

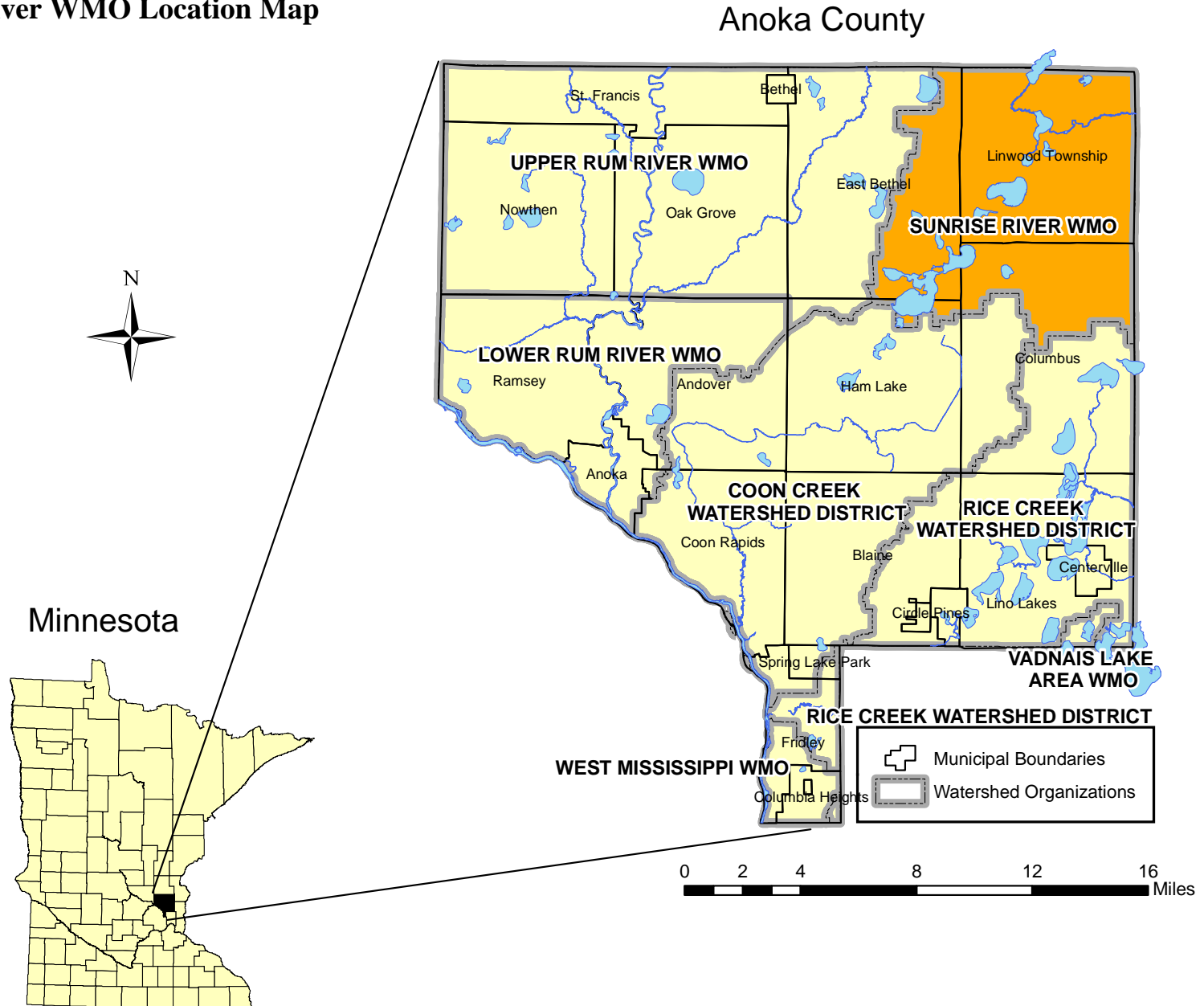
# 2017 Annual Report



**East Bethel – Ham Lake – Linwood - Columbus**

**April 13, 2018**

# Sunrise River WMO Location Map



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## I. Introduction to this Report

This report is intended for local and state oversight agencies, as well as interested citizens. At the local level, it is intended to provide member communities, their elected officials, and staff with an activity update. At the state level, this report meets the annual watershed management organization reporting requirements of Minnesota Rules 8410.0150. The report is intended to fulfill 2017 reporting requirements.

## II. About the Sunrise River WMO

The Sunrise River Watershed Management Organization (SRWMO) is a special purpose unit of government that operates as a joint powers organization under Minnesota Statutes, Section 471.59. It is comprised of Linwood Township and portions of the Cities of Columbus, Ham Lake, and East Bethel. Board members are appointed by the member communities. Financing is from member communities. The SRWMO's direction is laid out in its watershed management plan and the member municipalities' local water plans.

The SRWMO area is rich in water and natural resources. Approximately 50% of the area is water and wetlands, including 19 lakes. Five are major recreational lakes (Coon, Fawn, Linwood, Martin, and Typo). 19% of the SRWMO area is high quality natural communities that have undergone little human disturbance since pre-settlement times. Many of these areas have been designated by the State as sites of biodiversity significance or regionally significant ecological areas. 27 plant and animal species that are state endangered, threatened, special concern, or rare are known to occur in the SRWMO. These water and natural resources are at the heart of the character of these north Twin Cities metro communities.

Despite the overwhelming good quality of the natural resources, there are some areas of concern. Martin, Typo, and Linwood Lakes have been designated as "impaired" by the Minnesota Pollution Control Agency for excess nutrients. Several segments of the Sunrise River in Linwood Township are impaired for pH, turbidity, and the fish community. Coon



Sunrise River



and Linwood Lakes are infested with two aquatic invasive species: curly leaf pondweed and Eurasian Water Milfoil. There are questions about the effects that improperly maintained septic systems may be having on water quality. Many of these problems flow across community boundaries and cannot be effectively addressed by any one community alone. This is the reason for this joint powers watershed management organization.

The Sunrise River WMO Board of Managers considers its responsibilities to be overseeing the management of water resources in the watershed. The WMO serves the community by:

- Providing a forum to consider inter-community water problems.
- Setting minimum standards for member community ordinances that consider local water resources issues.
- Educating the public about water resources.
- Facilitating water quality improvement projects, which are often cooperative endeavors with others.
- Collecting data and conducting resource monitoring on a watershed basis.
- Providing a linkage between natural resources and land use planning decisions.
- Coordinating water management activities within the WMO among governmental agencies, communities and residents.
- Maintaining a general awareness of existing water problems and the WMO's responsibilities for water management.
- Ensuring expenditures result in corresponding benefits to the public.
- Avoiding duplication among government agencies and communities.

The SRWMO operates under the following philosophies:

- Water-related problems are community problems and not individual problems.
- Water resource management is a vital matter that cannot be effectively addressed by individual communities because watersheds cover multiple communities.
- Water resources should be managed on a watershed basis. The WMO is uniquely positioned to address water resource issues across community boundaries.
- Aquatic and terrestrial areas are integrally linked and cannot be effectively managed separately.

### **SRWMO Watershed Management**

The SRWMO is guided by its 10-year watershed management plan. The new plan can be found on the SRWMO website ([www.SRWMO.org](http://www.SRWMO.org)).

### III. Activity Report

#### a. Current Board Members

##### CITY OF COLUMBUS

Dennis Peterson  
16319 Kettle River Blvd  
Columbus, MN 55025

Vacant

councildennyp@ci.columbus.mn.us

##### CITY OF HAM LAKE

Matt Downing  
16163 Lexington Ave NE  
Ham Lake, MN 55304  
763.757.5121  
Matthewdowning108@gmail.com

Scott Heaton  
2247 147<sup>th</sup> Lane NE  
Ham Lake, MN 55304  
763.434.5440  
scottmatthewheaton@gmail.com

Sandy Flaherty, Alternate  
834 181<sup>st</sup> Ave NE  
Ham Lake, MN 55304  
Stevensandy6@q.com

##### CITY OF EAST BETHEL

Tim Harrington  
2241 221<sup>st</sup> Ave NE  
East Bethel, MN 55011  
763.413.7851  
Tim.harrington@ci.east-bethel.mn.us

Leon Mager (Vice Chair)  
19511 East Tri Oak Circle NE  
Wyoming, MN 55092-8420  
763.434.9652  
lam3@isd.net

##### LINWOOD TOWNSHIP

Paul Enestvedt  
6220 213<sup>th</sup> Lane NE  
Stacy, MN 55092  
651.408.0046  
Paul.enestvedt71@gmail.com

Dan Babineau (Chair)  
22275 Martin Lake Road NE  
Stacy, MN 55079  
763.390.9985  
danb@microconsulting.com

Tim Peterson, alternate  
22817 Typo Cr Dr NE  
Stacy, MN 55079  
651.233.4151  
bravehearttjp@gmail.com



**b. Day to Day Contact**

The day to day contact person for the SRWMO who can answer questions about the organization is:

Jamie Schurbon, Watershed Projects Manager  
 Anoka Conservation District  
 1318 McKay Drive NE, suite 300  
 Ham Lake, MN 55304  
 763-434-2030 ext. 12

**c. Employees and Consultants**

The SRWMO does not employ staff, but does utilize consulting services and enters into cooperative agreements with other government agencies. A description of contracted services is listed below:

**SRWMO consultants and partners during the reporting period:**

Consultant/Partner	Contact	Work Description
Anoka Conservation District	Jamie Schurbon Watershed Projects Manager 1318 McKay Drive NW, #300 Ham Lake, MN 55304 763-434-2030 ext. 12 jamie.schurbon@anokaswcd.org	<ol style="list-style-type: none"> <li><b>Water Monitoring</b> – Water quality and hydrology monitoring in lakes, streams, and wetlands.</li> <li><b>Water Quality Improvement Projects</b> – Implementation of water quality improvement efforts, including administering the SRWMO water quality grant program.</li> <li><b>Education</b> – Promotion of SRWMO programs.</li> <li><b>Website</b> - Maintain SRWMO website.</li> <li><b>Reporting</b> - Assistance</li> </ol>

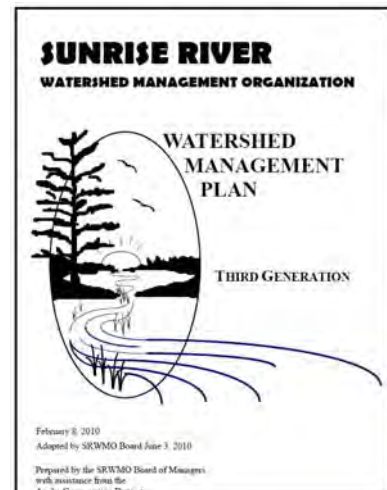
Consultant/Partner	Contact	Work Description
		<p>preparing this annual report and State Auditor reporting.</p> <p>6. <b>Administration</b> – Serve as a limited, on-call administrator to address miscellaneous day-to-day operational issues. Assists with local water plan reviews.</p> <p>7. <b>Watershed planning</b> – Updates to the 10-year SRWMO watershed management plan.</p>
Gail Gessner	Gail Gessner 4621 203rd Lane NW Oak Grove, MN 55303 (763) 753-2368 recordwmo@gmail.com	<b>Recording secretary</b> for meetings, plus miscellaneous administrative assistance.

#### d. Highlighted Recent Projects

Listed below from most to least recent

##### Sunrise River WMO Watershed Management Plan Update

The SRWMO is required to update its watershed management plan each 10 years. That plan serves to guide the activity of the organization. The current watershed plan expires December of 2019. The update process is beginning in early 2018 and takes approximately 18 months. Stakeholders including lake groups, elected officials, cities and state agencies will be invited to participate in planning. The SRWMO has contracted with the Anoka Conservation District for planning and plan writing services.





### **Lower St. Croix One Watershed, One Plan (2018-2019)**

The Sunrise River WMO is participating in a regional watershed planning called One Watershed, One Plan (1W1P). The process is done in collaboration with 16 other entities including counties, watershed organizations, and soil and water conservation districts. It aims to identify the highest priority regional water resources and ensure they are managed collaboratively. The process complements local water plans, like that of the SRWMO. It does not create any new government entities. It does make the area eligible for a new State funding program called Watershed Based Funding (note: the 7-county metro is already eligible without 1W1P).

The process is funded by a grant from the MN Board of Water and Soil Resources.

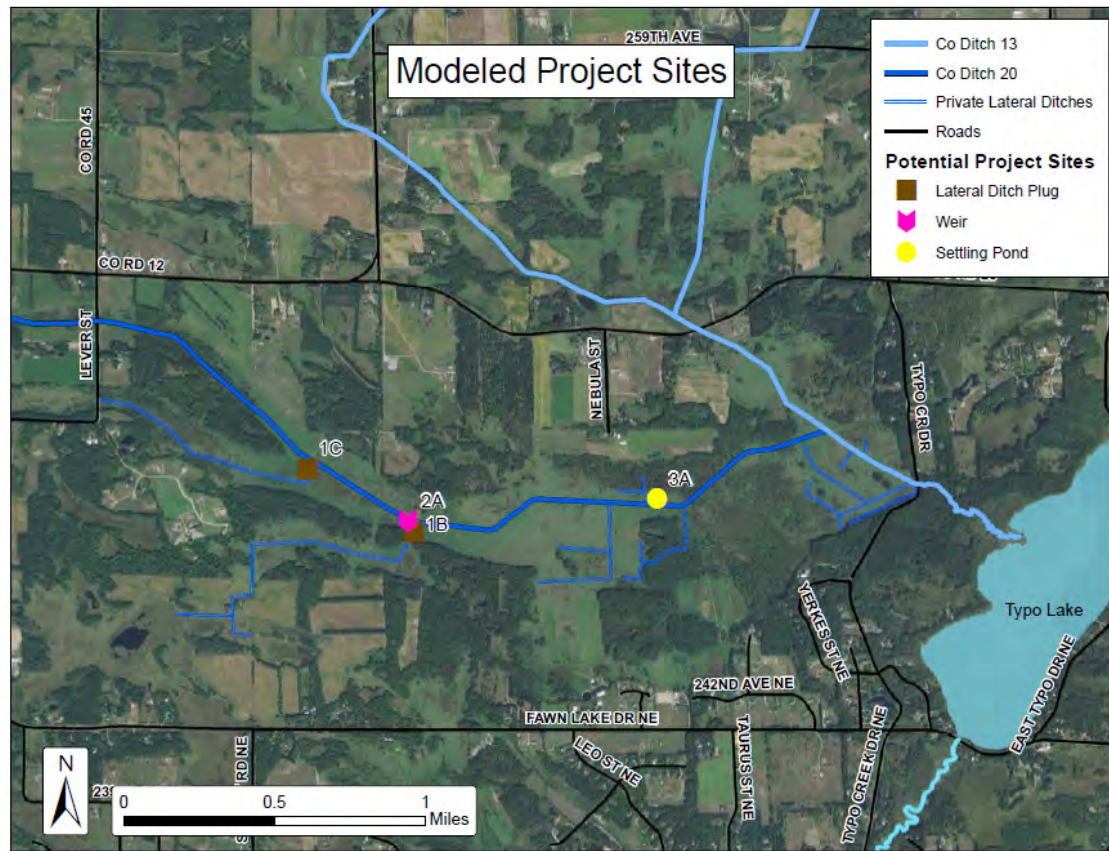


### **Ditch 20 Feasibility Study (completed 3-2018)**

This study identified and calculated cost effectiveness of wetland restoration projects around Ditch 20 to improve water quality in Martin and Typo Lakes downstream. Ditch 20 nutrient export was noted as a problem in a Total Maximum Daily Load (TMDL) study for those lakes. Ditching through broad peat lowlands was a likely cause. This study identified three locations for wetland restoration and one settling pond project, all of which would be highly cost effective at phosphorus reduction, but do have some inherent challenges and uncertainty. Landowners at each site are interested in cooperating in these projects. These projects will be considered by the SRWMO, Anoka Conservation District and Isanti County for future implementation.



