to identify and implement appropriate regulatory and design standards revisions to better protect water and natural resources, infrastructure, and properties in the watershed.
- c. Landlocked depressions that presently do not have a defined outlet and do not typically overflow may only be allowed a positive outlet provided the downstream impacts are addressed and the plan is approved by the Commission.
- d. The Commission encourages the use of Low Impact Design techniques to reduce runoff rates and volumes, erosion and sedimentation, and pollutant loading.
- e. Member cities shall adopt local controls and local stormwater management plans that are at least as stringent as the Commission Water Quantity goals and policies and the Commission Rules and Standards.
- f. Develop technical and educational resources for assisting landowners with implementing sustainable farming practices to manage water on their farms.

Floodplain Actions:

- g. The Commission requires a plan review by the local permitting authority for development or redevelopment if any part of the development is within or affects a 100-year floodplain.

Goal Area A. Water Quantity

- h. The Commission shall maintain Rules and Standards requiring development and redevelopment affecting the 100-year floodplain to meet Commission compensatory storage, low flow elevation, and timing requirements.
- i. Member cities shall adopt a floodplain ordinance and any other required local controls, and local stormwater management plans that are at least as stringent as the Commission Floodplain goals and policies and the Commission Rules and Standards.

4.2.2 Water Quality

The TMDLs and WRAPS completed for several lakes and streams in the watershed established nutrient and *E. coli* load reductions necessary to improve water quality. The Fourth Generation goals for water quality are focused on making progress to improve the lakes and streams in the watershed as well as protect those that are not impaired waters. The goals are aggressive; some of them will require much dedication and effort and public and private resources to achieve. However, public input received for this Plan, the TMDLs, and other sources show that achieving a high standard of water quality is a priority for the public as well as required by state statute, and the Implementation Plan includes actions to help meet these goals.

Goal Area B. Water Quality

- Goal B.1. Protect Lake Rebecca and achieve delisting of South Whaletail Lake.
- Goal B.2. Meet state standards in Spurzem, Half Moon, Ardmore, Independence, and Sarah Lakes, making progress towards their removal from the list of Impaired Waters.
- Goal B.3. Improve water quality in the impaired lakes by 10% over the average of the previous ten years by 2030.
- Goal B.4. Maintain or improve water quality in the lakes and streams with no identified impairments.
- Goal B.5. Conduct a TMDL/WRAPS progress review every five years.
- Goal B.6. Foster implementation of Best Management Practices in the watershed through technical and financial assistance through partnership development.

Water Quality Actions:

- a. The Commission adopts as water quality goals the standards for Class 2b waters in the North Central Hardwood Forest ecoregion as set forth in Minn. Rules 7050.0222.
- b. The Commission will undertake a routine lake and stream monitoring program to assess progress toward meeting these goals.
- c. The Commission shall maintain Rules and Standards requiring development and redevelopment meeting certain criteria to meet water quality requirements.
- d. The Commission shall maintain Rules and Standards requiring development and redevelopment meeting certain criteria to meet erosion control requirements.

Goal Area B. Water Quality

- e. The Commission will work in partnership with other organizations and agencies to pursue grant and other funding to implement improvement projects and feasibility studies.
- f. The Commission will update implementation plans and this Plan as necessary following TMDL/WRAPS completion and progress reviews.
- g. Member cities shall adopt local controls and local stormwater management plans that are at least as stringent as Commission Water Quality goals and policies and the Commission Rules and Standards.
- h. Periodically review manure management model ordinance to ensure it conforms with the most current MDA and MPCA laws and standards.

4.2.3 Groundwater

The Commission has undertaken limited groundwater management activities in the past, primarily by encouraging projects requiring project review to infiltrate a portion of runoff. Over the past decade cities that rely on groundwater for drinking water have worked with the Minnesota Department of Health to adopt wellhead protection plans and to implement policies and official controls to protect drinking water sources. In the Third Generation Plan, the Commission adopted a new requirement for development and redevelopment to infiltrate 1.1" of runoff to promote groundwater recharge and reduce runoff. This Fourth Generation Plan maintains that requirement.

Goal Area C. Groundwater

- Goal C.1. Promote groundwater recharge by requiring abstraction/infiltration of runoff from new development and redevelopment.
- Goal C.2. Protect groundwater quality by incorporating wellhead protection study results into development and redevelopment Rules and Standards.

Groundwater Actions:

- a. The Commission shall maintain Rules and Standards requiring development and redevelopment meeting certain criteria to meet infiltration requirements.
- b. Member cities shall adopt local controls and local stormwater management plans that are at least as stringent as Commission Groundwater goals and policies and the Commission Rules and Standards
- c. The Commission will partner with the DNR, USGS, MDH, and other agencies to educate the member cities and watershed community officials about groundwater issues and their relation to stormwater management and surface water quality.
- d. The Commission shall consult maps showing the wellhead protection zones within its boundaries upon completion of a local wellhead protection plan for use in determining vulnerable areas that should be exempted from infiltration.

4.2.4 Wetlands

The Commission's primary tool for managing wetlands is the Wetland Conservation Act (WCA). The six member cities self-administer WCA. The Commission requires submittal of a functions and values assessment using the latest version of MnRAM when an applicant proposes wetland impacts.

Goal Area D. Wetlands

Goal D.1. Preserve the existing functions and values of wetlands within the watershed.

Goal D.2. Promote wetland enhancement or restoration of wetlands in the watershed.

Wetland Actions:

- a. The Commission shall maintain Rules and Standards requiring development and redevelopment meeting certain criteria to provide buffers adjacent to wetlands, lakes, and streams.
- b. Member cities shall adopt local controls and local stormwater management plans that are at least as stringent as Commission Wetland goals and policies and the Commission Rules and Standards.
- c. Developers must complete a wetland delineation by a wetland professional to identify the location and extent of any wetlands present within the site.
- d. For any development or redevelopment proposing impacts to any wetlands in the watershed, a functions and values assessment using the most recent version of the MnRAM protocol must be completed and submitted to the respective LGU.
- e. Before consideration or approval of a wetland replacement plan or use of wetland banking credits, the member cities shall ensure that the applicant has exhausted all possibilities to avoid and minimize adverse wetland impacts according to the sequencing requirements of the Wetland Conservation Act. The order of descending preference for the location of replacement wetland, including the use of wetland banking credits, is as follows:
 1. On-site;
 2. Within the same subwatershed;
 3. Within the Pioneer-Sarah Creek watershed;
 4. Within Hennepin County; and
 5. Outside the Pioneer-Sarah Creek watershed within Major Watershed Number 18 or Major Watershed Number 19.
- f. Work with Hennepin County to incentivize and implement cost-effective wetland enhancement and/or restoration projects which improve water quality and wetland functions and values and attenuate peak flows.

4.2.5 Drainage Systems

Pioneer Creek between Highway 12 and Watertown Road and several lateral ditches, including parts of Robina Creek, are under the ditch authority of Hennepin County as County Ditch #19. The

County also is ditch authority for County Ditch #9 connecting and outletting Lake Schwappauff, Schendel Lake, and Hafften Lake in the northern watershed; and Judicial Ditch #20, which includes part of Deer Creek and several laterals, and Pioneer Creek downstream of Ox Yoke Lake. The primary Fourth Generation activity related to drainage systems is to periodically review the advantages and disadvantages of ditch authority and to reconsider jurisdiction.

Goal Area E. Drainage Systems

Goal E.1. Continue current Hennepin County jurisdiction over county ditches in the watershed.

Drainage System Actions:

- a. Periodically reconsider the appropriate jurisdiction over the county ditches in the watershed.
- b. Work with the county to implement multi-purpose drainage management projects which improve water quality while maintaining drainage rights for benefitted landowners on county ditches as well as other private drainage systems.
- c. Work with HCEE and BWSR to develop a policy regarding drain tiling and the discharge of private drainage into public waterways.

4.2.6 Operations and Programming

These goals guide the routine programs and operations of the Commission, and include the education and outreach program; maintenance of rules and standards; the annual monitoring program; and programs and activities to stay abreast of changing standards and requirements, search for grant and other funds to supplement the regular budget, and operate a capital improvement program and share in the cost of projects.

Goal Area F. Commission Operations and Programming

- Goal F.1. Identify and operate within a sustainable funding level that is affordable to member cities.
- Goal F.2. Foster implementation of TMDL and other implementation projects by sharing in their cost and proactively seeking grant funds.
- Goal F.3. Operate a public education and outreach program prioritizing elected and appointed officials' education and building better understanding between all stakeholders.
- Goal F.4. Operate a monitoring program sufficient to characterize water quantity and quality and biotic integrity in the watershed and to evaluate progress toward TMDL goals.
- Goal F.5. Maintain rules and standards for development and redevelopment that are consistent with local and regional TMDLs, federal guidelines, source water and wellhead protection requirements, nondegradation, and ecosystem management goals.
- Goal F.6. Serve as a technical resource for member cities and residents.

Goal Area F. Commission Operations and Programming

Operations and Programming Actions:

- a. Annually review the budget and Capital Improvement Program and convene a professional Technical Advisory Committee to identify and prioritize projects.
- b. Convene Citizen Advisory Committees as necessary to advise the Commission and to assist in program development and implementation.
- c. Prepare and implement an annual monitoring plan and provide annual reporting.
- d. Every five years evaluate progress toward meeting TMDL and WRAPS water quality goals, and adjust the Implementation Plans as necessary to achieve progress.
- e. Periodically review the development rules and standards for adequacy and make revisions as necessary.
- f. Coordinate water resources management between the Commission, Three Rivers Park District, Hennepin County, and the member cities.
- g. Continue to educate the public about water resources issues.
- h. Develop relationships with private land owners to implement new projects.
- i. Review and amend as necessary the Commission's Cost Share Policy for projects both on and separate from the CIP.

4.3 FOURTH GENERATION IMPLEMENTATION PLAN AND CAPITAL IMPROVEMENT PROGRAM

To achieve the goals set forth above the Commission will operate a regulatory program, implement monitoring and education and outreach programs, and undertake capital improvement projects. The following sections summarize these programs, which are described in more detail in attached appendices. Following the descriptions, Table 4.3 describes how the programs and projects in this Implementation Program address the Problems and Issues identified in the Gaps Analysis and subsequent public review and input and Table 4.4 details the Implementation Program and its estimated cost. The Capital Improvement Program (CIP) is set forth in Appendix F.

The Pioneer-Sarah Creek watershed is primarily residential and agricultural in land use, with a very limited commercial and industrial tax base. Its financial capacity is limited, but the Commission has been successful at obtaining grants to supplement local funding sources, and at building partnerships to leverage resources. In implementing this Plan, the Commission will continue to work on identifying opportunities, securing grant and other funding, and working jointly with member cities, HCEE, the TRPD, public and private entities, and individual property owners to maximize the cost-effectiveness of implementation activities. The success of this Plan is dependent on continuing and expanding those partnerships and outside resources.

4.3.1 Rules and Standards and Project Reviews

This Third Generation Watershed Management Plan adopted modifications to the standards for new development and redevelopment, codifying them in a Rules and Standards document. The modifications brought those standards closer to consistency with those of other jurisdictions and with state and other requirements TMDLs. The Rules and Standards are set forth in Appendix C.

Project Review Size Thresholds. All single-family residential projects that disturb more than one acre and all other non-single-family residential land-disturbing projects regardless of size are required to submit erosion control plans for review. The threshold of project size for application of Commission water quality and quantity rules and standards is one acre, regardless of density or land use.

Infiltration. The infiltration-from-net-new-impervious-surface requirement is 1.1 inches of runoff infiltrated within 48 hours. This is consistent with the MPCA's Minimal Impact Design Standards (MIDS) and the NPDES General and Construction Permits requirements. Where infiltration is not feasible, the rules require that runoff be filtered before discharging off the site. The rules include several credits toward meeting that infiltration volume requirement, including disconnection of impervious surface; conservation of existing native vegetation; and the use of decompacted and amended soil as a BMP.

Water Quality. The water quality requirement is "the load reduction achieved by abstracting 1.1 inches runoff from net new impervious or no net increase in TP or TSS, whichever is lower." From a practical standpoint, developers will need to calculate first, the loading from the pre-development condition, and second, the loading assuming the abstraction of 1.1 inches of impervious runoff from the post-development condition. The development must incorporate water quality BMPs to limit post-construction loading to the lesser of those two figures. Load reduction achieved by meeting the infiltration requirement can be applied toward meeting the water quality requirement.

Buffers. An average 25 foot, minimum 10 foot wide buffer adjacent to lakes, wetlands, PWI streams, and county ditches is required for any new development or redevelopment. This buffer requirement provides more flexibility in establishing the buffer while retaining the basic buffer functions. Where waters are subject to the state buffer law, the state requirements will take precedence.

4.3.2 2021-2030 Monitoring Program

The monitoring program refined in the Third Generation Plan had two organizing principles: continuation of routine flow and water quality monitoring in Pioneer and Sarah Creeks and Sentinel Lakes, and volunteer monitoring of water quality in other lakes. In this Fourth Generation Plan, each year the Commission will evaluate the proposed program and make modifications as necessary based on the most current data needs. The monitoring objectives guiding the Pioneer-Sarah Creek monitoring program and the assessment of data are shown below. The program is set forth in more detail in Appendix D.

MONITORING PROGRAM GOALS

1. To quantify the current status of streams and lakes throughout the watershed in comparison to state water quality standards.
2. To quantify changes over time, or trends, in stream and lake water quality in the watersheds.
3. To enhance the value of previous monitoring data by extending the period of record.
4. To track and quantify the effectiveness of implemented BMPs throughout the watersheds for the protection of water quality.
5. To evaluate progress toward meeting TMDL load reduction and other goals.

In general, the components of the monitoring program are:

- Continuation of routine flow and water quality monitoring on Pioneer Creek at Copeland Road and/or Pagenkopf Road and Sarah Creek at Highway 92.
- Periodic flow and water quality monitoring on Dance Hall Creek (DHC); Loretto Creek (LC); and Spurzem Creek (SC) on a rotating basis, or other streams or outfalls as desired.
- Annual monitoring of five “Sentinel Lakes”: Lake Independence, Lake Sarah, both basins of Whaletail Lake, and Little Long Lake. This monitoring has been completed by the TRPD under contract to the Commission. This Plan assumes that TRPD will continue its annual monitoring on Lake Rebecca and other lakes as they require.
- Continuation of the partnership with HCEE to obtain macroinvertebrate collections by student volunteers each year through the RiverWatch program and by cities to evaluate wetlands through the Wetland Health Evaluation Program. (WHEP).
- Continuation of the partnership with the Metropolitan Council to conduct lake surface water quality monitoring by volunteers every two to three years through the Citizen Assisted Monitoring Program (CAMP).
- Each year TRPD prepares a report on current water quality and trends, and reports water quality monitoring data to the state’s EQuIS database. The Commission will annually post updated data and report cards on the Commission’s website.

4.3.3 2021-2030 Education and Outreach Program

Education and Public Outreach is a core function of the Pioneer-Sarah Creek Watershed Management Organization. The Commission has conducted some education and outreach activities and has also collaborated with other organizations in Hennepin County as part of the West Metro Water Alliance (WMWA) and participated in Metro-wide education and outreach initiatives such as Blue Thumb, Watershed Partners and Northland NEMO.

This Fourth Generation Education and Public Outreach Program builds on the Commission’s education and outreach activities. The program is set forth in more detail in Appendix E. The following sections set forth the program goals and strategies.

WATERSHED EDUCATION AND PUBLIC OUTREACH PROGRAM GOALS

The goal of the Pioneer-Sarah Creek Watershed Management Commission's Education & Outreach Program is to engage people in the community in the protection and improvement of lakes, rivers, streams and wetlands through education, increased water awareness and community participation. This Program establishes individual stakeholder goals to better target implementation strategies.

Implementation Strategies. Each year the Commission will evaluate the proposed Education and Outreach program and establish education and outreach activities for the coming year. The Commission will rely on the following and other strategies to implement the program and achieve the Plan's education and outreach goals:

- Expand education and outreach opportunities by coordinating with other entities such as HCEE.
- Use the Commission's, member cities', and educational partners' websites and newsletters, social media, co-ops, local newspapers and cable TV to share useful information to stakeholders on ways to improve water quality and keep content current.
- Convene Citizen Advisory Committees as needed to advise the Commission and to assist in program development and implementation.
- Participate with collaborative groups to pool resources to undertake activities in a cost-effective manner, promote interagency cooperation and collaboration, and promote consistency of messages.
- Prominently display the Commission's logo on information and outreach items, project and interpretive signs, and other locations to increase visibility.
- Provide opportunities for the public to learn about and participate in water quality activities.
- Provide education opportunities for elected and appointed officials and other decision makers.
- Enhance education opportunities for youth.
- Provide opportunities for bridge-building between stakeholders with sometimes competing ideas and interests, such as lakeshore owners and agricultural operators.
- Collaborate with HCEE to undertake targeted education and outreach to agricultural and other landowners in the watershed.

4.3.4 TMDL Implementation

Commission Actions. In general, the Commission in the TMDL Implementation Plans and WRAPS has taken on responsibility for undertaking subwatershed assessments to identify potential BMP locations, for continuing ongoing water quality monitoring to assess progress, and for working cooperatively with HCEE and TRPD to implement urban, rural, and agricultural load reduction practices. Additional potential activities include targeted education and outreach to property owners, and exploration of strategies for in-lake nutrient management such as alum treatments, curly-leaf pondweed and carp management.

City Actions. The member cities have taken on responsibility in the TMDL Implementation Plans for undertaking capital projects and activities to reduce pollutant loading. Many of those actions are

not reflected in this Plan. Projects and programs for which the member cities seek Commission cost-share funding are included in the Implementation Plan shown on Table 4.4. The Local Plan Content requirements set forth in Section 4.4 of this Plan require the member cities to “Show how the city will take action to achieve the load reductions and other actions identified in and agreed to in the TMDL Implementation Plan.”

4.3.5 Capital Improvement Program

The primary focus of the Commission’s CIP is to systematically make progress toward meeting TMDLs focusing resources on one or two lakes at a time, periodically reviewing progress and updating realistic five to ten year working plans. The Commission will periodically convene a TAC/Working group to coordinate work and jointly assess progress and set priorities. The Commission contributes to a capital projects fund and shares in the cost of implementation projects. In addition, the Commission will continue to seek out grant and other funding to undertake larger cost-effective projects as opportunities arise.

Lake Management Plans. The Lake Independence TMDL was completed in 2007 and the Lake Sarah TMDL in 2011. Stakeholders have completed several implementation actions since that time. Additional monitoring data such as sediment core release rate analysis and lake inflow have since been collected. Priority implementation actions in this Plan are progress reviews for each of these TMDLs including lakeshed and lake response model and TMDL load reduction target updates. These progress reviews will also update the TMDL implementation plans. The focus of these plans will be on holistic, whole-lake ecological management that includes actions to manage aquatic vegetation, fish communities and internal load in addition to watershed load reductions.

Subwatershed Assessments and Studies. The Commission budgets at least \$20,000 annually for special studies and for cost sharing capital projects. Annually, the Commission will consider completing subwatershed assessments and special studies such as feasibility studies and special monitoring that will identify the most cost-effective practices and projects. It is currently the Commission’s priority to focus on identifying and implementing load reducing projects that make progress toward achieving TMDL goals. One subwatershed that is a priority for assessment is the area tributary to Spurzem Lake, which itself is tributary to Lake Independence.

Capital Projects. The Commission’s JPA authorizes the Commission to undertake capital improvement projects as set forth in Minn. Stat. 103B.251. That statute allows watershed organizations to fund projects on their CIP by certifying for payment by the county all or any part of the cost of a capital improvement. In 2011 the Commission adopted a major plan amendment to its Second Generation Plan that added a cost-share policy and revised the CIP to show a ten percent cost share from the Commission, funded by a dedicated portion of the annual member dues. That policy was continued in the Third Generation Plan and is incorporated into this Plan as well. In recent years the Commission has increased its cost share to 25 percent of the project cost net of any grants received.

For 2021-2030 the Commission will focus on completing or participating in subwatershed assessments and other studies and will prioritize cost-share in TMDL/WRAPS implementation projects, starting with Lake Independence and Lake Sarah. The Commission will annually solicit capital projects and cost-share activities from the member cities and will budget for and convene a Technical Advisory Committee (TAC) of staff and professional engineers to identify potential capital projects and to evaluate and prioritize city submittals for Commission funding. That TAC will continue in future years to provide advice and assistance to the Commission. The Commission may also consider a policy to supplement County incentives for cost-share practices in priority areas.

4.3.6 Commission Self-Assessment

A periodic robust and frank self-assessment is necessary to ensure that organizations stay on track to achieve goals. During this Fourth Generation Plan, the Commission will annually review progress towards goals. This self-assessment will use a matrix such as Table 4.2 below to systematically review and evaluate progress towards goals. This matrix will also be used to set each year's work plan as well as provide a "heads up" to member cities about future years' needs. This self-assessment will become part of the Commission's Annual Report.

Table 4.2. Conceptual self-assessment matrix.

Goal	Metric	Actions Taken this Past Year	Actions Taken to Date	Additional Actions to Achieve Goal	Schedule, Responsible Party(ies), Cost and Funding
Goal 1	<i>To be updated as necessary</i>	<i>To be completed annually</i>	<i>To be completed annually</i>	<i>To be completed annually</i>	<i>To be completed annually</i>
Goal 2	<i>To be updated as necessary</i>	<i>To be completed annually</i>	<i>To be completed annually</i>	<i>To be completed annually</i>	<i>To be completed annually</i>
...	

4.3.7 Addressing Identified Problems and Issues

As noted above, this planning process revealed several problems and issues to be considered in this Fourth Generation Watershed Management Plan. Table 4.3 below repeats the problems and issues set forth in Table 4.1 at the beginning of this report section, and describes how each were addressed in this Implementation Plan.

Table 4.3. Actions in this Plan addressing the identified problems and issues.

#	Problem or Issue	Actions in the 4 th Generation Plan
<i>Impaired Waters Implementation</i>		
1.1	Have not yet completed a review of progress toward meeting the Lake Independence and Sarah TMDLs.	Both TMDLs are programmed for review and update in the Implementation Plan.

#	Problem or Issue	Actions in the 4 th Generation Plan
1.2	Some of the lakes require significant internal load management such as alum treatment, rough fish and SAV management.	The CIP includes an alum treatment on South Whaletail Lake and a potential additional alum treatment on Lake Rebecca if necessary. Alum treatments may be considered for other lakes based on the results of the TMDL progress reviews. Rough fish assessment has been underway on the Lake Independence chain, with additional activities such as carp barriers completed or included in this plan.
1.3	The stream TMDLs suggest that manure management practices and SSTS issues may be contributing to the bacteria impairments on the streams.	The CIP includes funding for opportunistic manure management and other cost-share practices throughout the watershed. The Commission will also work with
1.4	Have not identified a process for evaluating progress toward the other lake and stream TMDLs.	This process will be developed based on the Commission's experience reviewing the Independence and Sarah TMDLs as part of those Lake Management Plans.
1.5	Lack of a directed framework to guide progress – no commonality of goals, approach, or sense of team effort between the stakeholders.	The Commission will convene a periodic TAC meeting to share information and develop shared goals and strategies.
1.6	BMP implementation is highly reliant on partnering with willing landowners.	HCEE intends to actively reach out to property owners and can bring cost-share funding to reduce costs. The Commission will consider a policy to supplement those cost-share funds.
1.7	Rather than focus solely on achieving numerical pollutant load reductions, manage lakes and streams holistically for a healthy aquatic ecosystem.	The Implementation Plan includes projects to develop Lake Management Plans for Lake Independence, Ardmore Lake, and Lake Sarah.
Agricultural Community Outreach		
2.1	There is a need for significant nutrient and bacterial load reductions in the agricultural areas of the watershed, but there are limited specific projects or strategies identified.	Subwatershed assessments include nutrient loading modeling to identify potential high loading areas for prioritization and potential BMPs. HCEE is actively reaching out to property owners to determine interest.
2.2	There is an opportunity to work more in partnership with HCEE to prioritize and incentivize conservation projects.	See 1.6 above.
2.3	Investigate and grow public-private partnerships to leverage resources and expertise.	The Commission will actively seek out such partnerships.
General Education and Outreach		
3.1	There is limited education and outreach. The Commission's 3rd Generation Plan set forth education and outreach goals and strategies for elected officials, cities, citizens, etc., but little has been accomplished.	The Commission will continue to work in partnership with Watershed Partners, Project NEMO, and HCEE to reach out to various stakeholders.

#	Problem or Issue	Actions in the 4 th Generation Plan
3.2	Need for ongoing commissioners and council member education so they can pass along that knowledge to the public.	HCEE staff have developed a program of ongoing Commissioner education. The Commission will continue to participate in Project NEMO training as available.
3.3	Little private landowner outreach and engagement except for the lake associations.	HCEE is actively reaching out to property owners to determine education and outreach needs.
Effective Operations		
4.1	Operating budget constraints affect the outreach and engagement staff can perform.	The Commission will continue to work in partnership with Watershed Partners, Project NEMO, and HCEE to reach out to various stakeholders in a cost-effective way.
4.2	There is a need for ongoing, continuous Commissioner education and development so they can effectively serve as Commissioners.	HCEE staff have developed a program of ongoing Commissioner education. The Commission will continue to participate in Project NEMO training as available.

Table 4.4. Pioneer-Sarah Creek Fourth Generation Plan Implementation Plan.

Action	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<i>Expenses:</i>											
OPERATINGEXPENSES											
Engineering/consulting	47,000	35,200	35,900	36,600	37,300	38,000	38,800	39,600	40,400	41,200	42,000
Administrative expense	36,000	36,000	36,700	37,400	38,100	38,900	39,700	40,500	41,300	42,100	42,900
Administrative-project reviews	1,000	1,000	1,000	1,000	1,200	1,200	1,200	1,300	1,300	1,400	1,400
Administrative-CIPManagement	2,500	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Administrative-tech support	800	750	750	750	750	750	750	750	750	750	750
Legal expense	500	500	500	500	500	500	500	500	500	500	500
Audit expense	4,500	4,500	4,500	4,500	4,500	4,500	4,600	4,700	4,800	4,900	5,000
Insurance	3,100	2,800	2,800	2,800	2,800	2,800	2,900	3,000	3,100	3,200	3,300
Website	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Technical Advisory Committee mtgs	3,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Lake monitoring - TRPD	8,100	8,100	8,300	8,500	8,700	8,900	9,100	9,300	9,500	9,700	9,900
Lake monitoring - CAVP	1,520	760	800	800	800	800	800	800	800	800	800
Stream monitoring—routine	9,500	9,500	9,700	9,900	10,100	10,300	10,500	10,700	10,900	11,100	11,300
Education program	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Education events	500	500	500	500	500	500	500	500	500	500	500
Invertebrate monitoring	1,000	750	750	750	750	750	750	750	750	750	750
Grant writing	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Third Gen Plan	10,000	-									
Management Plan admin	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Special Projects	2,000										
Fourth Gen Plan	10,000										
Capital Improvement Project/SWA	28,000	29,140	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000
TOTAL OPERATING EXPENSE	176,820	141,800	142,500	144,300	146,300	148,200	150,400	152,700	154,900	157,200	159,400
<i>Revenues:</i>											
Member Dues (max 2% increase)	103,800	103,800	104,500	106,300	108,300	110,200	112,400	114,700	116,900	119,200	121,400
Project Review Fees	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
CIP Income	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000
Interest & Dividends	9,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
TOTAL OPERATING REVENUE	146,800	141,800	142,500	144,300	146,300	148,200	150,400	152,700	154,900	157,200	159,400
% Dues Increase	3.8%	0.0%	0.7%	1.7%	1.9%	1.8%	2.0%	2.0%	1.9%	2.0%	1.8%

Note: See Appendix F for Capital Improvement Projects and Programs.

4.4 IMPACT ON LOCAL GOVERNMENTS

Following approval and adoption of the Pioneer-Sarah Creek Fourth Generation Watershed Management Plan pursuant to Minnesota Statutes 103B, governmental units having land use planning and regulatory responsibility are required by statute to prepare or amend their local water management plans. Local plan content is driven primarily by Minnesota Rules 8410 and must include a capital improvement program and implementation plan to bring the local water management plan into conformance with the Commission's Plan. This update must be completed no sooner than two years prior

4.4.1 Local Plan Content

Local Stormwater Management Plans adopted by member cities pursuant to Minnesota Statutes, Section 103B.235 shall be consistent with the Fourth Generation Watershed Management Plan. Local plans must comply with Minnesota Statutes, Section 103B.235 and Minnesota Rules 8410 regarding local plan content. The Commission strongly encourages communities to develop the scope of their local plan with assistance from the Commission. At a minimum, local plans are required to do the following:

- Update the existing and proposed physical environment and land use. Information from previous plans that has not changed may be referenced and summarized but does not have to be repeated. Local plans may adopt sections of this Plan's Inventory and Condition Assessment by reference unless the city has more recent information, such as revised figures and data.
- Explain how the goals and policies, and rules and standards in this Plan will be implemented at the local level, including any necessary modifications of local ordinances, policies, and practices, and a schedule for their adoption. Explain specifically how the manure management ordinance will be implemented and enforced.
- Show how the member city will take action to achieve the load reductions and other actions identified in and agreed to in TMDL Implementation Plans and the WRAPS study, including identifying known upcoming projects including street or highway reconstruction projects that will provide opportunities to include load and volume reduction BMPs. Member cities must report their load-reducing actions to the Commission, for inclusion in the Annual Report.
- Update existing or potential water resource related problems and identify nonstructural, programmatic, and structural solutions, including those program elements detailed in Minnesota Rules 8410.0100, Subp. 1 through 6.
- Summarize the estimated cost of implementation and potential sources of funding.
- Set forth an implementation program including a description of adoption or amendment of official controls and local policies necessary to implement the Rules and Standards; programs; policies; and a ten year capital improvement plan.

4.4.2 Local Plan Review

Each member city shall submit its proposed Local Stormwater Management Plan to the Commission and the Metropolitan Council for review before adoption by its governing body. The Metropolitan Council review period is 45 days and the Commission review period is 60 days after plan receipt.

4.4.3 Financial Impact

This Plan assumes the annual increase in member city assessments will be approximately an annual inflation increase, assumed to be 2%. The JPA allows member cities to request Commission review of proposed budget increases prior to accepting an annual budget. The largest municipal cost is likely to be the result of local planning efforts mandated by the State of Minnesota through the NPDES MS4 permit and updating local plans. Costs to revise the in-place local plan will range from minimal to \$20,000 depending on the level of activity anticipated by the community.

4.5 PLAN REVIEW, UPDATE AND REVISION

This Watershed Management Plan provides direction for the Pioneer-Sarah Creek Watershed Management Commission activities through the year 2030. The Commission may initiate amendments to the Plan at any time. The Commission intends that the Plan provide a flexible framework for managing the watershed.

The Commission will annually review the Implementation Plan and CIP, and revisions to the IP and CIP may require future minor or major plan amendments. The Plan estimates programs and general costs in the Implementation Plan for 2021-2030 activities, and future plan amendments may be necessary to amend the Implementation Plan based on new requirements, policies, or standard practices.

4.5.1 Amendment Procedures

All amendments to the Plan except minor amendments shall adhere to the full review and process set forth in Minnesota Statutes 103B.231, and this section. The Commission shall adopt proposed major plan amendments upon their approval by BWSR in accordance with Minnesota Statutes 103B.231. The amendment procedure for minor plan amendments shall be in accordance with Minnesota Rules 8410.0140 as such rules now exist or as subsequently amended.

Neither a minor nor a general plan amendment will be required for the following situations:

1. If projects included in the approved CIP are implemented in a different year than shown.
2. When a capital project is included in the approved CIP and the Commission's share of an updated cost estimate does not exceed 125 percent of the Commission's share shown on the CIP, as adjusted by the Construction Cost Index (CCI) as published by the Engineering News Record (ENR).

3. When a capital project is included in the approved Capital Improvement Program and the Commission's share of an updated cost estimate is less than the Commission's share shown on the CIP, as adjusted by the CCI. However, the Commission will review such projects to evaluate the extent to which the original project objectives are being met.

4.5.2 Form of the Amendment

Unless the entire document is reprinted, all adopted amendments adopted must be printed in the form of replacement pages for the Plan, each page of which must conform to the following:

1. On draft amendments being considered, show deleted text as stricken and new text underlined.
2. Be renumbered as appropriate.
3. Include the effective date of the amendment.

5.0 References

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<http://www.pca.state.mn.us/veiza22>

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Appendix A

Joint Powers Agreement

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1 AMENDED AND RESTATED
2 JOINT POWERS AGREEMENT ESTABLISHING
3 THE PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION
4

5 RECITALS

6 WHEREAS, on July 29, 1993, pursuant to statutory authority, the Cities of Corcoran,
7 Greenfield, Independence, Loretto, Maple Plain, Medina and Minnetrista, the Town of Watertown,
8 and the Hennepin Conservation District adopted a "Joint Powers Agreement to Protect and Manage the
9 Pioneer-Sarah Creek Watersheds" (the "Joint Powers Agreement"); and

10 WHEREAS, in 2000 the City of Corcoran withdrew from the Agreement; and

11 WHEREAS, in 2001 the Town of Watertown withdrew from the Agreement; and

12 WHEREAS, the Cities of Greenfield, Independence, Loretto, Maple Plain, Medina and
13 Minnetrista wish to amend and restate the Agreement's terms in this document.

14 NOW, THEREFORE, pursuant to the authority conferred upon the parties by Minn. Stat §§
15 471.59 and 103B.201, et seq., the parties to this Agreement do mutually agree as follows:

16 SECTION ONE
17 DEFINITIONS
18

19 For purposes of this Agreement, each of the following terms, when used herein with an initial
20 capital letter, will have the meaning ascribed to it as follows:

21 "Agreement" means the Joint Powers Agreement, as amended and restated in this document.

22 "Board" means the Board of Commissioners of the Commission.

23 "BWSR" means the Minnesota Board of Water and Soil Resources.

24 "Commissioner" means an individual appointed by a governmental unit to serve on the Board.

25 The term Commissioner shall include both the representative and alternate representative appointed to
26 serve on the Board.

27 "Pioneer-Sarah Creek Watershed" or "Watershed" means the area within the mapped area
28 delineated on the map filed with BWSR, as may be amended. A complete legal description defining
29 the boundary of the Pioneer-Sarah Creek Watershed is attached hereto and made apart hereof.

1 "Governmental Unit" means any signatory city or township,

2 "Member" means a governmental unit that enters into this Agreement.

3 "Watershed Management Organization ("WMO") means the organization created by this
4 Agreement, the full name of which is "Pioneer-Sarah Creek Watershed Management Commission." The
5 Commission shall be a public agency of its respective governmental units.

6 SECTION TWO
7 ESTABLISHMENT
8

9 The parties create and establish the Pioneer-Sarah Creek Watershed Management Commission.
10 The Commission membership shall include the Cities of Greenfield, Independence, Loretto, Maple Plain,
11 Medina and Minnetrista. In addition to other powers identified in this Agreement, the Commission shall
12 have all of the authority for a joint powers watershed management organization identified in Minn. Stat. §
13 103B.211.

14 SECTION THREE
15 PURPOSE STATEMENT
16

17 The purpose of this Agreement is to establish an organization within the Pioneer-Sarah Creek
18 Watershed to (a) protect, preserve, and use natural surface and groundwater storage and retention systems,
19 (b) minimize public capital expenditures needed to correct flooding and water quality problems, (c) identify
20 and plan for means to effectively protect and improve surface and groundwater quality, (d) establish more
21 uniform local policies and official controls for surface and groundwater management, (e) prevent erosion of
22 soil into surface water systems, (f) promote groundwater recharge, (g) protect and enhance fish and wildlife
23 habitat and water recreational facilities, and (h) secure the other benefits associated with the proper
24 management of surface and ground water, as identified in Minn. Stat. § 103B,201, including but not limited
25 to aesthetic values when owned by the public or constituting public resources, as defined in Minn. Stat. Ch.
26 116B.

27 The Commission's Members agree to (a) provide a forum for exchanging information in the
28 management of land use and land use techniques and control, (b) provide a forum for resolution of
29 intergovernmental disputes relating to management and protection of the Pioneer-Sarah Creek Watershed;

1 and (c) cooperate on a united basis on behalf of all units of government within the Pioneer-
2 Sarah Creek Watershed with all other levels of government for the purpose of facilitating natural
3 resource protection and management in the Watershed.

4 SECTION FOUR
5 BOARD OF COMMISSIONERS
6

7 4.1. Appointment. The governing body of the Commission shall be its Board. Each
8 Member shall be entitled to appoint one representative to serve on the Board and one alternate who
9 may sit when the representative is not in attendance, and said representative or alternative
10 representative shall be called a "Commissioner." It is expected that each Member ensure that its
11 Commissioner will attend each meeting of the Board.

12 4.2. Term. Each Member shall determine the term length for its Commissioner's
13 appointment to the Board. The representatives to the Commission shall serve at the pleasure of the
14 governing body of the Member appointing such representative to the Commission. The Commission
15 and its Members shall fill all Board vacancies pursuant to Minn. Stat. § 103B.227, subd. 1 and 2, as
16 may be amended from time to time.

17 4.3. Compensation. Commissioners shall serve without compensation from the
18 Commission, but this shall not prevent a Member from providing compensation to its Commissioner
19 for serving on the Board.

20 4.4. Officers. No later than the first meeting in February of each year, the Commission
21 shall elect from its membership a chairperson, a vice-chairperson, a treasurer and a secretary and such
22 other officers as it deems necessary to reasonably carry out the purposes of this Agreement. No
23 Commissioner may be elected to more than one office. All officers shall hold office for terms of one
24 year and until their successors have been elected by the Commission. An officer may be reelected to
25 the same office for unlimited terms. A vacancy in an office shall be filled from the Board membership
26 by election for the remainder of the unexpired term of such office. The officers' duties include the
27 following:

28 A. Chairperson. The Chairperson shall preside at all Board meetings and shall have
29 all the same privileges of discussion, making motions and voting, as do other

Commissioners. The Chairperson may delegate certain responsibilities to the Executive Secretary as necessary to carry out the duties of the office.

B. Vice-Chairperson. The Vice-Chairperson shall, in the absence or disability of the Chairperson, perform the duties and exercise the powers of the Chairperson.

C. Treasurer. The Treasurer shall have the custody of the funds and securities of the Commission and shall keep full and accurate accounts of receipts and disbursements in books belonging to the Commission and shall deposit all monies and other valuable effects in the name and to the credit of the Commission in such depository as may be designated by the Commission. He/she shall disburse funds of the Commission as approved by the Commission and shall render to the Commission at regular meetings, or as the Board may request, an account of all his/her transactions as Treasurer and of the financial condition of the Commission. The Treasurer may delegate certain duties to the Executive Secretary as necessary to carry out the duties of the office.

D. Secretary. The Secretary shall attend all Board meetings, shall act as clerk of such meetings, and shall record all votes and the minutes of all proceedings. He/she shall give notice of all Board meetings. The Secretary may delegate certain duties to the Executive Secretary as necessary to carry out the duties of the office.

4.5. Executive Secretary. The Commission may appoint an Executive Secretary to coordinate activities of the Commission, accept delegated duties by the Commission officers, and accept business duties not assigned to officers. All notices to the Commission shall be delivered or served at the office of the Executive Secretary.

4.6. Quorum and Voting. A majority of all Commissioners with voting privileges shall constitute a quorum. Once a quorum is present, a majority vote is required for approval on an action, unless as provided otherwise in this Agreement.

4.7. Meetings. The Board shall schedule meetings at least quarterly (every three months) on a uniform day and place selected by the Commission. Written notice of the location and time of all Commission meetings shall be sent to all Commission representatives and alternate representatives and to the Clerk of each Member. Special meetings may be held at the call of the Chairperson or by any three Commissioners by giving not less than 72 hours written notice of the time, place and purpose of such meeting.

1
2 SECTION FIVE
3 COMMISSION POWERS AND DUTIES

4 5.1. Watershed Management Plan. The Commission shall develop a watershed management
5 plan including a capital improvement program in conformance with Minn. Stat. § 103B.231. The
6 Commission shall adopt the plan within 120 days after BWSR's approval of the plan. After adoption, the
7 Commission shall implement the watershed management plan and enforce the regulations set out in the plan.
8 A copy of the adopted plan shall be filed with the clerk of each Member governmental unit.

9 5.2. Local Water Management Plans. The Commission shall review Members' local water
10 management plans as required by Minn, Stat. § 103B.235, subd. 3.

11 5.3. Review Services.

12 A. Where the Commission is authorized or requested to review and make
13 recommendations on any matter, the Commission may charge a reasonable fee for such review services.
14 The Commission's standard fee schedule, as amended from time to time, will be a part of the
15 Commission's Rules.

16 B. The Commission may charge an additional fee when it determines that a
17 particular project will require extraordinary and substantial review services. Before undertaking such
18 review services, the Commission shall provide the party to be charged the additional fee with written
19 notice of the services to be performed and the additional fee therefor. Unless said party objects within
20 5 business days of receipt of such written notice to the amount of the additional fee to be charged,
21 such review services shall be performed and the party shall be responsible for the cost thereof. If said
22 party objects to the proposed additional fee for such services within 5 business days and the party and
23 the Commission are unable to agree on a reasonable alternative amount for review services, such
24 extraordinary and substantial review services shall not be undertaken by the Commission.

25 The Members recognize that from time to time the Commission provides review services
26 regarding a violation under the Minnesota Wetland Conservation Act, and that there currently is no statutory
27 mechanism in place that allows the Commission to recover its costs from the wetland violator

1 for these review services. Therefore, when the Commission provides review services regarding a violation
2 under the Minnesota Wetland Conservation Act, the Commission may seek reimbursement for these
3 services from the Member where the subject property is located.

4 C. Upon request of any Member, the Commission shall review and evaluate any
5 dispute between the Member and other unit(s) of government regarding land use and natural resource
6 protection and management.

7 5.4 Public Participation.

8 A. Technical Advisory Committee. A Technical Advisory Committee ("TAC") to
9 the Commission is hereby created. TAC members and one or more alternate members shall be appointed by
10 the governing body of each Member. TAC members may be, but need not be, Commissioners. TAC
11 members shall serve at the pleasure of the governing body of each Member that appoints them and are
12 not required to meet statutory qualifications for Commissioners. TAC members will undertake
13 projects/tasks as requested or assigned to the TAC by the Commission and may participate in meetings
14 of the Commission pertaining to those assigned projects/tasks.

15 B. Citizen Advisory Committee. If a need is determined by the Commission, the
16 Commission will establish a Citizen Advisory Committee to the Commission, particularly to review and
17 comment on specific projects undertaken by the Commission pursuant to the Watershed Management
18 Plan.

19 5.5. Rules. The Commission shall adopt rules for (a) conducting its business, including but
20 not limited to additional duties of the Commission's officers, (b) the scope of responsibilities of the
21 Technical Advisory Committee and the Citizen Advisory Committee, if one is established, and (c)
22 preparing the annual work plan.

23 5.6. Contracts. The Commission may make such contracts, and enter into any such
24 agreements, as it deems necessary to make effective any power granted to it by this Agreement. No
25 Commissioner shall receive a direct financial benefit from any contract made by the Commission. Every
26 contract for the purchase or sale of merchandise, materials or equipment by the Commission shall be let
27 in

1 accordance with the Uniform Municipal Contracting Law (Minn. Stat. § 47L345) and the Joint Exercise of
2 Powers statute (Minn. Stat. § 47L59). In accordance with Minn. Stat. § 471.59, subd. 3, contracts let and
3 purchases made under this Agreement shall conform to the statutory requirements applicable to the
4 Member cities with a population over 2,500.

5 5.7. Employment. The Commission may contract for services, may use staff of other
6 governmental agencies, may use staff of the Members and may employ such other persons as it deems
7 necessary. Where staff services of a Member are utilized, such services shall not reduce the financial
8 contribution of such Member to the Commission's operating fund unless utilization of staff service is
9 substantial and the Commission so authorizes.

10 5.8. Public/Private Organizations. The Commission may cooperate or contract with the State
11 of Minnesota or any subdivision thereof or federal agency or private or public organization to
12 accomplish the purposes for which it is organized.

13 5.9. Annual Financial, Activity and Audit Reports; Newsletter. The Commission shall submit
14 to its Members and BWSR a financial report, an activity report and an audit report for the preceding
15 fiscal year, in compliance with state law. The Commission shall publish and distribute an annual
16 newsletter in compliance with state law. The Commission shall transmit to the clerk of each Member
17 copies of the reports/newsletter in a format ready for publication. Each Member shall
18 publish/distribute the reports/newsletter as it deems necessary. All of the Commission's books, reports
19 and records shall be available for and open to examination by any Member at all reasonable times.

20 5.10. Gifts, Grant, Loans. The Commission may, within the scope of this Agreement, accept
21 gifts, apply for and use grants or loans of money or other property from the United States, the State of
22 Minnesota, a unit of government or other governmental unit or organization, or any person or entity for the
23 purposes described herein; may enter into any reasonable agreement required in connection therewith;
24 may comply with any laws or regulations applicable thereto; and may hold, use and dispose of such
25 money or property in accordance with the terms of the gift, grant, loan or agreement relating thereto.

1 5.11. Boundary Change in the Pioneer-Sarah Creek Watershed.

2 A. Enlargement. Proceedings for the enlargement of the Pioneer-Sarah Creek
3 Watershed shall be initiated by a request from affected Member(s) to the Commission, or as mandated by
4 law. Such request should include a map and legal description of the affected area. In reviewing such a
5 request, the Commission should consider, among other things, (a) whether the affected area is
6 contiguous to the existing Pioneer-Sarah Creek Watershed, (b) whether the affected area can be feasibly
7 administered by the Commission; and (c) the reasons why it would be conducive to the public health and
8 welfare to add the area to the existing Pioneer-Sarah Creek Watershed. Upon deliberation, if it appears to
9 the Commission that the enlargement of the Watershed as requested would be for the public welfare and
10 public interest and the purpose of resource management would be served, or that in fact the enlargement
11 is mandated by law, the Commission shall by its findings and order enlarge the Pioneer-Sarah Creek
12 Watershed and file a copy of said findings and order with the appropriate governmental offices.

13 B. Transfer of Territory. Proceedings to transfer territory that is within the
14 Pioneer-Sarah Creek Watershed to the jurisdiction of another watershed management organization or a
15 watershed district shall be initiated by a request from affected Member(s) to the Commission, or as
16 mandated by law. Such request should include a map and legal description of the affected area. Upon
17 deliberation, if it appears to the Commission that the transfer of territory as requested would be for the
18 public welfare and public interest and the purpose of resource management would be served, the
19 Commission shall by its findings and order change the Pioneer-Sarah Creek Watershed boundaries
20 accordingly and file a copy of said findings and order with the appropriate governmental offices.

21 5.12. Subdistricts. The Commission may define and designate drainage subdistricts within the
22 Watershed and shall have authority to separate the Watershed into such different subdistricts and to
23 allocate capital improvement costs to a subdistrict area if that subdistrict is the only area that materially
24 benefits from the capital improvement.

25 5.13. Monitor Water Quality. In connection with its water management plan, the Commission
26 will establish a comprehensive water quality-monitoring plan for lakes and streams within the Watershed.

1 The Commission will also establish goals for judging the adequacy of its water quality protection
2 programs.

3 5.14 Ratification. The Commission may, and where required by this Agreement shall, refer
4 matters to the governing bodies of the Members for ratification. Within 60 days, the governing bodies of
5 the Members shall take action upon any matter referred for ratification.

6 5.15. Statutory Powers. The Commission may exercise all other powers necessary and
7 incidental to the implementation of the purposes and powers set forth herein and as outlined and authorized
8 by Minn. Stat. §§ 103B.201, et seq,

9 SECTION SIX
10 FINANCIAL MATTERS
11

12 6.1. Depositories/Disbursements. The Commission may collect and receive money and
13 services subject to the provisions of this Agreement from the parties and from any other sources approved
14 by the Commission and it may incur expenses and make expenditures and disbursements necessary
15 and incidental to the effectuation of the purposes of this Agreement. The Board shall designate a
16 national, state, or private bank or banks as a depository of Commission funds, Funds may be expended
17 by the Commission in accordance with procedures established herein. Orders, checks and drafts shall
18 be signed by two officers.

19 6.2. General Administration. Each voting Member agrees to contribute each year to a general
20 fund to be used for general administration purposes including, but not limited to, salaries, rent, supplies,
21 development on an overall plan, insurance, bonds, and to purchase and maintain devices to measure
22 hydrological and water quality data. The funds may also be used for normal maintenance of facilities
23 and capital improvements. The annual contribution by each voting Member shall be based on its share
24 of the taxable market value of all real property within the Watershed.

25 6.3. Budget Approval and Appeal Process. On or before July 1 of each year, the Board shall
26 adopt a budget for the following calendar year for the purpose of providing funds to conduct the
27 Commission's business in accordance with its annual work plan, Budget approval shall require a

1 majority vote of all Commissioners eligible to vote. At least 45 days before each Member governmental
2 unit must certify its levy to Hennepin County, the Commission shall certify the budget to the clerk of each
3 Member governmental unit together with a statement of the proportion of the budget to be provided by
4 each Member. The schedule of payments by the Members shall be determined by the Board in such a
5 manner as to provide for an orderly collection of the funds needed.

6 The governing body of each Member agrees to review the budget, and the Board shall upon notice
7 from any Member received prior to August 15, hear objections to the budget, and may amend the budget
8 (except the fee due cannot be increased), and then give notice to the Members of any and all
9 modifications or amendments.

10 SECTION SEVEN
11 CAPITAL IMPROVEMENT PROGRAM
12

13 7.1. Assessments. If a capital improvement ordered by the Commission may result in payment
14 from any Member, or if a capital improvement ordered by the Commission may result in a levy by a
15 Member against privately or publicly owned land within the Watershed, said capital improvement
16 shall follow the statutory procedure outlined in Minn. Stat. Ch. 429, except as herein modified.

17 7.2. Preliminary Reports/Public Hearings. For those improvements initiated by the
18 Commission or so designated in the Commission's watershed management plan to be constructed by the
19 Board, the Board shall secure from its engineers or some other competent person a preliminary report
20 advising it whether the proposed improvement is feasible and as to whether it shall best be made as
21 proposed or in connection with some other improvement and the estimated cost of the improvement as
22 recommended.

23 The Board shall then hold a public hearing on the proposed improvement after mailed notice to the
24 clerk of each Member governmental unit within the Watershed. The Commission shall not be required to
25 mail or publish notice except by said notice to the clerk, Said notice shall be mailed not less than 45
26 days before the hearing, shall state the time and place of the hearing, the general nature of the
27 improvement, the estimated total cost and the estimated cost to each Member governmental unit. The

1 Board may adjourn said hearing to obtain further information, may continue said hearing pending
2 action of the Member governmental units or may take such other action as it deems necessary to carry out
3 the purpose of this Commission.

4 A resolution setting forth the order for a capital improvement project shall require a favorable vote
5 by (a) at least two-thirds of all Commissioners eligible to vote, and (b) all Commissioners representing
6 Members who will directly benefit from the project. In all cases other than to order a capital improvement
7 project, a majority vote of all Commissioners eligible to vote shall be sufficient to adopt an action. The
8 order shall describe the improvement, shall allocate in percentages the cost between the Member
9 governmental units, shall designate the engineers to prepare plans and specifications, and shall designate
10 the Member who will contract for the improvement.

11 After the Board has ordered the improvement or if the hearing is continued while the Member
12 governmental units act on said proposal, it shall forward said preliminary report to all Member
13 governmental units with an estimated time schedule for the construction of said improvement. The Board
14 shall allow an adequate amount of time, and in no event less than 45 days, for each Member
15 governmental unit to conduct hearings, in accordance with the provisions of the aforesaid Chapter 429 or
16 the charter requirements of any Member city, or to ascertain the method of financing which said Member
17 governmental unit will utilize to pay its proportionate share of the costs of the improvement. Each Member
18 governmental unit shall ascertain within a period of 90 days the method it shall use to pay its proportionate
19 share of the costs.

20 If the Commission proposes to use Hennepin County's bonding authority as set forth in Minn. Stat.
21 § 103B.251, or if the Commission proposes to certify all or any part of a capital improvement to Hennepin
22 County for payment, then and in that event all proceedings shall be carried out in accordance with the
23 provisions set forth in said Section 103B,251.

24 The Board shall not order and no engineer shall prepare plans and specifications before the Board
25 has adopted a resolution ordering the improvement. The Board may direct one of its Members to prepare
26 plans and specifications and order the advertising for bids upon receipt of notice from each Member

1 governmental unit who will be assessed that it has completed its hearing or determined its method of
2 payment or upon expiration of 90 days after the mailing of the preliminary report to the Members.

3 7.3. Appeals/Arbitration. Any Member governmental unit being aggrieved by the Board's
4 determination as to the cost allocation of said capital improvement shall have 30 days after the Commission
5 resolution ordering the improvement to appeal said determination. Said appeal shall be in writing and shall
6 be addressed to the Board asking for arbitration, The determination of the Member's appeal shall be
7 referred to a Board of Arbitration. The Board of Arbitration shall consist of three persons; one to be
8 appointed by the Board of Commissioners, one to be appointed by the appealing Member governmental
9 unit, and the third to be appointed by the two so selected. In the event the two persons so selected do no
10 appoint the third person within 15 days after their appointment, then the Chief Judge of the Hennepin
11 County District Court shall have jurisdiction to appoint, upon application of either or both of the two earlier
12 selected, the third person to the Board of Arbitration. The third person selected shall not be a resident of
13 any Member governmental unit and if appointed by the Chief Judge said person shall be a person
14 knowledgeable in the subject matter. The arbitrators' expenses and fees, together with the other expenses,
15 not including attorney fees, incurred in the conduct of the arbitration shall be divided equally between the
16 Commission and the appealing Member, Arbitration shall be conducted in accordance with the Uniform
17 Arbitration Act, Minn, Stat. Ch. 572,

18 7.4. Contracts for Capital Improvements. All contracts which are to be let as a result of the
19 Board ordering a capital improvement, and for which two or more Member governmental units shall be
20 responsible for the costs, shall be let in accordance with the provisions of Minn. Stat, § 429.041. The
21 bidding and contracting of said work shall be let by any one of the Member governmental units, as ordered
22 by the Board, after compliance with the statutory requirements. Contracts and bidding procedures shall
23 comply with the legal requirements applicable to statutory cities.

24 The Commission shall not have the authority to contract in its own name for any improvement
25 work for which a special assessment will be levied against any private or public property under the
26 provisions of Chapter 429 or under the provisions of any Member city charter. These contracts shall be

1 awarded by action of the governing body of a Member and shall be in the name of a Member
2 governmental unit. This section does not preclude the Commission from proceeding under Minn. Stat. §
3 103B.251.

4 7.5. Contracts with Other Governmental Bodies. The Commission may exercise the powers
5 set forth in Section 7.4 but said contracts for a capital improvement shall require a majority vote of all
6 Commissioners eligible to vote.

7 7.6. Supervision. All improvement contracts shall be supervised by the entity awarding the
8 contract. The Commission staff shall also be authorized to observe and review the work in progress and the
9 Members agree to cooperate with the Commission staff in accomplishing its purposes. Representatives of
10 the WMO shall have the right to enter upon the place or places where the improvement work is in
11 progress for the purpose of making reasonable tests and inspections, The Commission staff shall report and
12 advise and recommend to the Board on the progress of the work,

13 7.7. Land Acquisition. The Commission shall not have the power of eminent domain and shall
14 not own any interest in real property. All interests in lands shall be held in the name of the Member wherein
15 said lands are located.

16 7.8. Capital Improvement Fund. The Commission shall establish an improvement fund or
17 funding mechanism for each capital improvement project. The Commission may fund all or part of the cost
18 of a capital improvement contained in the capital improvement program of the plan in accordance with
19 Minn. Stat. § 103B.251, The Commission and Hennepin County may establish a maintenance fund to be
20 used for normal and routine maintenance of an improvement constructed in whole or in part with money
21 provided by Hennepin County pursuant to Minn, Stat, § 103B.251. The levy and collection of an ad
22 valorem tax levy for an improvement, payment of bonds, or maintenance shall be by Hennepin County
23 based upon a tax levy resolution adopted by a majority vote of all eligible Members of the Board and
24 remitted to the County on or before the date prescribed by law each year. If it is determined to levy for
25 maintenance, the Commission shall be required to follow the hearing process established by Minn. Stat.

Ch. 103D. Mailed notice shall also be sent to the clerk of each Member governmental unit at least 30 days before the hearing.

7.9. Capital Improvement Cost Allocation.

A. All costs of improvements designated in the Board's adopted watershed management plan for construction by the Board, which the Board determines will benefit only one Member, shall be paid for entirely by that Member.

B. All costs of improvements designated in the Board's adopted watershed management plan for construction by the Board, which the Board determines benefit more than one Member, shall be apportioned by the Board by the following bases:

- (1) A negotiated amount to be arrived at by the Members who have lands in the subdistrict responsible for the capital improvement; or
- (2) On the basis of each Member's share of the taxable market value of all real property within the Watershed; or
- (3) Capital costs allocated under option (2) above may be varied by the Commission by a favorable vote by (a) at least two-thirds of all Commissioners eligible to vote and (b) all Commissioners representing Members who will directly benefit from the project, if (i) any Member community receives a direct benefit from the capital improvement which benefit can be defined as a lateral as well as a trunk benefit, or (ii) the capital improvement provides a direct benefit to one or more Members which benefit is so disproportionate as to require in a sense of fairness a modification in the formula.

C. If the project is constructed and financed pursuant to Minnesota Statutes 103B.251, the Members understand and agree that said costs will be levied on all taxable property in the watershed as set forth in the statute.

SECTION EIGHT
WITHDRAWAL FROM AGREEMENT

Withdrawal of any Member may be accomplished by filing written notice with the Commission and the other Members 60 days before the effective date of withdrawal. No Member may withdraw from this Agreement until the withdrawing Member has met its full financial obligations for the year of withdrawal and prior years.

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SECTION NINE
DISSOLUTION OF COMMISSION

9.1. This Agreement may be terminated upon the unanimous consent of the parties. If the Agreement is to be terminated, a notice of the intent to dissolve the Commission shall be sent to Hennepin County and BWSR at least 90 days before the date of dissolution.

9.2. In addition to the manner provided in Section 9.1 for termination, any Member may petition the Commission's Board to dissolve the Commission. Upon 90 days notice in writing to the clerk of each member governmental unit and to Hennepin County and BWSR, the Board shall hold a hearing and upon a majority vote of all Commissioners eligible to vote, the Board may by Resolution recommend that the Commission be dissolved. Said Resolution shall be submitted to each Member governmental unit and if ratified by three-fourths of the governing bodies of all eligible Members within 60 days, said Board shall dissolve the Commission allowing a reasonable time to complete work in progress and to dispose of personal property owned by the Commission.

9.3. Winding Up. Upon dissolution, all personal property of the Commission shall be sold and the proceeds thereof, together with monies on hand after payment of all obligations, shall be distributed to the Members. Such distribution of Commission assets shall be made in approximate proportion to the total contributions to the Commission for such costs made by each Member, All payments due and owing for operating costs under Section 6.2, or other unfilled financial obligations, shall continue to be the lawful obligation of the Members. In no event may this Agreement be terminated until all of the planning and plan implementation provisions of the Act, which are required of a watershed management organization, have been completed.

SECTION TEN
MISCELLANEOUS PROVISIONS

10.1. Special Assessments. The Commission shall not have the power to levy a special assessment upon any privately or publicly owned land. All such assessments shall be levied by the Member wherein said lands are located. The Commission shall have the power to require any Member to contribute the costs allocated or assessed according to the other provisions of this agreement.

1 10.2. Member's Construction Projects that Will Affect Pioneer-Sarah Creek. Each Member
2 agrees that it will not directly or indirectly collect or divert any additional surface water to or from Pioneer-
3 Sarah Creek or its tributaries without approval from the Commission. Such approval may be granted
4 by the Commission for a Member to proceed with the construction or reconstruction of improvements
5 within the individual corporate Member's boundaries and at said Member's sole cost upon a finding (a)
6 that there is an adequate outlet, (b) that said construction is in conformance with the overall plan, and
7 (c) that the construction will not adversely affect other Members.

8 10.3. Member Vote Suspension for Failure to Contribute. Any Member who is more than 60
9 days in default in contributing its proportionate share to the general fund shall have the vote of its Board
10 representative suspended pending the payment of its proportionate share. Any Member who is more
11 than 60 days in default in contributing its proportionate share of the cost of any improvement to the
12 contracting Member shall upon request of the contracting Member have the vote of its Board
13 representative suspended, pending the payment of its proportionate share, Any Member whose Board
14 representative vote is under suspension shall not be considered as an eligible Member as such
15 membership affects the number of votes required to proceed on any matter under consideration by the
16 Board.

17 10.4. Amendment. The Commission may recommend changes and amendments to this
18 Agreement to the Members. Amendments shall be acted upon by the Members within 90 days of referral.
19 Amendments shall be evidenced by appropriate resolutions of the Members filed with the Commission and
20 shall, if no effective date is contained in the amendment, become effective as of the date all such
21 filings have been completed.

22 10.5. Termination of Prior Agreement. By executing this document, the parties hereby agree to
23 terminate the prior joint powers agreement, adopted July 29, 1993.

24 10.6. Counterparts. This Agreement and any amendment may be executed in several
25 counterparts and all so executed shall constitute one Agreement or amendment, binding on all of the parties
26 hereto notwithstanding that all of the parties are not signatory to the original or the same counterpart.

10.7. Effective Date. This Agreement shall be in full force and effect when all governmental units delineated in Section 2 have executed this Agreement. All Members need not sign the same copy.

10.8. Duration. This Agreement shall have an unlimited duration.

10.9. Statutory References. All statutory references include all future amendments.

Dated: 8/17/04

CITY OF GREENFIELD

By: Thomas G. Swann
Its Mayor

Attest: Christa Okerman
Its City Clerk

Dated: 2-24-04

CITY OF INDEPENDENCE

By: Lewis D. John
Its Mayor

Attest: Loi Huser
Its City Clerk

Dated: 3/9/2004

CITY OF LORETTO

By: Kent C. Torce
Its Mayor

Attest: Kelly Bruninell
Its City Clerk

Dated: 3/23/04

CITY OF MAPLE PLAIN

By: Jack Vigoren
Its Mayor

Attest: Debbie Hudson
Its City Clerk

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Dated: 3-16-04

CITY OF MEDINA

By:

Its Mayor

Attest:

Its City Clerk

Dated: 3/15/04

CITY OF MINNETRISTA

By:

Its Mayor

Attest:

Its City Clerk

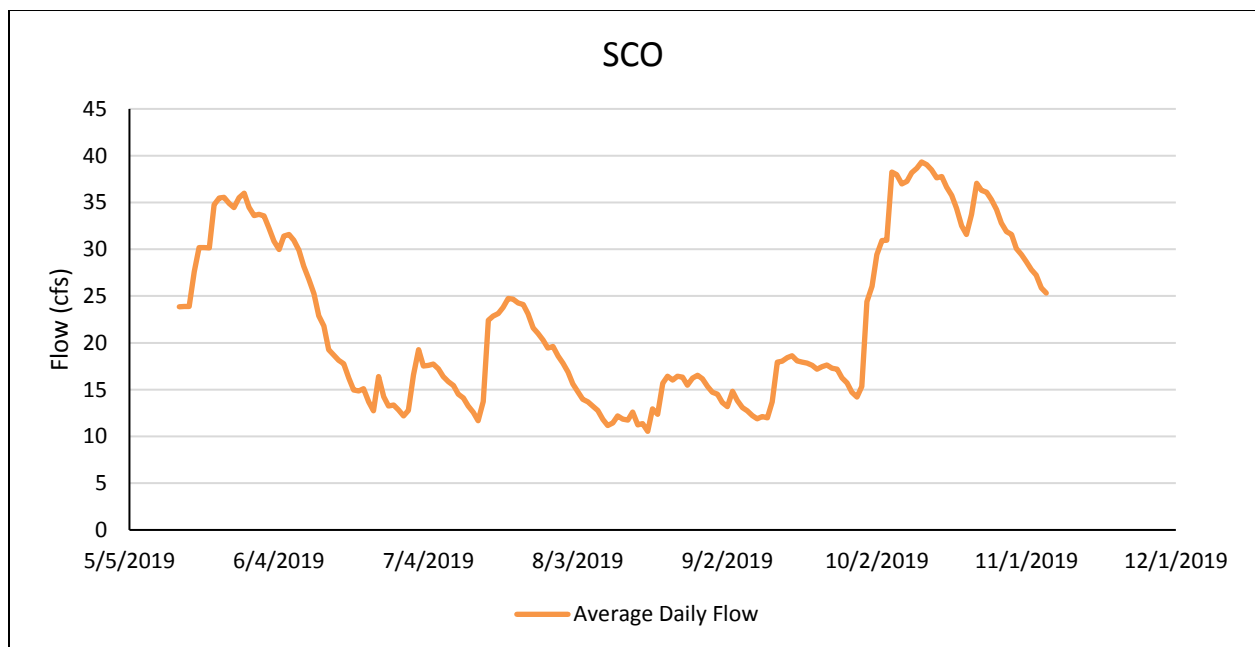
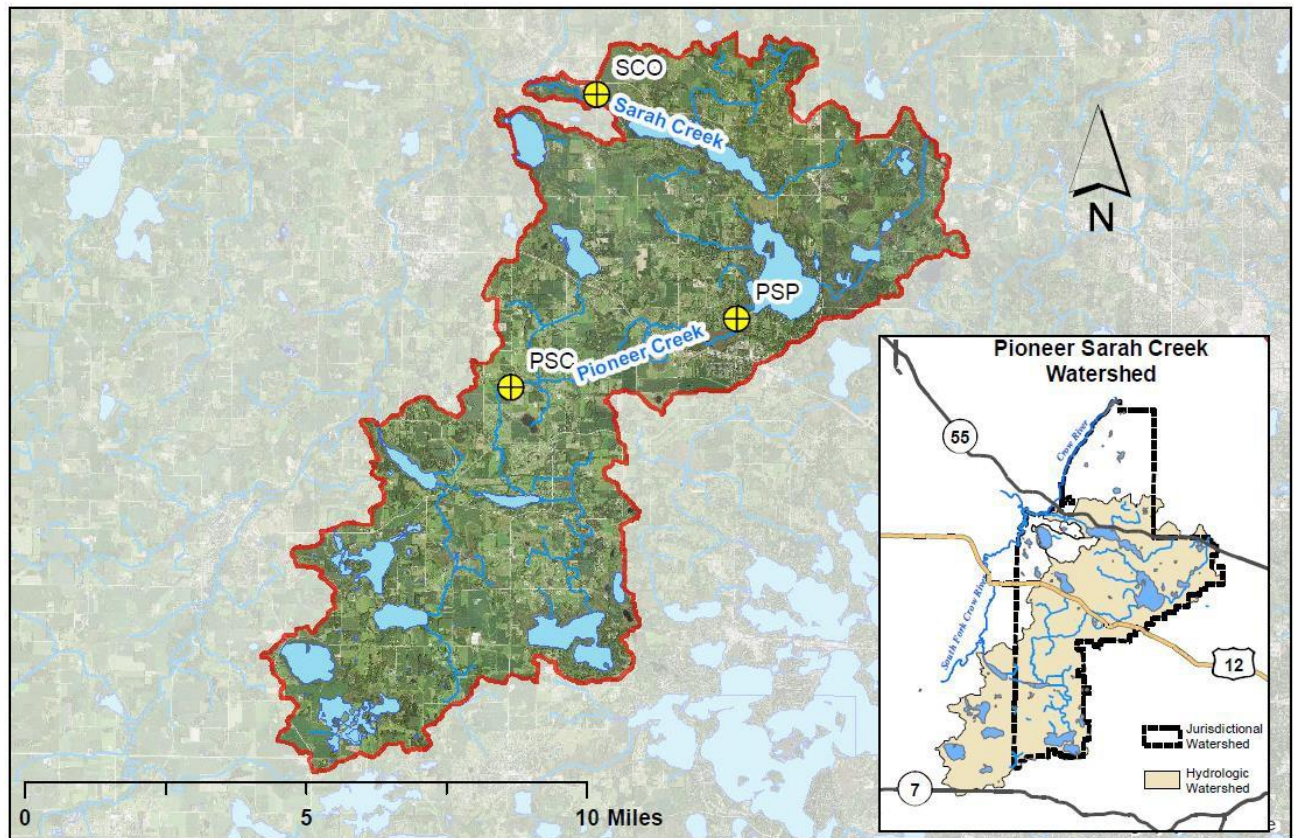
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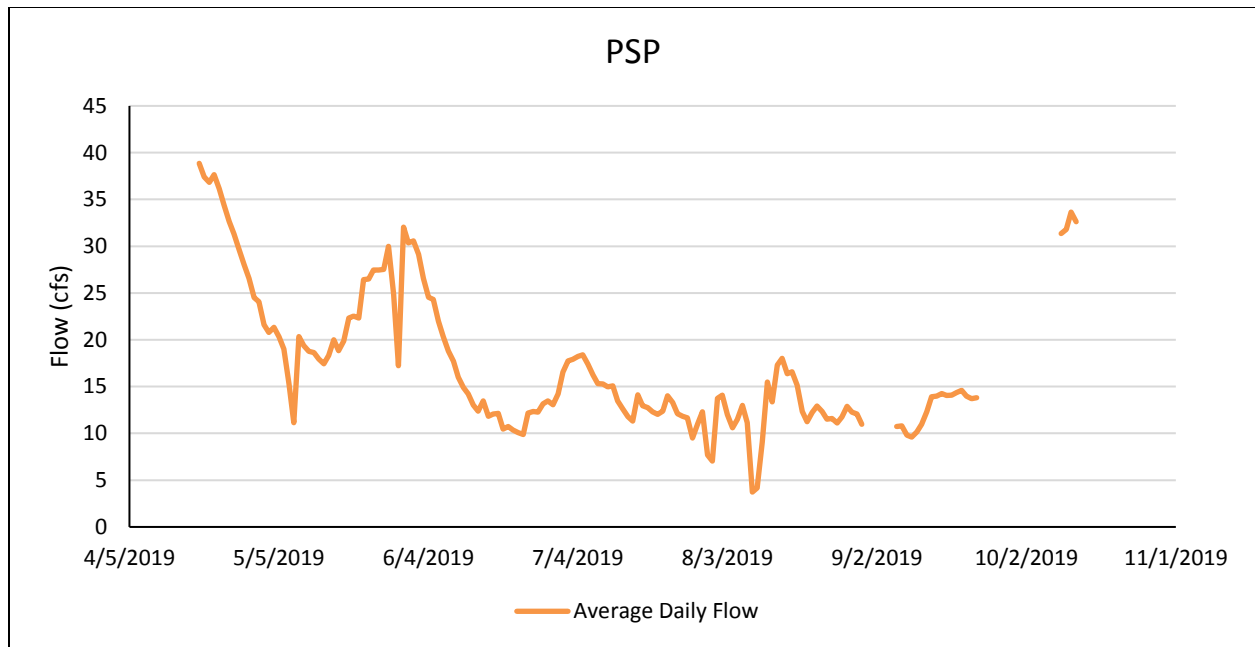
Appendix B