### *Ditch 20 Area Modeled Water Quality Projects*



### **Martin and Typo Lakes Carp Removal (2017-2019)**

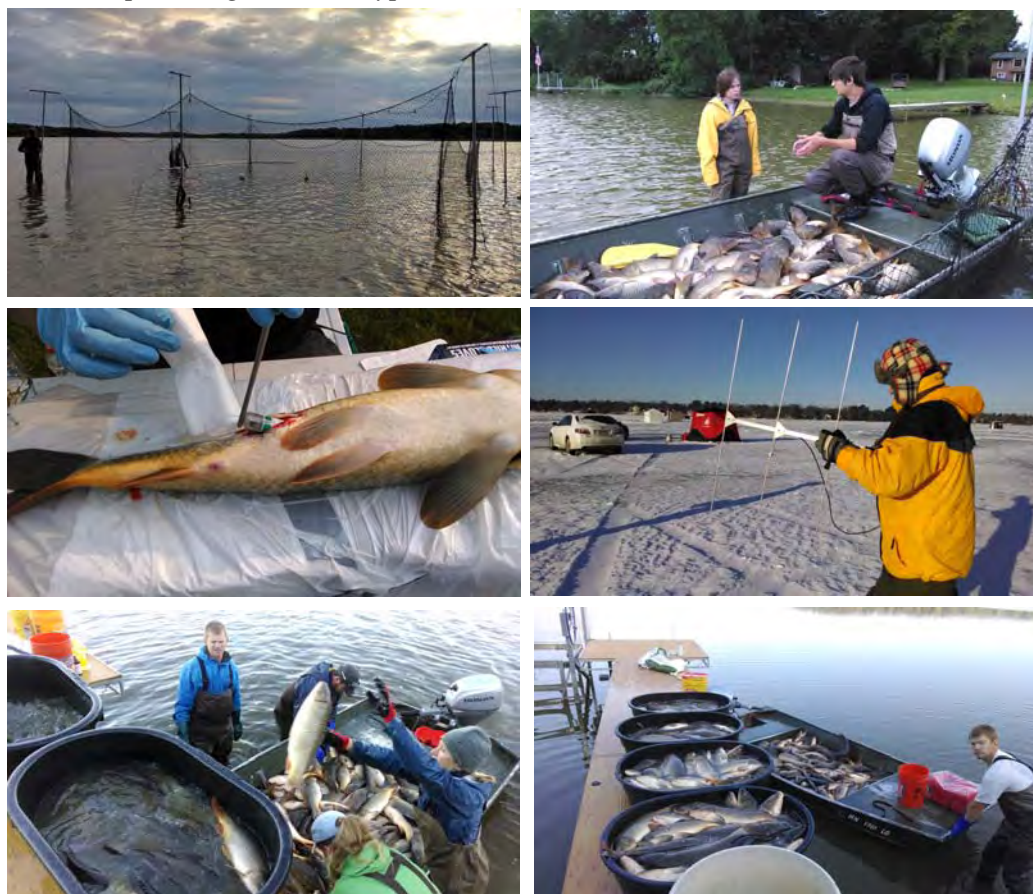
This project is a follow-up to the carp barriers project. The purpose is to improve water quality and the game fishery in Martin and Typo Lakes. To accomplish this Carp Solutions, Inc., a spin-off company from the University of Minnesota Aquatic Invasive Species Research Lab will be conducting carp surveys, radio tracking and harvests. This project is funded by a MN DNR Conservation Partners Legacy grant (\$99,000), the Sunrise River WMO (\$5,000), Martin Lakers Association (\$4,900) and Anoka Conservation District (\$5,000). The project will both aim to reduce carp populations below the critical threshold for ecological damage of 100 lbs/ac and craft a plan for maintaining this condition long-term.

In 2017 the following work was completed on this project:

- Box netted at Typo Lake on 6 occasions with 2-3 nets each time. 2,100 carp removed.
- Electrofished in Martin Lake as a population survey, and to get carp for mark/recapture and radio tagging.
- Surgically implanted radio tags into 20 carp in each Martin and Typo Lakes.
- Located radio tagged carp monthly and mapped their locations.
- Fin clipped several hundred carp in each lake for mark-recapture study that will result in population estimations. Many (>100) marked carp were recaptured during Typo Lake box netting.

- Trap netted at 5 satellite waters and wetlands around the lakes to locate young carp that would indicate the area is used for spawning and be subject to future management.
- Began coordination for winter commercial harvest. A contract was secured with a commercial fisherman, but he performed no work.
- Regularly updated our project partners and our website (see under "active projects" on [www.AnokaSWCD.org](http://www.AnokaSWCD.org)). There are some photos on the website.

#### *2017 Carp Management at Typo and Martin Lakes*



#### **Martin and Typo Lake Carp Barriers (completed 2016)**

A series of four barriers has been installed to control carp in Martin and Typo Lakes in order to improve water quality and habitat. This project is funded by \$435,753 in MN DNR Conservation Partners Legacy grants, the Sunrise River WMO, Martin Lakers Association and Anoka Conservation District. The same funding partners are teaming to follow this project with a carp removal program in 2017-2019.





*Completed carp barriers*

Martin Lake Outlet



South Inlet of Martin Lake



North Inlet of Martin Lake



Typo Lake Outlet



**Coon Lake Stormwater Retrofits (completed 2016)**

Three rain gardens, one stormwater stabilization and three lakeshore restorations were installed in neighborhoods draining to Coon Lake in 2015 and 2016. These were among the most highly cost effective projects at reducing nutrient delivery to the lake, as identified in the 2013 Coon Lake Subwatershed Assessment. These projects are funded by a \$42,987 2014 BWSR Clean Water Fund Grant, the SRWMO, Coon Lake Improvement District, Coon Lake Improvement Association and Coon Lake Beach Community Center.



### *Completed Coon Lake Stormwater Retrofits*

Lincoln Drive Stabilization



Mager Lakeshore



Community Center Rain Garden



19303 E Front Blvd Rain Garden



Karger Lakeshore Restoration



Sheffield Lakeshore Restoration



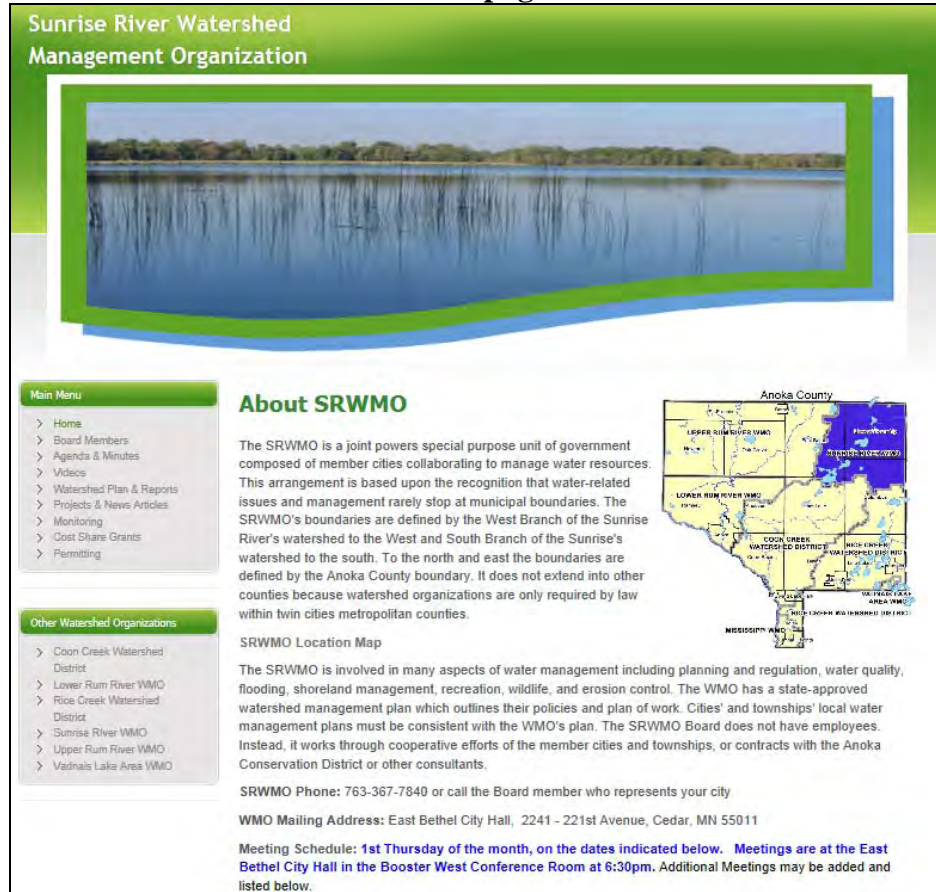
### **e. Public Outreach**

The SRWMO does regular public outreach and education projects, but the WMO's website serves as the primary, continuous public outreach tool. Website contents include general information about the organization, meeting agendas and minutes, water monitoring results and profiles of WMO projects. The SRWMO ensures visibility of its website by asking member cities and townships to post the SRWMO



website address in their newsletters. Links to the SRWMO website are also provided through each member community's website and the Anoka Conservation District website. The SRWMO website address is <http://www.srwmo.org>

### Sunrise River WMO website homepage



**Sunrise River Watershed Management Organization**

**Main Menu**

- > Home
- > Board Members
- > Agenda & Minutes
- > Videos
- > Watershed Plan & Reports
- > Projects & News Articles
- > Monitoring
- > Cost Share Grants
- > Permitting

**Other Watershed Organizations**

- > Coon Creek Watershed District
- > Lower Rum River WMO
- > Rice Creek Watershed District
- > Sunrise River WMO
- > Upper Rum River WMO
- > Vadnais Lake Area WMO

**About SRWMO**

The SRWMO is a joint powers special purpose unit of government composed of member cities collaborating to manage water resources. This arrangement is based upon the recognition that water-related issues and management rarely stop at municipal boundaries. The SRWMO's boundaries are defined by the West Branch of the Sunrise River's watershed to the West and South Branch of the Sunrise's watershed to the south. To the north and east the boundaries are defined by the Anoka County boundary. It does not extend into other counties because watershed organizations are only required by law within twin cities metropolitan counties.

**SRWMO Location Map**

The SRWMO is involved in many aspects of water management including planning and regulation, water quality, flooding, shoreland management, recreation, wildlife, and erosion control. The WMO has a state-approved watershed management plan which outlines their policies and plan of work. Cities' and townships' local water management plans must be consistent with the WMO's plan. The SRWMO Board does not have employees. Instead, it works through cooperative efforts of the member cities and townships, or contracts with the Anoka Conservation District or other consultants.


**SRWMO Phone:** 763-367-7840 or call the Board member who represents your city

**WMO Mailing Address:** East Bethel City Hall, 2241 - 221st Avenue, Cedar, MN 55011

**Meeting Schedule:** 1st Thursday of the month, on the dates indicated below. Meetings are at the East Bethel City Hall in the Booster West Conference Room at 6:30pm. Additional Meetings may be added and listed below.

Additional public outreach is accomplished through at least annual newsletter articles. The articles are distributed to member communities for distribution in their newsletters. Periodic larger articles are distributed as press releases to the local newspaper, the Forest Lake Times.

In 2017 the SRWMO's newsletter article promoted septic system maintenance. It was printed in city and township newsletters. That article is shown to the right. It is presented as an infographic because that format best fits the constraints of city newsletters and is believed to result in more lasting impressions.



**Every Three Years**

It's the longest anyone should go between septic system pumpings. Avoid costly repairs. Keep our groundwater, lakes and rivers clean.

**Pump your septic tank**

Sunrise Rum River Watershed Management Organization  
[www.SRWMO.org](http://www.SRWMO.org)

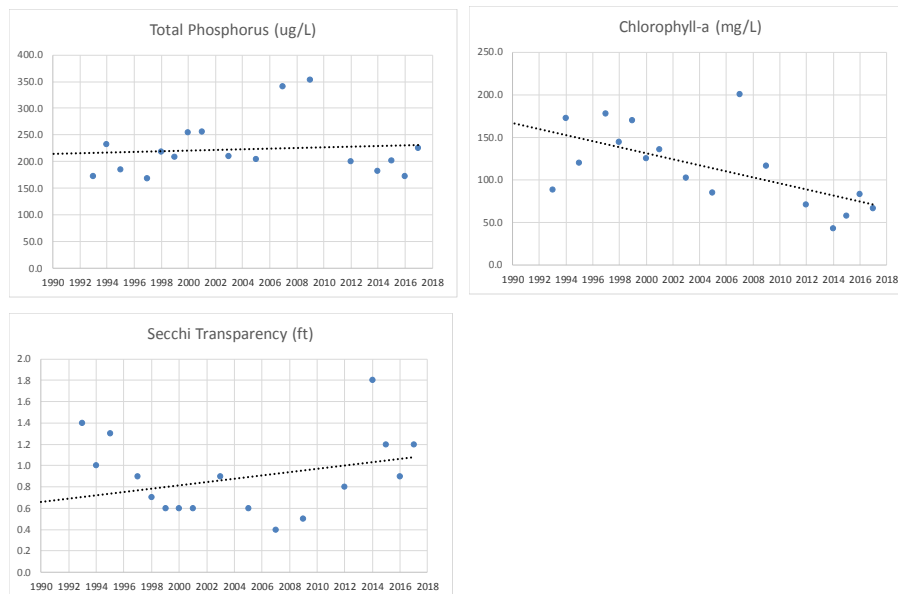
## f. Water Quality Trends

The SRWMO has a long term water quality monitoring program that includes most larger stream and recreational lakes in the watershed. From 2000-2009 the SRWMO had a robust water monitoring program to establish a baseline of data; little water monitoring had been done previously. From 2010 to the present the amount of monitoring has moderated to a level sufficient to detect trends. Many waterbodies are monitored every 2-3 years.

An important part of evaluating implementation of the watershed management plan is looking at water quality trends. Both Martin and Typo Lakes have had statistically significant water quality improvements through 2017. Typo Lake and Martin Lake have been the subject of recent water quality improvement projects including rain gardens, carp barriers and carp harvests.

Typo Lake's water quality improvement appears to be primarily a reduction in algae (as measured by chlorophyll-a) and perhaps phosphorus reduction. A test that incorporates the correlated factors of total phosphorus, chlorophyll-a and Secchi transparency found statistically significant water quality change (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth;  $F_{2,14}=5.7$ ,  $p=0.02$ ). If these factors are examined separately with one-way ANOVAs, Cl-a has a statistically significant decline ( $F_{1,15}=4.55$ ,  $p<0.05$ ), while total phosphorus and Secchi transparency show no statistically significant change. Total phosphorus also has no statistically significant change. When graphed, graph total phosphorus appears to be increasing but this is due to high levels in 2007 and 2009; if those years are excluded phosphorus appears to be decreasing slightly.