Water Quality Trends

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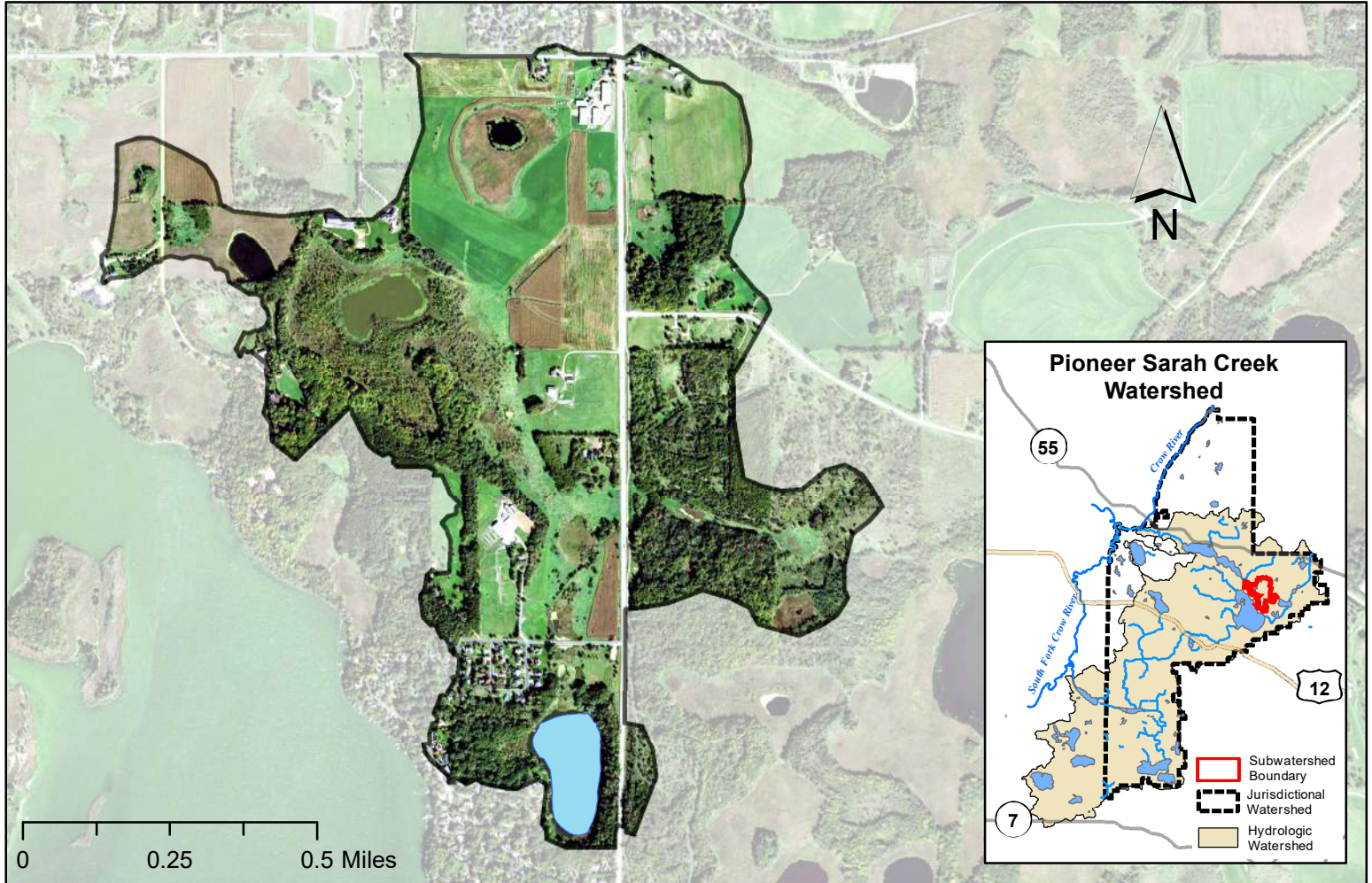
Pioneer/Sarah Creek Stream monitoring - 2019



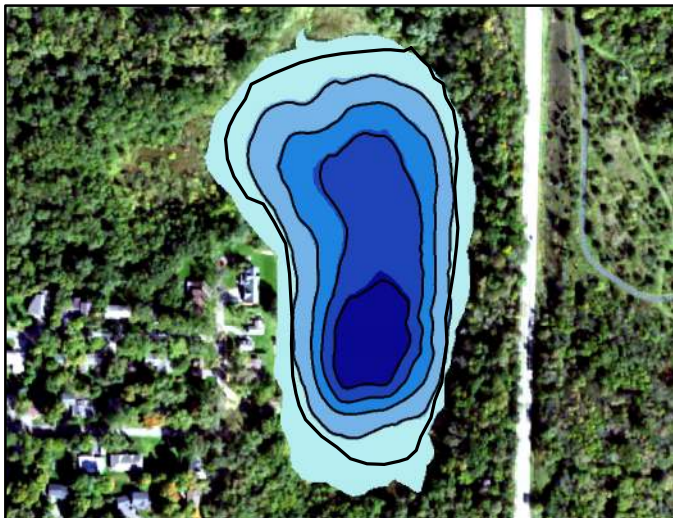


PSC was not monitored in 2019 due to high water conditions.

Lake Ardmore Watershed Map

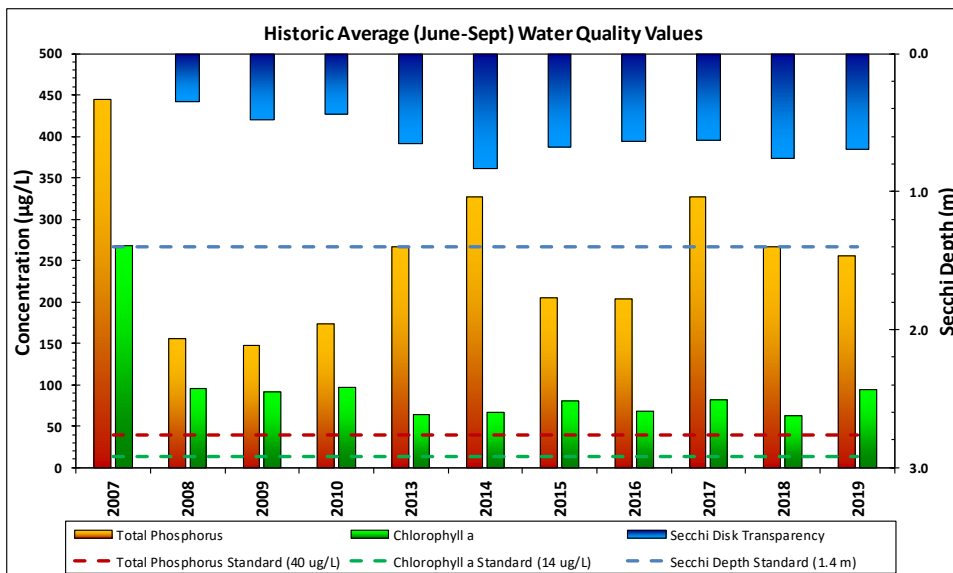


Lake Ardmore Bathymetry



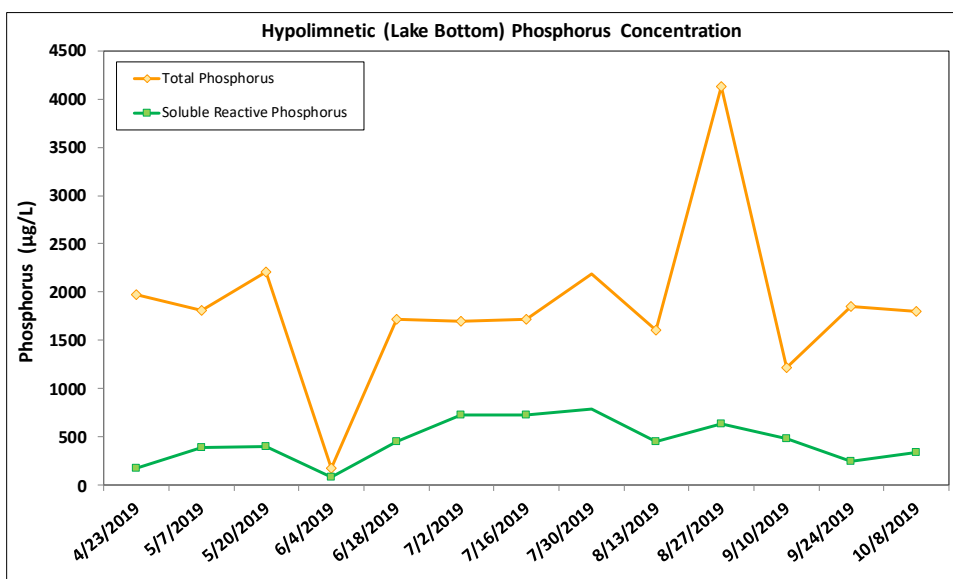
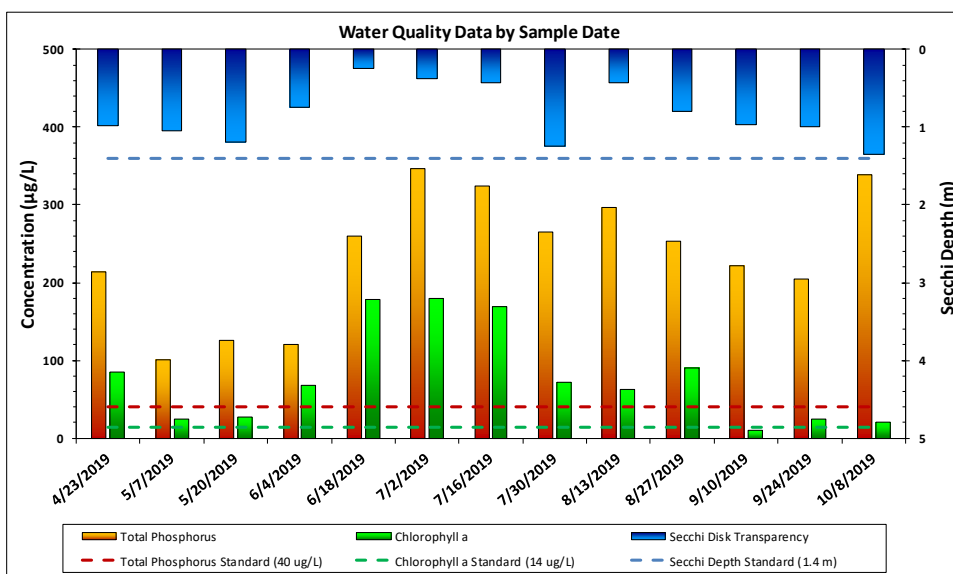
Lake and Watershed Characteristics

DNR #	27015300
Watershed Area	514 Acres
Lake Area	13.5 Acres
Percent Littoral Area	75%
Average Depth	9.4 ft.
Maximum Depth	24.4 ft.
Watershed Area:Lake Area	38:1
Impairment Classification	Needs Assessment
Classification	Deep Lake



Ardmore Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2007	F	F	F	F
2008	F	F	F	F
2009	F	F	F	F
2010	F	F	F	F
2013	D	F	F	D
2014	D	D	D-	D
2015	F	F	F	F
2016	D	F	F	D
2017	F	F	F	F
2018	D	D	D-	D
2019	F	F	F	F
MPCA Standard	C	B	C	C+

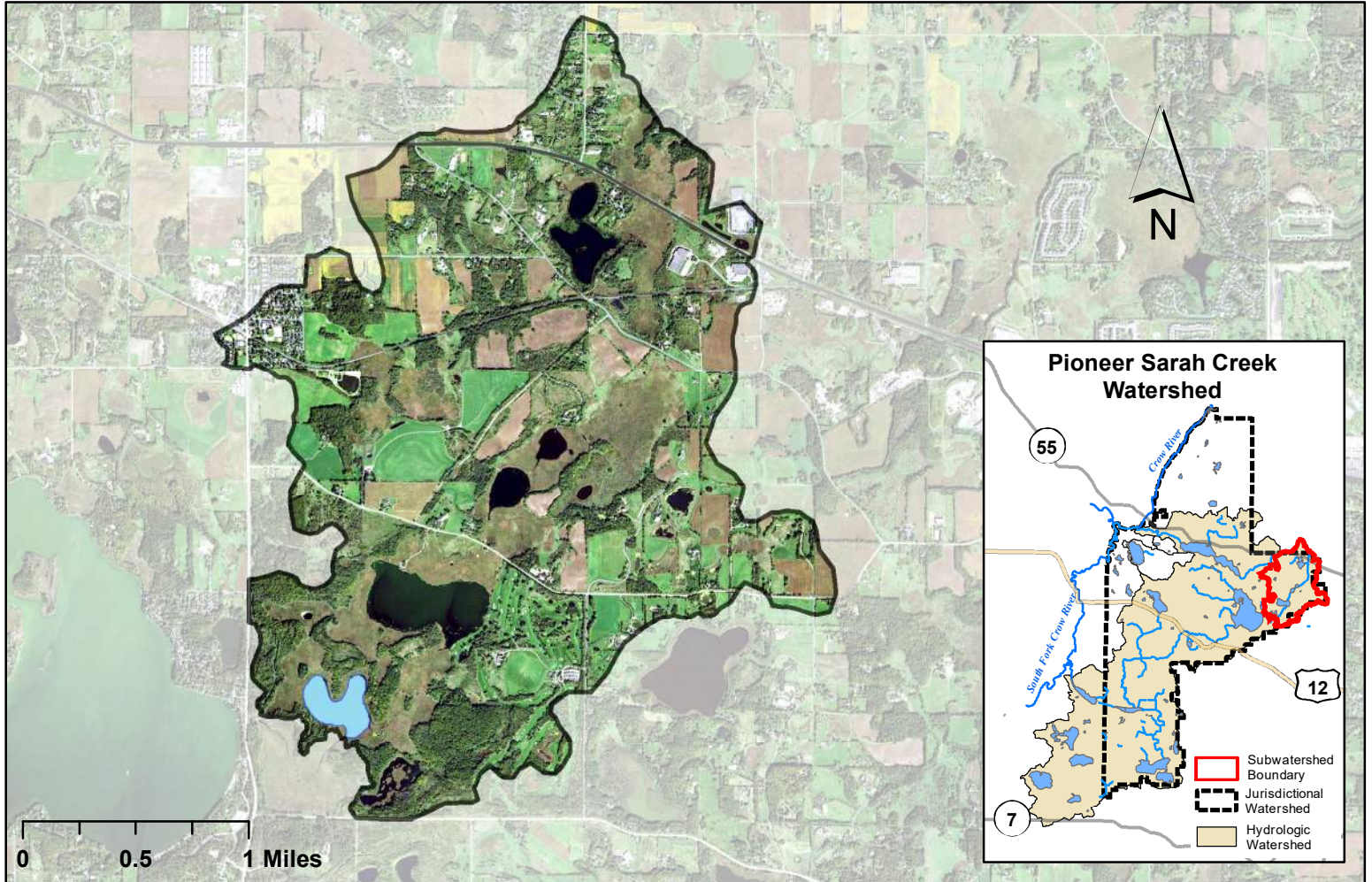
Met Council Grading System for Lake Water Quality



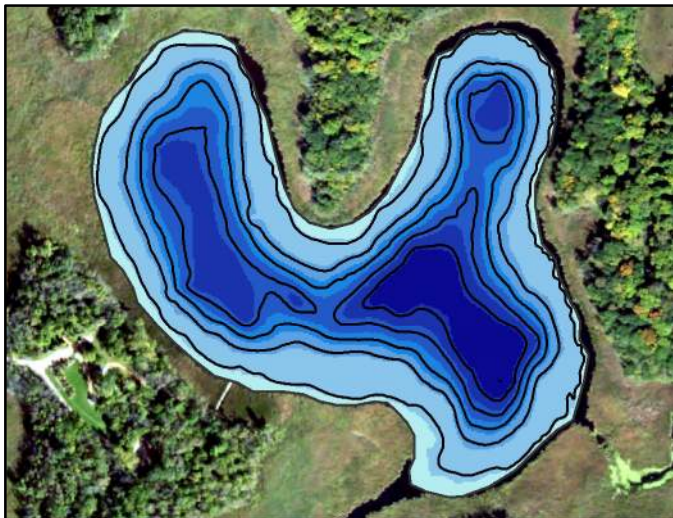
Division of Water Resources

January 2020

Half Moon Lake Watershed Map

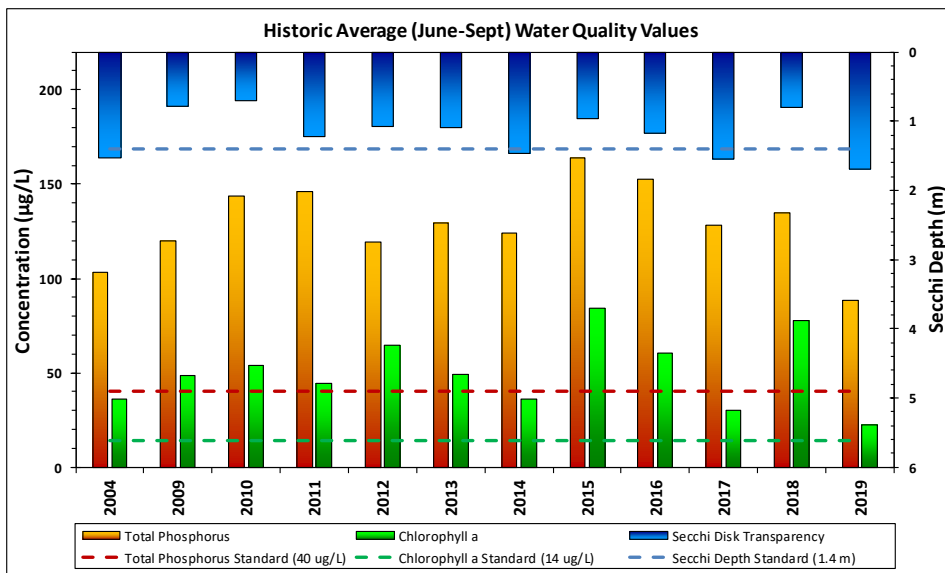


Half Moon Lake Bathymetry



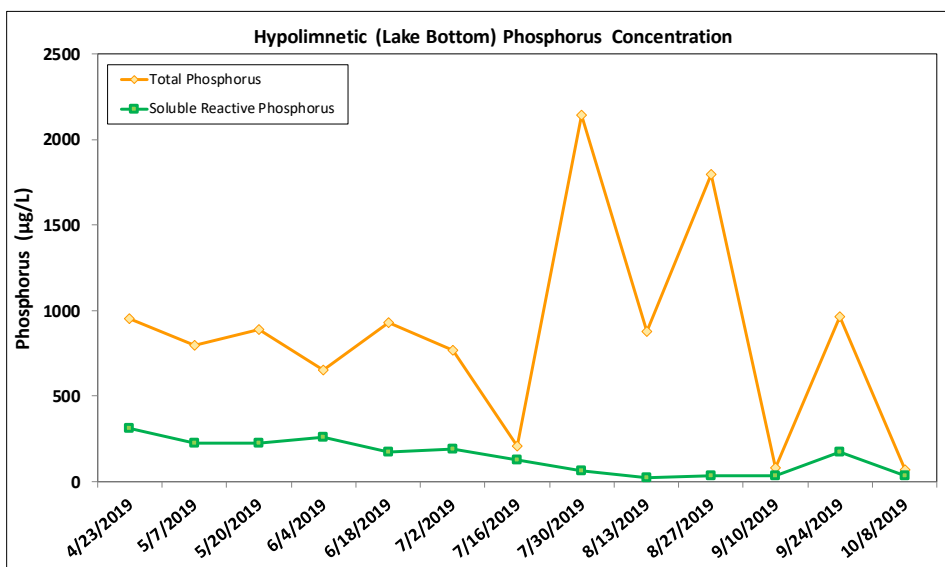
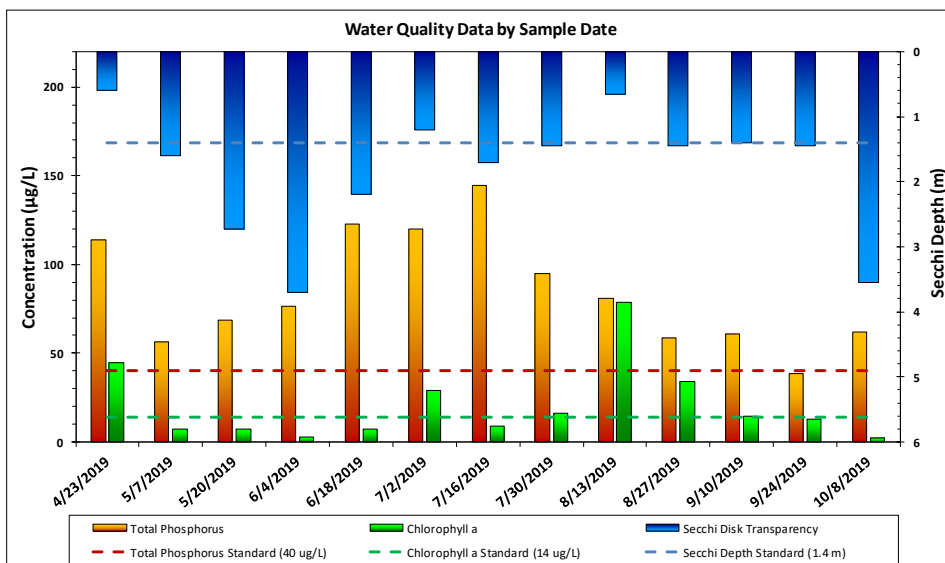
Lake and Watershed Characteristics

DNR #	27015200
Watershed Area	3,258 Acres
Lake Area	31.1 Acres
Percent Littoral Area	11%
Average Depth	13.4 ft.
Maximum Depth	30.3 ft.
Watershed Area:Lake Area	104.7:1
Impairment Classification	Proposed 2016
Classification	Deep Lake



Half Moon Lake Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2004	D	C	C	C-
2009	D	D	D	D
2010	D	D	D	D
2011	D	C	C	C-
2012	D	D	D	D
2013	D	D	D	D
2014	D	C	C	C-
2015	F	F	D	F
2016	D	D	D	D
2017	D	C	C	C-
2018	D	F	D	D-
2019	D	C	C	C-
MPCA Standard	C	B	C	C+

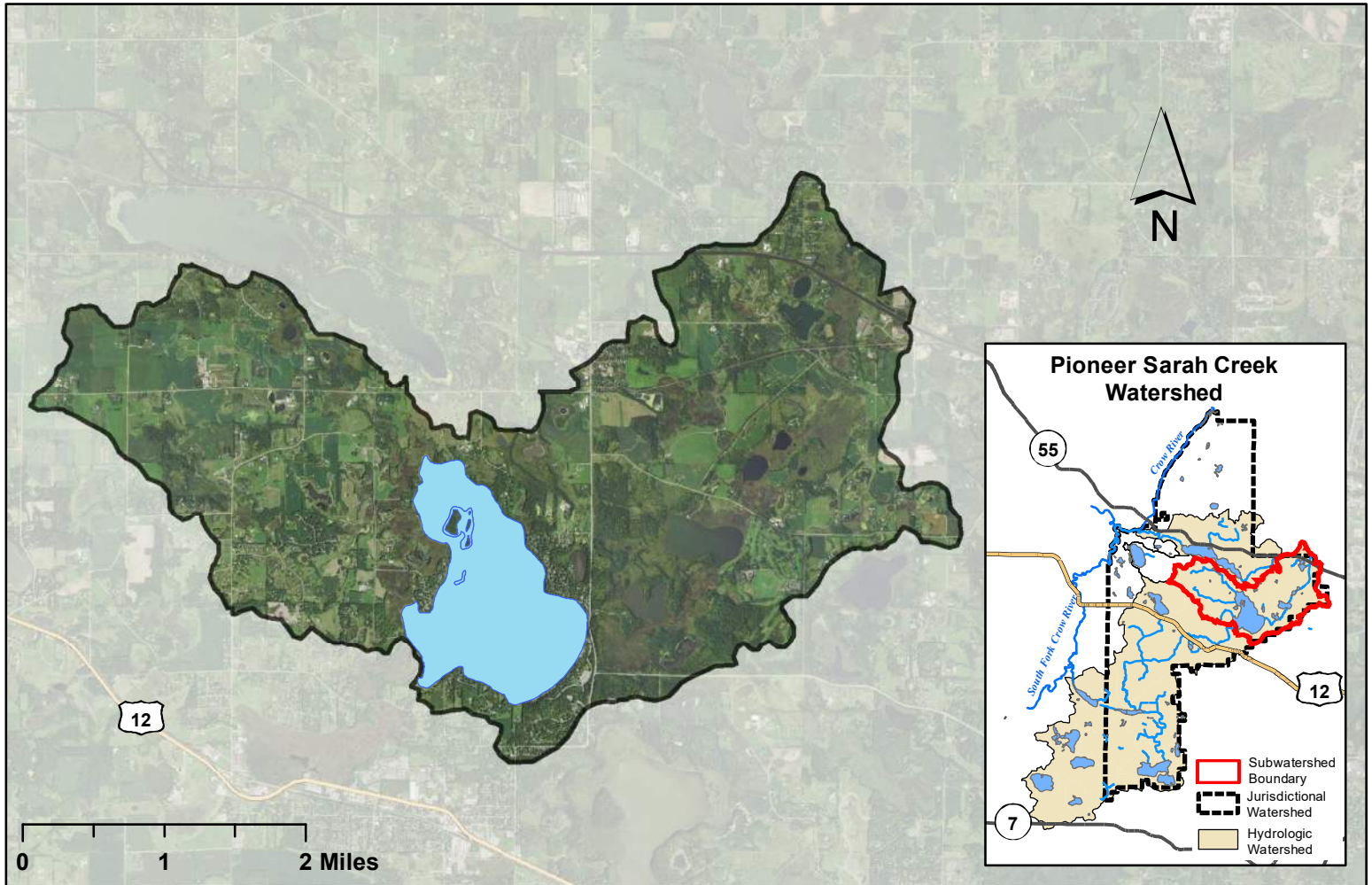
Met Council Grading System for Lake Water Quality



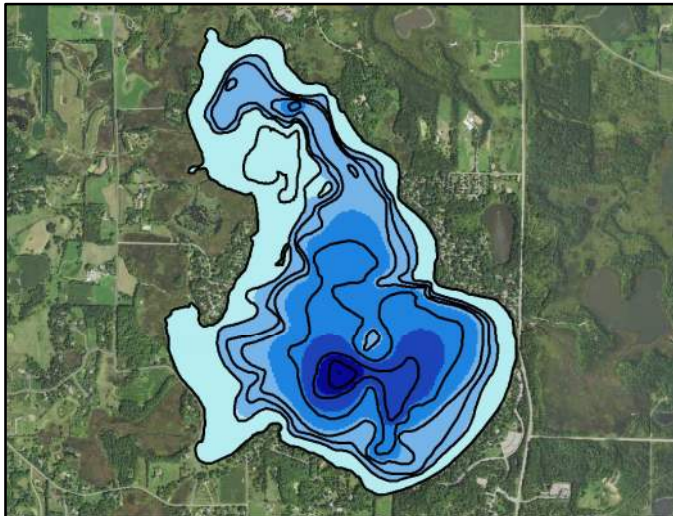
Division of Water Resources

January 2020

Lake Independence Watershed Map

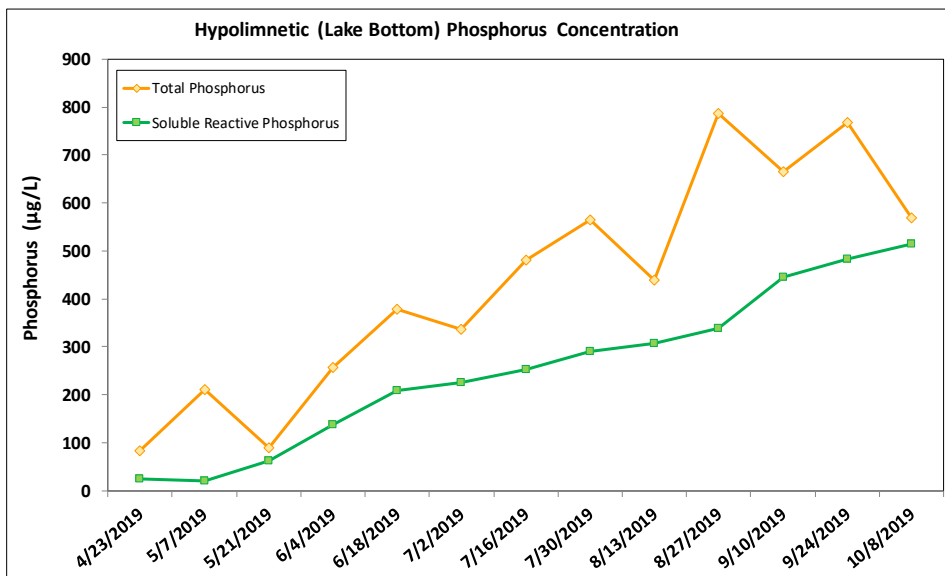
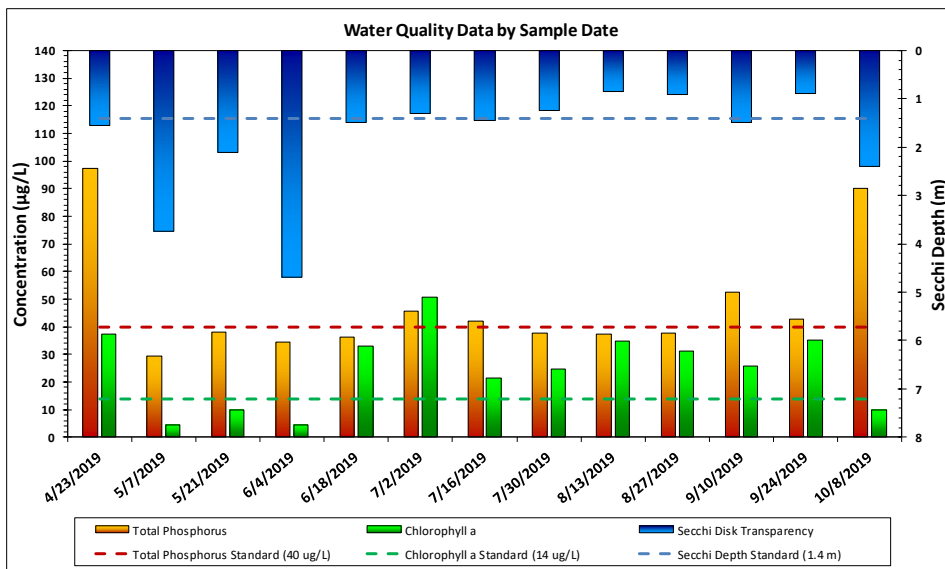
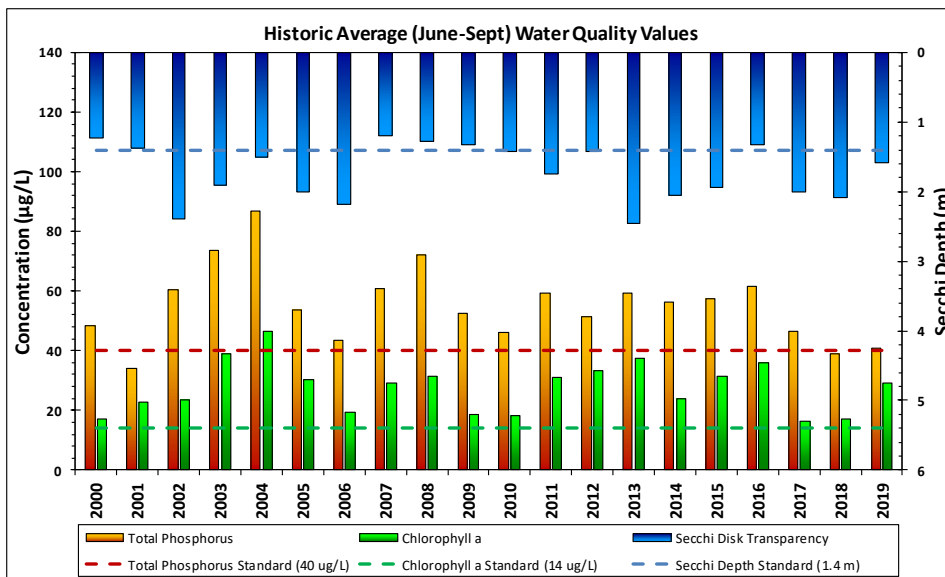


Lake Independence Bathymetry



Lake and Watershed Characteristics

DNR #	27017600
Watershed Area	7,632 Acres
Lake Area	832 Acres
Percent Littoral Area	51%
Average Depth	15.9 ft.
Maximum Depth	58 ft.
Watershed Area:Lake Area	9.2:1
Impairment Classification	Excess Nutrients 2002
Classification	Deep Lake



Lake Independence Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2000	C	B	C	C+
2001	C	C	C	C
2002	C	C	B	C+
2003	D	C	C	C-
2004	D	C	C	C-
2005	C	C	C	C
2006	C	B	C	C+
2007	C	C	D	C-
2008	D	C	C	C-
2009	C	B	C	C+
2010	C	B	C	C+
2011	C	C	C	C
2012	C	C	C	C
2013	C	C	B	C+
2014	C	C	C	C
2015	C	C	C	C
2016	C	C	C	C
2017	C	B	C	C+
2018	C	B	C	C+
2019	C	C	C	C
MPCA Standard	C	B	C	C+

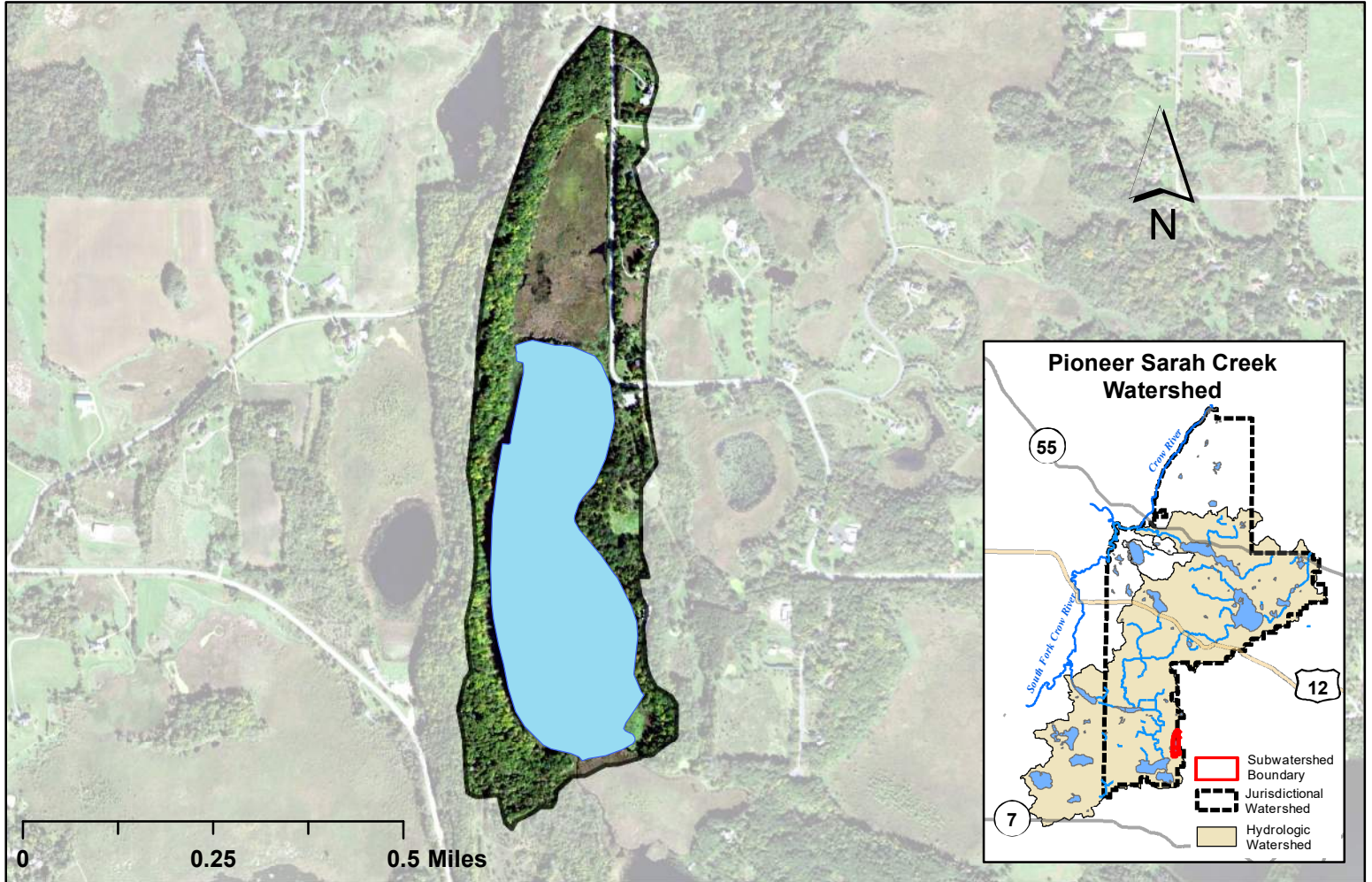
Met Council Grading System for Lake Water Quality



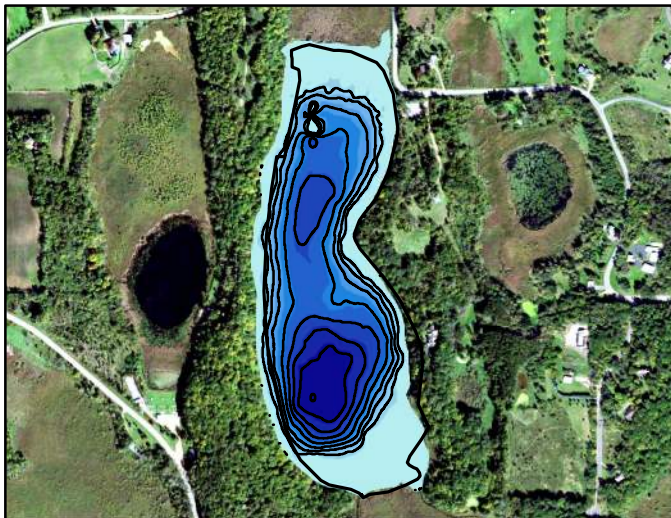
Division of Water Resources

January 2020

Little Long Lake Watershed Map

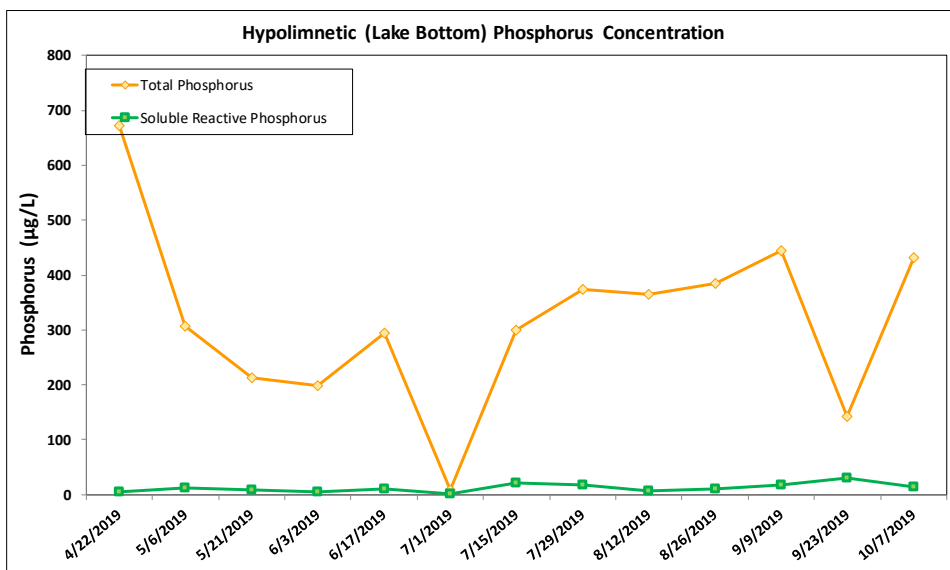
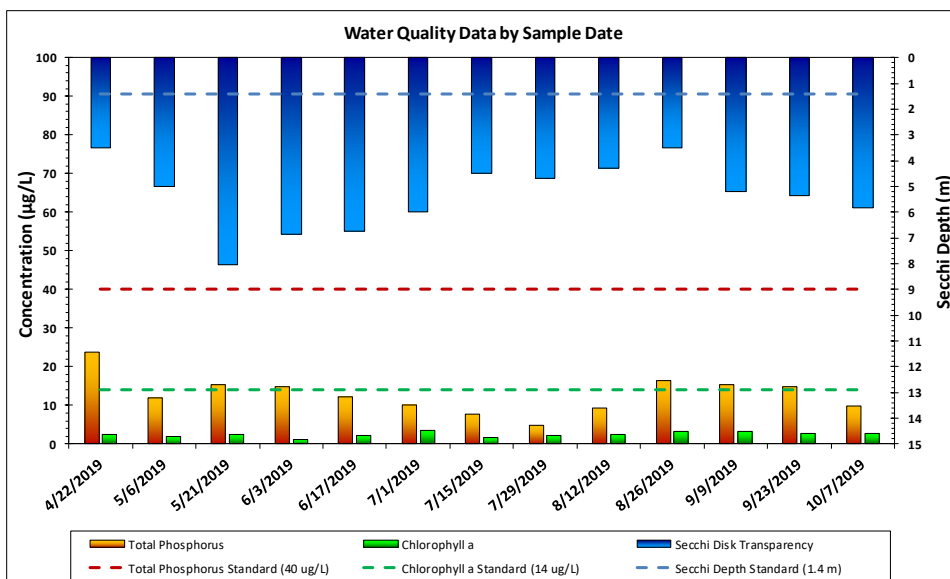
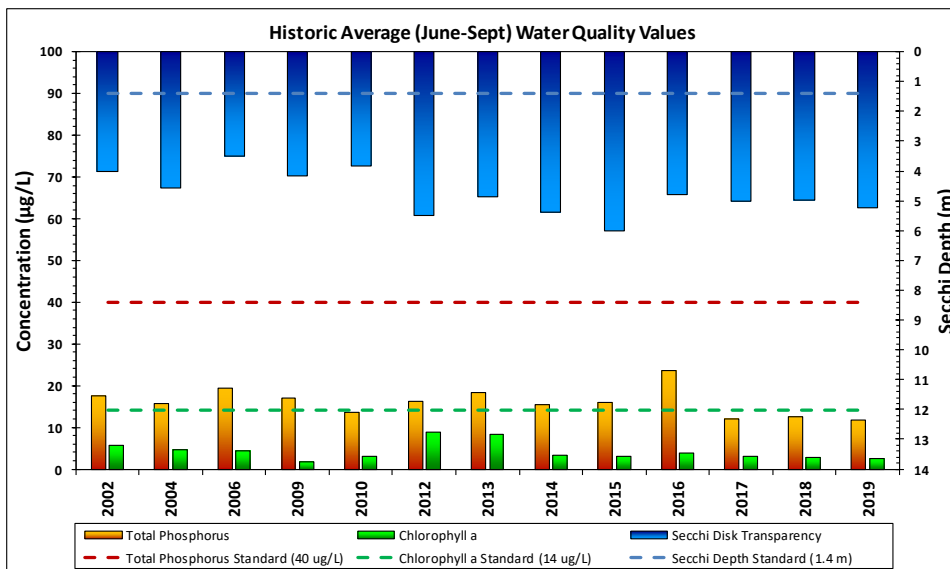


Little Long Lake Bathymetry



Lake and Watershed Characteristics

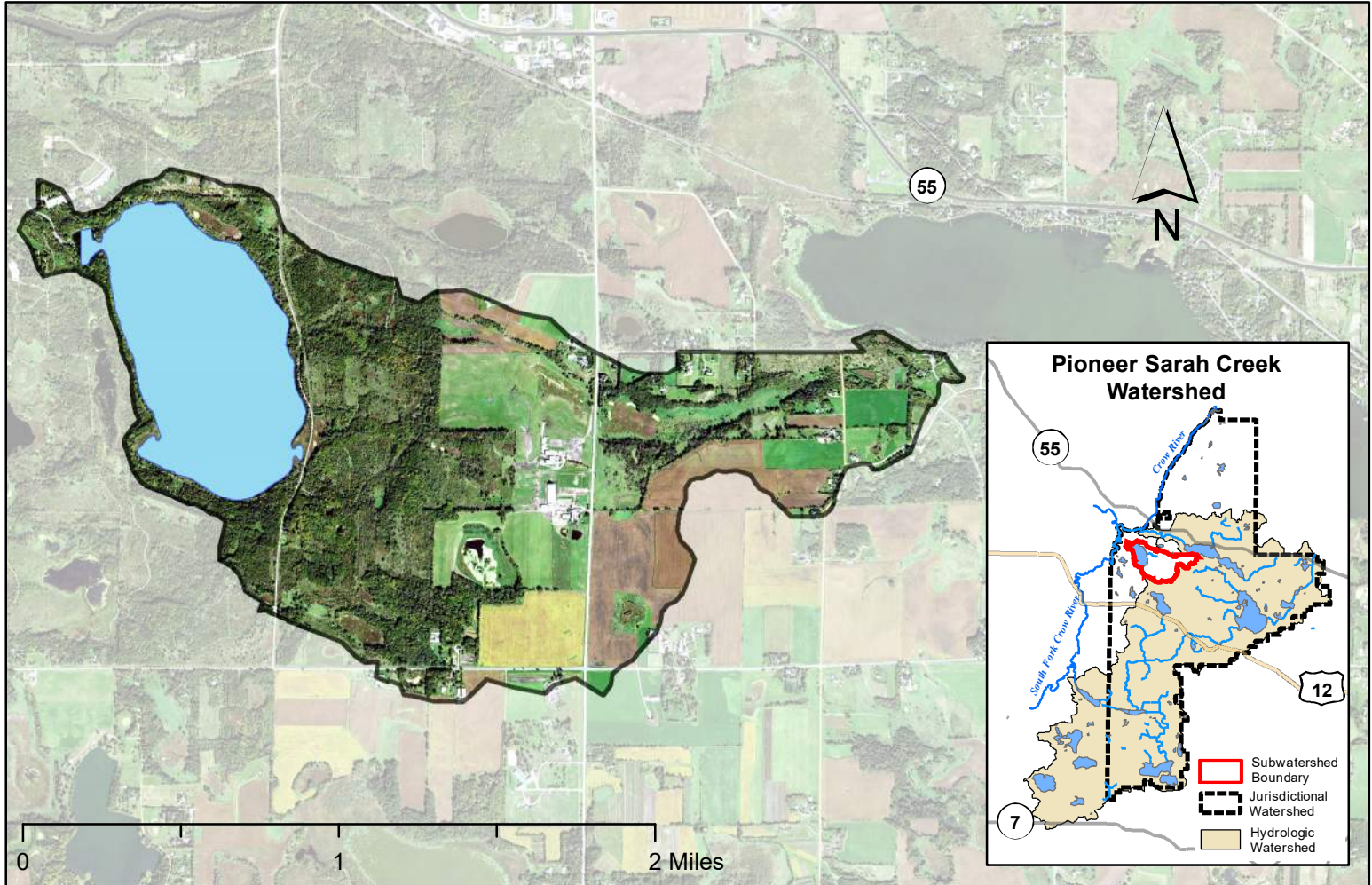
DNR #	27017900
Watershed Area	92 Acres
Lake Area	53.5 Acres
Percent Littoral Area	40%
Average Depth	27.8 ft.
Maximum Depth	80.5 ft.
Watershed Area:Lake Area	1.7:1
Impairment Classification	None
Classification	Deep Lake



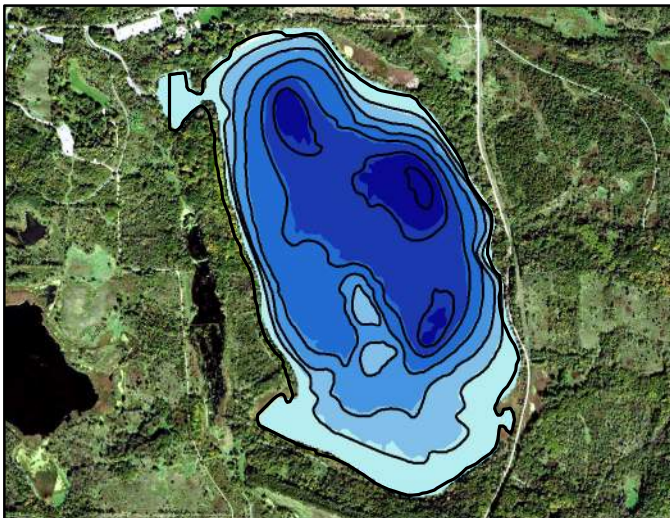
Little Long Lake Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2002	A	A	A	A
2004	A	A	A	A
2006	A	A	A	A
2009	A	A	A	A
2010	A	A	A	A
2012	A	A	A	A
2013	A	A	A	A
2014	A	A	A	A
2015	A	A	A	A
2016	B	A	A	A-
2017	A	A	A	A
2018	A	A	A	A
2019	A	A	A	A
MPCA Standard	C	B	C	C+

Met Council Grading System for Lake Water Quality

Lake Rebecca Watershed Map

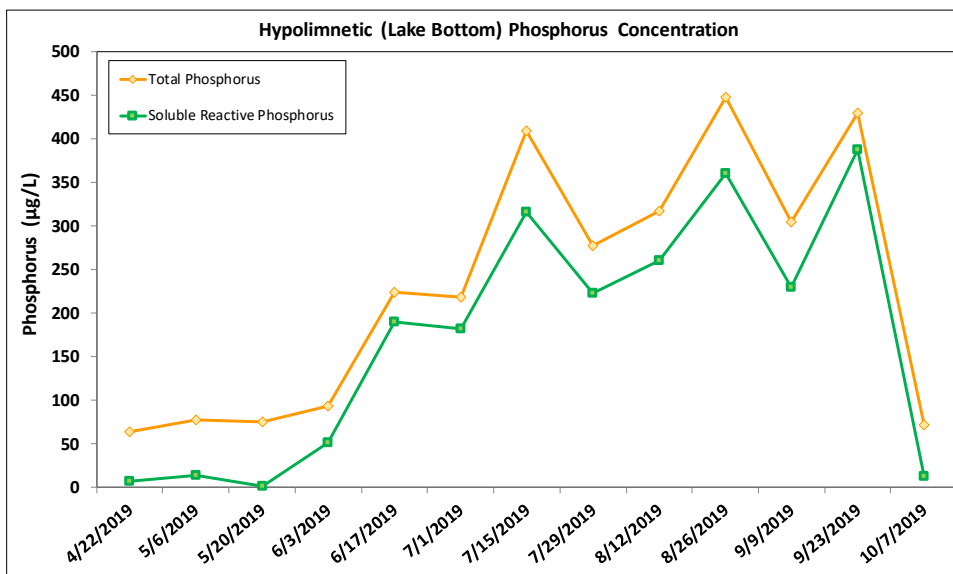
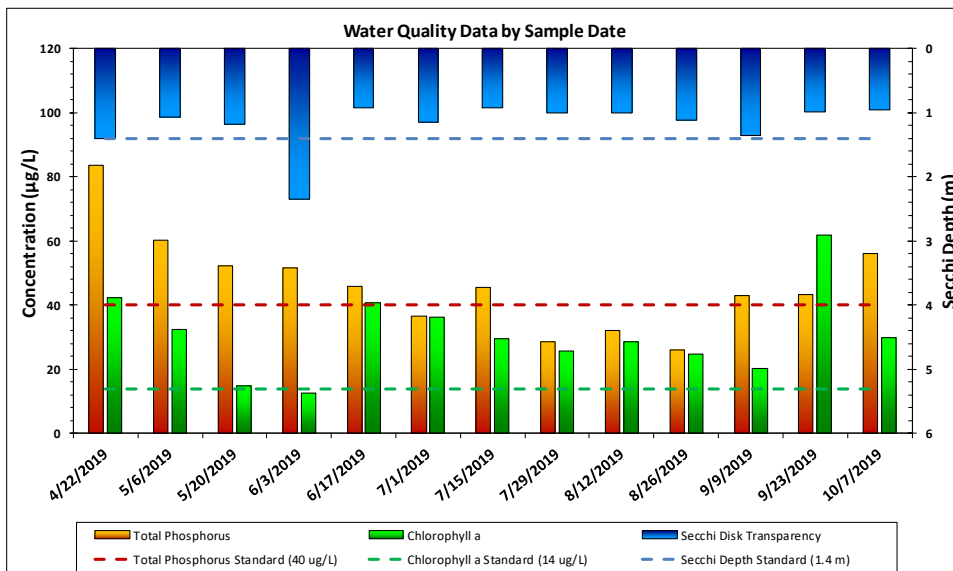
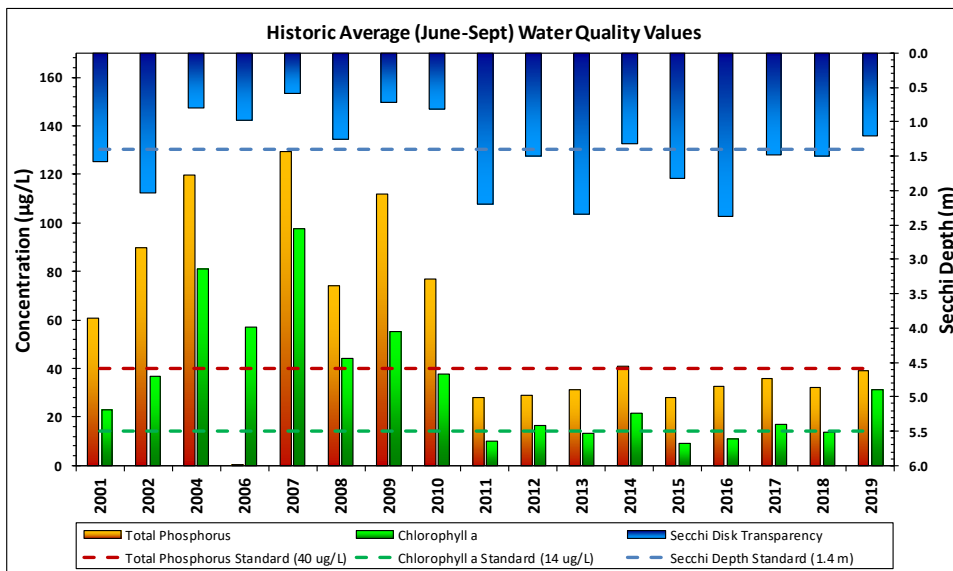


Lake Rebecca Bathymetry



Lake and Watershed Characteristics

DNR #	27019200
Watershed Area	1,277 Acres
Lake Area	261 Acres
Percent Littoral Area	50%
Average Depth	14.4 ft.
Maximum Depth	31.1 ft.
Watershed Area:Lake Area	4.9:1
Impairment Classification	Excess Nutrients 2008
Classification	Deep Lake



Lake Rebecca Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2001	C	C	C	C
2002	D	C	C	C-
2004	D	F	D	D-
2006	A	D	D	C
2007	D	F	F	F
2008	D	C	C	C-
2009	D	D	D	D
2010	D	C	D	D+
2011	B	B	B	B
2012	B	B	C	B-
2013	B	B	B	B
2014	C	C	C	C
2015	B	A	C	B
2016	C	B	B	B-
2017	C	B	C	C+
2018	C	B	C	C+
2019	C	C	C	C
MPCA Standard	C	B	C	C+

Met Council Grading System for Lake Water Quality

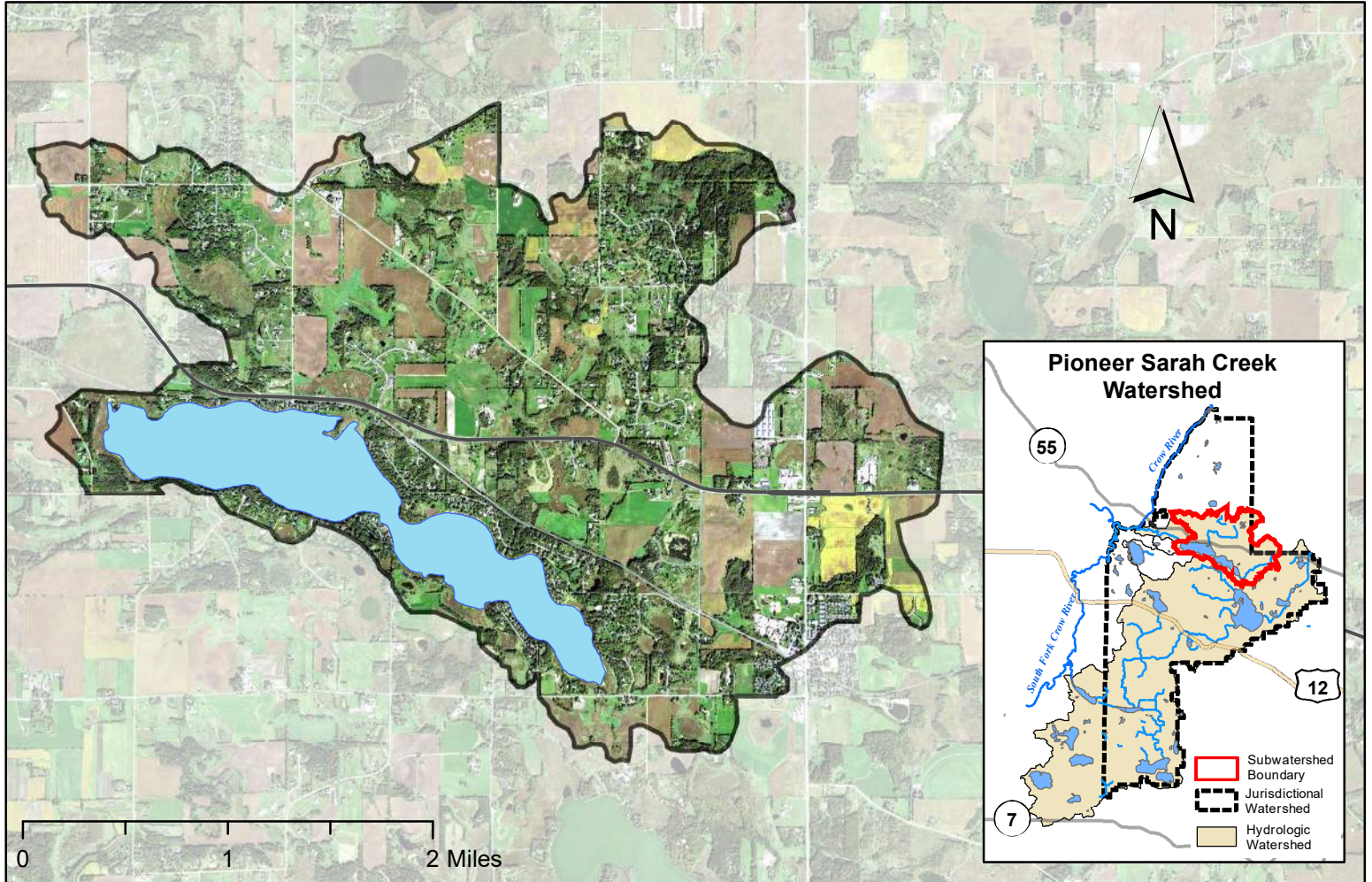
Alum Treatment: 2011



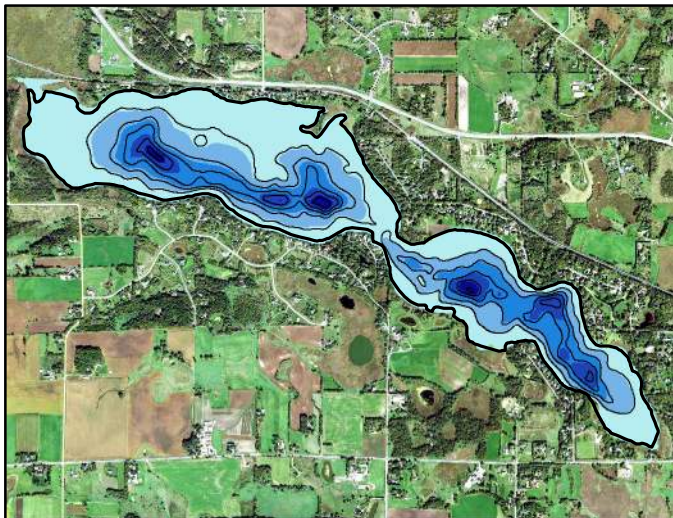
Division of Water Resources

January 2020

Lake Sarah Watershed Map

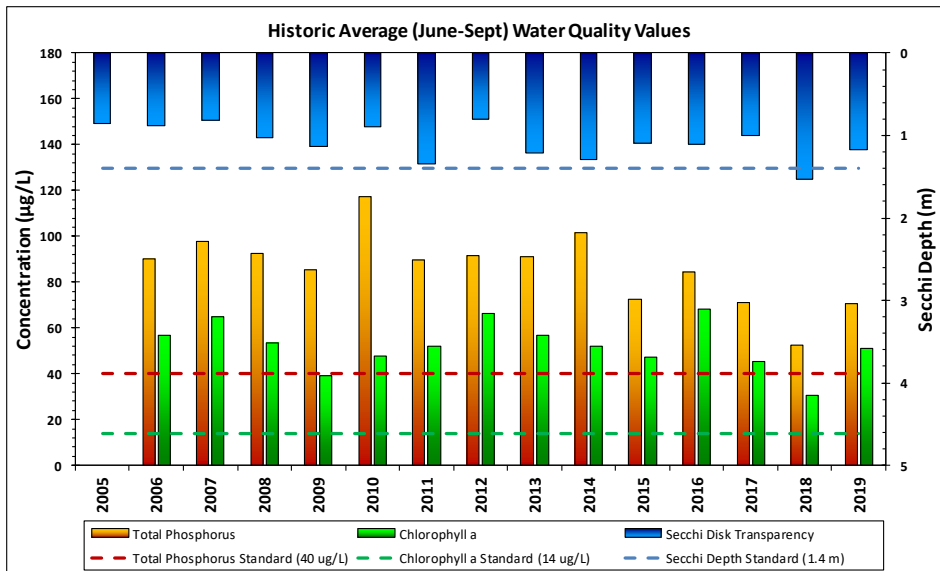


Lake Sarah Bathymetry



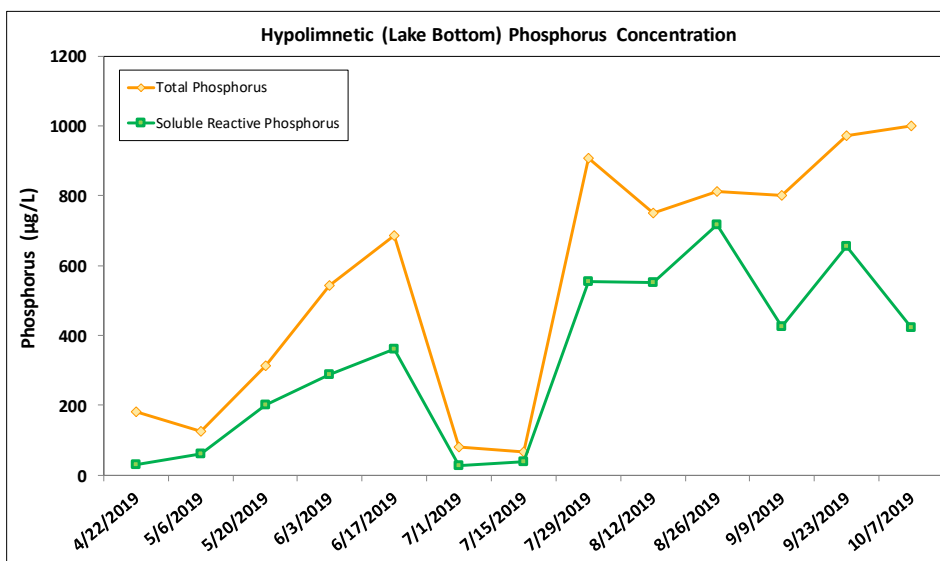
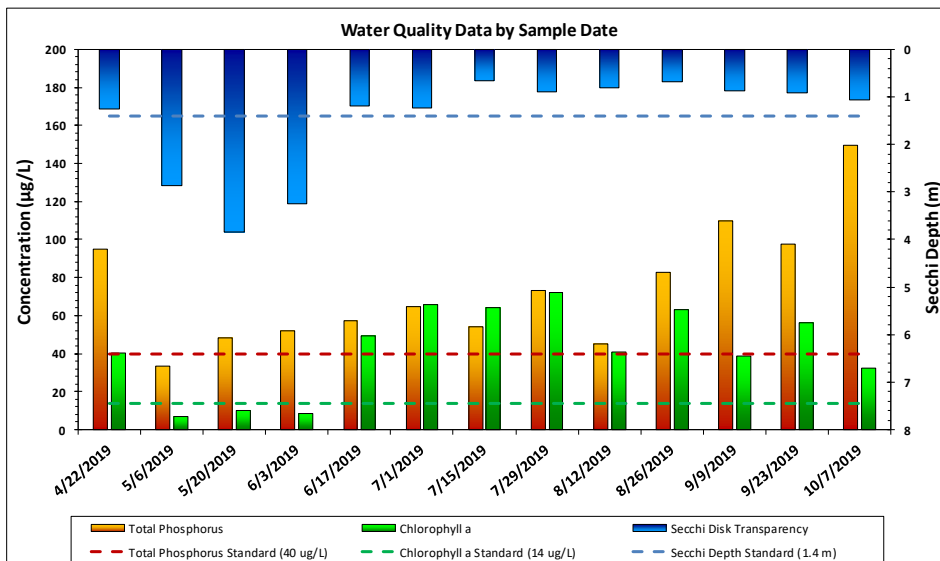
Lake and Watershed Characteristics