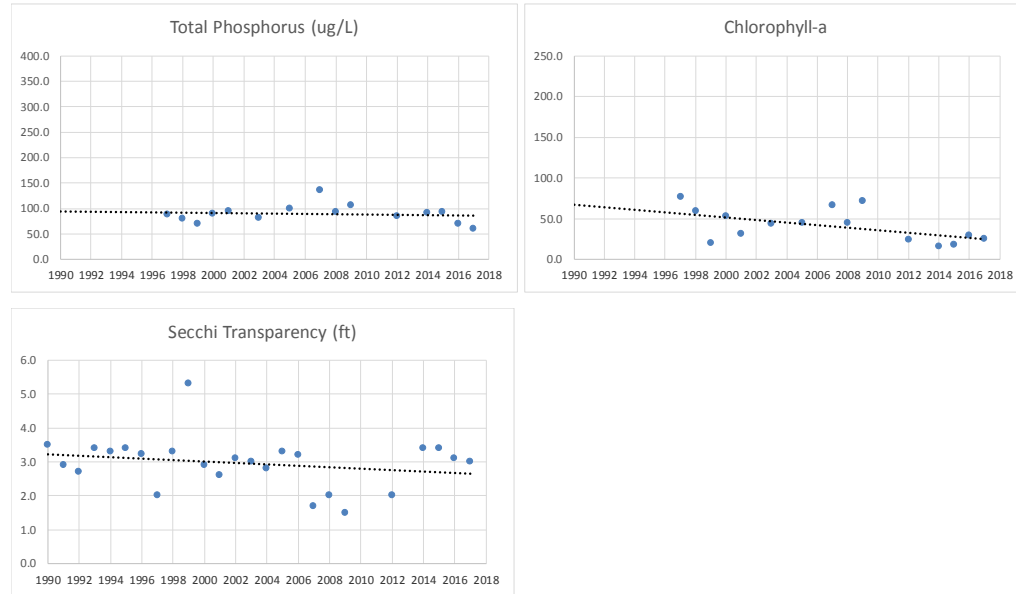
### *Typo Lake Water Quality Data Showing Trend Lines*



Martin Lake's water quality improvement also appears to be primarily driven by algae reduction. A test that incorporates the correlated factors of total phosphorus, chlorophyll-a and Secchi transparency found statistically significant water quality change (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth;

$F_{2,13}=5.82$ ,  $p<0.02$ ). Further examination of the data (one-way ANOVAs on the individual response variables) shows that while TP and Secchi depth appear to be staying virtually flat, while Chl-a has shown a statistical decrease ( $F_{1,14}=9.25$ ,  $p<0.01$ ).

### *Martin Lake Water Quality Data Showing Trend Lines*



More detailed water quality data and analysis can be found in **Appendix B** and online. **Appendix B** presents analysis from 2017. Previous annual watershed monitoring reports are available on the SRWMO website ([www.SRWMO.org](http://www.SRWMO.org)). All water quality data collected by the SRWMO is on the MN Pollution Control Agency's EQuIS database, which is accessible through their website.

## **g. Evaluation of Watershed Management Plan Implementation**

The SRWMO Watershed Management Plan contains a schedule of tasks that the WMO should accomplish in order to realize its goals (see table on following page). One of the most objective ways to evaluate plan implementation is comparing planned and accomplished work. The tables on the following pages compare work planned and work actually accomplished. There is one table for 2010-2014 and another table for 2015-2019, thereby covering the entire 10 years of the current plan's life.

In 2017 minor deviations from the Watershed Management Plan occurred. These included:

Change	Excluded lakeshore landscape marketing.
Reason	This longstanding program has not been successful. The SRWMO elected to use this funding on other efforts. It will be re-assessed during development of the SRWMO's 4 <sup>th</sup> Generation Watershed Management Plan. In the meantime, this topic is addressed through newsletters and the SRWMO website.
Change	Reduced "other water quality projects" from \$10,000 to \$5,850.



Reason	This reduced funding amount was sufficient to address two priority projects: Linwood Lake aquatic invasive weed management plan, and Martin and Typo Lakes carp harvest project. Other potential projects were not ready.
Change	Added the Martin and Typo Lakes carp harvest program.
Reason	While not a project specifically mentioned in the SRWMO Watershed Management Plan, this type of management in these waterbodies is in the watershed plan. This project is a follow up to the carp barriers project. The financing for this project was <10% from the SRWMO due to a grant and other partners.
Change	Increased administrative assistance by \$640 (8 hrs) by contract amendment mid-way through 2017.
Reason	Administrative tasks were greater than anticipated, including proposed watershed management organization boundary changes, participation in One Watershed, One Plan and others.
Change	Reduced water quality cost share grant program funding from \$2,000 planned to \$1,000.
Reason	Sufficient funds were carried over from previous years.
Change	Aquatic plant educational programing was not included.
Reason	This item was inadvertently excluded.

**2010-2014 work planned in the SRWMO Watershed Plan and actually accomplished.** Numbers are sites monitored or projects completed.

Task	2010		2011		2012		2013		2014	
	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done
<b>Monitoring and Studies</b>										
Lake Levels	5	5	5	5	5	5	5	5	5	5
Lake Water Quality	3	3	Find volunteers	Secured volunteers for 5 recreational lakes	6	6	0	0	2	2
Stream Water Quality	0	0	0	0	2	2	1	0	2	0
Stream Hydrology	2	2	2	2	2	2	2	0	2	0
Reference Wetland	3	3	3	3	3	3	3	3	3	3
<b>Studies and Investigations</b>										
Typo/Martin Lake TMDL Study	none	MPCA finalizing study	none	none	none	TMDL approved by MPCA				
Fawn Lk curly leaf pondweed assmt			Yes	Prelim review in 2010, work unnecessary						
Linwood Lake TMDL									\$20,000	Watershed WRAP/TMDL completed
<b>Water Quality Improvement Projects</b>										
Water Quality Cost Share Grant Fund	\$1,840	\$1,840 contributions, \$0 awarded	\$2,000	\$2,000 contributions, \$0 awarded	\$2,000	\$2,000, \$29.43 awarded, \$4,300 diverted to carp barriers	\$2,000	\$0	\$2,000	\$2,000
Martin - Typo Lakes Water Quality Projects		Rough fish barrier design.		Grant secured for carp barriers.	\$20,000	\$20,000 to carp barriers	\$15,000	\$15,000 to carp barriers		1 constructed, 3 underway
Martin Lake Area Stormwater Retrofit	\$5,000	\$5,000 Martin Lake area stormwater retrofits.	\$10,000	3 rain gardens installed. \$7,000 + grants						
Coon Lake Area Stormwater Retrofit						Work started, with no costs until 2013	Subwatershed retrofit study	Subwatershed retrofit study	\$20,000	\$25,000, projects started
St. Croix Basin Team	Yes	Joined								
Other Water Quality Improvement Projects		E Front Blvd retrofit planned.		E Front retrofit installed by city	\$10,000	\$10,000 to Martin/Typo Lakes carp barriers				
Continued on next page...										

Task	2010		2011		2012		2013		2014	
	Planned	Done	Planned	Done	Planned	Done	Planned	Done	Planned	Done
<b>Education and Public Outreach</b>										
SRWMO Website	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Officials Tour										
Lakeshore Landscaping Ed			Yes	Web video. Mailing to 66 Fawn Lake homes. Joined Blue Thumb	Yes	Lake assoc presentation,demo project, SRWMO display banner, web promo	Yes	Created display, handouts and staffed it at 2 community events	Yes	News release about local residents' practices
Aquatic Plant Ed			New sign at Martin Lk access	New sign at Martin Lk access					Yes	Staffed event displays
Other Ed			Annual newsletter article	Annual newsletter article	Annual newsletter article	Annual newsletter article	Annual newsletter article	Annual newsletter article	Annual newsletter article	Annual newsletter article
<b>Other</b>										
Estimate SRWMO P export			Yes	Yes						
Co. Geologic Atlas						Part a done				
<b>Non-Operating Administrative Expenses</b>										
On call admin asst			No	Yes	No	Yes	Yes	Yes	Yes	Yes
Annual Report to BWSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annual Report to State Auditor	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Review municipal local water plans	Yes	Reviewed 2 of 4	Yes	All completed						
Develop member community annual report template	Yes	Yes								
Grant Search/App	No	No	Yes	Matched DNR and BWSR Grants. DNR grant for carp barriers successful.	Yes	Matched for BWSR grants for Coon and Martin Lake stormwater retrofits. Denied.	Yes	Matched BWSR CWF grant for Coon Lake area stormwater retrofits		Matched BWSR CWF grant for Ditch 20 feasibility study
Seek bids for services			Yes	Yes			Yes	Yes		

**2015-2019 work planned in the SRWMO Watershed Plan and actually accomplished.** Numbers are sites monitored or projects completed.

Task	2015		2016		2017		2018		2019	
	Planned	Done	Planned	Done	Planned	Done	Planned	Underway	Planned	Done
<b>Monitoring and Studies</b>										
Lake Levels	5	5	5	5	5	5	5	5		
Lake Water Quality	4	4	2	2	0	0	5	6		
Stream Water Quality	2	2	1	1	1	1	2	2		
Stream Hydrology	2	2	1	0	2	2	2	2		
ReferenceWetland	3	3	3	3	3	3	3	3		
Water quality project effectiveness monitoring	1	2 lake water quality sites, 2 hydrology sites associated with carp barriers	1	2 lake water quality sites, 2 hydrology sites associated with carp barriers	1	2 lake water quality sites, 2 hydrology sites associated with carp barriers	1	0		
<b>Studies and Investigations</b>										
Fawn Lk curly leaf pondweed assmt	Yes	Yes								
Ditch 20 feasibility study for water quality projects		Feasibility study		Feasibility study		Feasibility study completed				
<b>Water Quality Improvement Projects</b>										
Water Quality Cost Share Grant Fund	\$2,000	\$0, fund has sufficient balance	\$2,000	\$0, fund has sufficient balance	\$2,000	\$1,000, fund has strong balance	\$2,000	\$0		
Martin - Typo Lakes Water Quality Projects		3 carp barriers being constructed		3 carp barriers completed						
Coon Lake Area Stormwater Retrofit	\$20,000	\$15,000, 4 projects constructed		2 lakeshore restorations, 1 rain garden						
Other Water Quality Projects	\$10,000	\$6,750 used toward Coon Lk retrofits or Ditch 20 study	\$10,000	\$5,000 Ditch 20 feasibility study	\$10,000	\$850 Linwood Lk Imp Assoc for veg mgmt plan. \$5,000 Martin & Typo Lks carp harvests				
<b>Education and Public Outreach</b>										
SRWMO Website	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Overhaul website		
Lakeshore Landscaping Ed	Yes	Booklet distribution to 670 homes	Yes	Combined with annual newsletter	Yes	No	Yes	No		

Task	2015		2016		2017		2018		2019	
	Planned	Done	Planned	Done	Planned	Done	Planned	Underway	Planned	Done
Continued on next page...										
Aquatic Plant Ed					Yes	No				
Other Ed	Annual newsletter article	Annual newsletter article, Display at Linwood Family Fun Day	Annual newsletter article	Annual newsletter article, Display at Linwood Family Fun Day	Annual newsletter article	Annual newsletter article	Annual newsletter article	Annual newsletter article		
<b>Other</b>										
Co. Geologic Atlas				Part b completed						
<b>Non-Operating Administrative Expenses</b>										
On call admin asst	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Annual Report to BWSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Annual Report to State Auditor	No	Yes	No	Yes	No	Yes	No	Yes		
Grant Search/App	Yes	Searched, but none applied for	Yes	Searched, but none applied for	Yes	Applied for and awarded DNR CPL grant for Martin and Typo Lake carp removal	Yes	Participating in Watershed Based Funding process. Likely \$162,341 allocation to SR watershed area.		
Seek bids for services	Yes	Yes			Yes	Yes	No	Yes – for watershed plan update consultant		

**h. 2018 Work Plan** (insurance, secretarial and similar operating expenses are not included)

<b>Task</b>	<b>Purpose</b>	<b>Description</b>	<b>Locations or Action</b>	<b>Cost</b>
<b>Prepare 2017 Annual Report to BWSR and municipalities</b> (this report)	To provide transparency and accountability of organization operations.  To improve communication with member communities.	Produce an annual report of SRWMO activities and finances that satisfies Minnesota Rules 8410.0150 and is an effective tool for reporting WMO accomplishments to member city councils. The goal is to allow the city councils to better understand the SRWMO's work.	Secured Anoka Conservation District (ACD) staff to assist with this task.	\$800
<b>Prepare Annual Report to State Auditor</b>	To provide transparency and accountability of organization operations.	Online reporting of WMO finances through the State Auditor's SAFES website.	Watershed-wide	\$300
<b>Administrator (on-call, limited)</b>	To provide a day-to-day WMO contact for the public and partners. To complete day-to-day miscellaneous operational tasks.	Day-to-day WMO administration.	ACD has been hired to provide this service up to 40 hours.	\$3,200
<b>Watershed Mgmt Plan Update</b>	To update the SRWMO Watershed Management Plan in accordance with MN Rules 8410.	Planning includes a variety of steps to set SRWMO goals, policies and activities over a 10 year period. A plan update is due Dec. 31, 2019 and takes 18 mo to complete.	Watershed-wide	\$10,000 in 2018
<b>Grant search and applications</b>	Obtain outside funding for water quality improvement projects.	Search for grant opportunities and apply for those that are applicable to SRWMO projects. In 2018 emphasis is on participating in the Watershed Based Funding process which has preliminarily allocated \$162,341 to the watershed.	ACD has been hired to provide this service. Projects for which to pursue grants were selected.	\$1,000
<b>Lake Level Monitoring</b>	To understand lake hydrology, including the impact of climate or other water budget changes. These data are useful for regulatory, building/development, and lake management decisions.	Weekly water level monitoring in lakes by volunteers. All are available on the Minnesota DNR website using the "LakeFinder" feature ( <a href="http://www.dnr.mn.us/state/lakefind/index.html">www.dnr.mn.us.state/lakefind/index.html</a> ).	Coon, Linwood, Martin, Fawn, and Typo Lakes	\$1,500
<b>Lake Water Quality Monitoring</b>	To detect water quality trends and diagnose the cause of changes.	May through September twice-monthly monitoring of the following parameters: total phosphorus, chlorophyll-a, secchi transparency, dissolved oxygen, turbidity, temperature, conductivity, pH, and salinity.	Coon, Linwood, Martin, Fawn, Typo and Boot Lakes	\$12,600

<b>Task</b>	<b>Purpose</b>	<b>Description</b>	<b>Locations or Action</b>	<b>Cost</b>
<b>Monitoring of Water Quality Improvement Project Effectiveness</b>	Determine the effectiveness of practices installed to improve water quality.	Monitoring lakes, streams or discharge after installation of practices aimed at improving water quality to ensure the desired results and direct any management changes.		\$0
<b>Stream Water Quality Monitoring</b>	To detect water quality trends and diagnose the cause of changes.	4 baseflow samples, 4 during storms. Parameters: stage, total phosphorus, TSS, Secchi tube, dissolved oxygen, turbidity, chlorides, temperature, conductivity, pH, and salinity.	1. W Branch Sunrise R at Co Rd 77 2. S Branch Sunrise R at Hornsby St	\$2,800
<b>Reference Wetland Monitoring</b>	To provide understanding of wetland hydrology, including the impact of climate and land use. These data aid in delineation of nearby wetlands by documenting hydrologic trends including the timing, frequency, and duration of saturation.	Continuous groundwater level monitoring at a wetland boundary, to a depth of 40 inches. This is part of a network of 18 wetland hydrology monitoring stations county-wide.	1. Carlos Avery Reference Wetland 2. Carlos 181st Reference Wetland, 3. Tamarack Reference Wetland	\$1,950
<b>Cost Share Grants for Water Quality Improvement</b>	To improve water quality in lakes, rivers, and streams.	These grants offer up to 70% cost sharing of the materials needed for a water quality improvement project. The landowner is responsible for the remainder of materials, all labor, and any aesthetic components of the project. Typical projects include erosion correction, lakeshore restoration, and rain gardens. The Anoka Conservation District provides grant administration and technical assistance to landowners. SRWMO funds are used only in the SRWMO area.	Half of the planned expenditure in 2016 due to strong carryover fund balance.	\$0
<b>Martin and Typo Lakes Carp Removal</b>	To improve Martin and Typo Lakes Lake water quality, fishery and ecological health.	Carp management planning and removal including population surveys, radio tracking, and carp removal.	Martin and Typo Lakes	\$0 , project continues in 2018 with previously provided funds
<b>SRWMO Website Overhaul</b>	To address website security and hacking problems.	Redesign the SRWMO website and move it to a new template with greater security features.	<a href="http://www.Srwmo.org">http://www.Srwmo.org</a>	\$1,500
<b>SRWMO Website</b>	To increase awareness of the SRWMO and its programs. The website also provides tools and information that helps users better understand water resources issues in the area.	Annually maintain and update the SRWMO website with current information about the organization, meeting minutes and agendas, and watershed plan update information.	<a href="http://www.Srwmo.org">http://www.Srwmo.org</a>	\$540

Task	Purpose	Description	Locations or Action	Cost
<b>Annual Ed publication - Lakeshore Land-scaping Marketing</b>	Promote water quality projects such as lakeshore restorations, rain gardens, and others.	Variety of outreach techniques to lakeshore property owners.	Throughout watershed	\$0
	Inform the public about the SRWMO. Meet state requirements for an annual publication.			
<b>Annual Newsletter Article</b>	To increase visibility of the SRWMO name and messaging. To meet State-required outreach.	Newsletter article distributed to member communities for publication in their newsletters.	Throughout watershed	\$500

**The following deviations from watershed plan are anticipated in 2018:**

- Change Deleted water quality cost share grant program funding of \$2,000.
- Reason Sufficient funds were carried over from previous years.
- Change Moved \$2,000 from the water quality cost share fund held at the Anoka Conservation District to the SRWMO general fund.
- Reason The board felt the fund contained excess funds. After the change, funding remained for 2-3 lakeshore restorations.
- Change Added a SRWMO website overhaul to a new platform.
- Reason The current website is more than 10 years old and lacks current day security features. Several instances of hacking have occurred in the last 18 months. One problem was that a number of unauthorized Russian-sounding user names were added to the website administration. Another problem was hackers were generating fraudulent emails that appeared to come from the Chair asking the Treasurer to transfer funds or make a payment.
- Change Reduced the 2019 planned budget amount for update of the SRWMO Watershed Management Plan.
- Reason After several years of saving funds totaling \$35,175 the board felt the amount was sufficient.
- Change Removed lakeshore landscaping education.
- Reason This longstanding program has not been successful. The SRWMO elected to use this funding on other efforts.
- Change Added chlorides monitoring to two stream water quality monitoring sites at the outlets of the SRWMO. Cost was \$450.
- Reason This parameter had not been monitored in >4 years and the board feels it is important because of regionally observed chloride increases.
- Change Added water quality monitoring at Boot Lake.



- Reason The Linwood Lake Improvement Association requested this monitoring. They are preparing a lake management plan, and realized the lake's only stream inlet which comes from Boot Lake had never been monitored. They suspect it may be a source of some problems. Monitoring the stream inlet was not feasible due to difficult access, so monitoring Boot Lake was selected instead. The results should help inform the lake management plan as well as the SRWMO Watershed Plan update.
- Change Deleted monitoring of water quality improvement project effectiveness, which was in the Watershed Plan for \$1,000.
- Reason All of the effectiveness monitoring sites were already being monitored under the routine schedule.

#### i. Status of Local Ordinances, Water Plan Adoption and Implementation

All SRWMO member communities are required to have a Local Water Plan that is consistent with the SRWMO Watershed Management Plan. The WMOs have approval authority over these Local Water Plans. Whenever a WMO plan is updated the member municipalities have two years to update their Local Water Plans, ordinances, and other control measures to be consistent with the WMO Plan.

All local water plans have been approved. The following is the status of each city or township's local water plan:

**Linwood Township** – Linwood Township has adopted the SRWMO Watershed Management Plan by reference.

**Ham Lake** – Approved in February 2013 by the SRWMO.

**East Bethel** – Approved in May 2011 by the SRWMO.

**Columbus** – Approved February 2011 by the SRWMO.

To track member cities' progress on local plan implementation, the SRWMO requires a brief annual report from each city and provides a template for this report. In addition to serving as a reporting tool, the template serves as a "to do" list for our cities. These reports are available upon request, and are summarized in the table below.

#### Status of city local water plans and some recent accomplishments toward plan implementation.

Linwood Township	
Submitted 2017 annual report to SRWMO?	No
Status of ordinances and control measures	The Township has the full suite of ordinances required by the SRWMO.
Some Recent Implementation	<ul style="list-style-type: none"> <li>Inventory of septic systems around Linwood Lake, identifying potentially troubled systems, and offering technical and financial assistance to fix problems.</li> </ul>

<b>Accomplishments</b>	<ul style="list-style-type: none"> <li>• Outreach and education reaching 1,800 households on the topics of wetland buffers, water quality monitoring, groundwater protection, controlling invasive species, hazardous waste disposal, yard waste management and activities of the SRWMO.</li> </ul>
<b>City of East Bethel</b>	
<b>Submitted 2017 annual report to SRWMO?</b>	Yes
<b>Status of ordinances and control measures</b>	The City has the full suite of ordinances required by the SRWMO.
<b>Some Recent Implementation Accomplishments</b>	<ul style="list-style-type: none"> <li>• Education materials distributed to 11,000 residents on the topics of water quality monitoring, controlling invasive species, and yard waste management.</li> <li>• Completed mapping of stormwater system in 2014.</li> <li>• Annual street sweeping.</li> </ul>
<b>City of Ham Lake</b>	
<b>Submitted 2017 annual report to SRWMO?</b>	Yes
<b>Status of ordinances and control measures</b>	The City has the full suite of ordinances required by the SRWMO.
<b>Some Recent Implementation Accomplishments</b>	<ul style="list-style-type: none"> <li>• Ongoing work to complete BMP's in the City's Storm Water Pollution Prevention Plan.</li> <li>• Educational efforts through the City's newsletter, which reaches the entire population of 5,548 households and businesses. Educational article topics in 2017 included groundwater protection, water conservation, hazardous waste disposal, yard waste management, ag BMPs, pet waste disposal, and activities of the SRWMO.</li> <li>• Uncertain about progress on mapping of stormwater systems. Completion was required by the WMO by 2014.</li> </ul>
<b>City of Columbus</b>	
<b>Submitted 2017 annual report to SRWMO?</b>	Yes
<b>Status of ordinances and control measures</b>	The City has the full suite of ordinances required by the SRWMO.
<b>Some Recent Implementation Accomplishments</b>	<ul style="list-style-type: none"> <li>• Educational efforts through the City's newsletter, which reaches the entire population of 1,450 households and businesses. Educational article topics in 2016 included wetland buffers, water quality monitoring, groundwater protection, controlling invasive species, hazardous waste disposal and activities of the SRWMO.</li> <li>• Partially completed mapping of stormwater systems. Completion was required by the WMO by 2014.</li> <li>• Street sweeping.</li> <li>• Inspections of storm water treatment basins.</li> </ul>

**j. Solicitations for Services**

State rules require watershed management organizations to solicit bids for professional services at least once every two years. Most recently the SRWMO solicited bids in early 2018 for work to occur in the same year. Two requests for proposals were made: one for annual water monitoring and management and the other for update of the SRWMO Watershed Management plan.

The SRWMO sought proposals from a variety of firms for these services. To build a list of possible consultants the Chairperson contacted engineering departments of 12 nearby cities, plus Anoka County, to learn who they used for similar work. Requests for proposals were sent to the resulting list. Four firms responded that they would not choose to provide proposals.

In 2019 the SRWMO plans to solicit bids for services in 2020.

**k. Permits, Variances, and Enforcement Actions**

The SRWMO does not issue permits, variances, or take enforcement actions. These responsibilities are held by the member municipalities, as outlined in each municipality's local water plan, ordinances, and policies.

## IV. Financial and Audit Report

### a. 2017 Financial Report

See Appendix A – 2017 Financial Report.

### b. Financial Audit

An annual financial report is complete. That report is Appendix A.

The SRWMO completed an audit of 2014 finances in 2015. No audit of 2017 is required per MN Statutes, section 6.756. The next anticipated audit should occur after the end of 2019. Per state statute, that audit will be for any one of the previous five years, which the auditor shall choose at random.

### c. 2018 Budget

At its May 4, 2017 meeting the SRWMO Board approved a 2018 budget of \$48,460. Budget details are below.

		<b>Linwood</b>	<b>East Bethel</b>	<b>Columbus</b>	<b>Ham Lake</b>
<b><u>NON-OPERATING EXPENSES (split by percentages)</u></b>		<b><u>46.40%</u></b>	<b><u>32.93%</u></b>	<b><u>16.72%</u></b>	<b><u>3.95%</u></b>
Grant Search and Applications	\$1,000.00	\$464.00	\$329.30	\$167.20	\$39.50
Lake Level Monitoring	\$1,300.00	\$603.20	\$428.09	\$217.36	\$51.35
Lake Water Quality Monitoring	\$10,800.00	\$5,011.20	\$3,556.44	\$1,805.76	\$426.60
Lake Water Quality Monitoring - Improvement Project Effectiveness	\$0.00				
Stream Water Quality Monitoring	\$4,200.00	\$1,948.80	\$1,383.06	\$702.24	\$165.90
Stream Hydrology Monitoring	\$1,370.00	\$635.68	\$451.14	\$229.06	\$54.12
Reference Wetland Hydrology Monitoring	\$1,800.00	\$835.20	\$592.74	\$300.96	\$71.10
Upcoming Water Quality Projects	\$8,000.00	\$3,712.00	\$2,634.40	\$1,337.60	\$316.00
SRWMO Cost Share Grant Fund	\$1,000.00	\$464.00	\$329.30	\$167.20	\$39.50
Website – Annual Operations	\$540.00	\$250.56	\$177.82	\$90.29	\$21.33
Lakeshore Landscaping Marketing	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SRWMO Annual Education Publication/Newsletter Article	\$500.00	\$232.00	\$164.65	\$83.60	\$19.75
Tour of Water Quality Projects for Public Officials	\$1,500.00	\$696.00	\$493.95	\$250.80	\$59.25
Watershed Plan Update beginning 2018	\$10,000.00	\$4,640.00	\$3,293.00	\$1,672.00	\$395.00
Legal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Financial Audit (next req'd in 2020 of 2019)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Advertise Bids for Pro Services (req'd in odd yrs.)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>SUBTOTAL</b>	<b>\$42,010.00</b>	<b>\$19,492.64</b>	<b>\$13,833.89</b>	<b>\$7,024.07</b>	<b>\$1,659.40</b>
<b><u>OPERATING EXPENSE (split equally four ways)</u></b>					
Secretarial or other administrative	\$950.00	\$237.50	\$237.50	\$237.50	\$237.50
Liability Insurance	\$2,000.00	\$500.00	\$500.00	\$500.00	\$500.00
Administrative Assistance – City of East Bethel	\$300.00	\$75.00	\$75.00	\$75.00	\$75.00
ACD Administrator (on-call, limited)	\$2,100.00	\$525.00	\$525.00	\$525.00	\$525.00
Annual report to BWSR and member communities	\$800.00	\$200.00	\$200.00	\$200.00	\$200.00
Annual financial report to State Auditor	\$300.00	\$75.00	\$75.00	\$75.00	\$75.00
<b>SUBTOTAL</b>	<b>\$6,450.00</b>	<b>\$1,612.50</b>	<b>\$1,612.50</b>	<b>\$1,612.50</b>	<b>\$1,612.50</b>
<b>Grand Total</b>	<b>\$48,460.00</b>	<b>\$21,105.14</b>	<b>\$15,446.39</b>	<b>\$8,636.57</b>	<b>\$3,271.90</b>

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# Appendix A:

## 2017 Financial Report

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# **SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION**

## **FINANCIAL REPORT FOR YEAR ENDED DECEMBER 31, 2017**

**To the Chairperson, Dan Babineau, of Sunrise River Water Management  
Organization**

The enclosed statement has been prepared after review of the organization's financial records. I have not audited the organization's records and do not express an opinion. The enclosed information fairly reflects the Sunrise River WMO's financial position for the stated year, based on records provided to me by the organization.

April 13, 2018

Prepared by:  
Jamie Schurbon  
Anoka Conservation District  
1318 McKay Drive NE, suite 300  
Ham Lake, MN 55304  
763-434-2030



**SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION**  
**2241 - 221st Avenue**  
**Cedar, MN 55011**

**STATEMENT OF REVENUES AND EXPENSES**

For: year beginning January 1, 2017 and ending December 31, 2017

<b>Expenditures</b>	<b>Amount</b>
<b>Operating</b>	
Insurance – MN Counties Intergovernmental Trust	\$1,554.00
Secretarial services - Gail Gessner	\$875.00
On-call admin assistance - Anoka Conservation District	\$2,100.00
Annual report to BWSR – ACD	\$800.00
Annual financial report to State Auditor (ACD)	\$300.00
Administrative - City of East Bethel	\$0.00
Peterson Co LTD - Audit	\$0.00
Other	\$0.00
SUBTOTAL	\$5,629.00
<b>Non-Operating</b>	
Water Monitoring - Anoka Conservation District (ACD)	\$9,425.00
Studies and Investigations - ACD	\$0.00
Grant search and applications- ACD	\$200.00
Education and public outreach - ACD	\$1,005.00
Water quality improvement projects - ACD	\$5,850.00
Cost share grant fund for water quality projects	\$1,000.00
Other	\$0.00
Other	\$0.00
SUBTOTAL	\$17,480.00
<b>GRAND TOTAL</b>	<b>\$23,109.00</b>
<b>Revenues</b>	<b>Amount</b>
Linwood Twp	\$13,837.62
City of Columbus	\$5,985.78
City of Ham Lake	\$2,607.48
City of East Bethel	\$10,274.14
Insurance dividend	380.00
Other	0.00
Other	0.00
<b>GRAND TOTAL</b>	<b>\$33,085.02</b>
<b>Retained Cash Reserves</b>	<b>\$9,976.02</b>
<b>Total Cash Reserves</b>	<b>\$33,041.75</b>

# SUNRISE RIVER WATERSHED MANAGEMENT ORGANIZATION

## BALANCE SHEET

For the year beginning January 1, 2017 and ending December 31, 2017

<b>Assets</b>	
Cash	\$33,041.75
Accounts Receivable	\$0.00
Water quality project grant fund held at the Anoka Conservation District	\$6,964.93
Other	\$0.00
Other	\$0.00
Total Assets	\$40,006.68
<b>Liabilities</b>	
Accounts Payable	\$0.00
Other	\$0.00
Other	\$0.00
Other	\$0.00
Total Liabilities	\$0.00