DNR #	27019100
Watershed Area	4,519 Acres
Lake Area	536 Acres
Percent Littoral Area	61%
Average Depth	13.7 ft.
Maximum Depth	49.9 ft.
Watershed Area:Lake Area	8.4:1
Impairment Classification	Excess Nutrients 2006
Classification	Deep Lake



Lake Sarah Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2005			D	D
2006	D	D	D	D
2007	D	D	D	D
2008	D	D	D	D
2009	D	C	D	D+
2010	D	C	D	D+
2011	D	D	C	D+
2012	D	D	D	D
2013	D	D	C	D+
2014	D	D	C	D+
2015	D	C	D	D+
2016	D	D	D	D
2017	D	C	D	D+
2018	C	C	C	C
2019	D	D	D	D
MPCA Standard	C	B	C	C+

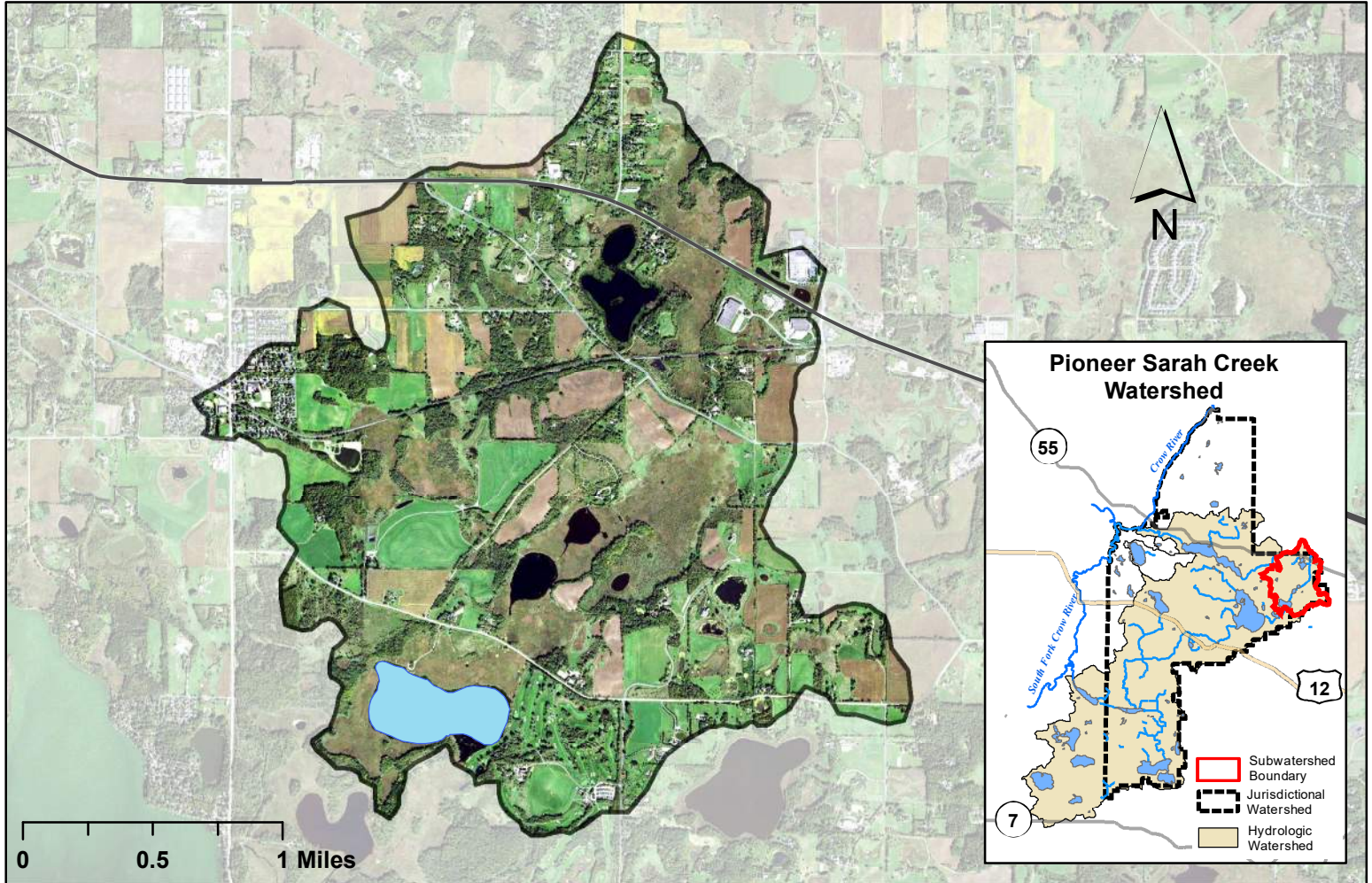
Met Council Grading System for Lake Water Quality



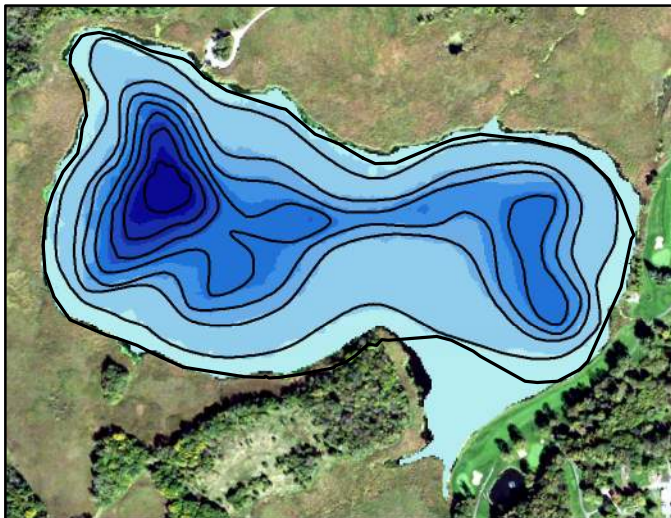
Division of Water Resources

January 2020

Spurzem Lake Watershed Map

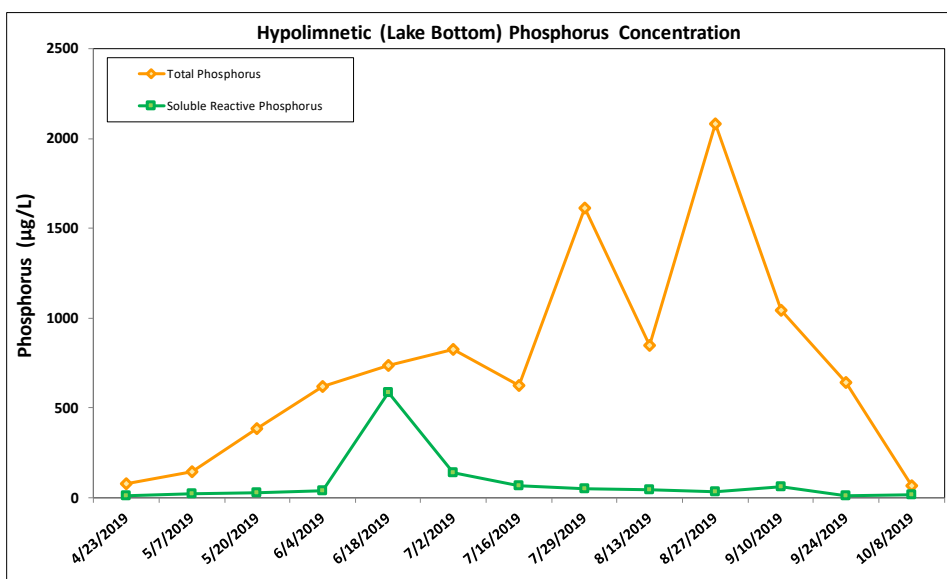
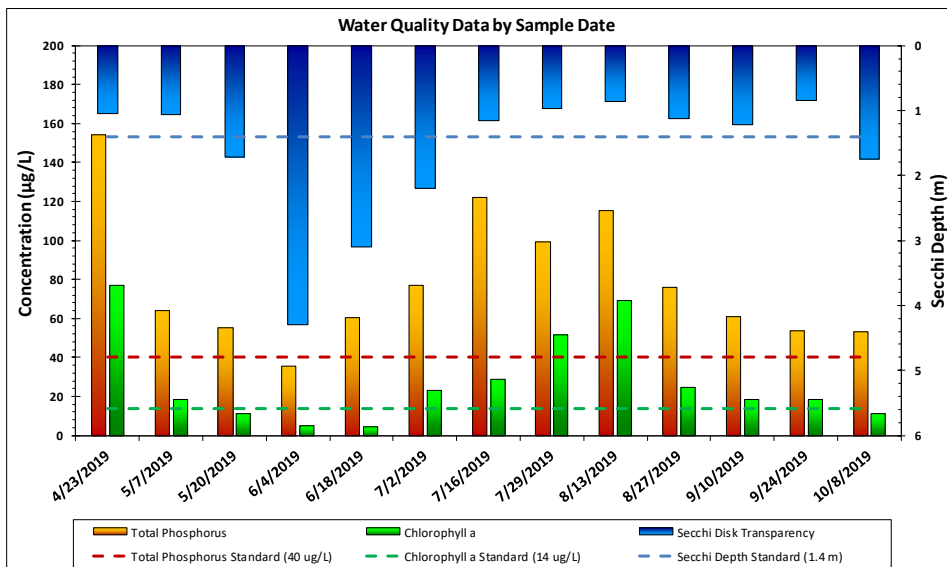
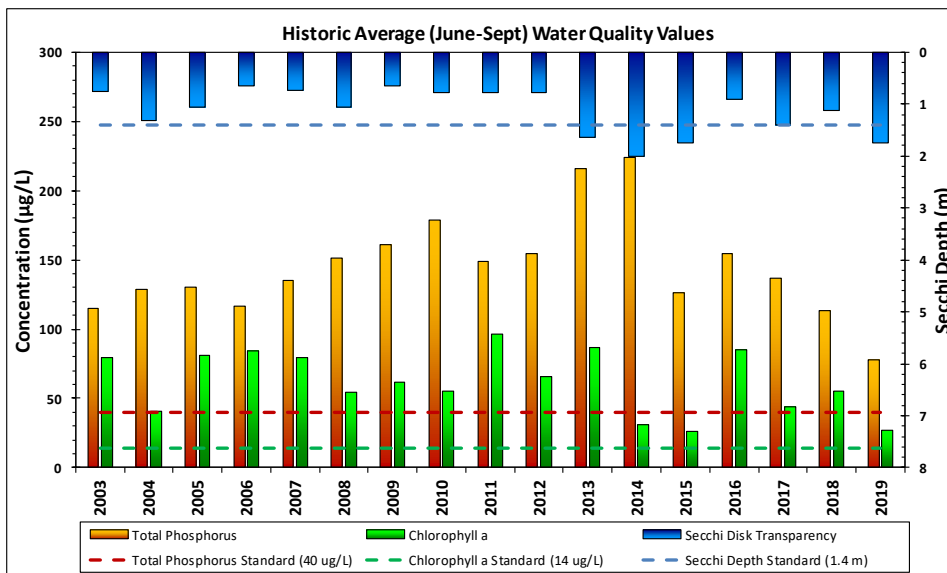


Spurzem Lake Bathymetry



Lake and Watershed Characteristics

DNR #	27014900
Watershed Area	2,915 Acres
Lake Area	78.6 Acres
Percent Littoral Area	70%
Average Depth	11.1 ft.
Maximum Depth	37.4 ft.
Watershed Area:Lake Area	37.1:1
Impairment Classification	Excess Nutrients 2008
Classification	Deep Lake



Spurzem Lake Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2003	D	F	D	D-
2004	D	C	C	C-
2005	D	F	D	D-
2006	D	F	F	F
2007	D	F	D	D-
2008	D	D	D	D
2009	F	D	F	F
2010	F	D	D	D-
2011	D	F	D	D-
2012	F	D	D	D-
2013	F	F	C	D-
2014	F	C	C	D+
2015	D	C	C	C-
2016	F	F	D	F
2017	D	C	C	C-
2018	D	D	D	D
2019	D	C	C	C-
MPCA Standard	C	B	C	C+

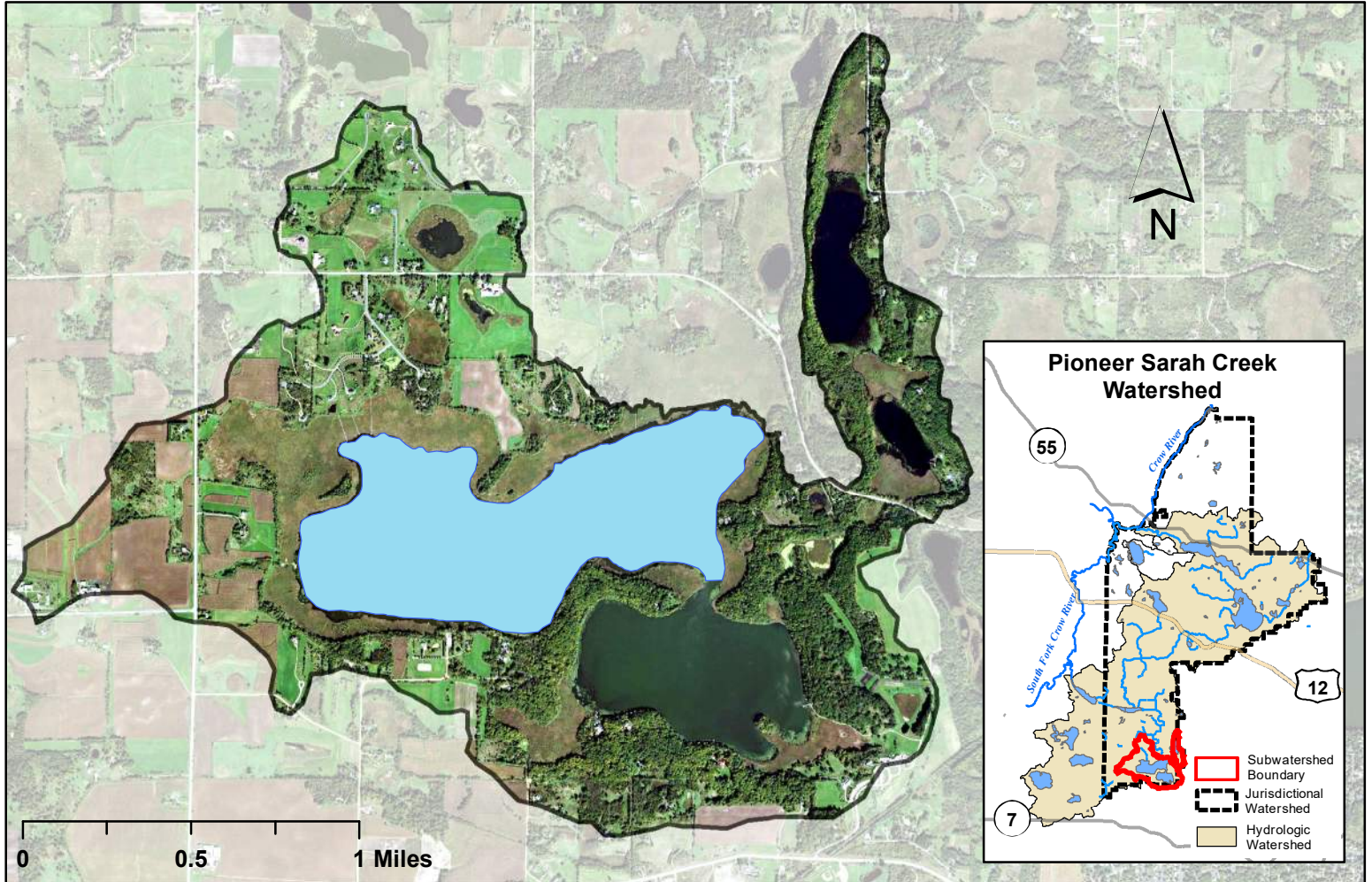
Met Council Grading System for Lake Water Quality



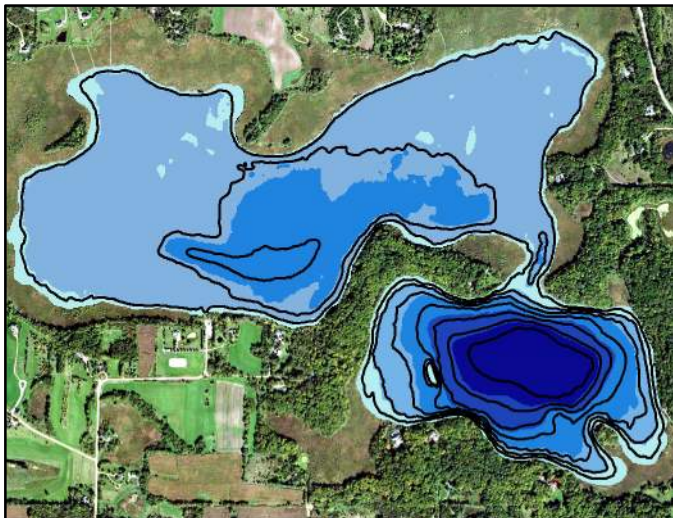
Division of Water Resources

January 2020

Whaletail North Watershed Map

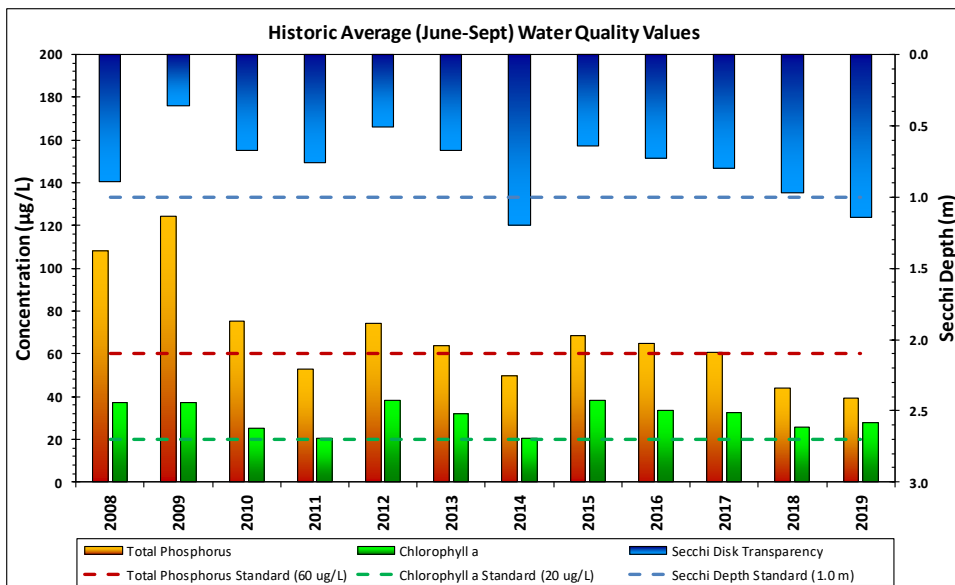


Whaletail North Bathymetry



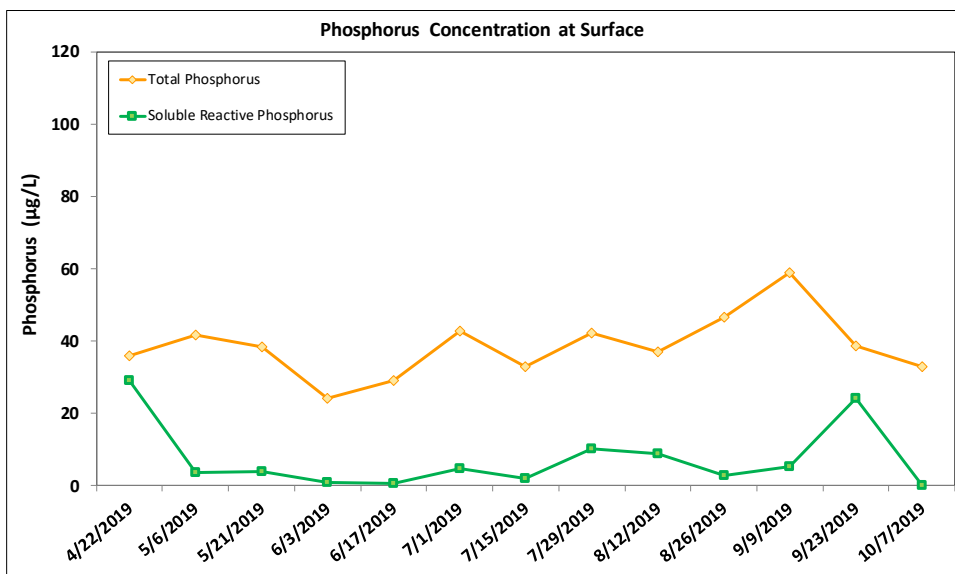
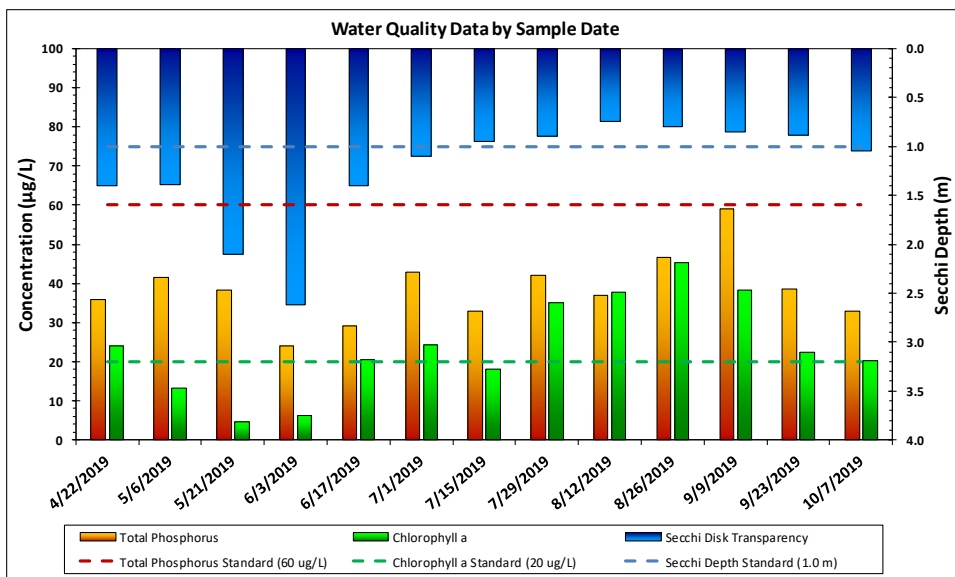
Lake and Watershed Characteristics

DNR #	27018401
Watershed Area	1,585 Acres
Lake Area	370 Acres
Percent Littoral Area	100%
Average Depth	5.2 ft.
Maximum Depth	10.3 ft.
Watershed Area:Lake Area	4.3:1
Impairment Classification	Proposed 2016
Classification	Provisional Shallow Lake



Whaletail North Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2008	D	C	D	D+
2009	D	C	F	D
2010	D	C	F	D
2011	C	C	D	C-
2012	D	C	F	D
2013	C	C	F	D+
2014	C	C	C	C
2015	D	C	F	D
2016	C	C	D	C-
2017	C	C	D	C-
2018	C	C	D	C-
2019	C	C	D	C-
MPCA Standard	C	C	D	C-

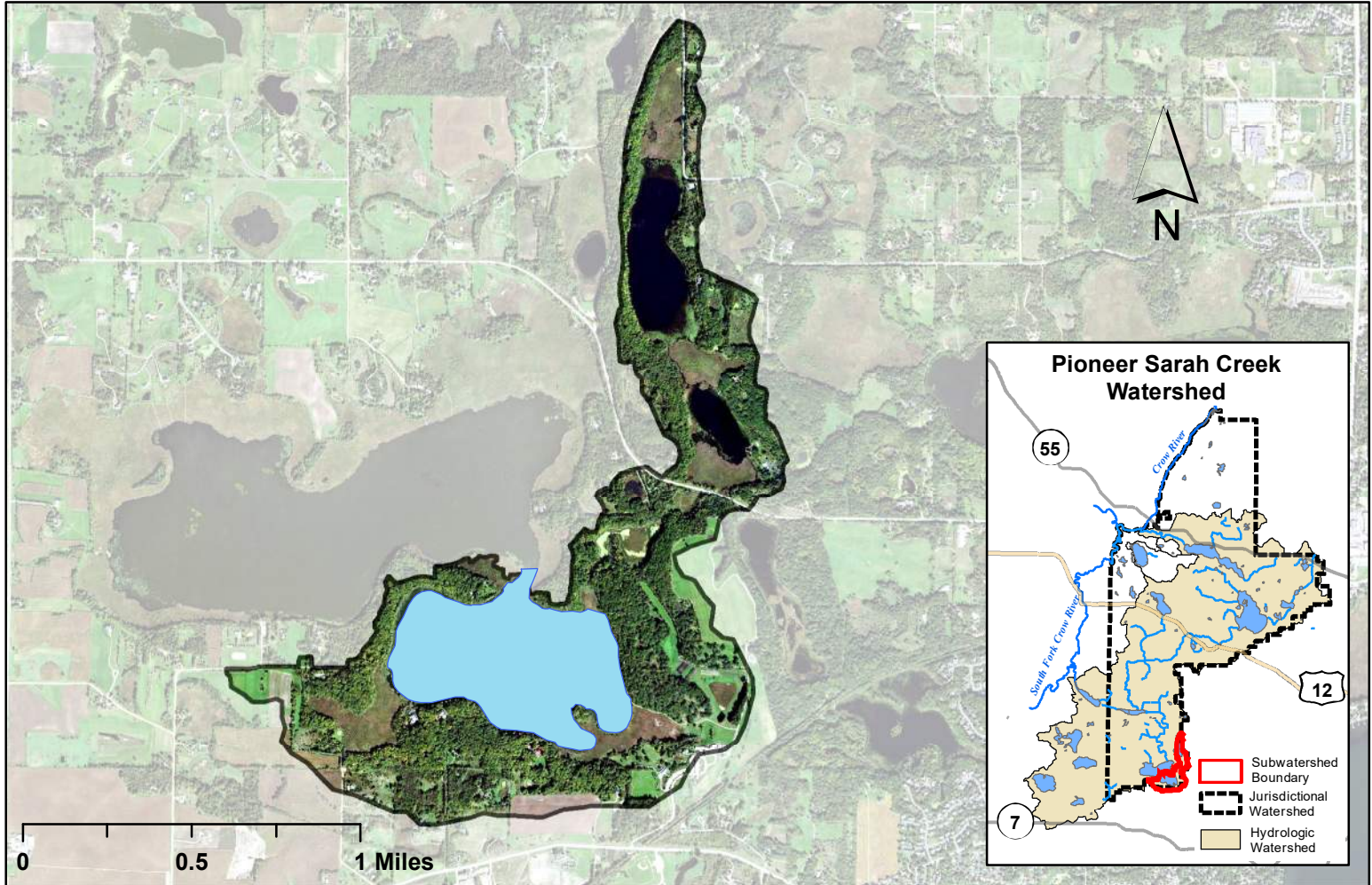
Met Council Grading System for Lake Water Quality



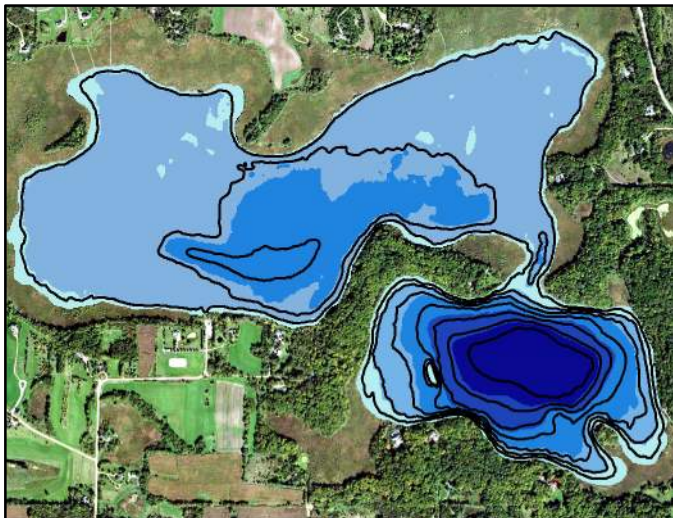
Division of Water Resources

January 2020

Whaletail South Watershed Map

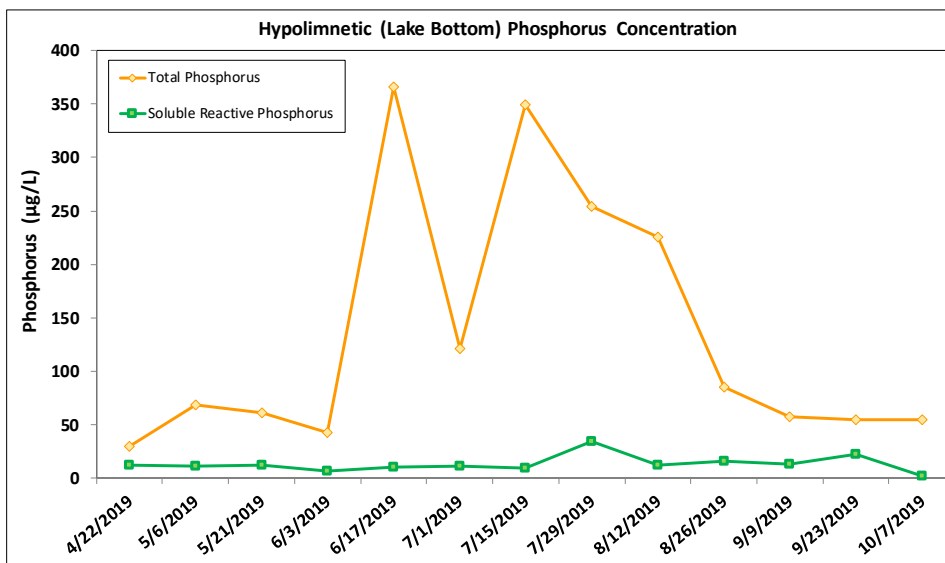
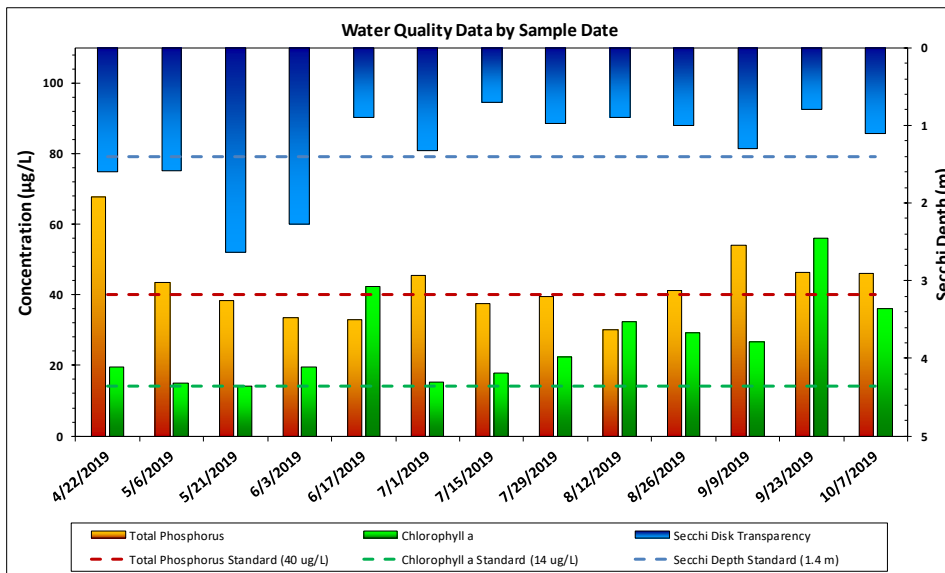
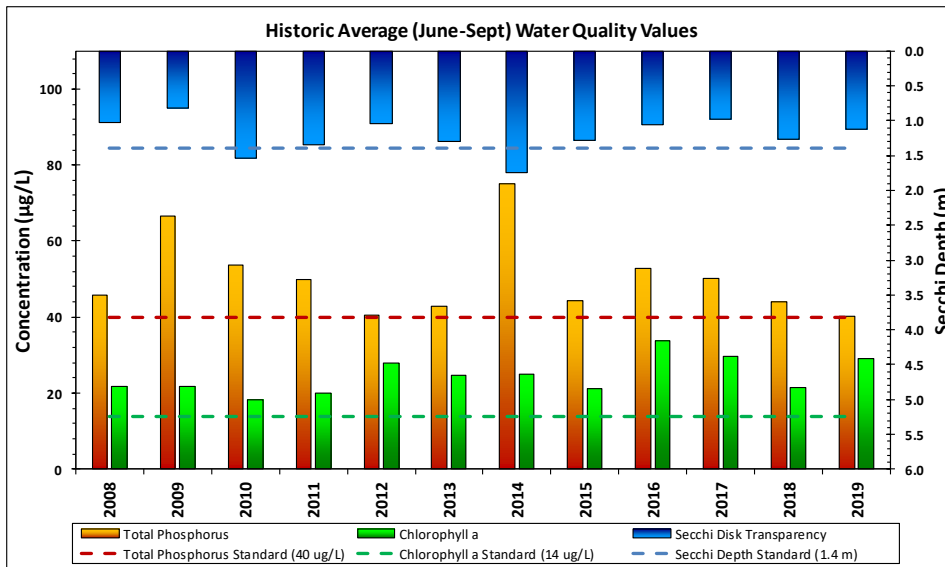


Whaletail South Bathymetry



Lake and Watershed Characteristics

DNR #	27018402
Watershed Area	661 Acres
Lake Area	156 Acres
Percent Littoral Area	66%
Average Depth	12.1 ft.
Maximum Depth	23.3 ft.
Watershed Area:Lake Area	4.2:1
Impairment Classification	Proposed 2016
Classification	Provisional Deep Lake



Whaletail South Water Quality Report Card				
Year	TP	Chl-a	Secchi	Avg Grade
2000	D	B	D	C-
2001	C	C	D	C-
2003	C	C	C	C
2005	C	C	D	C-
2007	C	C	C	C
2008	C	C	D	C-
2009	C	C	D	C-
2010	C	B	C	C+
2011	C	C	C	C
2012	C	C	D	C-
2013	C	C	C	C
2014	D	C	C	C-
2015	C	C	C	C
2016	C	C	D	C-
2017	C	C	D	C-
2018	C	C	C	C
2019	C	C	D	C-
MPCA Standard	C	B	C	C+

Met Council Grading System for Lake Water Quality



Division of Water Resources

January 2020

Appendix C

Rules and Standards

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Pioneer-Sarah Creek Watershed Management Commission

Rules and Standards

Adopted: March 4, 2015

Effective: June 1, 2015

**PIONEER-SARAH CREEK
WATERSHED MANAGEMENT COMMISSION
RULES AND STANDARDS**

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Appendix A – Wet Pond Design Standards

POLICY STATEMENT

The Pioneer-Sarah Creek Watershed Management Commission is a Joint Powers Association of the State under the Minnesota Watershed Act, and a watershed management organization as defined in the Metropolitan Surface Water Management Act. These acts provide the Commission with power to accomplish its statutory purpose: the conservation, protection, and management of water resources in the boundaries of the watershed through sound scientific principles. The Commission has adopted a water resources management plan pursuant to the Acts. These Rules implement the plan's principles and objectives.

Land alteration and utilization can affect the rate and volume and degrade the quality of surface water runoff. Sedimentation from ongoing erosion and construction activities can reduce hydraulic capacity of waterbodies and degrade water quality. Water quality problems already exist in many waterbodies in the watershed. Most of these waterbodies have been designated by the State of Minnesota as Impaired Waters, and do not meet state water quality standards.

Activities that increase the rate or volume of stormwater runoff will aggravate existing flooding problems and contribute to new ones. Activities that degrade runoff quality will cause quality problems in receiving water. Activities that fill floodplain or wetland areas will reduce flood storage and hydraulic capacity of waterbodies, and will degrade water quality by eliminating the filtering capacity of such areas.

These Rules and Standards protect the public health, welfare, and natural resources of the watershed by regulating the alteration of land and waters in the watershed to 1) reduce the severity and frequency of high water, 2) preserve floodplain and wetland storage capacity, 3) improve the chemical and physical quality of surface waters, 4) reduce sedimentation, 5) preserve the hydraulic and navigational capacities of waterbodies, 6) promote and preserve natural infiltration areas, and 7) preserve natural shoreline features. In addition to protecting natural resources, these Rules and Standards are intended to minimize future public expenditures on problems caused by land and water alterations.

RELATIONSHIP WITH MUNICIPALITIES AND COUNTY

The Commission recognizes that the control and determination of appropriate land use is the responsibility of the municipalities. The Commission will review projects involving land-disturbing activities in accordance with these Rules and Standards. The Commission intends to be active in the regulatory process to ensure that water resources are managed in accordance with its goals and policies.

The Commission desires to provide technical advice to the municipalities in the preparation of local stormwater management plans and the review of projects that may affect water resources prior to investment of significant public or private funds.

RULE A. DEFINITIONS

For the purposes of these Rules, unless the context otherwise requires, the following words and terms shall have the meanings set forth below. References in these Rules to specific sections of the Minnesota Statutes or Rules include amendments, revisions or recodifications of such sections. The words “shall” and “must” are mandatory; the word “may” is permissive.

100 Year Event. The rainfall depth with a 1 percent chance of occurring in a given year.

Abstraction. Removal of stormwater from runoff, by such methods as infiltration, evaporation, transpiration by vegetation, and capture and reuse, such as capturing runoff for use as irrigation water.

Agricultural Activity. The use of land for the production of agronomic, horticultural or silvicultural crops, including dairy animals, food animals, nursery stock, sod, fruits, vegetables, flowers, cover crops, grains, Christmas trees, and for grazing.

Alteration or Alter. When used in connection with public waters or wetlands, any activity that will change or diminish the course, current, or cross-section of public waters or wetlands.

Applicant. Any person or political subdivision that submits an application to the Commission for a project review under these Rules.

Best Management Practices (BMPs). Techniques proven to be effective in controlling runoff, erosion and sedimentation including those documented in the Minnesota Construction Site Erosion and Sediment Control Planning Handbook (BWSR 1988), Protecting Water Quality in Urban Areas (MPCA 2000), and the Minnesota Stormwater Manual (MPCA 2005) as revised.

Biofiltration. Using living material to capture and/or biologically degrade or process pollutants prior to discharging stormwater, such as directing runoff through a vegetated buffer or to a rain garden or vegetated basin with an underdrain.

Bioretention. A terrestrial-based (upland, as opposed to wetland) water quality and water quantity control process. Bioretention employs a simplistic, site-integrated design that provides opportunity for runoff infiltration, filtration, storage and water uptake by vegetation.

Buffer Strip. An area of natural, unmaintained, vegetated ground cover abutting or surrounding a watercourse or wetland.

BWSR. The Minnesota Board of Water and Soil Resources.

Commission. The Pioneer-Sarah Creek Watershed Management Commission.

Commissioners. The Board of Commissioners of the Pioneer-Sarah Creek Watershed Management Commission.

Compensatory Storage. Excavated volume of material below the floodplain elevation required to offset floodplain fill.

County. Hennepin County, Minnesota.

Dead Storage. The permanent pool volume of a water basin or the volume below the runout elevation of a water basin.

Detention Basin. Any natural or manmade depression for the temporary storage of runoff.

Development. Any proposal to subdivide land, any land-disturbing activity or creation of impervious surface.

Directly Connected Impervious Surface. Any hard surface (rooftop, driveway, sidewalk, roadway, etc.) from which runoff is not subject to loss beyond initial abstraction before being routed to the downstream collection and conveyance system.

Disturbance. See Land Disturbing Activity.

Drain or Drainage. Any method for removing or diverting water from waterbodies, including excavation of an open ditch, installation of subsurface drainage tile, filling, diking, or pumping.

Erosion. The wearing away of the ground surface as a result of wind, flowing water, ice movement, or land disturbing activities.

Erosion and Sediment Control Plan. A plan of BMPs or equivalent measures designed to control runoff and erosion and to retain or control sediment on land during the period of land disturbing activities in accordance with the standards set forth in these Rules.

Excavation. The artificial removal of soil or other earth material.

Fill. The deposit of soil or other material by artificial means.

Filtration. A process by which stormwater runoff is captured, temporarily stored, and routed through a filter bed to improve water quality and slow down stormwater runoff.

Floodplain. The area adjacent to a waterbody that is inundated during a 1% chance (100-year) flood, as defined by the FEMA Flood Insurance Study for the member City.

Impaired Water. A waterbody that does not meet state water quality standards and that has been included on the MPCA Section 303(d) list of Impaired Waters of the state.

Impervious Surface. A surface compacted or covered with material so as to be highly resistant to infiltration by runoff. Impervious surface shall include roads, driveways and parking areas, whether or not paved, sidewalks greater than 3 feet wide, patios, tennis and basketball courts, swimming pools, covered decks and other structures. Open decks with joints at least ¼ inch wide, areas beneath overhangs less than 2 feet wide, and sidewalks 3 feet or less wide shall not constitute impervious surfaces under these Rules.

Infiltration. The passage of water into the ground through the soil.

Infiltration Area. Natural or constructed depression located in permeable soils that capture, store and infiltrate the volume of stormwater runoff associated with a particular design event.

Interested Party. A person or political subdivision with an interest in the pending subject matter.

Land Disturbing Activity. Any change of the land surface to include removing vegetative cover, excavation, fill, grading, and the construction of any structure that may cause or contribute to erosion or the movement of sediment into waterbodies. The use of land for agricultural activities, or improvements such as mill an overlay or concrete rehabilitation projects that do not disturb the underlying soil, shall not constitute a land disturbing activity under these Rules.

Landlocked Basin. A basin that is 1 acre or more in size and does not have a natural outlet at or below the 1% chance (100-year) flood elevation as determined by the 1% chance (100-year), 10-day runoff event.

Low Floor. The finished surface of the lowest floor of a structure.

Member City. Any city wholly or partly within the Commission's boundary that has executed the Joint Powers Agreement.

MnDOT. The Minnesota Department of Transportation.

MPCA. The Minnesota Pollution Control Agency.

Municipality. Any city wholly or partly within the Commission's boundary.

NPDES. National Pollutant Discharge Elimination System.

NURP. The Nationwide Urban Runoff Program developed by the Environmental Protection Agency to study stormwater runoff from urban development.

Ordinary High Water Level (OHW). The 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 OHW level is the elevation of the top of the bank of the channel. If an OHW has been established for a waterbody by the Minnesota Department of Natural Resources, that will constitute the OHW under this definition.

Owner. The owner of a parcel of land or the purchaser under a contract for deed.

Parcel. A parcel of land designated by plat, metes, and bounds, registered land survey, auditor's subdivision, or other accepted means and separated from other parcels or portions by its designation.

Person. Any individual, trustee, partnership, unincorporated association, limited liability company or corporation.

Political Subdivision. A municipality, county or other political division, agency or subdivision of the state.

Project. A space, parcel, or parcels of real property owned by one or more than one person which is being or is capable of being developed or redeveloped as a single project.

Public Health and General Welfare. Defined in Minnesota Statutes, Section 103D.011, Subdivisions 23 and 24.

Public Waters. Any waters as defined in Minnesota Statutes, Section 103G.005, Subdivision 15.

Public Waters Wetland. Any wetland as defined in Minnesota Statutes, Section 103G.005, Subdivision 15a.

Redevelopment. Any proposal to re-subdivide land, or any land-disturbing activity or addition of impervious surface to a developed site.

Runoff. Rainfall, snowmelt or irrigation water flowing over the ground surface.

Sediment. Soil or other surficial material transported by surface water as a product of erosion.

Sedimentation. The process or action of depositing sediment.

Shoreland Protection Zone. Land located within a floodplain or within 1,000 feet of the OHW of a public water or public waters wetland or 300 feet of a public waters watercourse.

Site. A space, parcel, or parcels of real property owned by one or more than one person which is being or is capable of being developed or redeveloped as a single project.

Standard. A required level of quantity, quality, or value.

Stormwater Management Plan. A plan for the permanent management and control of runoff prepared and implemented in accordance with the standards set forth in these Rules.

Structure. Anything manufactured, constructed or erected which is normally attached to or positioned on land, including portable structures, earthen structures, walks, roads, water and storage systems, drainage facilities and parking lots.

Subdivision or Subdivide. The separation of a parcel of land into two or more parcels.

TMDL. A Total Maximum Daily Load is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. “TMDL” can also refer to a study that calculates that load, or to the allocation of that allowable load to its various sources. An Implementation Plan may be part of the TMDL study or it may be a separate document that sets forth the steps that will be taken to achieve the TMDL.

Volume Management. The retention and abstraction of a certain volume of stormwater runoff onsite through techniques such as infiltration, evapotranspiration, and capture and reuse.

Water Basin. An enclosed natural depression with definable banks capable of containing water that may be partly filled with public waters.

Waterbody. All water basins, watercourses and wetlands as defined in these Rules.

Watercourse. Any natural or improved stream, river, creek, ditch, channel, culvert, drain, gully, swale, or wash in which waters flow continuously or intermittently in a definite direction.

Water Resources Management Plan. The watershed management plan for the Commission adopted and implemented in accordance with Minnesota Statutes, Section 103B.231.

Watershed. Region draining to a specific watercourse or water basin.

Wetland. Land transitional between terrestrial and aquatic systems as defined in Minnesota Statutes, Section 103G.005, Subdivision 19.

Wetland Conservation Act (WCA). Minnesota Wetland Conservation Act of 1991 as amended.

RULE B. PROCEDURAL REQUIREMENTS

- 1. APPLICATION REQUIRED.** Any person or political subdivision undertaking an activity for which a project review is required by these Rules shall first submit to the Commission a project review application, design data, plans, specifications, fees, and such other information and exhibits as may be required by these Rules. Applications shall be signed by the owner, or the owner's authorized agent, except for activities of a political subdivision which may be signed by either the owner or the general contractor. All project review applications must be authorized by the municipality where the proposed project is located.
- 2. FORMS.** Project review applications shall be submitted on forms provided by the Commission. Forms are available at the Commission office or Web site.
- 3. ACTION BY COMMISSION.** The Commission shall act within 60 days after receipt of a complete application, including all required information, exhibits and fees. If a state or federal law or court order requires a process to occur before the Commission acts on an application, or if an application requires prior approval of a state or federal agency, the deadline for the Commission to act is extended to 60 days after completion of the required process or the required prior approval is granted. The Commission may extend the initial 60-day period by providing written notice of the extension to the applicant. The extension may not exceed 60 days unless approved by the applicant.
- 4. SUBMITTAL.** A complete project review application with all required information and exhibits shall be filed with the Commission at least 14 calendar days prior to the scheduled meeting date of the Commission. Late or incomplete submittals will be scheduled to a subsequent meeting date.
- 5. CONDITIONS.** A project review may be approved subject to reasonable conditions to assure compliance with these Rules. The conditions may include a requirement that the applicant and owner enter into an agreement with the member city in a form acceptable to the Commission to a) specify responsibility for the construction and future maintenance of approved structures or facilities, b) document other continuing obligations of the applicant or owner, c) grant reasonable access to the proper authorities for inspection, monitoring and enforcement purposes, d) affirm that the Commission or other political subdivisions can require or perform necessary repairs or reconstruction of such structures or facilities, e) require indemnification of the Commission for claims arising from issuance of the approved project review or construction and use of the approved structures or facilities, and f) reimburse the reasonable costs incurred to enforce the agreement. Project reviews and agreements may be filed for record to provide notice of the conditions and continuing obligations.

6. **ISSUANCE OF PROJECT REVIEWS.** The Commission will issue a project review approval only after the applicant has satisfied all requirements of these Rules and paid all required fees.
7. **VALIDITY.** Issuance of a project review approval based on plans, specifications, or other data shall not prevent the Commission from thereafter requiring the correction of errors in the approved plans, specifications and data, or from preventing any activity being carried on thereunder in violation of these Rules.
8. **MODIFICATIONS.** The applicant shall not modify the approved activity or plans and specifications on file with the Commission without the prior approval of the Commission.
9. **INSPECTION AND MONITORING.** With permission of the property owner and under the authority of the member city, the Commission may perform such field inspections and monitoring of the approved activity as the Commission deems necessary to determine compliance with the conditions of the project review and these Rules. Any portion of the activity not in compliance shall be promptly corrected. In applying for a project review, the applicant consents to entry upon the land for field inspections and monitoring, or for performing any work necessary to bring the activity into compliance.
10. **SUSPENSION OR REVOCATION.** The Commission may suspend or revoke a project review approved under these Rules whenever the project review approval is issued in error or on the basis of incorrect information supplied, or in violation of any provision of these Rules, or if the preliminary and final project approvals received from the municipality or county are not consistent with the conditions of the approved project review.
11. **EXPIRATION OF COMMISSION APPROVALS.** An approved project review shall expire and become null and void if the approved activity is not commenced within one year from date of approval, or if the approved activity is suspended or abandoned for a period of one year from the date the activity originally commenced. With the approval of the affected member city, applicants may apply for an extension of that period if the city review process is extended beyond the usual review period. Before an activity delayed for one year or more can recommence, the project approval must be renewed. Any applicant may apply for an extension of time to commence the approved activity under an unexpired project review approval.

An application for renewal or extension must be in writing, and state the reasons for the renewal or extension. Any plan changes and required fees must be included with the application. There must be no unpaid fees or other outstanding violations of the approval being renewed or extended. An application for extension must be received by the Commission at least 30 days prior to the approval's expiration. The Commission shall consider the application for renewal or extension on the basis of the Rules in effect on the date the application is being considered. The Commission may extend the time for commencing the approved activity for a period not exceeding one year upon finding that

circumstances beyond the control of the applicant have prevented action from being taken.

- 12. SEVERABILITY.** If any provision of these Rules is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of these Rules shall not be affected thereby.

RULE C. GENERAL STANDARDS

- 1. POLICY.** It is the policy of the Commission to protect the water resources of the watershed by requiring that all activities within the watershed comply with minimum standards for the protection of water quality and the environment.
- 2. REGULATION.**
 - a) All land disturbing activities, whether requiring a project review under these Rules or otherwise, shall be undertaken in conformance with BMPs.
 - b) Project reviews are required of any land disturbing activity meeting the review thresholds set forth in Rule D Section 2.
 - c) In areas that drain to Impaired Waters, TMDL Implementation Plans may include site-specific requirements for any land-disturbing activities that are in addition to these rules and standards.
 - d) No person shall conduct land-disturbing activities without protecting adjacent property and waterbodies from erosion, sedimentation, flooding, or other damage.
 - e) Development shall be planned and conducted to minimize the extent of disturbed area, runoff velocities, and erosion potential, and to reduce and delay runoff volumes. Disturbed areas shall be stabilized and protected as soon as possible and facilities or methods used to retain sediment on-site.
 - f) Existing natural watercourses and vegetated soil surfaces shall be used to convey, store, filter, and retain runoff before discharge into public waters or a stormwater conveyance system.
 - g) Runoff from roof gutter systems shall discharge onto lawns or other pervious surfaces to promote infiltration where possible.
 - h) Use of fertilizers and pesticides in the shoreland protection zone shall be so done as to minimize runoff into public waters by the use of earth material, vegetation, or both. No phosphorus fertilizer shall be used unless a soil nutrient analysis shows a need for phosphorus or in the establishment of new turf.
 - i) When development density, topographic features, and soil and vegetation conditions are not sufficient to adequately handle 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. The Commission encourages designs using surface drainage, vegetation and infiltration rather than buried pipes and man-made materials and facilities.

- j) Whenever the Commission determines that any land disturbing activity has become a hazard to any person or endangers the property of another, adversely affects water quality or any waterbody, increases flooding, or otherwise violates these Rules, the Commission shall notify the member city where the problem occurs and the member city shall require the owner of the land upon which the land disturbing activity is located, or other person or agent in control of such land, to repair or eliminate such condition within the time period specified therein. The owner of the land upon which a land disturbing activity is located shall be responsible for the cleanup and any damages from sediment that has eroded from such land. The Commission may require the owner to submit a project review application under these Rules before undertaking any repairs or restoration.

RULE D. STORMWATER MANAGEMENT

1. **POLICY.** It is the policy of the Commission to control excessive rates and volumes of runoff by:
 - a) Requiring that peak runoff rates not exceed existing conditions or the capacity of downstream conveyance facilities or contribute to flooding or streambank erosion.
 - b) Managing subwatershed discharge rates and flood storage volumes to be consistent with the goals of the Commission's water resources management plan and the local water resources management plans.
 - c) Controlling runoff rates by the use of on-site or if feasible regional detention or infiltration facilities.
 - d) Reviewing stormwater management structures based on the 1% (100-year) critical storm event for the drainage area.
 - e) Routing runoff to water treatment ponds or other acceptable facilities before discharging into waterbodies.
 - f) Promoting the use of natural resources for storing runoff and improving water quality and other amenities where appropriate.
 - g) Promoting natural infiltration of runoff.
2. **REGULATION.** No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for the following types of projects without first submitting to and obtaining approval of a project review from the Commission or the city in which the project is located that incorporates a stormwater management plan for the activity, development or redevelopment:

- a) Plans of any land development or site development that disturbs more than 1 acre of land.
- b) Linear projects that create one acre or more of new impervious surface must meet all Commission requirements for the net new impervious surface.
- c) Plans of any land development or individual site development adjacent to or containing a lake, wetland, or a natural or altered watercourse as listed in the Hennepin County wetland inventory or the final inventory of Protected Waters and Wetlands for Hennepin County, as prepared by the DNR.
- d) Any culvert installation or replacement, bridge construction, stream cross-section alteration, or activity requiring a DNR Waters Permit.
- e) Plans for any land development or site development within the 1% chance (100-year) floodplain as defined by the Flood Insurance Study for the member city or the Commission's flood study.
- f) Plans of any land development or site development regardless of size, if such review is requested by a member city.
- g) Land disturbing activity that drains to more than one watershed, for that portion of the site draining into the Pioneer-Sarah Creek Watershed.

3. CRITERIA. Stormwater management plans shall comply with the following criteria regarding runoff rate restrictions, volume control requirements, and water quality requirements.

- a) A hydrograph method based on sound hydrologic theory will be used to analyze runoff for the design or analysis of flows, volumes, water quality, and water levels.
- b) *Runoff rates* for the proposed activity shall not exceed existing runoff rates for the 2-year, 10-year, and 100-year critical storm events and rainfall distribution for the project location as set forth in NOAA Atlas 14 Volume 8, published June 2013, or its successor, using the online NOAA Precipitation Frequency Data Server or a similar data source. Applicant must document the location and event depths used. If an approved local water management plan requires more restrictive rate control, then the more restrictive rate shall govern. Runoff rates may be restricted to less than the existing rates when necessary for the public health and general welfare of the watershed.
 - i) If detention basins are used to control rate of runoff they shall be designed to provide:
 - (1) An outlet structure to control the 2-year, 10-year, and 100-year critical storm events to predevelopment runoff rates. Said outlet structure will be required to control critical storm events to less than predevelopment runoff rates if downstream facilities have insufficient capacity to handle the increased flow.

- (2) Alternative to (1), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required rate control. This means that no rate control may be required for an individual development provided there is a regional facility designed and constructed to accommodate the flow from this property.
- (3) An identified overflow spillway sufficiently stabilized to convey a 1% (100-year) critical storm event.
- (4) A normal water elevation above the OHW of adjacent waterbodies.
- (5) Access for future maintenance.
- (6) An outlet skimmer to prevent migration of floatables and oils for at least the two year storm event.
- (7) The low floor elevation shall be at minimum two feet above the critical event 100-year elevation and at minimum one foot above the emergency overflow elevation of nearby waterbodies and stormwater ponds.
- ii) Regional detention basins may be used to manage peak flow rates and meet water quality objectives when feasible.
- iii) Analysis of flood levels, storage volumes and flow rates for waterbodies and detention basins shall be based on the range of rainfall and snow melt duration producing the critical flood levels and discharges, whichever is most critical.
- iv) Landlocked water basins may be provided with outlets that:
 - (1) Retain a hydrologic regime complying with floodplain and wetland alterations.
 - (2) Provide sufficient storage below the outlet run-out elevation to retain back-to-back 100-year, 24-hour rainfalls and runoff above the highest anticipated groundwater elevation and prevent damage to property adjacent to the basin.
 - (3) Do not create adverse downstream flooding or water quality conditions.
- c) Stormwater runoff volume must be *infiltrated/abstracted* onsite in the amount equivalent to one point one inch (1.1") of runoff generated from new impervious surface.
 - i) Applicant must minimize the creation of new impervious surface, reduce existing impervious surfaces where possible, and minimize the amount of directly connected impervious surface.
 - ii) When using infiltration for volume reduction, runoff must be infiltrated within 48 hours. Infiltration volumes and facility sizes shall be calculated based on the measured infiltration rate determined by a double-ring infiltrometer test(s) conducted to the requirements of ASTM Standard D3385 at the proposed bottom elevation of the infiltration area. Other testing methods may be used with the approval of the Commission's Engineer. The measured infiltration rate shall be divided by the appropriate correction factor selected from the Minnesota

Stormwater Manual. This site investigation must be conducted by a licensed soil scientist or engineer.

- iii) A post-construction percolation test must be performed on each infiltration practice and must demonstrate that the constructed infiltration rate meets or exceeds the design infiltration rate prior to project acceptance by the city.
- iv) Infiltration areas will be limited to the horizontal areas subject to prolonged wetting.
- v) Areas of permanent pools tend to lose infiltration capacity over time and will not be accepted as an infiltration practice.
- vi) Stormwater runoff must be pretreated to remove solids before discharging to infiltration areas to maintain the long term viability of the infiltration areas.
- vii) Design and placement of infiltration BMPs shall be done in accordance with the Minnesota Department of Health guidance "Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas," as amended.
- viii) Constructed bioretention and infiltration practices such as rain gardens, infiltration trenches, and infiltration benches shall not be used in:
 - (1) Fueling and vehicle maintenance areas;
 - (2) Areas with less than 3 feet separation from the bottom of the infiltration system to the elevation of seasonal high groundwater;
 - (3) Areas with runoff from industrial, commercial and institutional parking lots and roads and residential arterial roads with less than 5 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater;
 - (4) Areas within 400 feet of a community water well, within 100 feet of a private well, or within a delineated 1-year time of travel zone in a wellhead protection area;
 - (5) Sites documented to contain contaminated soils or groundwater.
- ix) Credit towards compliance with the abstraction requirement in (c) may be achieved by:
 - (1) Meeting post construction soil quality and amendment depth requirements. Areas that will be subjected to clearing, grading, or compaction that will not be covered by impervious surface, incorporated into a drainage facility, or engineered as structural fill or slope may be included in the credit calculation if they meet post construction soil quality and amendment depth requirements. Soil amendment areas become part of the site's storm drainage system, and must be protected by a utility and drainage easement and be included in the site's utility maintenance agreement. The applicant may compute a credit of 0.5 inches over the soil amendment area and apply that toward the abstraction volume requirement.

- (a) A minimum 8-inch depth of compost amended soil or imported topsoil shall be placed in all areas of the project site being considered for the abstraction credit. Before the soil is placed, the subsoil must be scarified (loosened) at least 4 inches deep, with some incorporation of the amended soil into the existing subsoil to avoid stratified layers.
 - (b) Soil amendment may be achieved by either mixing 2 inches of approved compost into the 8 inches of soil depth, or by mixing a custom-calculated amount of compost to achieve 8 inches of uncompacted soil depth with a minimum organic content of five percent.
 - (c) The amended areas must pass a 12-inch probe test during the site final inspection, in accordance with the Commission's testing procedure. Once amended, soil areas must be protected from recompaction.
- (2) Preserving undisturbed forest or grassland conservation areas. Conservation areas must remain undisturbed during construction and must be protected by a permanent conservation easement prescribing allowable uses and activities on the parcel and preventing future development. A long-term vegetation management plan describing methods of maintaining the conservation area in a natural vegetative condition must be submitted with the stormwater management plan. The applicant may compute a credit of 0.5 inches over the conservation area and apply that toward the abstraction volume requirement.
- (3) Providing wetland buffers in excess of minimum requirements. Areas eligible for credit must meet all wetland buffer requirements, must be monumented and shown on the construction plans. The applicant may compute a credit of 0.5 inches over the excess buffer area and apply that toward the abstraction volume requirement.
- (4) Disconnecting impervious surface by redirecting runoff across a pervious surface or into an engineered bioinfiltration facility. Impervious disconnection must be designed to prevent any reconnection of runoff with the storm drain system. The applicant may subtract the disconnected impervious surface area from the total impervious surface area used to compute the required abstraction volume.
- x) Alternative to (c), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required volume management. This means that no volume management may be required for an individual development provided there is a regional facility designed and constructed to accommodate the volume from this property.
- d) Where infiltration is not advisable or infeasible due to site conditions, *biofiltration* must be provided for that part of the abstraction volume that is not abstracted by other BMPs. Where biofiltration is infeasible, at a minimum filtration through a medium that incorporates organic material, iron fillings, or other material to reduce soluble phosphorus must be provided.

- e) There shall be *no net increase in total phosphorus (TP) or total suspended solids (TSS)* from pre-development land cover to post-development land cover. Pre-development land cover is defined as the predominant land cover over the previous 10 years. The TP and TSS export coefficients to be used to calculate predevelopment and post-development land use loadings are set forth in Commission project review guidance.
 - i) Full infiltration of one point one (1.1) inches of runoff from all impervious surface will satisfy (e).
 - ii) If it is not feasible to achieve the full 1.1 inch infiltration requirement, a combination of BMPs may be used to achieve the no-net-increase requirement.
 - iii) If permanent sedimentation and water quality ponds are used they shall be designed to the Wet Pond Design Standards set forth on Appendix A to these Rules and provide:
 - (1) Water quality features consistent with NURP criteria and best management practices.
 - (2) A permanent wet pool with dead storage of at least the runoff from a 2.5-inch storm event.
 - iv) Alternative to (e), runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required treatment. This means that no treatment may be required for an individual development provided there is a regional facility designed and constructed to accommodate the flow from this property.

4. WAIVERS.

- a) The Commission may waive the on-site runoff rate, volume and water quality control design criteria as noted above, if a municipality has an off-site stormwater facility that provides equivalent control and treatment of runoff that conforms to Commission standards.
- b) The design criteria for infiltration may be waived for sites with total impervious surface of less than one acre if infiltration BMPs have been incorporated to the maximum extent possible.

5. EXHIBITS. The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format). All plans must be signed by a licensed professional engineer registered in Minnesota.

- a) Property lines and delineation of lands under ownership of the applicant.
- b) Delineation of the subwatershed contributing runoff from off-site, proposed and existing subwatersheds on-site, emergency overflows and watercourses.
- c) Proposed and existing stormwater facilities location, alignment and elevation.

- d) Delineation of existing on-site wetland, marsh, shoreland and floodplain areas.
- e) Where infiltration or filtration is used as a stormwater management practice, identification, description, results of double-ring infiltrometer tests, and permeability and approximate delineation of site soils and seasonal high groundwater elevation in both existing and proposed as-developed condition.
- f) Existing and proposed ordinary high and 1% chance (100-year) water elevations on-site.
- g) Existing and proposed site contour elevations at 2-foot intervals, referenced to NAVD (1988 datum). If NAVD 1988 is not used, applicant must specify the datum used and the appropriate conversion factor.
- h) Construction plans and specifications of all proposed stormwater management facilities, including design details for outlet controls.
- i) Runoff volume and rate analysis for the 2-year, 10-year, and 100-year critical storm events, existing and proposed.
- j) Pre-construction and post-construction annual runoff volume (ac-ft), annual total phosphorus (lbs/yr), and annual total suspended solids (lb/yr).
- k) All hydrologic, water quality and hydraulic computations made in designing the proposed stormwater management facilities.
- l) A narrative describing the pre-and post-construction drainage conditions and the post-construction BMPs incorporated in the plans.
- m) Applications requesting a soil management credit must include a Soil Management Plan (SMP) that shall include an 11" x 17" or larger site map indicating areas where soils will be amended, and calculations for soil volumes to be stockpiled and amounts and specifications of amendment or topsoil to be imported to achieve specified minimum organic matter content.
- n) Delineation of any ponding, flowage or drainage easements, or other property interests, to be dedicated for stormwater management purposes.

6. MAINTENANCE. All stormwater management structures and facilities shall be maintained in perpetuity to assure that the structures and facilities function as originally designed. The owner of any water quality treatment device if not a governmental unit shall provide to the member city, in a form acceptable to the Commission, a recordable agreement detailing an operations and maintenance plan that assures that the structure(s) will be operated and maintained as designed.

7. EASEMENTS. The member city shall obtain from the applicant, in form acceptable to the Commission, recordable temporary and perpetual easements for ponding, flowage and drainage purposes over hydrologic features such as waterbodies, wetlands, buffers, floodplain and stormwater basins and other permanent BMPs. The easements shall include the right of reasonable access for inspection, monitoring, maintenance and enforcement purposes.

8. **COVENANTS.** The Commission may require as a condition of project review approval that the member city shall require that the land be subjected to restrictive covenants or a conservation easement, in form acceptable to the Commission, to prevent the future expansion of impervious surface and the loss of infiltration capacity.

RULE E. EROSION AND SEDIMENT CONTROL

1. **POLICY.** It is the policy of the Commission to control runoff and erosion and to retain or control sediment on land during land disturbing activities by requiring the preparation and implementation of erosion and sediment control plans.
2. **REGULATION.** No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for which a project review is required under Rule D without first submitting to and obtaining approval of a project review from the Commission that incorporates an erosion and sediment control plan for the activity, development or redevelopment.
3. **CRITERIA.** Erosion and sediment control plans shall comply with the following criteria:
 - a) Erosion and sediment control measures shall be consistent with best management practices as demonstrated in the most current version of the MPCA manual "Protecting Water Quality in Urban Areas," and shall be sufficient to retain sediment on-site.
 - b) Erosion and sediment controls shall meet the standards for the General Permit Authorization to Discharge Storm Water Associated with Construction Activity Under the National Pollutant Discharge Elimination System/State Disposal System Permit Program Permit MN R100001 (NPDES General Construction Permit) issued by the Minnesota Pollution Control Agency, except where more specific requirements are required.
 - c) All erosion and sediment controls shall be installed before commencing the land disturbing activity, and shall not be removed until completion.
 - d) The activity shall be phased when possible to minimize disturbed areas subject to erosion at any one time.
4. **EXHIBITS.** The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format). Erosion and sediment control plans must be prepared by a qualified professional.
 - a) An existing and proposed topographic map showing contours on and adjacent to the land, property lines, all hydrologic features, the proposed land disturbing activities, and the locations of all runoff, erosion and sediment controls and soil stabilization measures.