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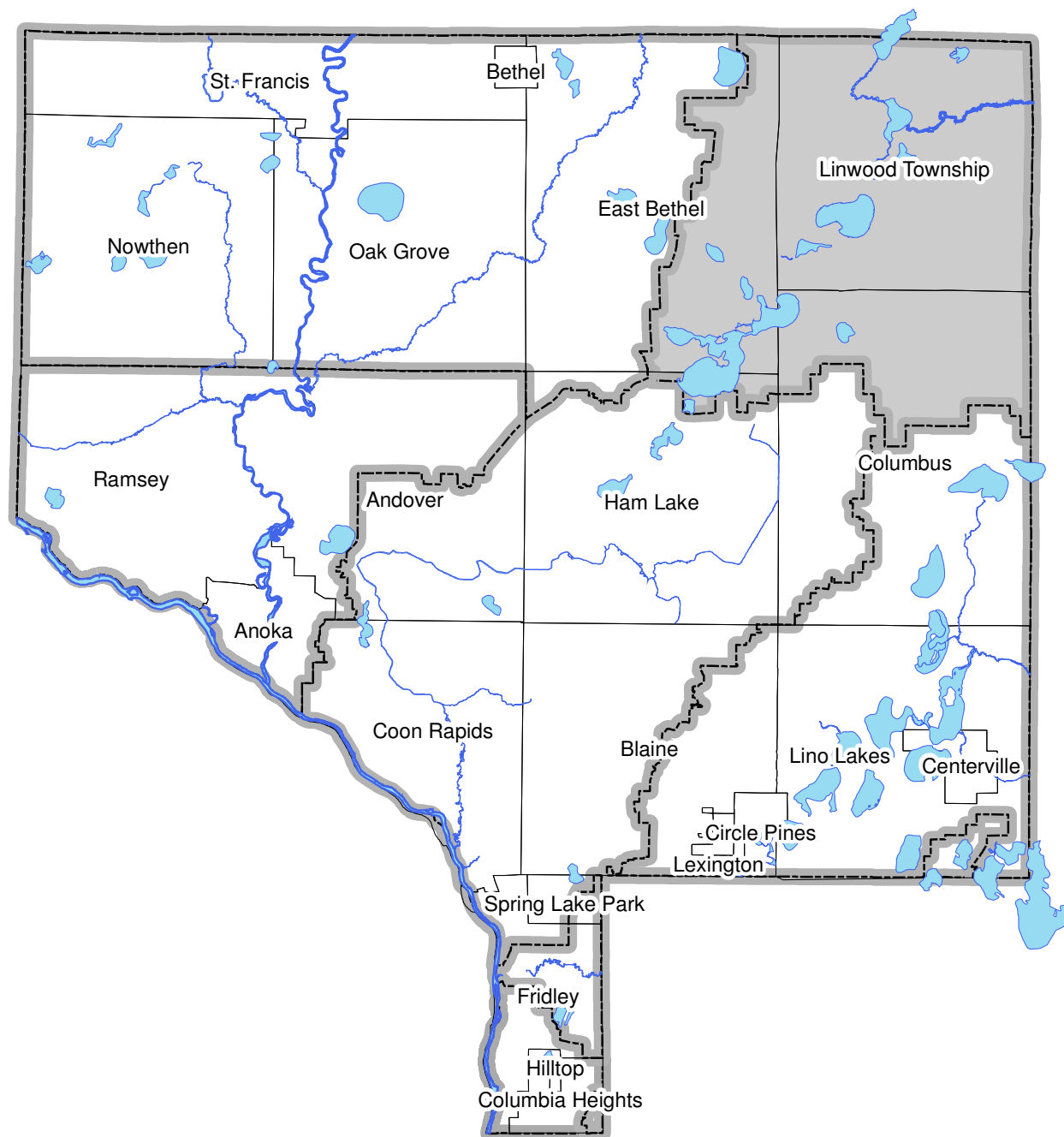
# Appendix B:

## 2017 Water Monitoring and Management Work Results

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# Excerpt from the 2017 Anoka Water Almanac

## *Chapter 2: Sunrise River Watershed*



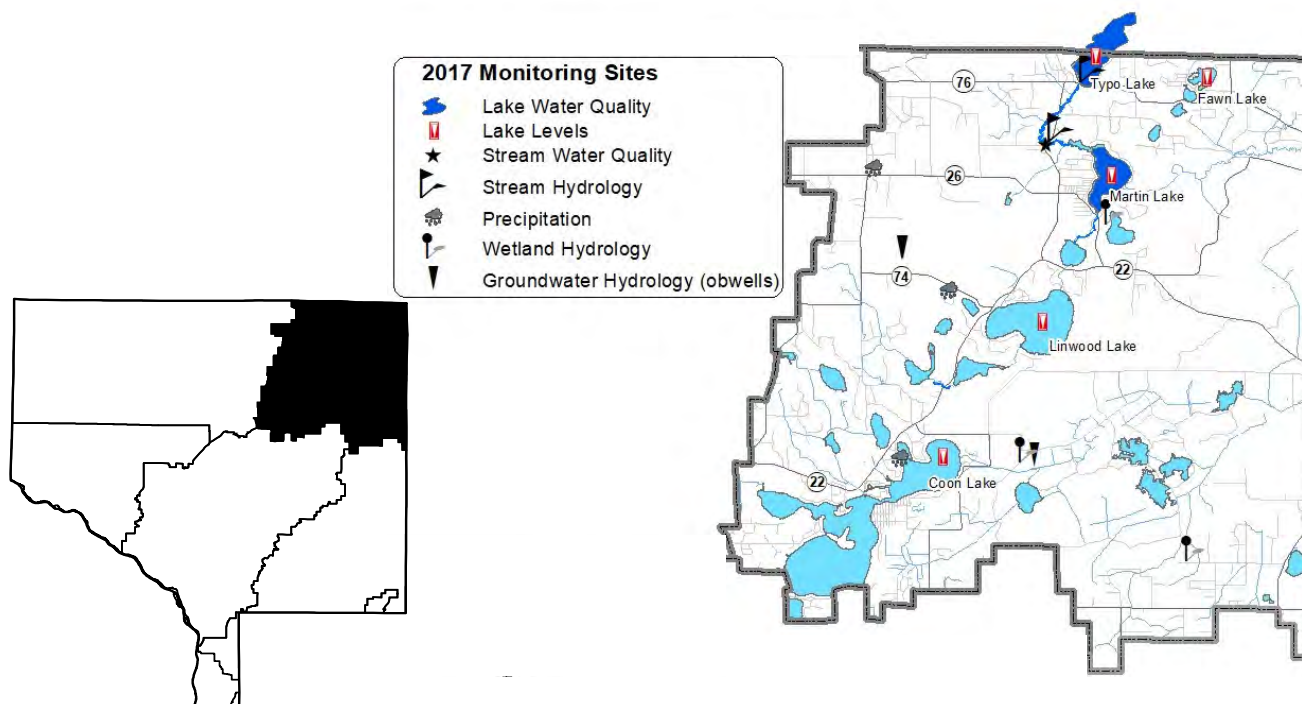
Prepared by the Anoka Conservation District



## Chapter 2: Sunrise River Watershed

Task	Partners	Page
Lake Levels	SRWMO, ACD, MN DNR, volunteers	2-34
Lake Water Quality	SRWMO, ACD, ACAP	2-36
Stream Hydrology	SRWMO, ACD, ACAP	2-41
Stream Water Quality	SRWMO, ACD, ACAP	2-43
Wetland Hydrology	SRWMO, ACD, ACAP	2-50
Water Quality Grant Fund	SRWMO, ACD	2-54
Martin and Typo Lake Carp Removal Project	SRWMO, ACD, Martin Lakers Assoc, DNR	2-55
Ditch 20 Feasibility Study	SRWMO, ACD	2-56
Annual Education Publication	SRWMO, ACD	2-58
SRWMO Website	SRWMO, ACD	2-59
Grant Search and Applications	SRWMO, ACD	2-60
SRWMO 2016 Annual Report	SRWMO, ACD	2-61
On-call Administrative Services	SRWMO, ACD	2-62
Financial Summary		2-63
Recommendations		2-64
Groundwater Hydrology (obwells)	ACD, MNDNR	See Chapter 1
Precipitation	ACD, volunteers	See Chapter 1

ACD = Anoka Conservation District, SRWMO = Sunrise River Watershed Management Organization,  
MNDNR = Minnesota Dept. of Natural Resources, ACAP = Anoka County Ag Preserves





## Lake Levels

**Description:** Weekly water level monitoring in lakes. The past five and twenty-five years of data for each lake are illustrated below, and all historical data are available on the Minnesota DNR website using the “LakeFinder” feature ([www.dnr.mn.us.state/lakefind/index.html](http://www.dnr.mn.us.state/lakefind/index.html)).

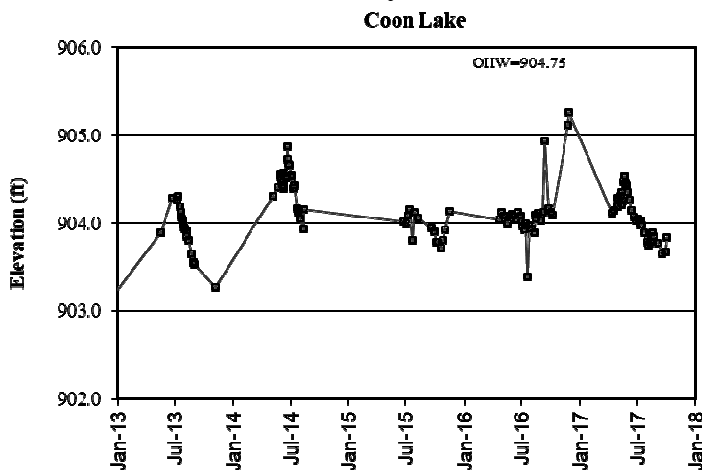
**Purpose:** To understand lake hydrology, including the impact of climate or other water budget changes. These data are useful for regulatory, building/development, and lake management decisions.

**Locations:** Coon, Fawn, Linwood, Martin, and Typo Lakes

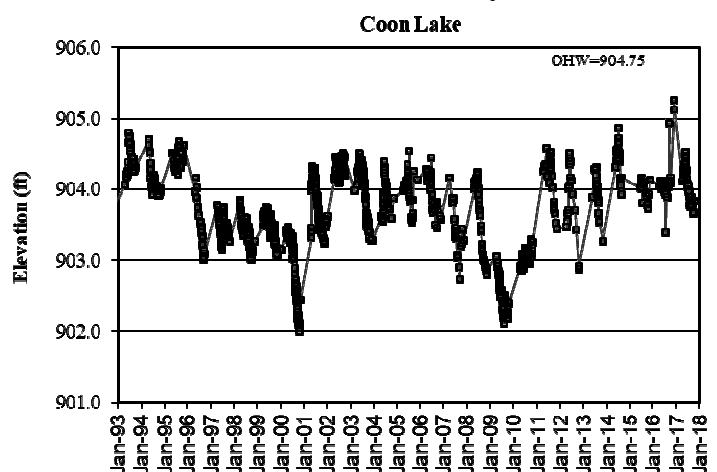
**Results:** Lake levels were measured by volunteers throughout the 2017 open water season. Lake gauges were installed and surveyed by the Anoka Conservation District and MN DNR. In 2017, lakes followed the expected pattern of increasing water levels in spring and early summer and then fell later in the summer due to less rainfall. Martin and Linwood Lakes saw a slight rebound in levels through fall after a large early October rain event.

All lake level data can be downloaded from the MN DNR website’s Lakefinder feature. Ordinary High Water Level (OHW), the elevation below which a DNR permit is needed to perform work, is listed for each lake on the corresponding graphs below.