- b) Plans and specifications for all proposed runoff, erosion and sediment controls, and temporary and permanent soil stabilization measures.
 - c) Detailed schedules for implementation of the land disturbing activity, the erosion and sediment controls, and soil stabilization measures.
 - d) Detailed description of the methods to be employed for monitoring, maintaining and removing the erosion and sediment controls, and soil stabilization measures.
 - e) Soil borings if requested by the Commission.
5. **MAINTENANCE.** The project review applicant shall be responsible for proper operation and maintenance of all erosion and sediment controls and soil stabilization measures, in conformance with best management practices and the NPDES permit. The project review applicant shall, at a minimum, inspect and maintain all erosion and sediment controls and soil stabilization measures daily during construction, weekly thereafter, and after every rainfall event exceeding 0.5 inches, until vegetative cover is established.

RULE F. FLOODPLAIN ALTERATION

1. **POLICY.** It is the policy of the Commission to prevent and control flooding damage by:
- a) Preserving existing water storage capacity below the 100-year critical flood elevation on all waterbodies in the watershed to minimize the frequency and severity of high water.
 - b) Minimizing development in the floodplain that will unduly restrict flood flows or aggravate known high water problems.
 - c) Requiring compensatory storage for floodplain fill.
2. **REGULATION.** No person or political subdivision shall alter or fill land below the 100-year critical flood elevation of any public waters watercourse, public waters wetland, or other wetland without first obtaining an approved project review from the Commission.
3. **CRITERIA.**
- a) Floodplain alteration or filling shall not cause a net decrease in flood storage capacity below the projected 1% (100-year) critical flood elevation or alter the timing of flooding unless it is shown that the proposed alteration or filling, together with the alteration or filling of all other land on the affected reach of the waterbody to the same degree of encroachment as proposed by the applicant, will not cause high water or aggravate flooding on other land and will not unduly restrict flood flows.
 - b) All new structures shall be constructed with the low floor at the elevation required in the municipality's ordinance, however, in no case shall the low floor be less than two feet above the regulatory elevation.

4. **EXHIBITS.** The following exhibits shall accompany the project review` application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format):
- a) Site plan showing boundary lines, delineation and existing elevation contours of the work area, ordinary high water level, and 1% (100-year) critical flood elevation. All elevations shall be referenced to the NAVD 1988 datum. If NAVD 1988 is not used, applicant must specify the datum used and the appropriate conversion factor.
 - b) Grading plan showing any proposed elevation changes.
 - c) Preliminary plat of any proposed subdivision.
 - d) Determination by a registered professional engineer of the 100-year critical flood elevation before and after the proposed activity.
 - e) Computation of the change in flood storage capacity as a result of the proposed alteration or fill.
 - f) Erosion and sediment control plan which complies with these Rules.
 - g) Soil boring logs and report if available.
5. **EXCEPTIONS.** If a municipality has adopted a floodplain ordinance that prescribes an allowable degree of floodplain encroachment, the applicable ordinance shall govern the allowable degree of encroachment and no project review will be required under this Floodplain Alteration Rule.

RULE G. WETLAND ALTERATION

1. **POLICY.** It is the policy of the Commission to preserve and protect wetlands for their water quality, stormwater storage, habitat, aesthetic, and other attributes by:
- a) Achieving no net loss in the quantity, quality and biological diversity of wetlands in the watershed.
 - b) Increasing the quantity, quality and biological diversity of wetlands in the watershed by restoring or enhancing diminished or drained wetlands.
 - c) Enforcing mitigation of direct or indirect impacts from activities that destroy or diminish the quantity, quality and biological diversity of watershed wetlands.
 - d) Replacing affected wetlands where sequencing demonstrates that avoidance is not feasible.
2. **REGULATION.** No person or political subdivision shall drain, fill, excavate or otherwise alter a wetland without first obtaining the approval of a wetland replacement plan from the local government unit with jurisdiction over the activity. Mitigation of wetland impacts will be considered in the following sequence: 1) mitigated by enhancing the

impacted wetland; 2) mitigated within the subcatchment of the impacted wetland; 3) mitigated in the drainage area of the impacted wetland; 4) mitigated in the watershed of the impacted wetland; 5) mitigated through purchase of wetland bank credits.

3. CRITERIA.

- a) Any drainage, filling, excavation or other alteration of a wetland shall be conducted in compliance with Minnesota Statutes, section 103G.245, the Wetland Conservation Act, and regulations adopted thereunder.
- b) A wetland may be used for stormwater storage and treatment only if pre-treatment is provided and the use will not adversely affect the function and public value of the wetland as determined by the local government unit.
- c) Other activities which would change the character of a wetland shall not diminish the quantity, quality or biological diversity of the wetland.

- 4. LOCAL GOVERNMENT UNIT.** The Commission will serve as the local government unit (LGU) for administration of the Wetland Conservation Act (WCA) for those cities that have designated the Commission to serve in that capacity. If a member city has not designated the Commission as the LGU for the administration of the WCA, they shall be responsible for administering the WCA. MnDOT serves as the LGU on its right of way.

RULE H. BRIDGE AND CULVERT CROSSINGS

- 1. POLICY.** It is the policy of the Commission to maintain channel profile stability and conveyance capacity by regulating crossings of watercourses for driveways, roads and utilities.
- 2. REGULATION.** No person or political subdivision shall construct or improve a road, driveway or utility crossing across any public waters watercourse or county ditch without first submitting to the Commission and receiving approval of a project review.
- 3. CRITERIA.** Crossings shall:
- a) Retain adequate hydraulic capacity to pass the 100-year flow and maintain the 100-year flow profile, if available.
 - b) Mimic the existing base flow (1-year, 2-year) conditions.
 - c) Not adversely affect water quality.
 - d) Represent the "minimal impact" solution to a specific need with respect to all reasonable alternatives.
 - e) Allow for future erosion, scour, and sedimentation maintenance considerations.

- f) If the project proposes changing the FEMA FIS profile,, a FEMA map revision must be obtained.
- g) If the project requires a DNR Work in Public Waters permit, the conditions of that permit must be satisfied.

4. EXHIBITS. The following exhibits shall accompany the project review application (one set full size, one set reduced to a maximum size of 11" x 17", and one electronic set in pdf format):

- a) Construction plans and specifications.
- b) Analysis prepared by a registered professional engineer showing the effect of the project on hydraulic capacity and water quality.
- c) An erosion and sediment control plan that complies with these Rules.

5. MAINTENANCE.

- a) The maintenance, reconstruction and stabilization of any public crossing shall be the responsibility of the political subdivision with jurisdiction over the crossing.
- b) The maintenance, reconstruction and stabilization of any private crossing shall be the responsibility of the owner of the crossing.
- c) If a crossing over any public waters watercourse is determined by the Commission to be causing significant erosion, the Commission may notify the member city where said crossing is located and the member city may order the owner of the crossing to make necessary repairs or modifications to the crossing and outlet channel.

RULE I. BUFFER STRIPS

- 1. POLICY.** It is the policy of the Commission to maintain the water quality and ecological functions provided by watercourses and wetlands by requiring the development of vegetated buffers around watercourses, lakes and wetlands where development and redevelopment occurs, and to encourage the installation of vegetated buffers around all watercourses and wetlands. Vegetative buffers reduce the impact of surrounding development and land use on watercourse, lake and wetland functions by stabilizing soil to prevent erosion, filtering sediment from runoff, and moderating water level fluctuations during storms. Buffers provide essential habitat for wildlife. Requiring buffers recognizes that watercourse, lake and wetland quality and function are related to the surrounding upland.
- 2. REGULATION.** No person or political subdivision shall commence a land disturbing activity or the development or redevelopment of land for which a project review is required under Rule D on land that contains or is adjacent to a watercourse, lake or wetland

without first submitting to and obtaining approval of a project review from the Commission that incorporates a vegetated buffer strip between the development or redevelopment and the watercourse or wetland.

3. GENERAL PROVISIONS.

- a) This Rule shall apply to all lands containing or abutting watercourses, lakes or wetlands that are subject to a project review under these Rules. Watercourses, lakes and wetlands shall be subject to the requirements established herein, and other applicable federal, state and local ordinances and regulations. If a municipality has a buffer strip requirement that has been reviewed and approved by the Commission, the municipal regulation shall have precedence over the Commission's Rules.
- b) An applicant shall determine whether any watercourse, lake or wetland exists, and shall delineate the boundary for any wetland on the land. An applicant shall not be required to delineate wetlands on adjacent property, but must review available information to estimate the wetland boundary.
- c) Documentation identifying the presence of any watercourse, lake or wetland on the applicant's land, including wetland delineation and buffer strip vegetation evaluation, must be provided to the Commission with a project review application.
- d) Wetland and buffer strip identifications and delineations shall be prepared in accordance with state and federal regulations.

4. CRITERIA. The following standards apply to all lands that contain or abut a watercourse, lake or wetland:

- a) BMPs shall be followed to avoid erosion and sedimentation during land disturbing activities.
- b) When a buffer strip is required the applicant shall, as a condition to issuance of an approved project review:
 - i) Submit to the member city, in a form acceptable to the Commission, a recordable conservation easement for protection of approved buffer strips. The easement shall describe the boundaries of the watercourse or wetland and buffer strips, identify the monuments and monument locations, and prohibit any of the alterations set forth in Paragraph 5(e) below and the removal of the buffer strip monuments within the buffer strip or the watercourse or wetland.
 - ii) Submit to the member city, in a form acceptable to the Commission, an executed buffer maintenance plan and agreement for the first two growing seasons following establishment, and providing an escrow or an alternate surety to assure successful vegetation establishment.
 - iii) Install the wetland monumentation required by Paragraph 7 below.

- c) All open areas within the buffer strip shall be seeded or planted in accordance with Paragraph 8 below. All seeding or planting shall be completed prior to removal of any erosion and sediment control measures. If construction is completed after the end of the growing season, erosion and sediment control measures shall be left in place and all disturbed areas shall be mulched for protection over the winter season.

5. BUFFER STRIPS.

- a) A buffer strip shall be maintained around the perimeter of all watercourses, lakes or wetlands. The buffer strip provisions of this Rule shall not apply to any parcel of record as of the date of this Rule until such parcel is developed or redeveloped or unless required by a previous project review. The Commission does, however, strongly encourage the installation of buffer strips on all parcels in the watershed.
- b) Buffer strips on watercourses, lakes, and wetlands shall be an average 25 feet wide and a minimum of 10 feet wide. It is recommended that all structures have a minimum 15 foot setback from the buffer strip.
- c) Buffer strips shall apply whether or not the watercourse or wetland is on the same parcel as a proposed development.
- d) Buffer areas disturbed by grading operations must be finish graded to a slope of 6:1 or less or an increase in width of five (5) feet for each one (1) foot decrease in horizontal width (i.e., a 25 required foot buffer width at a 5:1 slope must be 30 feet wide, 4:1 must be 35 feet wide, and 3:1 must be 40 feet wide.)
- e) Buffer strip vegetation shall be established and maintained in accordance with Paragraph 8 below. Buffer strips shall be identified within each parcel by permanent monumentation in accordance with Paragraph 7 below.
- f) Subject to Paragraph 5(g) below, alterations including building, storage, paving, mowing, plowing, introduction of noxious vegetation, cutting, dredging, filling, mining, dumping, grazing livestock, agricultural production, yard waste disposal or fertilizer application, are prohibited within any buffer strip. Noxious vegetation shall be removed to meet state standards. Alterations would not include plantings that enhance the natural vegetation or selective clearing or pruning of trees or vegetation that are dead, diseased or pose similar hazards.
- g) The following activities shall be permitted within any buffer strip, and shall not constitute prohibited alterations under Paragraph 5(f) above:
 - i) Use and maintenance of an unimproved access strip through the buffer, not more than 20 feet in width, for recreational access to the watercourse, lake or wetland and the exercise of riparian rights.
 - ii) Placement, maintenance, repair or replacement of utility and drainage systems that exist on creation of the buffer strip or are required to comply with any subdivision approval or building permit obtained from the municipality or county,

so long as any adverse impacts of utility or drainage systems on the function of the buffer strip have been avoided or minimized to the extent possible.

- iii) Construction, maintenance, repair, reconstruction, or replacement of existing and future public roads crossing the buffer strip, so long as any adverse impacts of the road on the function of the buffer strip have been avoided or minimized to the extent possible.

6. ALTERNATE WETLAND PROTECTION METHODS.

- a) Should application of the buffer standards in Paragraph 5 above render a parcel of record as of the date of this Rule unbuildable based on current city ordinances, the Watershed engineer may allow alternative methods to protect the wetland. Such methods must include a buffer strip no less than ten feet wide, supplemented by redirection of drainage to a wider area of buffer, or to a Best Management Practice such as a rain garden or vegetated swale.
- b) The use of alternative wetland protection methods will be evaluated as part of the review of a stormwater management plan under these Rules. Alternative wetland protection methods must be in keeping with the spirit and intent of this Rule.

7. MONUMENTATION. A monument shall be required 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 strip. Additional monuments shall be placed as necessary to accurately define the edge of the buffer strip. A monument shall consist of a post and a buffer strip sign meeting Commission standards. The signs shall include warnings about mowing, disturbing or developing the buffer strip.

8. VEGETATION.

- a) Where acceptable natural vegetation exists in buffer strip areas, the retention of such vegetation in an undisturbed state is required unless an applicant receives approval to replace such vegetation. A buffer strip has acceptable natural vegetation if it:
 - i) Has a continuous, dense layer of native vegetation that has been uncultivated or unbroken for at least 5 consecutive years; or
 - ii) Has an overstory of native trees and/or shrubs that has been uncultivated or unbroken for at least 5 consecutive years; or
 - iii) Contains a mixture of the plant communities described in Subparagraphs 8(a)(i) and (ii) above that has been uncultivated or unbroken for at least 5 years.
- b) Notwithstanding the performance standards set forth in Paragraph 8(a), the Commission may determine existing buffer strip vegetation to be unacceptable if:
 - i) It contains undesirable plant species including but not limited to common buckthorn, reed canary grass, or species on the Minnesota State Noxious Weeds List; or

- ii) It has topography that tends to channelize the flow of runoff; or
 - iii) For some other reason it is unlikely to retain nutrients and sediment.
 - iv) Where buffer strips are not vegetated or have been cultivated or otherwise disturbed within 5 years of the project review application, such areas shall be replanted and maintained with native vegetation. The buffer strip plantings must be identified on the project review application. Acceptable buffer strip design and planting methods are detailed in the reference document "Restoring and Managing Native Wetland and Upland Vegetation" (Jacobson 2006, prepared for BWSR and MnDOT).
- c) Buffer strip vegetation shall be established and maintained in accordance with the requirements found in this Paragraph. During the first two full growing seasons, the owner must replant any buffer strip vegetation that does not survive. The owner shall be responsible for reseeding and/or replanting if the buffer strip changes at any time through human intervention or activities. At a minimum the buffer strip must be maintained as a "no mow" area.

9. ENCROACHMENT.

- a) Buffer strips must be kept free of all materials, equipment and structures, including fences and play equipment. Buffer strips must not be grazed, cropped, logged or mown except as approved by the Commission. The topography of the buffer strips shall not be altered by any means, including paving, plowing, cutting, dredging, filling, mining, or dumping.
- b) Variances.
 - i) Only variances meeting the standards and criteria set forth in Rule K shall be granted.
 - ii) Variances shall not be granted that would circumvent the intent and purposes of this Rule.

RULE J. FEES

- 1. POLICY.** The Commission finds that it is in the public interest to require applicants to pay the cost of administering and reviewing project review applications, and inspecting approved activities to assure compliance with these Rules, rather than using the Commission's annual administrative levy for such purposes. The Commission shall by resolution establish a schedule of fees that may be amended from time to time to reflect the cost of providing each service.
- 2. APPLICATION.** Each application for the issuance, transfer or renewal of a project review recommendation under these Rules shall be accompanied by an application fee to defray the cost of processing the application.

3. **REVIEW.** A project review applicant under these Rules shall pay a fee for the cost of the review and analysis of the proposed activity, including services of engineering, legal, and other consultants. The review fee shall be payable upon the submission of the project review application.
4. **WETLAND MITIGATION PLAN.** A project review applicant under these rules shall pay a fee for the cost of the review and analysis of a proposed activity involving a wetland mitigation plan in a municipality where the Commission is the LGU. The fee is to cover the costs of engineering, legal, and other consultants and shall be payable upon the submission of the project review application. Should the cost of said wetland mitigation plan review exceed the review fee, the application shall deposit such additional sums as are needed to pay such costs. Failure to pay such costs is grounds to deny the application or suspend review.
5. **WETLAND MITIGATION PLAN MONITORING.** A project review applicant under these rules in a municipality where the Commission is the LGU shall deposit an escrow to cover the cost of Commission monitoring and annual monitoring plan review for the five-year period. If the escrow amount is insufficient to cover the costs the Commission may require additional funds from the applicant.
6. **WETLAND MITIGATION SECURITY DEPOSIT.** A project review applicant under these rules in a municipality where the Commission is the LGU shall provide a security to assure that the replacement plan is followed. The amount of the security shall be calculated on a case-by-case basis based on the estimated cost of construction, follow up and contingency. The security may also include an amount determined by the Commission to be sufficient to protect the public in the event the replacement plan does not succeed.
7. **DEPOSITS.** The Commission will maintain an accounting for all deposits made under this Rule. No interest will be paid to applicants for funds held in deposit.

RULE K. VARIANCES

1. **WHEN AUTHORIZED.** The Commission may grant variances from the literal provisions of these Rules. A variance shall only be granted when in harmony with the general purpose and intent of the Rules in cases where strict enforcement of the Rules will cause practical difficulties or particular hardship, and when the terms of the variance are consistent with the Commission's water resources management plan and Minnesota Statutes, chapter 103D.
2. **HARDSHIP.** "Hardship" as used in connection with the granting of a variance means the land in question cannot be put to a reasonable use if used under the conditions allowed by these Rules; the plight of the applicant is due to circumstances unique to the land and

not created by the applicant; and the variance, if granted, will not adversely affect the essential character of the locality and other adjacent land. Economic considerations alone shall not constitute a hardship if a reasonable use for the land exists under the terms of these Rules. Conditions may be imposed in the granting of a variance to insure compliance and to protect adjacent land and the public health and general welfare of the Commission.

3. **PROCEDURE.** An application for a variance shall describe the practical difficulty or particular hardship claimed as the basis for the variance. The application shall be accompanied with such surveys, plans, data and other information as may be required by the Commission to consider the application.
4. **VIOLATION.** A violation of any condition imposed in the granting of a variance shall be a violation of these Rules and shall automatically terminate the variance.

RULE L. ENFORCEMENT

1. **ADMINISTRATION.** These Rules shall be administered by the Commission. The Commission shall consider applications required under these Rules and determine whether such applications should be approved, approved with conditions, or denied. Such determination shall be communicated to the member city in which the project lies and to the applicant.
2. **IMPLEMENTATION BY MEMBER CITIES.** It shall be the duty of each city to enforce and implement such determinations by the Commission under the various permitting processes and regulations of the city. Each city shall make such amendments to its official controls, regulations, and permitting processes as are necessary to provide it with the authority to enforce and implement the determinations of the Commission.
3. **FAILURE BY CITY TO IMPLEMENT.** Upon a determination by the Commission that a city has not enforced or implemented a decision of the Commission in the administration of these Rules, the Commission shall notify the city of such determination and direct that appropriate action be taken by the city. If the city does not take such action, the Commission may take such legal steps as are available to it to effect such enforcement or implementation.

RULE M. AMENDMENT OF THESE RULES

1. **AMENDMENT.** These rules may be amended from time to time by the Commission. Proposed amendments shall be reviewed by the member cities prior to adoption unless the Commission determines that said amendment is of a minor or technical nature. Minor or technical amendments include recodifying or streamlining the rules, clarifying

policies, or other actions that do not adversely affect a member city or impact the Commission's or member cities' ability to meet their water management plan goals.

2. **PROCEDURE.** Proposed major amendments to these rules shall be first considered by the Commission and then forwarded to the member cities for a 45-day comment period. Following that comment period, the Commission shall consider the proposed amendment and the comments received for approval. All amendments shall be made by resolution.

PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION
RULES APPENDIX A
WET POND DESIGN STANDARDS

Permanent Pool Depth	Average 4', maximum 10'
Permanent Pond Surface Area	Greater of 2% of watershed's impervious area and 1% of the watershed
Permanent Pool Length to Width Ratio	3:1 or greater with an irregularly shaped shoreline
Side Slopes	10:1 for 10-foot bench centered on the normal water elevation and between 3:1 and 20:1 elsewhere
Side Slope Stabilization	Native seed with mix 33-261 (MnDOT 310), 34-271 (BWSR W2) or equivalent between NWL and HWL, provide 10' buffer where possible with mix 35-221 (MnDOT 330 (dry)) or mix 35-241 (MnDOT 350 (mesic))
Floatable Removal	Skimming device discharging at no greater than 0.5 fps during the 2-year event or a submerged outlet with a minimum 0.5 feet from the normal water level to the crown of the outlet pipe
Sediment Accumulation Area	Provide maintenance pads to remove sediment deltas at inlets
Permanent Pool Volume	A 4-foot mean depth and equal to 2.5-inch rain over the watershed
Source	Protecting Water Quality in Urban Areas (MPCA 2000)

SUMMARY

Pioneer-Sarah Creek Watershed Management Commission Management Rules and Standards*

	Standard	Purpose	Applicability
Project Reviews Required	A Stormwater Management Plan consistent with all applicable management rules and standards* must be reviewed and approved prior to commencement of land disturbing activities.	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes; improve water quality; protect water resources; and promote natural infiltration of runoff.	All development or redevelopment projects of the following types: <ul style="list-style-type: none"> • Projects disturbing more than one acre of land • Projects within the 100-year floodplain • Projects adjacent to or within a lake, wetland, or watercourse • Any land disturbing activity requested by a member city to be reviewed regardless of project size • Linear projects creating more than one acre of new impervious surface
Rate Control	Peak runoff rates may not exceed existing rates for the 2-year, 10-year, and 100-year critical storm event; or the capacity of downstream conveyance facilities; or contribute to flooding	To control excessive rates and volumes of runoff; manage subwatershed discharge rates and flood storage volumes	All projects disturbing more than one acre of land. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Volume Management	1.1 inch of impervious surface runoff must be abstracted on site within 48 hours	To control excessive rates and volumes of runoff; manage discharge rates and flood storage volumes; protect stream channels from erosion; and promote natural infiltration of runoff.	All projects disturbing more than one acre of land. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Erosion and Sediment Control	Erosion control plan using Best Management Practices (BMPs) and consistent with the NPDES General Construction Permit is required	To control erosion and sediment so as to protect conveyance systems and water quality	All projects requiring a project review
Floodplain Alteration	Compensating storage is required to mitigate floodplain fill	To prevent and control flooding damage	All development or redevelopment projects within the 100-year floodplain regardless of project size
Water Quality	No net increase in total phosphorus and total suspended sediment annual load	To protect water quality	All projects disturbing more than one acre of land. Redevelopment projects disturbing less than 50 percent of the site must meet the requirement only for the disturbed area.
Buffer Strips	Vegetated buffer strips average 25 foot, minimum 10 foot wide adjacent to lakes, wetlands and other watercourses	To protect water quality; reduce erosion and sedimentation; reduce pollutants from runoff and debris; and provide habitat	All projects requiring a project review that contain or abut a wetland or watercourse
Wetland	Wetlands may not be drained, filled, excavated, or otherwise altered without an approved wetland replacement plan from the local government unit (LGU) with jurisdiction	To preserve and protect wetlands for their water quality, stormwater storage, habitat, aesthetic, and other attributes	All land disturbing activity impacting a wetland as defined by the Wetland Conservation Act (WCA)

*Important Note: Approved TMDL Implementation Plans may have additional site-specific requirements.

Appendix D

Monitoring Program

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**Pioneer-Sarah Creek Watershed Management Commission
Fourth Generation Watershed Management Plan
Monitoring Program**

Minnesota Rules 8410.0100 Subp. 5 states that:

A. Each plan must establish water quality and quantity monitoring programs that are capable of producing accurate data to the extent necessary to determine whether the water quality and quantity goals of the organization are being achieved. The programs shall, at a minimum, include the location of sampling, the frequency of sampling, the proposed parameters to be measured, and the requirement of periodic analysis of the data.

The Commission obtained valuable baseline data on its lakes and streams through the monitoring phase of the Total Maximum Daily Load (TMDL) and Watershed Restoration and Protection Strategies (WRAPS) projects. There is limited data on the streams in the watershed. Several lakes in the watershed have a lengthy history of monitoring, including Lakes Independence, Sarah, and Rebecca.

A number of lakes in the watershed are on the 303(d) Impaired Waters List for excess nutrients: Independence, Sarah, Spurzem, Hafften, North and South Whale Tail, Half Moon, Irene, Peter, and Ardmore. The MPCA removed, or delisted Lake Rebecca in 2016 based on its improved water quality. Sarah Creek is listed for excess *E. coli*. Pioneer Creek and a portion of Deer Creek (unnamed Creek to Ox Yoke Lake), were listed in 2016 for low dissolved oxygen and *E. coli*. While outside the watershed's legal boundary, Unnamed Creek (Mud Lake to Rice Lake) is within the Pioneer-Sarah Creek WRAPS boundary and was listed in 2016 for dissolved oxygen and *E. coli*.

TMDLs have been completed for the lake nutrient and stream *E. coli* impairments except for Lake Irene. Pollutant load reductions to achieve state water quality standards for the stream and lake impairments as well as protection activities for Little Long Lake and Lake Rebecca, which currently meet state water quality standards. The Commission has taken on responsibility not only for an ongoing monitoring program that meets the requirements of Minnesota Rules cited above, but that also meets any monitoring requirements of the WRAPS.

Fourth Generation Monitoring Program Framework

The Fourth Generation Monitoring Program has two organizing principles:

1. Continue to obtain detailed flow and water quality data on Pioneer and Sarah Creeks and on sentinel lakes, and collect data on other lakes and streams on a rotating basis; and
2. Collect data sufficient to document water quality trends, both positive and negative, and assess progress toward meeting TMDL/WRAPS goals.

Each year the Commission will evaluate this proposed program and make modifications as necessary based on the most current data needs. The monitoring objectives guiding the Pioneer-Sarah Creek watershed monitoring program and the assessment of data are:

- To quantify the current status of streams and lakes throughout the watershed in comparison to state water quality standards.
- To quantify changes over time, or trends, in stream and lake water quality in the watersheds.
- To enhance the value of previous monitoring data by extending the period of record.
- To track and quantify the effectiveness of implemented BMPs throughout the watersheds for the protection of water quality.
- To evaluate progress toward meeting TMDL load reduction and other goals.

Monitoring data will be used to:

- Quantify any changes to receiving waters (lakes, streams, and wetlands) and their biota as land use conversion and development occurs.
- Convey information about the water resources in the watershed and their condition to multiple stakeholders, raising the visibility of the Commission.
- Target TMDL/WRAPS implementation and resource protection actions based on cost-effectiveness.
- Perform TMDL/WRAPS progress reviews.
- Accumulate enough information to support de-listing impaired waters that have improved to meet state water quality standards.
- Assist member cities who have Municipal Separate Storm Sewer Systems (MS4s) with their permit application and annual reporting requirements.
- Support applications for grant funding.
- Calibrate and validate hydrologic, hydraulic, and water quality models

Stream Monitoring

Table 1 sets forth the framework for stream monitoring in the Pioneer-Sarah Creek watershed for 2021-2030. Monitored parameters may vary from year to year based on current data needs such as obtaining baseline data for upcoming new standards or collecting additional data to assist in evaluating progress towards TMDL goals.

The Commission contracts with TRPD to annually monitor flow and water quality on Sarah Creek at site SCO (see Figure 1) and on Pioneer Creek at the Copeland Drive crossing (PSC) and at one additional site in the watershed per year on a rotating basis, so that each site is monitored every two to three years. These sites are: Pioneer Creek-Pagenkopf; Dance Hall Creek (DHC); Loretto Creek (LC); and Spurzem Creek (SC). In addition, the Commission may from time to time undertake special stream monitoring on other tributaries where necessary, for example to measure progress toward meeting a TMDL, calibrate models or refine source assessments.

The Commission currently partners with Hennepin County Environment and Energy to offer the RiverWatch volunteer macroinvertebrate monitoring program for high school students. One site on

Pioneer Creek just south of Pagenkopf Road has been monitored periodically since 2001. This is a valuable education and outreach program that provides useful information about stream health. However, the data collected through these programs is not comparable to the data used by the MPCA to evaluate stream biotic health using the state standard Macroinvertebrate Index of Biotic Integrity. The Commission will continue to offer the RiverWatch monitoring opportunity, but the data may need to be supplemented by professional staff using the MPCA macroinvertebrate protocol and assessment. The need for and specific locations and schedule will be developed in the WRAPS.

Additional stream monitoring that may be considered based on the findings of the WRAPS/TMDLs is longitudinal and diurnal dissolved oxygen (DO) monitoring. Longitudinal monitoring assesses stream DO along the entire length of the stream in one morning. Monitoring starts near sunup at the headwaters, where a DO reading is taken. The technician then moves downstream a set distance and takes another reading, then repeats until the end of the stream is reached. This provides a snapshot of the entire stream at once early in the morning when stream DO is at its lowest. Diurnal monitoring occurs at a point in the stream where an instrument takes continuous DO measurements of a 72 hour period. This shows how DO fluctuates from low to high to low again on a daily cycle. The Commission may undertake such monitoring later in the 10-year planning period, to understand how management actions are impacting DO in the streams with DO impairments.

Lakes Monitoring

There are numerous basins in the Pioneer-Sarah Creek watershed, with 17 lakes that have at some point in time been monitored. Lakes Independence, Sarah, and Rebecca have an extensive record, including surface water and water column monitoring. The Commission has regularly participated in the Metropolitan Council's Citizen Assisted Lake Monitoring Program (CAMP) since 2005, although some lakes were occasionally monitored through that program as far back as 1993.

CAMP volunteers monitor surface water conditions and chemistry. They also judge the appearance of the lake, its odor, and its suitability for recreation. Ardmore, Haften, Little Long, and Peter have been monitored periodically through this program.

Three Rivers Park District monitors Lake Rebecca, and the Commission contracts with the District to annually monitor Independence, Sarah, Little Long, Spurzem, Whaletail, and Half Moon. The Commission received a Surface Water Assessment Grant to undertake 2010 and 2011 monitoring on several basins that had not previously been studied: Irene, Rattail, Robina, and Schwauppau, and also on Mud and Rice, which are outside the legal boundary but within the hydrologic boundary. Aquatic vegetation surveys have been completed on several lakes as part of the WRAPS monitoring.

Table 1 sets forth the framework for lake monitoring in the Pioneer-Sarah Creek watershed. This framework establishes three "Sentinel Lakes" that will be monitored every year by the Three Rivers Park District for the Commission: Independence, Sarah, and Little Long Lakes. In addition, Three Rivers will continue annual monitoring on Lake Rebecca. These lakes include three high-profile recreational lakes and one lake with very good water quality (Little Long). Other lakes will be monitored on a rotating basis, either under contract with Three Rivers Park District (Half Moon,

Spurzem, Rattail) or through CAMP (Ardmore, Hafften, and Peter, and on Irene, Schwauppau, Winterhalter, and Thomas if volunteers can be found). The Commission will also periodically update aquatic vegetation surveys in the sentinel lakes.

Other Monitoring

Aquatic Invasive Species (AIS). Three Rivers Park District and DNR periodically conduct zebra mussel surveys on Lake Independence. The District also has zebra mussel sampling plates on several lakes. The District and DNR partnered on zebra mussel treatments on Lake Independence when they were first discovered. The District has also conducted common carp biomass/population estimates on Lake Independence and its tributaries. The Commission currently shares in the cost of curly-leaf pondweed treatments on Lake Sarah.

Wetlands. The Commission does not currently undertake any wetland monitoring. Hennepin County Environmental Services offers the Wetland Health Evaluation Program (WHEP), training and supervising adult volunteers to assess wetland vegetation and macroinvertebrates. The Commission may in the future elect to participate in this program if suitable sites and volunteers can be found.

Special Monitoring. The Commission may from time to time undertake special monitoring where necessary, for example monitoring upstream and downstream of a wetland to calibrate models or refine source assessments, or to do performance monitoring of installed BMPs.

The Commission will periodically collect from the member cities, Hennepin County, MnDOT and other MS4s information about the BMPs that were installed in the watershed in the previous year. This data will assist in tracking progress toward achieving TMDL and WRAPS load reduction and protection goals.

Table 1. Pioneer-Sarah Creek WMC Fourth Generation proposed monitoring framework.

Resource	Activity	Purpose	Requirement	Frequency	Comments/Standards
Streams	Flow and water quality monitoring on Sarah Creek at SCO (Hwy 92 crossing) and on Pioneer Creek at PSC (Copeland Rd crossing)	Current conditions and long-term trends; TMDL compliance; annual water yield trend; calibrate models	MR 8410.0100 Subp. 5 / TMDL compliance / voluntary	Annually	Modify or add parameters as necessary
	Flow and water quality monitoring on tributary sites, rotate among: Dance Hall Creek (DHC); Loretto Creek (LC); and Spurzem Creek (SC)	Current conditions and long-term trends; TMDL compliance; annual water yield trend; calibrate models		Rotate every 2-3 years	Modify or add parameters as necessary
	DO longitudinal and diurnal assessment on impaired streams	TMDL compliance	TMDL compliance/ voluntary	Every 5 years	DO standards, biotic response
	Macroinvertebrate community	TMDL compliance	TMDL compliance/ voluntary	Every 5 years	IBI Standards
	RiverWatch volunteer stream monitoring	Current condition; trends; education & outreach	Voluntary	Annually	Educational activity
	Land Use/ stream condition/ buffer assessments	Long-term trends	Voluntary	As needed	TMDL compliance and BMP implementation
Lakes	Citizens Assisted Monitoring Program (CAMP)	Current condition; trends; education & outreach	MR 8410.0100 Subp. 5 / TMDL compliance / voluntary	6 lakes total, 2-3 lakes per year, bi-weekly	Lake water quality standards; education and outreach
	Sentinel Lakes annual monitoring	Current conditions and long-term trends		5 lakes, monthly, annually	Lake water quality standards
	Monthly monitoring through Three Rivers Park District	Current conditions and long-term trends		Monthly as needed	Lake water quality standards
	Vegetation surveys	Current conditions and long-term trends	TMDL compliance/ voluntary	Spring and fall every 5 years	Lake restoration
	DNR fish surveys	Current conditions and long-term trends	TMDL compliance/ voluntary	DNR schedule	Lake restoration
Wetlands	Wetland Health Evaluation Program	Current condition; trends; education & outreach	Voluntary	Annually	Baseline wetland health
Groundwater	Track well groundwater elevation data	Baseline for ground-water recharge/ discharge	Voluntary	As needed	Important if base flow becomes an issue
Other	Special source assessment and other monitoring	Collect one-time or periodic special monitoring, such as: inflow and outflow of target wetlands; small streams; BMP effectiveness; biology	TMDL compliance/ voluntary	As needed	Some special monitoring may require cost-share from a benefitting MS4
	Annually log BMPs undertaken in the subwatershed of each resource	Progress toward meeting load reductions	TMDL compliance/ voluntary	Annually	Member cities report annually

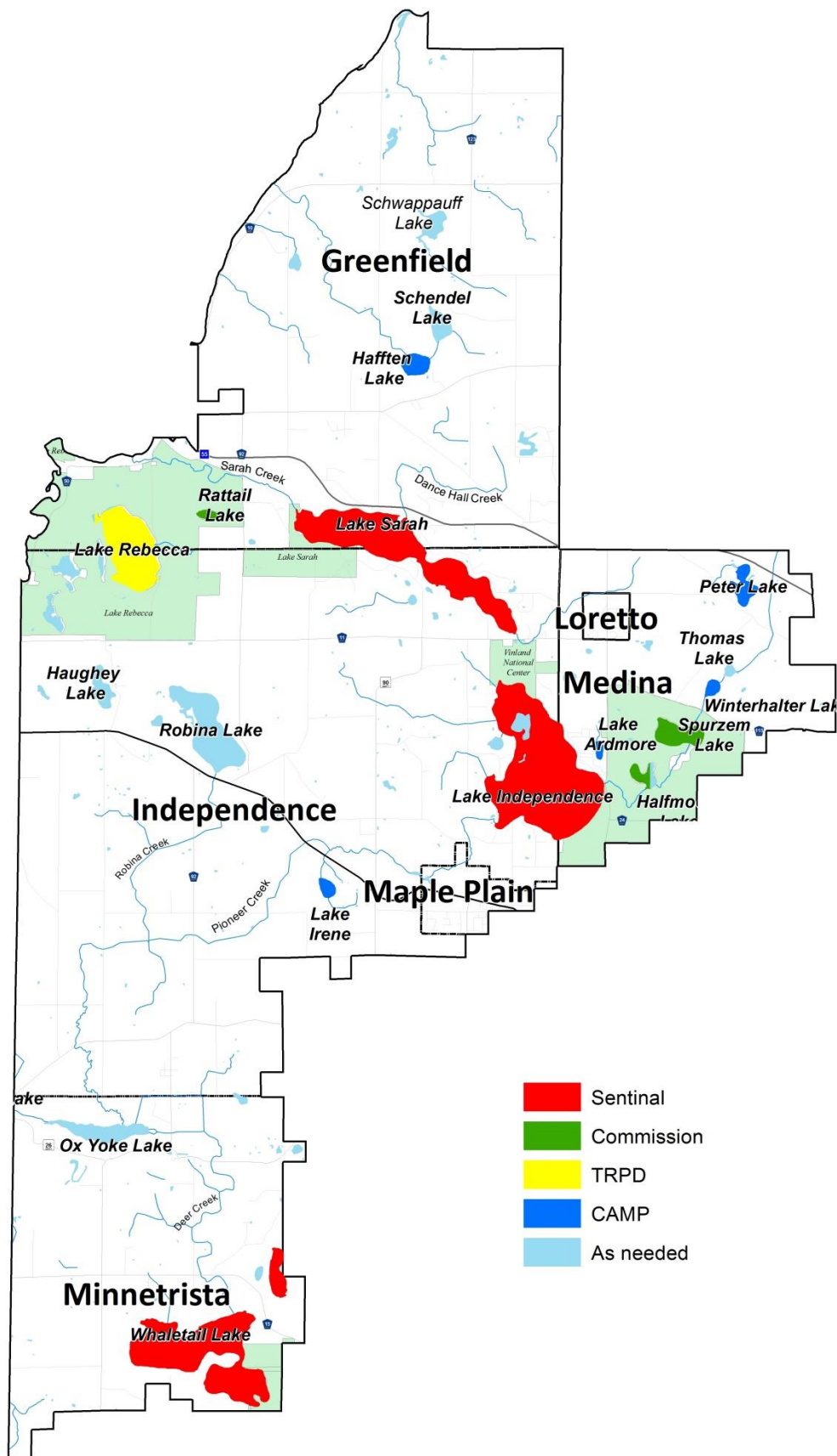


Figure 1. Pioneer-Sarah Creek WMC Fourth Generation Monitoring Program - Lakes

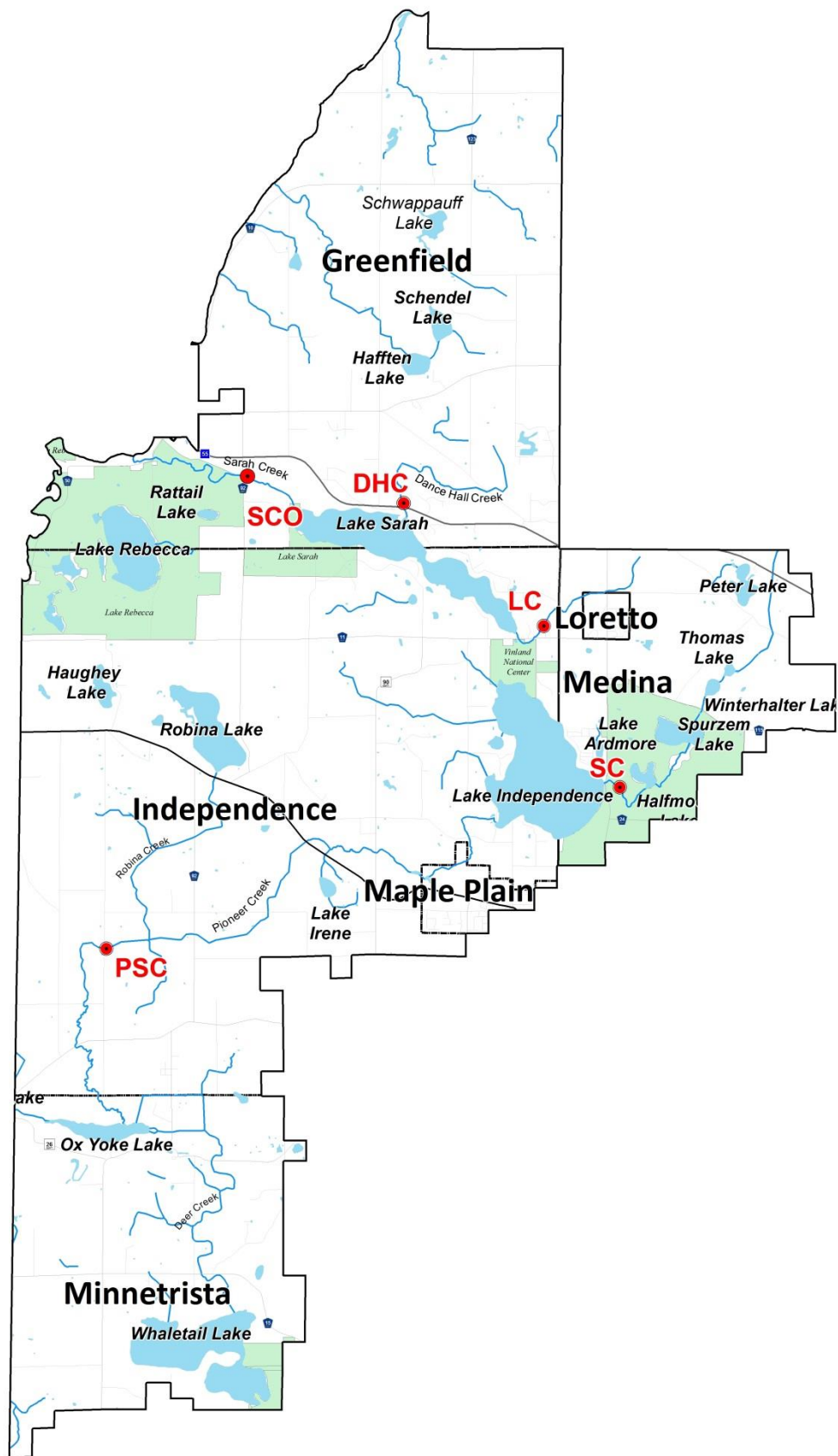


Figure 2. Pioneer-Sarah Creek WMC Fourth Generation Monitoring Program-Streams

Appendix E

Education and Outreach Plan

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**Pioneer-Sarah Creek Watershed Management Commission
Fourth Generation Watershed Management Plan
Education and Outreach Plan**

The goal of the Pioneer-Sarah Creek Watershed Management Commission's Education & Outreach Program is to engage people in the community in the protection and improvement of lakes, rivers, streams and wetlands through education, increased water awareness and community participation.

STAKEHOLDER EDUCATIONAL GOALS

Stakeholders and target audiences are individuals or groups to whom education is being directed. The Plan has identified the following target audiences and general educational goals for each. Often more than one target audience will benefit from an educational activity.

1. All property owners
 - a. Understand that they live in a watershed and know where their stormwater runoff goes
 - b. Understand nutrient sources and the impacts of excess nutrients on lakes and streams
 - c. Understand how runoff rates and volumes affect lakes and streams
 - d. Understand and undertake Best Management Practices (BMPs) to reduce nutrient loads and runoff volume
 - e. Participate in volunteer activities or events
2. Lakeshore property owners
 - a. Know the water quality status of their lake, and the types and magnitude of improvements needed
 - b. Know both the major beneficial aquatic plants in their lake as well as the major invasives
 - c. Have a general understanding of limnology (lake science)
 - f. Understand and undertake Best Management Practices such as lakeshore buffers and proper application of fertilizer, herbicides, and pesticides
3. Government: elected and appointed officials, staff, board and commission members
 - a. Have a general understanding of watersheds, water resources and where stormwater to and from the city goes
 - b. Understand the water resources implications of land use change
 - c. Are aware of water management policies and actions of other local, watershed, regional, and state organizations
 - g. Understand how to incorporate water resources management actions into development and redevelopment as well as city operations
4. Educators and students
 - a. Incorporate water resources education and activities into curricula
 - b. Participate in family education and outreach events centered around water
 - c. Have opportunities for volunteer monitoring, service projects, and other hands-on learning
 - h. Educators are aware of and have access to continuing education centered around water
5. Agriculture and animal operators
 - a. Understand and use Best Management Practices such as proper manure management and targeted fertilizer application
 - b. Undertake conservation and nutrient management actions

IMPLEMENTATION STRATEGIES

- Expand education and outreach opportunities by coordinating with other entities such as Hennepin County.
- Use the Commission's, member cities', and educational partners' websites and newsletters, social media, co-ops, local newspapers and cable TV to share useful information to stakeholders on ways to improve water quality and keep content current.
- Convene Citizen Advisory Committees as needed to advise the Commission and to assist in program development and implementation.
- Participate with collaborative groups to pool resources to undertake activities in a cost-effective manner, promote interagency cooperation and collaboration, and promote consistency of messages.
- Prominently display the Commission's logo on information and outreach items, project and interpretive signs, and other locations to increase visibility.
- Provide opportunities for the public to learn about and participate in water quality activities.
- Provide education opportunities for elected and appointed officials and other decision makers.
- Enhance education opportunities for youth.
- Provide opportunities for bridge-building between stakeholders with sometimes competing ideas and interests, such as lakeshore owners and agricultural operators.
- Collaborate with Hennepin County to undertake targeted education and outreach to agricultural and other landowners in the watershed.

2021-2025 PRIORITY AREAS FOR EDUCATION AND OUTREACH

In setting its annual work plan, the Commission will review education and outreach priorities and develop specific education and outreach actions for the coming year. These actions may be ongoing or programs or activities; participation in programs or activities sponsored by other organizations; suggestions or information for member city implementation; or other actions depending on the education and outreach priorities. The following are the priority areas for the first few years of the Fourth Generation Plan:

1. Sponsor watershed and water resources training opportunities such as NEMO (Nonpoint Education for Municipal Officials) for the Commissioners, and as available for member city councils and staff.
2. Collaborate with Hennepin County staff to undertake ongoing Commissioner education on various introductory and continuing education topics.
3. Work cooperatively with Hennepin County staff to reach out to urban, rural, and agricultural property owners
4. Disseminate education materials to all stakeholders about actions they can take to protect and improve water quality.
5. Maintain a website and social media presence with up to date and fresh content.
6. Participate with collaborative groups such as Watershed Partners.

Table 1. Pioneer-Sarah Creek Fourth Generation Watershed Management Plan Education and Public Outreach Activities.

Activity	Educational Outcomes	Example Actions	Estimated Cost	Schedule/ Frequency
Collaborate with Hennepin County staff to provide Commissioner and landowner education and outreach	<ul style="list-style-type: none"> Enhance Commissioner knowledge Raise profile of Commission Coordination of messages Increased public outreach 	<ul style="list-style-type: none"> Short presentations on a variety of topics at each Commission meeting as ongoing education Accompany county staff at outreach activities such as small group meetings 	Minimal	Monthly
Convene Citizen Advisory Committees (CAC) as necessary	<ul style="list-style-type: none"> Coordination and implementation of education and outreach program Increased public outreach 	<ul style="list-style-type: none"> Meet as necessary to coordinate and implement education and outreach Use email and social media to coordinate efforts and enhance community participation and communication Make recommendations to Commission Represent the Commission at education and outreach events 	Variable	As necessary
Coordinate programming with collaborative groups	<ul style="list-style-type: none"> Consistency of message across wider area Youth education Adult education Increased visibility for Commission 	<ul style="list-style-type: none"> Participate in developing education campaigns 	Variable	As necessary
Coordinate with other organizations to provide continuing education opportunities to elected and appointed officials	<ul style="list-style-type: none"> Enhance understanding of watersheds and water resources Increase awareness of trends in regulations, maintenance, public opinions, etc. 	<ul style="list-style-type: none"> Sponsor Northland NEMO or other workshops for all Commissioners, City Councils, and Planning Commissions Provide tailored education and outreach activities such as workshops, presentations, written materials, and on-line resources 	\$300 Annually	At least once per year
Maintain website	<ul style="list-style-type: none"> Ability to provide a wide range of information to users for self-directed education 	<ul style="list-style-type: none"> Maintain and update website 	\$2,200 Annually	Ongoing
Sponsor volunteer water quality monitoring, watershed clean-up activities, and volunteer planting and maintenance opportunities	<ul style="list-style-type: none"> Engage and educate residents, students, and other interested parties through hands-on activities Support positive actions to protect and improve water resources Increased visibility for and knowledge of Commission 	<ul style="list-style-type: none"> Sponsor volunteer lake, stream, and wetland monitoring Encourage and facilitate volunteer events Hold an annual family water quality event 	\$500 Annually + volunteer monitoring budget	Ongoing

Activity	Educational Outcomes	Example Actions	Estimated Cost	Schedule/ Frequency
Distribute electronic and printed educational materials	<ul style="list-style-type: none"> ▪ Distribution of useful information to assist in implementing BMPs 	<ul style="list-style-type: none"> ▪ Post electronic information on Commission and County website ▪ Distribute printed materials to member cities, and make available at events 	\$300 Annually Cities fund repro cost	Printed– 1 per year Electronic – at least 3 new items per year
Contribute press releases and information material to local media	<ul style="list-style-type: none"> ▪ Distribution of useful information to assist in implementing BMPs ▪ Increased visibility for and knowledge about Commission 	<ul style="list-style-type: none"> ▪ Submit press releases on programs and projects in the watersheds ▪ Submit press releases with useful, timely information 	\$330 Annually	At least 3 times/year
Coordinate programming with other Metro organizations	<ul style="list-style-type: none"> ▪ Consistency of message across wider area ▪ Access to additional education and outreach materials 	<ul style="list-style-type: none"> ▪ Continue membership in Blue Thumb and Watershed Partners ▪ Coordinate with NEMO 	\$1,000 Annually	Annual and ongoing
Provide education, outreach, and financial assistance to lake associations, schools, faith based-groups, community organizations, and other groups	<ul style="list-style-type: none"> ▪ Improve general understanding of watersheds and water resources ▪ Encourage the adoption of practices that protect water resources ▪ Increase visibility for and knowledge of Commission 	<ul style="list-style-type: none"> ▪ Sponsor annual lake association summit ▪ Provide small grants as incentives to implement volunteer events and demonstration projects ▪ Provide small grants to educators to enhance environmental and water resources education in the schools 	\$3,000 - 5,000 Annually	Ongoing
			\$15,980 to \$17,980	

Appendix F

Capital Improvement Program (CIP)

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**Pioneer-Sarah Creek Watershed Management Commission
Third Generation Watershed Management Plan
Capital Improvement Projects and Funding**

Projects proposed for the Capital Improvement Program (CIP) are shown in Table F.1 and described in more detail following the table. This initial CIP was prepared from projects submitted by the member cities and reviewed and prioritized by the Commission's Technical Advisory Committee (TAC). Priority in this case is expressed as order of implementation. Order 1 projects should be completed before considering order 2 projects. Order 3 projects are typically opportunistic projects that could be implemented at any time as resources and willing property owners are available. Completion of some of the more expensive projects on the CIP will be dependent on grant and other resources.

It is anticipated that this CIP will be reviewed annually, and additional projects and studies may be added by plan amendment as submitted by the member cities or as recommended by the TAC. It is the intent of the Commission to finance these projects using its current Cost Share Policy as funds are available and through local funds and grants as available.

Some of the projects on this CIP are dependent on winning grants to help defray the cost of implementation. The Commission budgets annually for professional assistance in preparing grant applications. Hennepin County and Three Rivers Park District staff also provide assistance with grant applications.

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Table F.1. Capital Improvement Program.

Note: See project descriptions following the tables. PSC = Pioneer-Sarah WMC; Ind=Independence; Med=Medina; Lor=Loretto; Gr=Greenfield; Minn=Minnetrista; MP=Maple Plain; TRPD=Three Rivers Park District

Order	Project Name	Total Cost	Commission Share	Potential Funding Source(s)	Engaged Landowner	2020	2021	2022	2023	2024	2025	2026-2030
Lake Independence Drainage Area												
1	Ardmore Carp Barrier and Stream Stabilization	\$74,000	\$16,000	Grant, TRPD	Yes							
1	Baker Park Ravine	\$520,000	\$5,000	Grants, PSC, TRPD, Ind, Med	Yes	5,000						
1	Lake Independence TMDL Review & Management Plan	\$30,000	\$30,000	PSC, Ind, Med, Lor, TRPD	NA		30,000					
2	Lake Independence Area BMPs	\$100,000	\$25,000	PSC, Ind, Med, County, Lor, Grant	Not yet			10,000		10,000		5,000
1	Subwatershed Assessment: Spurzem Area	\$60,000	\$15,000	PSC, Med, Lor	NA		15,000					
2	Spurzem Area BMPs	\$100,000	\$25,000	Grant, PSC, Med, Lor, County	Not yet				10,000		10,000	5,000
1	Lake Ardmore Management Plan	\$10,000	\$10,000	PSC, Med	NA				10,000			
2	Ardmore Lake Alum Treatment	\$20,000	\$5,000	Grant, PSC, Med	NA					5,000		
2	Half Moon Lake Alum Treatment	\$45,000	\$11,250	Grant, PSC, TRPD, Med, Lor	NA							11,250
2	Peter Lake Alum Treatment	\$65,000	\$16,250	Grant, PSC, Med	NA							16,250
2	Spurzem Lake Alum Treatment	\$62,000	\$15,500	Grant, PSC, TRPD, Med, Lor	NA							15,500
3	Lake Independence Alum Treatment	\$1,390,500	\$250,000	Grant, PSC, Med, Ind, Lor, TRPD	NA							250,000
Lake Sarah Drainage Area												
1	Sediment Sampling in Lake Sarah	\$12,000	\$3,000	PSC, Ind, Gr, Lor	NA		3,000					
2	Lake Sarah TMDL Review & Management Plan	\$25,000	\$25,000	PSC, Ind, Gr, Lor	NA			25,000				
2	Dancehall Creek SWA BMPs	\$200,000	\$50,000	Grant, PSC, Gr, County	Not yet			10,000	10,000		10,000	20,000
2	HR68 & Gully Stabilization	\$75,000	\$18,750	PSC, Ind, County	Not yet			18,750				
1	Lake Sarah Curlyleaf Pondweed Treatment	\$28,000	\$8,000	PSC, Ind, Gr, lake assn	NA	8,000	8,000					
3	Lake Sarah Alum Treatment	\$250,000	\$62,500	Grant, PSC, Ind, Gr, Lor	NA						62,500	
Pioneer Creek Drainage Area												
1	Whaletail South Alum Treatment	\$300,646	\$75,160	Grant, PSC, Minn, TRPD	NA		75,160					
1	Pioneer Creek @ Pagenkopf Rd Carp Barrier	\$75,000	\$18,750	Grant, PSC, Ind	NA		18,750					
2	CSAH 91/ CR92 Supplemental BMPs	\$100,000	\$25,000	PSC, County	NA		25,000					
3	Wetland Restorations/ Deer & Unnamed Creeks	\$50,000	\$12,500	PSC, Minn, County	Not yet		6,250				6,250	
3	Channel Restorations/ Deer & Unnamed Creeks	\$60,000	\$15,000	PSC, Minn, County	Not yet			7,500				7,500
Crow River Drainage Area												
1	Shriners BMP Impl & Regional Hydraulic Restoration	\$150,000	\$25,000	Grant, PSC, County, TRPD	Yes	150,000						
1	Lake Rebecca Alum Treatment	\$225,000	\$56,250	Grant, PSC, TRPD	NA				53,250			
3	Subwatershed Assessment: Hafften, Schendel, Schwauppauff	\$15,000	\$3,750	PSC, Gr	NA							3,750
Ongoing Opportunity Based Projects - Watershed Wide												
2	Stormwater BMPs / retrofits	varies	\$10,000	PSC, County	Not yet		5,000		5,000			
2	Feedlot / Manure Management BMPs	varies	\$10,000	PSC, County	Not yet			5,000		5,000		
2	Agricultural Practice BMPs	varies	\$10,000	PSC, County	Not yet				5,000		5,000	
	TOTAL	\$4,042,146	\$852,660			\$163,000	\$286,160	\$76,250	\$93,250	\$10,000	\$93,750	\$334,250

Note: The Commission intends to review this CIP annually and may revise it from time to time, including providing more detail for 2026-2030, in accordance with its Plan Amendment policies.

Project Descriptions

Unless otherwise noted, it is assumed that the Commission's share will be as shown on Table F.1, with the balance funded by the member city, supplemented as necessary through grant funds and stakeholder and landowner financial participation.

Lake Independence Drainage Area

Lake Independence TMDL Review and Management Plan

The Lake Independence TMDL was completed in 2007. Stakeholders have completed several implementation actions since that time. Additional monitoring data such as sediment core release rate analysis and lake inflow have since been collected. This project is a progress review and development of a Lake Management Plan for Lake Independence, including updating watershed and lake response modelling and TMDL load reduction targets. The progress review will also update the TMDL implementation plan, including actions for the upstream impaired lakes. The focus of this plan will be on holistic, whole-lake ecological management that includes actions to manage aquatic vegetation and fish communities and internal load in addition to watershed load reductions.

Lake Independence Area BMPs

The City of Independence had previously completed a subwatershed assessment for that part of the city that is tributary to Lake Independence. The report identified 64 potential BMPs, including wetland restorations, hydrologic restorations, gully stabilizations, residential rain gardens, grassed waterways, and other practices to reduce phosphorus and sediment loading to the lake. Most of these are on private property. This project is to provide cost share for those practices as willing landowners become available. <http://www.pioneersarahcreek.org/independence-sra.html>

Subwatershed Assessment-Spurzem Drainage Area

This project is the completion of a subwatershed assessment of the drainage area to Spurzem Lake to identify potential BMPs and estimate their costs and removals.

Spurzem Area BMPs

Following completion of the subwatershed assessment, this project is to share in the cost of implementing BMPs to reduce phosphorus and sediment loading to Spurzem Lake or the upstream tributary lakes.

Lake Ardmore Management Plan

The Commission and the city of Medina have recently completed some BMPs in the Lake Ardmore drainage area. This lake is tributary to Lake Independence. This project is the development of a holistic, whole-lake ecological management that includes actions to manage aquatic vegetation and fish communities and internal load in addition to watershed load reductions.

Ardmore Lake Alum Treatment

The purpose of the project is to significantly reduce the sediment phosphorus release during anoxic conditions through the application of aluminum sulfate in Ardmore Lake, which is upstream of Lake Independence. The reduction of phosphorus internal loading in Ardmore will significantly improve the in-lake water quality conditions and is necessary to achieve the MPCA in-lake water quality standards.

Half Moon Lake Alum Treatment

The purpose of the project is to significantly reduce the sediment phosphorus release during anoxic conditions through the application of aluminum sulfate in Half Moon Lake, which is upstream of Lake Independence. The reduction of phosphorus internal loading in Half Moon will significantly improve the in-lake water quality conditions and is necessary to achieve the MPCA in-lake water quality standards.

Peter Lake Alum Treatment

The purpose of the project is to significantly reduce the sediment phosphorus release during anoxic conditions through the application of aluminum sulfate in Peter Lake, which is upstream of Lake Independence. The reduction of phosphorus internal loading in Peter will significantly improve the in-lake water quality conditions and is necessary to achieve the MPCA in-lake water quality standards.

Spurzem Lake Alum Treatment

The purpose of the project is to significantly reduce the sediment phosphorus release during anoxic conditions through the application of aluminum sulfate in Spurzem Lake, which is upstream of Lake Independence. The reduction of phosphorus internal loading will significantly improve the in-lake water quality conditions and is necessary to achieve the MPCA in-lake water quality standards.

Lake Independence Alum Treatment

The project is to significantly reduce the sediment phosphorus release through the application of aluminum sulfate, which will significantly improve the in-lake water quality conditions. The control of internal load is necessary to achieve the MPCA in-lake water quality standards. The Commission considers Independence a Sentinel Lake. A TMDL study was completed in 2007 that identified internal loading as a significant portion of the total loading that impacts water quality conditions.

Lake Sarah Drainage Area

Lake Sarah Sediment Sampling

Prior to completing the proposed TMDL Review and Management Plan, sampling the sediment in Lake Sarah would provide a more accurate estimate of internal load released from sediments. This is critical for partitioning phosphorus load between external and internal sources and in determining the types of BMPs and their priority.

Lake Sarah TMDL Review and Management Plan

The Lake Sarah TMDL was completed in 2011. A subwatershed assessment has been completed for the Dance Hall Creek drainage area. Stakeholders have completed several watershed and in-lake implementation actions since that time. Additional monitoring data has been or will be collected. This project is a progress review and development of a Lake Management Plan for Lake Sarah, including updating watershed and lake response modelling and TMDL load reduction targets. The progress review will also update the TMDL implementation plan. The focus of this plan will be on holistic, whole-lake ecological management that includes actions to manage aquatic vegetation and fish communities and internal load in addition to watershed load reductions.

Dance Hall Creek Drainage Area BMPs

The Lake Sarah TMDL identified flow discharging from Dance Hall Creek into Lake Sarah as a significant source of nutrient load to the lake. In 2014, the City of Greenfield partnered with Hennepin County Environmental Services, Three Rivers Park District, and the Commission to complete a subwatershed

assessment of the Dance Hall Creek drainage area. This project would implement high-priority BMPs identified in that study. <http://www.pioneersarahcreek.org/dance-hall-creek.html>

HR 68 and Gully Stabilization

Hydrologic restoration and stabilization of a gully that is conveying excess phosphorus and sediment to Lake Sarah. This project is identified as HR 68 in the Lake Sarah and Lake Independence Stormwater Retrofit Analysis. While located on private property willing landowners have been identified.

Lake Sarah Curlyleaf Pondweed Treatment

In partnership with the DNR and the Lake Sarah Improvement Association, apply herbicide (Aquathol) to non-native curly-leaf pondweed (CLP) which was included in the TMDL Implementation Plan as a solution to the large in-lake load for Lake Sarah (900 lbs/yr or 17% overall load).

Lake Sarah Alum Treatment

The purpose of the project is to significantly reduce the sediment phosphorus release during anoxic conditions through the application of aluminum sulfate in Lake Sarah. The reduction of phosphorus internal loading in Sarah will significantly improve the in-lake water quality conditions and is necessary to achieve the MPCA in-lake water quality standards.

Pioneer Creek Drainage Area

Whaletail South Alum Treatment.

The purpose of the project is to significantly reduce the sediment phosphorus release during anoxic conditions through the application of aluminum sulfate in South Whaletail Lake. The reduction of phosphorus internal loading in South Whaletail Lake will significantly improve the in-lake water quality conditions. The control of internal load in South Whaletail Lake is necessary to achieve the MPCA in-lake water quality standards.

Pioneer Creek Pagenkopf Road Carp Barrier.

The project is to install a carp barrier on Pioneer Creek at the downstream end of the culvert located at Pagenkopf Road. A carp movement study indicated that fish are moving in large numbers in the spring through Pioneer Creek to access shallow lakes located downstream of Lake Independence to spawn. A barrier would (1) prohibit carp movement from moving back and forth between Lake Independence and the downstream shallow lakes through Pioneer Creek at Pagenkopf, and (2) provide an opportunity to remove carp at the barriers in the spring to reduce overall biomass

Supplemental BMPs for CSAH12/CR92 Reconstruction.

Hennepin County and MNDOT are working jointly to improve safety along CSAH12 at its intersection with County Road 92. Stormwater BMPs, specifically two ponds, will be implemented to treat runoff from new impervious surface created with this project. This CIP proposes to install additional BMPs, specifically at least one iron-enhanced sand filter or spent-lime filter, to better treat dissolved phosphorus and other pollutants prior to discharge into Robina Creek. This project only includes BMPs that go above-and-beyond permit requirements.

Wetland Restorations/ Deer & Unnamed Creeks.

The project is the restoration of two wetland systems to address the dissolved oxygen impairment and improve hydrology and water quality in the Deer and Unnamed Creek flow through wetland systems. The purpose is to decrease sediment oxygen demand and improve the overall water quality.

Channel Restorations/ Deer & Unnamed Creeks

The project is channel restoration through development of low-flow channels in impaired Unnamed and Deer Creeks. The goal is to complete approximately 2000 linear feet of channel restoration, 1000 feet per project. The purpose is to decrease width and increase velocity, meandering, riffles, and aeration throughout the waterbodies.

Crow River Drainage Area

Shriners BMP Implementation & Regional Hydraulic Restoration

This project is several improvements at the Zuhrah Shrine Horse Facility and adjacent properties just east of Lake Rebecca to alleviate wetland flooding issues impacting pasturing and feeding conditions and contributing to excess nutrient and sediment loading to Lake Rebecca. Improvements that will be considered include:

- Tile repair
- Sediment basins
- Bio reactors at tile outlets
- Dry lot construction
- Grazing and manure plan
- Control structure at culvert
- Other basin opportunities
- Water quality testing and monitoring
- Piezometer for ground water monitoring
- SWA for area
- Tile outlet inventory
- Control structure at Co Rd 92 crossing

Lake Rebecca Alum Treatment

The purpose of the project is to reduce the sediment phosphorus release during anoxic conditions through the application of aluminum sulfate in Rebecca Lake. The reduction of phosphorus internal loading in Rebecca will be necessary to ensure that the lake continues to meet the MPCA water quality standards. Lake Rebecca had an alum treatment in 2010/2011 to reduce the internal loading of sediment phosphorus release. The overall effectiveness of the alum treatment has been reduced overtime, and a bump treatment will be needed to ensure that the lake continues to meet the MPCA water quality standards. A study will be completed in 2020 to evaluate the existing alum-phosphorus binding capacity through sediment phosphorus release analysis.

Subwatershed Assessment-Hafften, Schendel, Schwauppauuff

This project is the completion of a subwatershed assessment of the drainage area to Hafften, Schendel, Schwauppauuff Lakes and the Crow River to identify potential BMPs, and estimate their costs and removals.

Ongoing Opportunity Based Projects - Watershed Wide

Stormwater BMPs/Retrofits, Feedlot/Manure Management BMPs, Agricultural Practice BMPs.

The Commission has a partnership with Hennepin County Environment and Energy staff as they work with private landowners to undertake stormwater and agricultural management practices. As opportunities arise throughout the watershed, the Commission may supplement County cost-share funds to assist and incentivize those landowners to achieve phosphorus, sediment, and bacterial loading to the waters in the watershed.