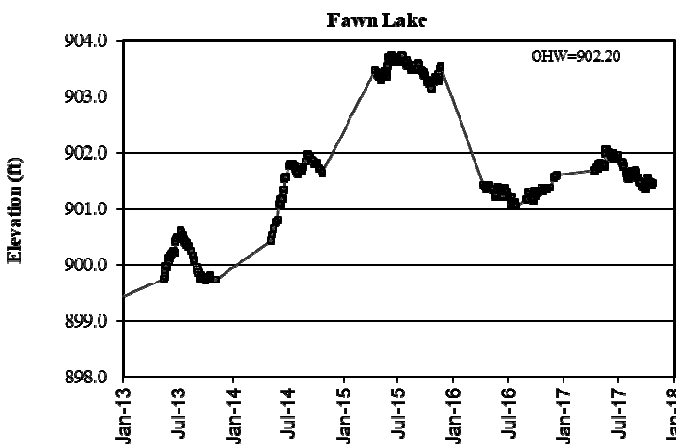
Coon Lake Levels – last 5 years



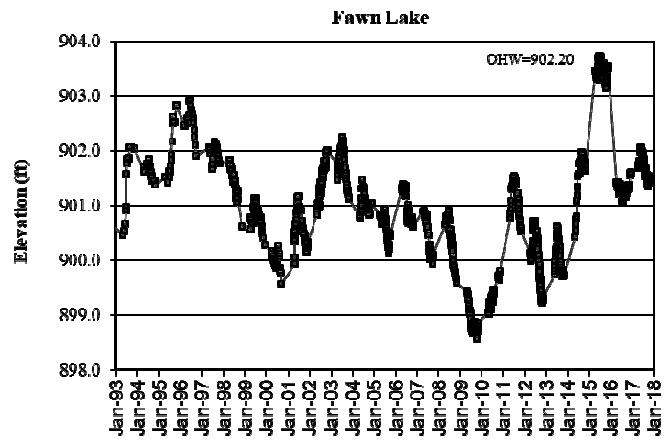
Coon Lake Levels – last 25 years



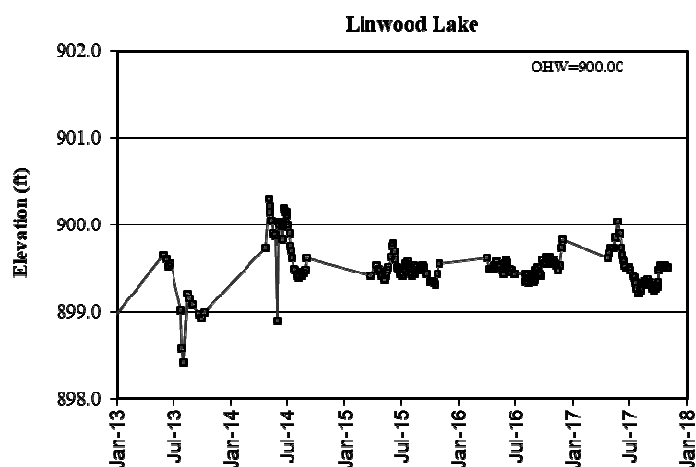
Fawn Lake Levels – last 5 years



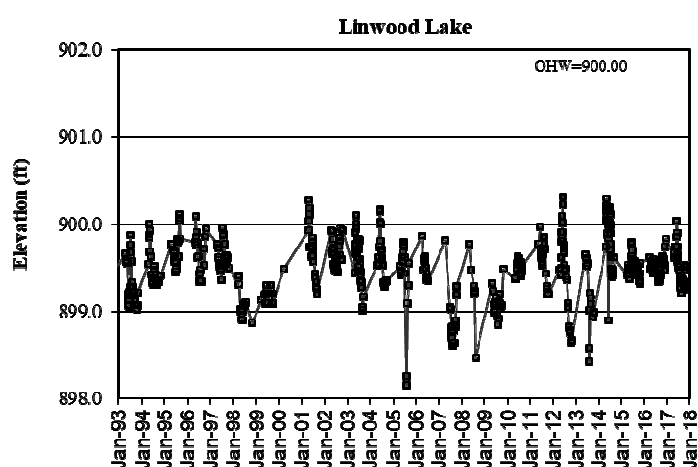
Fawn Lake Levels – last 25 years



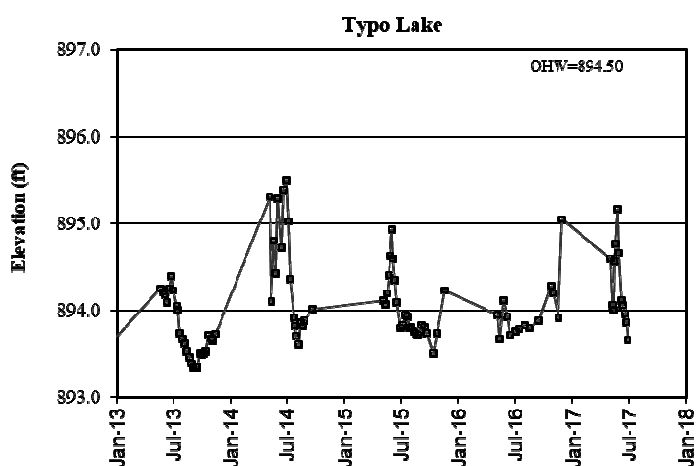
**Linwood Lake Levels – last 5 years**



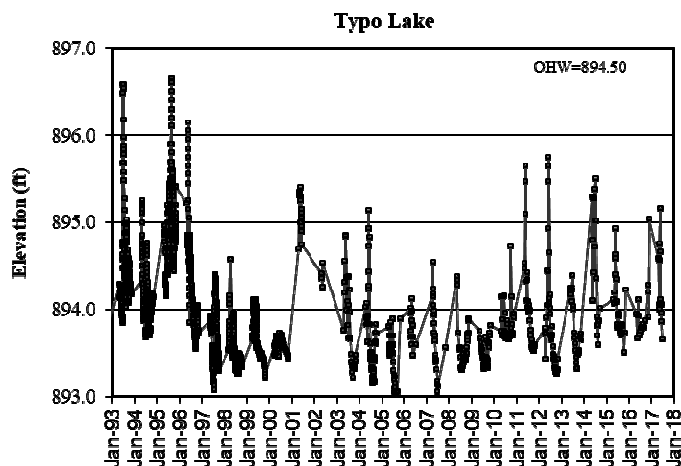
**Linwood Lake Levels – last 25 years**



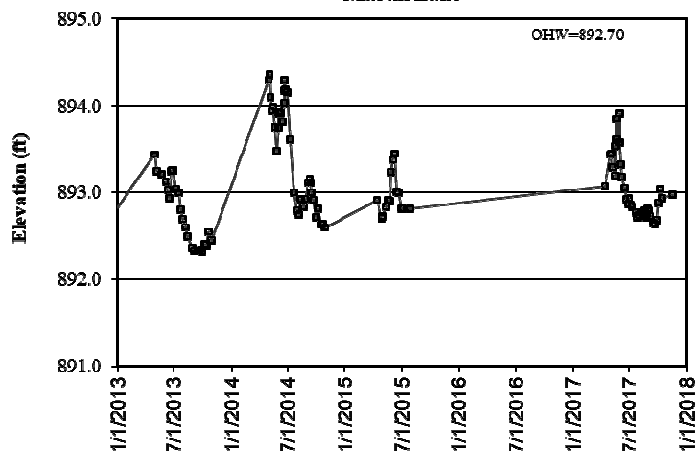
**Typo Lake Levels – last 5 years**



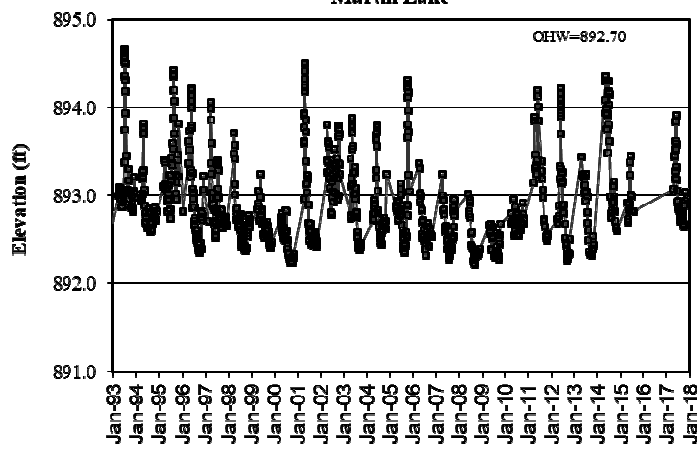
**Typo Lake Levels – last 25 years**



**\*Martin Lake Levels – last 5 years**



**\*Martin Lake Levels – last 25 years**



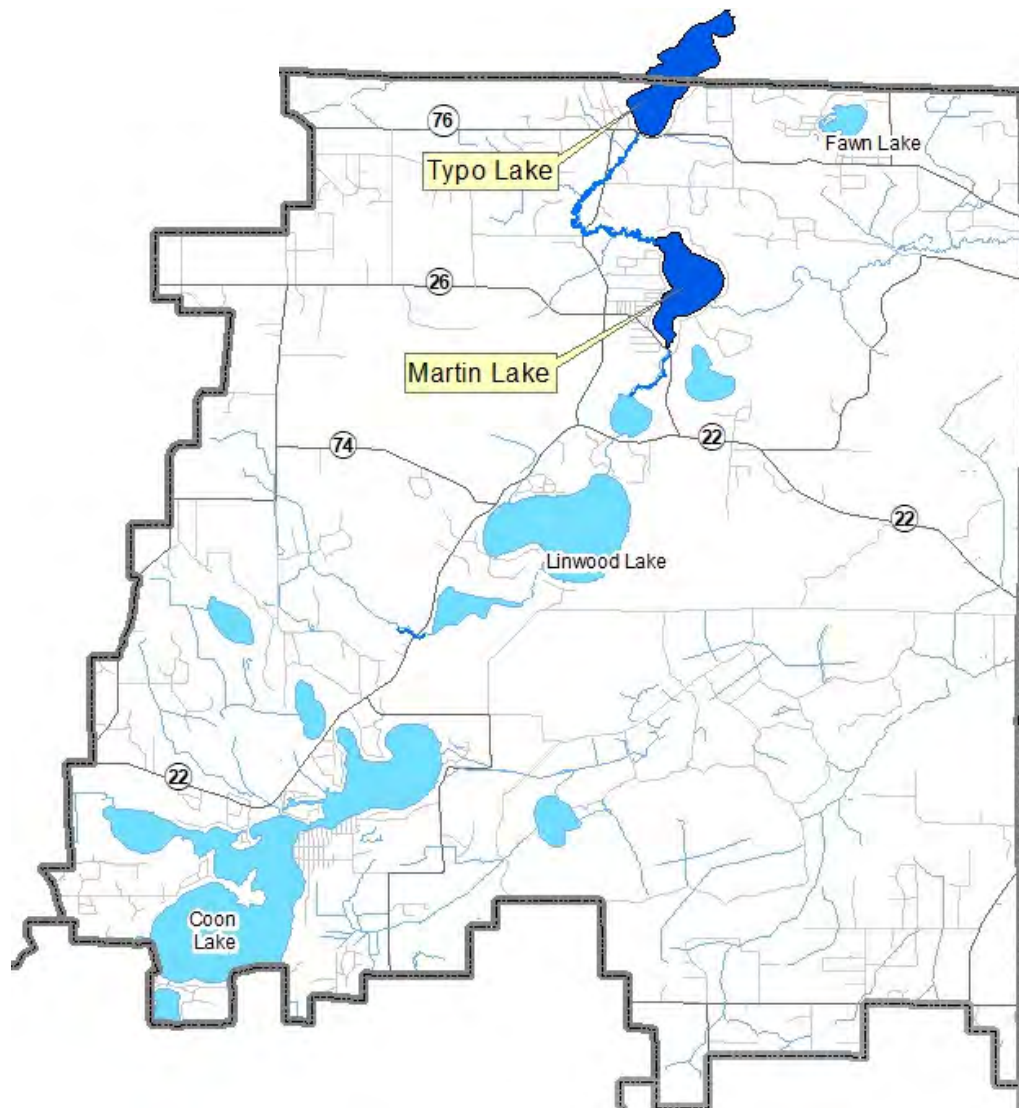
\*No lake level data was received for Martin Lake in 2016

## Lake Water Quality

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- Description:** May through September, every-other-week, monitoring is conducted for the following parameters: total phosphorus, chlorophyll-a, Secchi transparency, dissolved oxygen, turbidity, temperature, conductivity, pH, and salinity.
- Purpose:** To detect water quality trends and diagnose the cause of changes.
- Locations:** Typo Lake  
Martin Lake
- Results:** Detailed data for each lake are provided on the following pages, including summaries of historical conditions and trend analysis. Previous years' data are available from the MPCA ([https://cf.pca.state.mn.us/water/watershedweb/wdip/search\\_more.cfm](https://cf.pca.state.mn.us/water/watershedweb/wdip/search_more.cfm)) or from ACD. Refer to Chapter 1 for additional information on lake dynamics and interpreting the data.

### Sunrise Watershed Lake Water Quality Monitoring Sites



## ***Typo Lake***

***Linwood Township, Lake ID # 30-0009***

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### **Background**

Typo Lake is located in northeast Anoka County and southeast Isanti County. It has a surface area of 290 acres and maximum depth of 6 feet (1.82 m), though most of the lake is about 3 feet deep. The lake has a mucky, loose, and unconsolidated bottom in some areas, while other areas have a sandy bottom. The public access is located at the south end of the lake along Fawn Lake Drive. The lake is used little for fishing or recreational boating because of the shallow depth and extremely poor water quality. The lake's shoreline is mostly undeveloped, with only 21 homes within 300 feet of the lakeshore. The lake's watershed of 11,520 acres is 3% residential, 33% agricultural, 28% wetlands, with the remainder being forested or grassland. Typo Lake is on the Minnesota Pollution Control Agency's (MPCA) list of impaired waters for excess nutrients.

### **2017 Results**

In 2017 Typo Lake had extremely poor water quality compared to other lakes in this region (NCHF Ecoregion), receiving an overall F letter grade. This overall grade is consistent with all previous years monitored except for the D- achieved in 2014. Average total phosphorus (TP) was higher than the previous five years monitored at 226 µg/L. However, removing two very high outliers lowers the average to 134 µg/L, which would be lowest average on record. While total phosphorus levels continue to far exceed the 60 µg/L state standards, average concentrations appear to be staying well below averages from a decade ago. Continuing to pursue and fund restoration projects in the lakeshed, as well as managing rough fish populations in the lake, should continue to produce lower phosphorus levels.

Chlorophyll-a (Cl-a) levels in 2017 averaged 66.7 µg/L. This is well below the historical average of 115.3 µg/L, lower than the 2016 average of 83.4 µg/L, but above average concentrations in 2014 and 2015.

Average Secchi transparency in 2017 was 1.2 feet. While this marks an improvement from a decade ago (in 2007 and 2009 a Secchi disk could be seen only 5-6 inches below the surface, on average) it is still far below the state standard of over 3 feet. There was a slight improvement in 2012 to 9-10 inches and a larger improvement in 2014 to 21-22 inches. In 2016, average Secchi transparency declined back to under a foot (about 11 inches).

### **Trend Analysis**

Seventeen years of water quality monitoring have been conducted by the Minnesota Pollution Control Agency (1993, '94, and '95) and the Anoka Conservation District (1997-2001, '03, '05, '07, '09, '12, 20014-2017). Water quality has improved from 1993 to 2017 in a statistically significant way (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth;  $F_{2,14}=5.7$ ,  $p=0.02$ ). When we tested these response variables individually with one-way ANOVAs TP and Secchi depth still show no significant change across this time period. Cl-a, however, is now showing a statistically significant decline ( $F_{1,15}=4.55$ ,  $p<0.05$ ). A superficial look at graphs of these parameters suggests that total phosphorus is actually generally increasing, though this increase is driven by very high concentrations in 2007 and 2009. Excluding these outliers actually shows a slight declining trend in TP. Secchi depth appears to be increasing. The major driver of improved water quality is decreasing Cl-a concentrations.

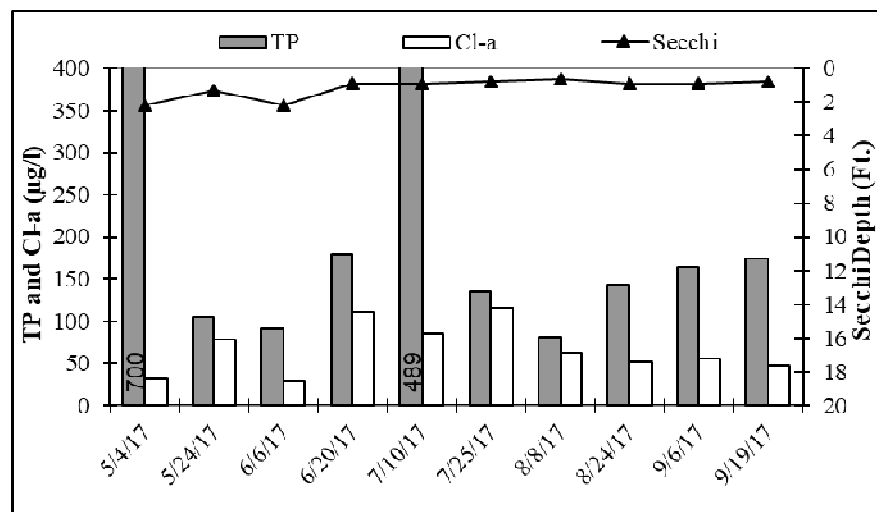
### **Discussion**

Typo Lake, along with Martin Lake downstream, were the subject of a Total Maximum Daily Load (TMDL) study by the Anoka Conservation District, which was approved by the State and EPA in 2012. This study documented the sources of nutrients to the lake, the degree to which each is impacting the lake, and put forward lake rehabilitation strategies. Some factors impacting water quality on Typo Lake include the presence of rough fish, high phosphorus inputs from a ditched wetland west of the lake, and lake sediments. Recent work has included installation of carp barriers (completed in 2016), carp removals (2017-19) and a feasibility study of ditched wetland restorations upstream of Typo Lake (final reporting in early 2018).

# Typo Lake

## Linwood Township, Lake ID # 30-0009

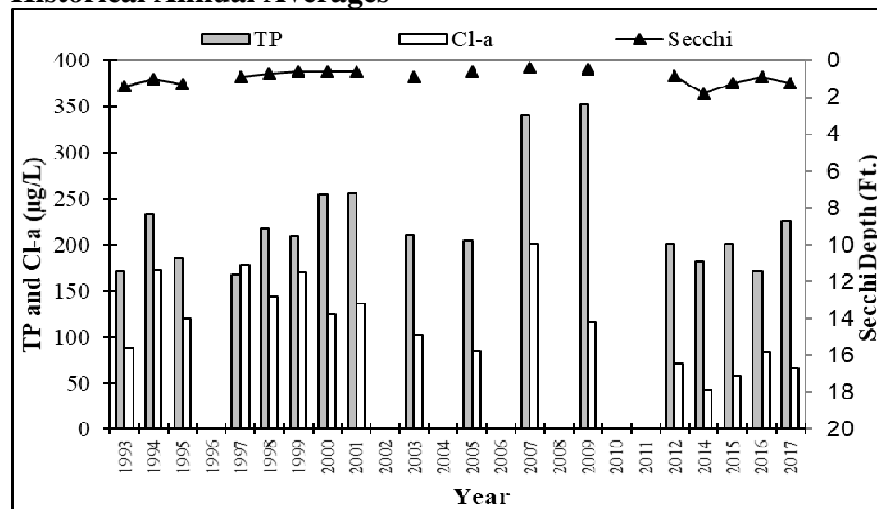
### 2017 Results



### Historical Report Card

Year	TP	Cl-a	Secchi	Overall
1974			F	
1975			F	
1993	F	F	F	F
1994	F	F	F	F
1995	F	F	F	F
1997	F	F	F	F
1998	F	F	F	F
1999	F	D	F	F
2000	F	F	F	F
2001	F	F	F	F
2003	F	F	F	F
2005	F	F	F	F
2007	F	F	F	F
2009	F	F	F	F
2012	F	D	F	F
2014	F	C	F	D-
2015	F	D	F	F
2016	F	F	F	F
2017	F	D	F	F
2017 average	226* µg/L	66.7 µg/L	0.4 meters	
State standards	60 µg/L	20 µg/L	1.0 meters	

### Historical Annual Averages



\*Two outliers removed lowers avg. to 134 µg/L

### 2017 Raw Data

Units	Date	Time	5/4/2017	5/24/2017	6/6/2017	6/20/2017	7/10/2017	7/25/2017	8/8/2017	8/24/2017	9/6/2017	9/19/2017	Average	Min	Max
			13:40	13:40	14:50	13:10	10:25	10:15	10:25	11:00	10:20	10:10			
pH			7.01	7.06	7.10	7.78	7.16	8.44	8.92	9.48	9.34	9.18	9.05	9.05	9.48
Conductivity	mS/cm		0.01	0.213	0.228	0.297	0.280	0.264	0.265	0.250	0.240	0.255	0.276	0.257	0.297
Turbidity	NTU		1	23.40	32.40	30.50	89.30	86.20	123.00	84.50	79.20	96.90	65	23	97
D.O.	mg/l		0.01	14.02	13.38	9.61	12.13	7.40	10.38	13.55	12.13	10.72	8.64	11.20	14.02
D.O.	%		1	136%	135%	116%	146%	92%	127%	161%	138%	112%	95%	126%	161%
Temp.	°C		0.1	13.0	14.1	22.1	22.5	24.8	24.2	23.0	21.8	16.3	17.5	19.93	24.82
Temp.	°F		0.1	55.4	57.3	71.8	72.4	76.7	75.6	73.5	71.2	61.4	63.4	67.9	76.7
Salinity	‰		0.01	0.10	0.11	0.14	0.13	0.13	0.12	0.12	0.12	0.13	0.1	0.1	0.1
Cl-a	µg/l		1	32.0	78.3	28.5	112.0	85.4	115.0	61.9	51.3	55.5	47.0	66.7	115.0
T.P.	mg/l		0.005	0.700	0.105	0.091	0.179	0.489	0.136	0.081	0.143	0.165	0.174	0.226	0.700
T.P.	µg/l		5	700	105	91	179	489	136	81	143	165	174	226	700
Secchi	ft		0.1	2.2	1.3	2.2	0.9	0.9	0.8	0.7	0.9	0.8	0.8	1.2	2.2
Secchi	m		0.1	0.7	0.4	0.7	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.4	0.7
Field Observations			Brown, Cloud		Brown		Murky		Brown		Green		Brown		Brown
Physical			4	4	4	4	4	3	4	5	4	5	4.1	3.0	5.0
Recreational			4	4	4	3	3	2	2	4	4	4	3.4	2	4

\*reporting limit

## ***Martin Lake***

***Linwood Township, Lake ID # 02-0034***

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### **Background**

Martin Lake is located in northeast Anoka County. It has a surface area of 223 acres and maximum depth of 20 ft. The public access is located on the southern end of the lake. The lake is used moderately by recreational boaters and fishers, and would likely be used more if water quality improved. Martin Lake is almost entirely surrounded by private residences. The 5,402 acre watershed is 18% developed; the remainder is vacant, agricultural or wetlands. The non-native, invasive plant curly-leaf pondweed occurs in Martin Lake but not at nuisance levels. Martin is on the Minnesota Pollution Control Agency's (MPCA) list of impaired waters for excess nutrients.

### **2017 Results**

In 2017 Martin Lake had typical water quality compared to other recent years, which compares poorly to other lakes in the North Central Hardwood Forest Ecoregion (NCHF), and received a C letter grade. Martin Lake is quite eutrophic for a lake of its size and depth due to chronically high total phosphorus (TP) and chlorophyll-a (Cl-a). In 2017 total phosphorus levels, however, continued a three-year improvement averaging 59.3 µg/L. This is the lowest average on record, though it remains above the impairment threshold of 40 µg/L. This now marks two consecutive years with lowest average total phosphorus on record for Martin Lake following the previous record low average of 69.1 µg/L in 2016. These averages are half, or less than half, of averages from a decade ago (135.0 µg/L in 2007)

Chlorophyll-a dropped slightly from the previous year to 24.9 µg/L in 2017. While the 5 year average since 2012 (22.19 µg/L) has been much lower than the 2005-2009 average (108.3 µg/L), this average still remains above the impairment standard of 14 µg/L.

Average Secchi transparency was 3.0 feet in 2017, exactly matching its historical average. This average remains about 30% below the State impairment threshold of 4.6 feet. The ACD staff continue to note green water during late summer months.

### **Trend Analysis**

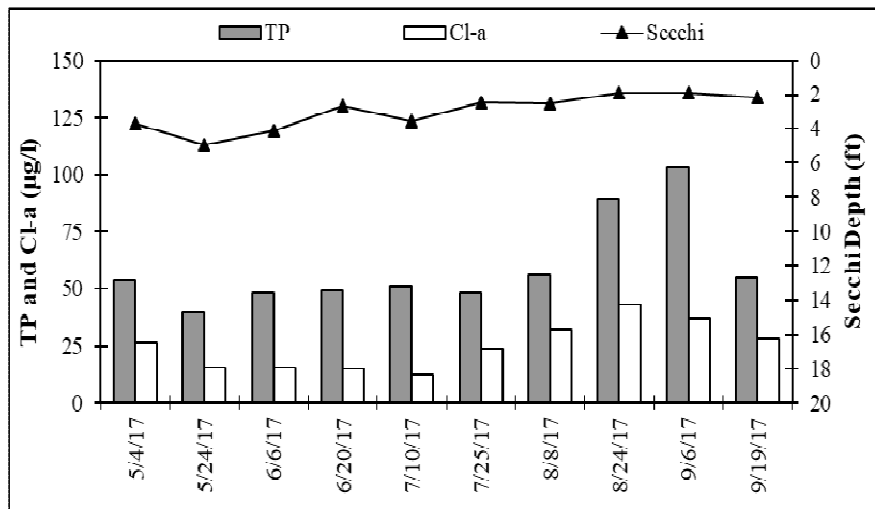
Sixteen years of water quality data have been collected by the Minnesota Pollution Control Agency (1983), Metropolitan Council (1998, 2008), and the ACD (1997, 1999-2001, 2003, 2005, 2007, 2009, 2012-2017). Citizens monitored Secchi transparency 17 other years. Anecdotal notes from DNR fisheries data indicate poor water quality dating back to at least 1954. Although still pretty poor, water quality in Martin Lake has actually shown an improvement from 1983 to 2017 that is statistically significant (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth;  $F_{2,13}=5.82$ ,  $p<0.02$ ). Further examination of the data (one-way ANOVAs on the individual response variables) shows that while TP and Secchi depth appear to be staying virtually flat, Cl-a has shown a statistical decrease ( $F_{1,14}=9.25$ ,  $p<0.01$ ). Similar to Typo Lake, a decrease in Cl-a concentrations are driving a statistically significant improvement in overall water quality.

### **Discussion**

Martin Lake, along with Typo Lake upstream, was the subject of a TMDL study by the Anoka Conservation District that was approved by the State and EPA in 2012. This study documented the source of nutrients to the lake, the degree to which each is impacting the lake, and put forward lake rehabilitation strategies. Water from Typo Lake and internal loading (carp, septic systems, sediments, etc.) are two of the largest negative impacts on Martin Lake water quality. Installation of carp barriers was completed in 2016. Carp removals and other management efforts are taking place in 2017-19. Upstream of Typo Lake, a feasibility study is being completed in early 2018 regarding restoration of ditched wetlands. In the neighborhoods adjacent to Martin Lake three rain gardens were installed in 2011. Recent water quality monitoring results suggest these management approaches are improving conditions in these lakes, but reaching goals will require additional efforts and time.

**Martin Lake**  
Linwood Township, Lake ID # 02-0034

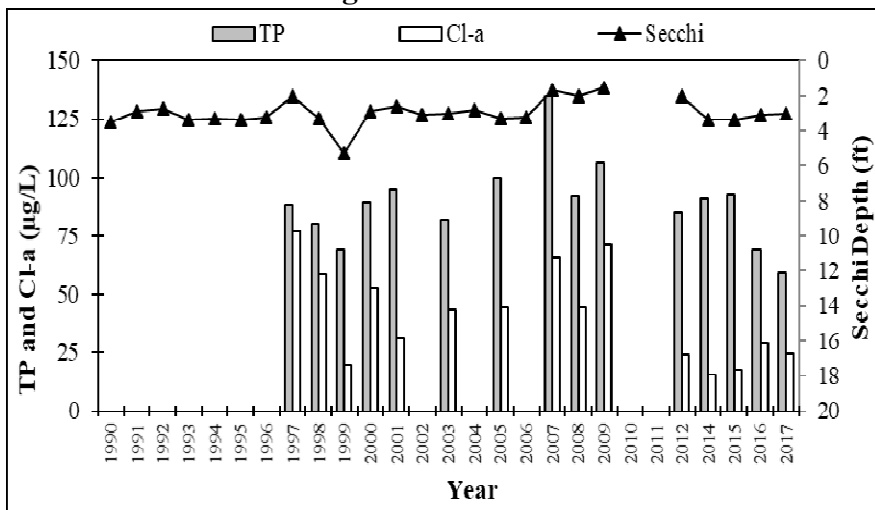
**2017 Results**



**Historical Report Card**

Year	TP	Cl-a	Secchi	Overall
1996			D	
1997	D	D	F	D
1998	D	D	D	D
1999	C	B	C	C
2000	D	C	D	D
2001	D	C	D	D
2002			D	
2003	D	C	D	D
2004			D	
2005	D	C	D	D
2006			D	
2007	D	D	F	D
2008	D	C	F	D
2009	D	D	F	D
2012	D	C	F	D
2014	D	B	D	C
2015	D	B	D	C
2016	C	C	D	C
2017	C	C	D	C
2017 average	59.3 µg/L	24.9 µg/L	0.4 meters	
State standards	40 µg/L	14 µg/L	1.4 meters	

**Historical Annual Averages**



**2017 Raw Data**

	Units	Date:										Average	Min	Max
		R.L.*	Results	Results	Results	Results	Results	Results	Results	Results	Results			
pH			0.1	13.090	8.070	8.280	8.170	8.600	8.490	8.740	8.700	9.026	8.070	13.090
Conductivity	mS/cm		0.01	0.25	0.28	0.30	0.29	0.29	0.35	0.34	0.31	0.30	0.25	0.35
Turbidity	NTU		1	12.00		8.40	26.10	7.80	33.60	28.60	33.40	22.30	19.80	33.40
D.O.	mg/l		0.01	1308%	872%	989%	904%	818%	991%	1117%	1053%	943%	1005%	1308%
D.O.	%		1	1.2	1.0	1.2	1.1	1.0	1.2	1.4	1.2	1.1	1.2	1.4
Temp.	°C		0.1	11.9	14.8	22.4	22.7	25.2	24.8	23.6	22.0	19.3	20.6	25.2
Temp.	°F		0.1	53.38	58.57	72.23	72.77	77.27	76.59	74.41	71.64	66.67	69.00	77.27
Salinity	‰		0.01	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2
Cl-a	µg/l		1.000	26.300	15.700	15.700	15.000	12.100	23.900	32.000	42.700	37.400	27.800	42.700
T.P.	µg/l		0.005	0.054	0.040	0.048	0.049	0.051	0.048	0.056	0.089	0.103	0.055	0.103
T.P.	µg/l		5	54.0	40.0	48.0	49.0	51.0	48.0	56.0	89.0	103.0	59.3	103.0
Secchi	ft			3.7	4.9	4.1	2.7	3.6	2.4	2.5	1.9	1.9	3.0	4.9
Secchi	m			1.1	1.5	1.2	0.8	1.1	0.7	0.8	0.6	0.6	0.9	1.5
Field Observations/Appearance				Fairly Brown	Murky	Brown	Brown	Green	Brown	Brown	Green	Green	Green	
Physical				2	1	1	1	3	3	3	4	3	4	
Recreational				2	1	1	1	1	1	1	3	2	3	

\*reporting limit

## Stream Hydrology Monitoring

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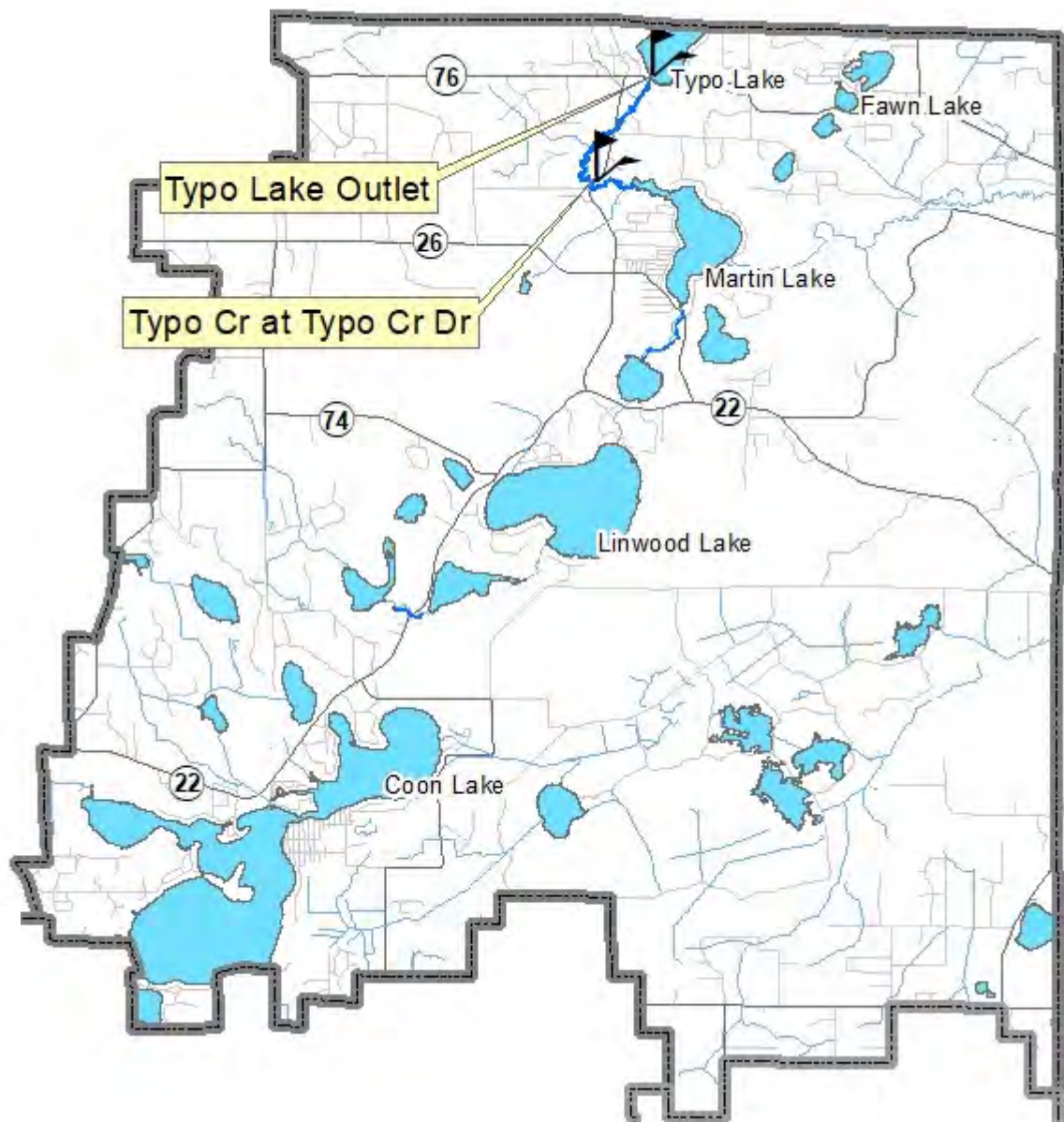
**Description:** Continuous water level monitoring in streams.

**Purpose:** To provide understanding of stream hydrology, including the impact of climate, land use or discharge changes. These data also facilitate calculation of pollutant loads, use of computer models for developing management strategies, and water appropriations permit decisions. The Typo Lake outlet and Typo Creek carp barriers were monitored on either side to assess whether the barriers were affecting flow.

**Locations:** Typo Lake outlet carp barrier and Typo Creek carp barrier

**Results:** Results are presented on the following pages

### 2017 Sunrise River Watershed Stream Hydrology Monitoring Sites





## Stream Hydrology Monitoring

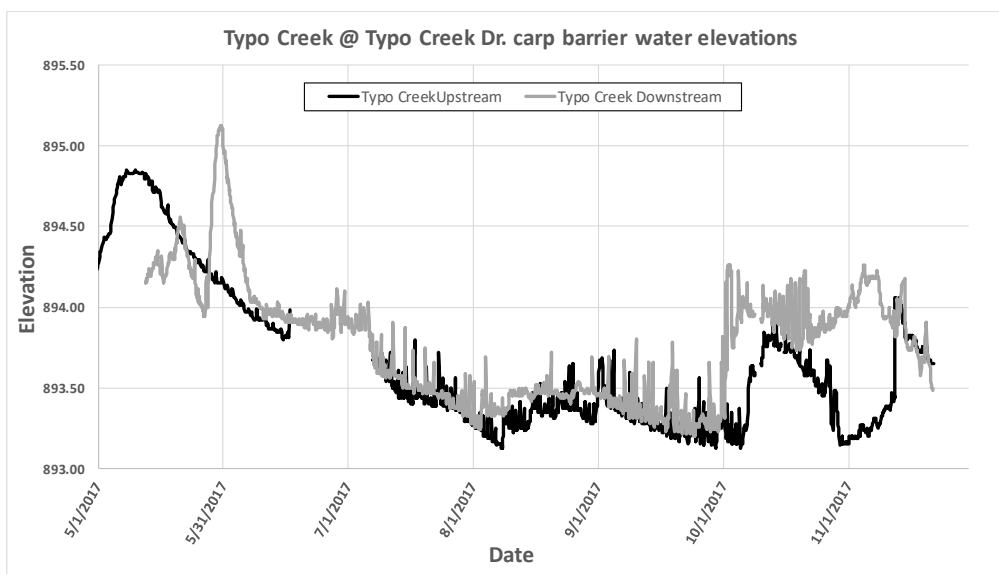
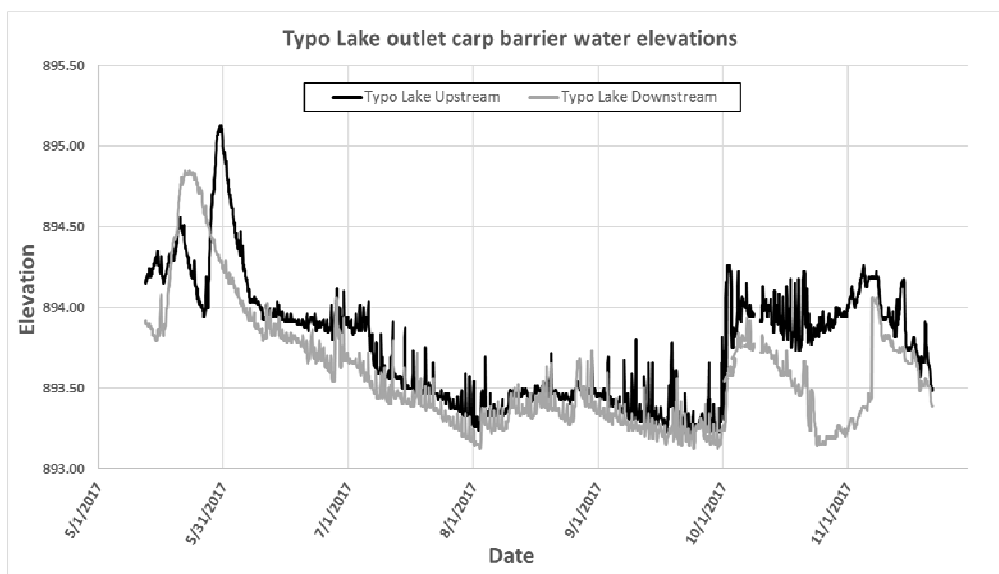
### TYPO CREEK

At Typo Lake outlet and Typo Creek Drive, Linwood Township

**Years Monitored:** 2016-2017

**Background:** The carp barrier structures installed in Typo Creek are made up of a series of stacked aluminum grates between two secure piling structures. The metal grates facilitate water passage out of Typo Lake and through Typo Creek, while preventing carp from migrating through to spawn. There was concern during the early stages of the projects that the barriers may clog up with floating cattail rafts, algae, and other debris, holding water back and causing flooding. The Anoka Conservation District installed and surveyed continuous level loggers on the upstream and downstream sides of both carp barriers to assess whether the barriers were affecting flow. Throughout most of the year, both sites read very similar levels upstream and downstream. Differences early and late in the year are likely, at least partially, due to instrument performance.

#### 2017 Typo Lake outlet and Typo Creek at Typo Creek Drive carp barrier water elevations



## Stream Water Quality

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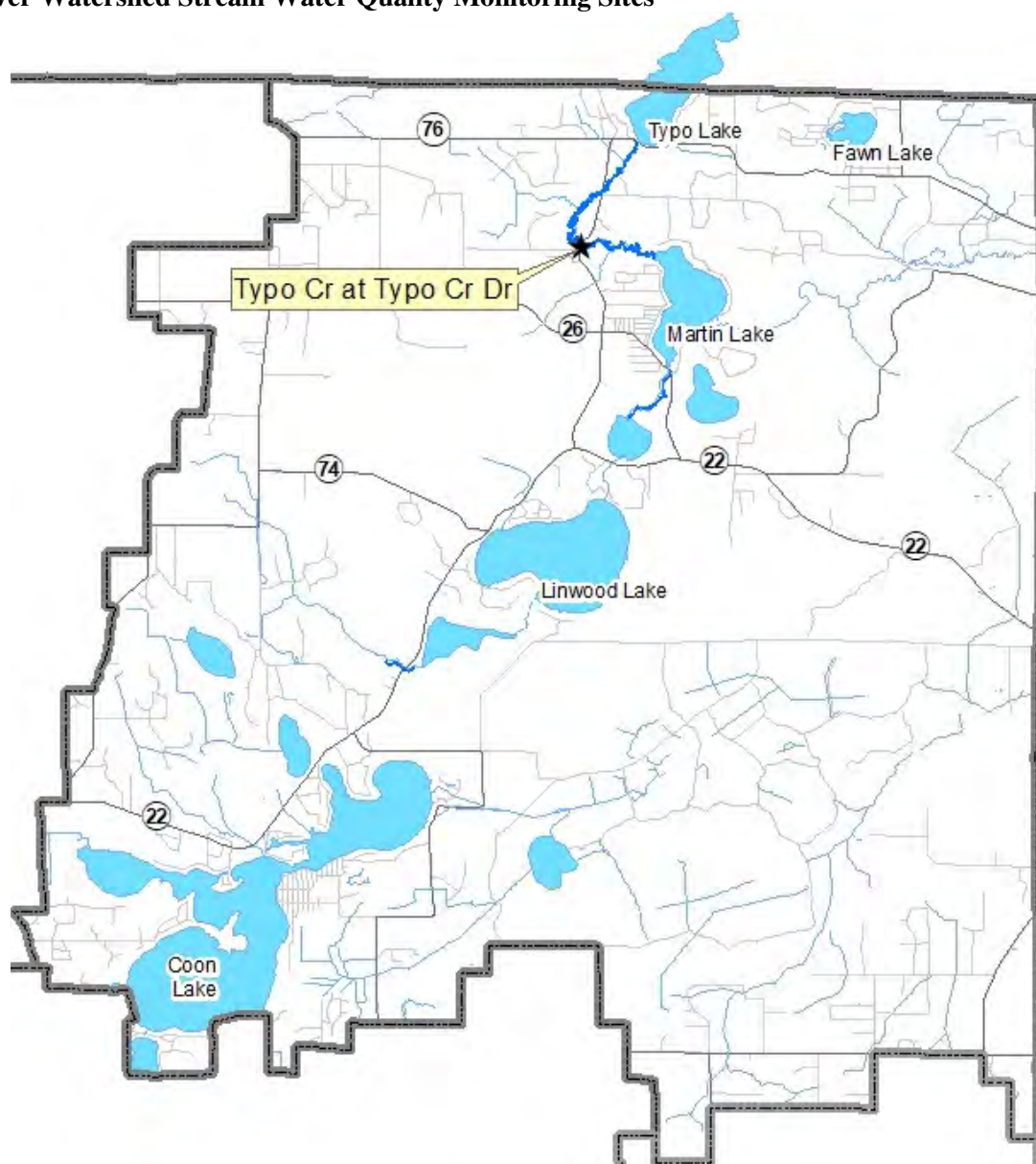
**Description:** Stream water quality is monitored with grab samples on eight occasions throughout the open water season, including four times immediately following a storm (1" of rain within a 24hr period) and four times during baseflow conditions. The selected site was chosen to monitor the impacts of the carp barriers installed in the watershed over time. Parameters monitored include water level, pH, conductivity, turbidity, transparency, dissolved oxygen, total phosphorus and total suspended solids. This data can be paired with stream hydrology monitoring to do pollutant-loading calculations.

**Purpose:** To detect water quality trends and problems, and diagnose the source of problems.

**Location:** Typo Creek at Typo Creek Drive near 233<sup>rd</sup> Ave. NE

**Results:** Results are presented on the following pages.

### 2017 Sunrise River Watershed Stream Water Quality Monitoring Sites



## *Stream Water Quality Monitoring*

### **TYPO CREEK AT TYPO CREEK DR.**

Near Typo Creek Dr. and 233<sup>rd</sup> Ave. NE, Linwood Township

STORET SiteID = S003-188

#### **Years Monitored**

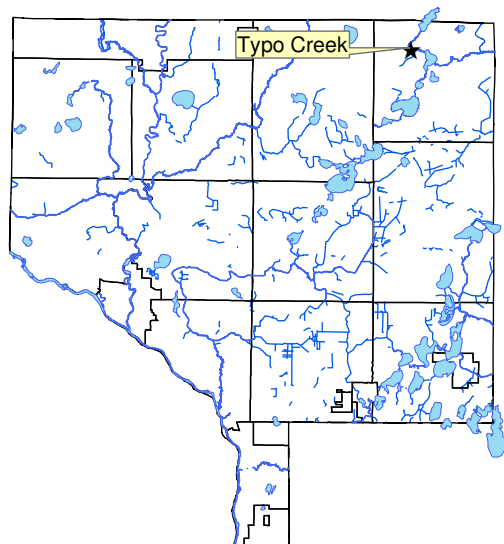
1998, 2000, 2001, 2003, 2016-2017

#### **Background**

The northern inlet to Martin Lake, also called Typo Creek, flows from the outlet of Typo Lake about 1.9 miles south to Martin Lake. It is the primary inlet to Martin Lake. The watershed is primarily undeveloped. This stream carries a relatively large volume of water, with flows ranging from 4-6 cfs during baseflow and 10-17 cfs during stormflow. Upstream water quality projects including carp barriers (completed 2016) and carp harvests (2017-2019) are aimed at improving water quality in this stream and the lakes it connects.

#### **Methods**

The creek was monitored by grab samples. Eight water quality sampling events were conducted in 2017, four during baseflow and four following storms. Storms were generally defined as one-inch or more of rainfall in 24 hours or a significant snowmelt event combined with rainfall. Parameters tested with portable meters included pH, conductivity, turbidity, temperature, dissolved oxygen, and salinity. Parameters tested by water samples sent to a state-certified lab included total phosphorus, and total suspended solids.



#### **Summary**

Summarized water quality monitoring findings and management implications include:

- Dissolved pollutants, as measured by conductivity and chlorides, are at low and healthy levels. However, 2016 and 2017 baseflow concentrations were higher than years tested previously.

*Management discussion:* Road deicing salts are a concern region-wide. They are measurable in area streams year-round, including Typo Creek. While they may be acceptably low now, levels do appear to be higher during recent years. Excessive de-icing efforts should be minimized in the area, and future monitoring should consider testing chlorides approximately every third year.

- Phosphorus loading and eutrophication remains the largest concern for Typo Creek. Measured total phosphorus (TP) routinely exceeds state impairment standards. TP in 2017 was within the same range observed in other years. Phosphorus levels here are reflective of conditions in Typo Lake immediately upstream. Typo Creek phosphorus is discharged into Martin Lake.

*Management discussion:* Management in response to the TMDL report, including projects like the installation of carp barriers and harvesting of carp, should reduce phosphorus levels in the creek as well as the upstream and downstream lakes. Additional funding and projects are likely necessary into the future to bring phosphorus in this system as a whole down to healthy levels.

- Suspended solids and turbidity remain a large problem in Typo Creek and are directly related to the issues causing excessive nutrient loading.

*Management discussion:* Efforts involved with the reduction of nutrient loading and management of carp populations should have a direct effect on the suspended solids and turbidity issues in Typo Creek.

- pH, on average, was within the range considered normal and healthy for streams in this area again during 2017. In previous years it was outside the range that is considered healthy. The creek was listed by the State as impaired for high pH in 2006 due to swings above and below state standards. pH appears to be more stable and within the acceptable range in recent years. Improved water quality in Typo Lake upstream due to restoration projects should continue to help bring pH to more stable and neutral levels.
- Dissolved oxygen (DO) remains lower in Typo Creek than would be ideal. The excessive nutrients and algal growth, and subsequent decomposition, is likely driving low DO levels.

*Management discussion:* Low dissolved oxygen is likely having an impact on native aquatic life. For example, it may favor rough fish species over game fish because they can tolerate lower oxygen levels. This issue is primarily driven by the nutrient loading in Typo Lake, and subsequent decomposition, as well as organic soils in the waterway. Because of the long history of nutrient and organic matter loading to this creek, even the best management practices will take many years to achieve goals.

## **Results and Discussion**

Excessive nutrient loading is the root cause of intense high algae, turbidity and pH in Typo Creek. This, along with populations of common carp, is having a profound negative impact on the water quality, and likely the flora and fauna, of this system as a whole. A TMDL study has been completed for this stream, and corrective projects are being implemented. While the lakes seem to be experiencing improved water quality in response to these projects, notable improvement has not been observed in Typo Creek. The severity of the issues facing this creek, and the rest of its watershed, will require a large amount of time, involvement and project development to reach goals.

### ***Conductivity and chlorides***

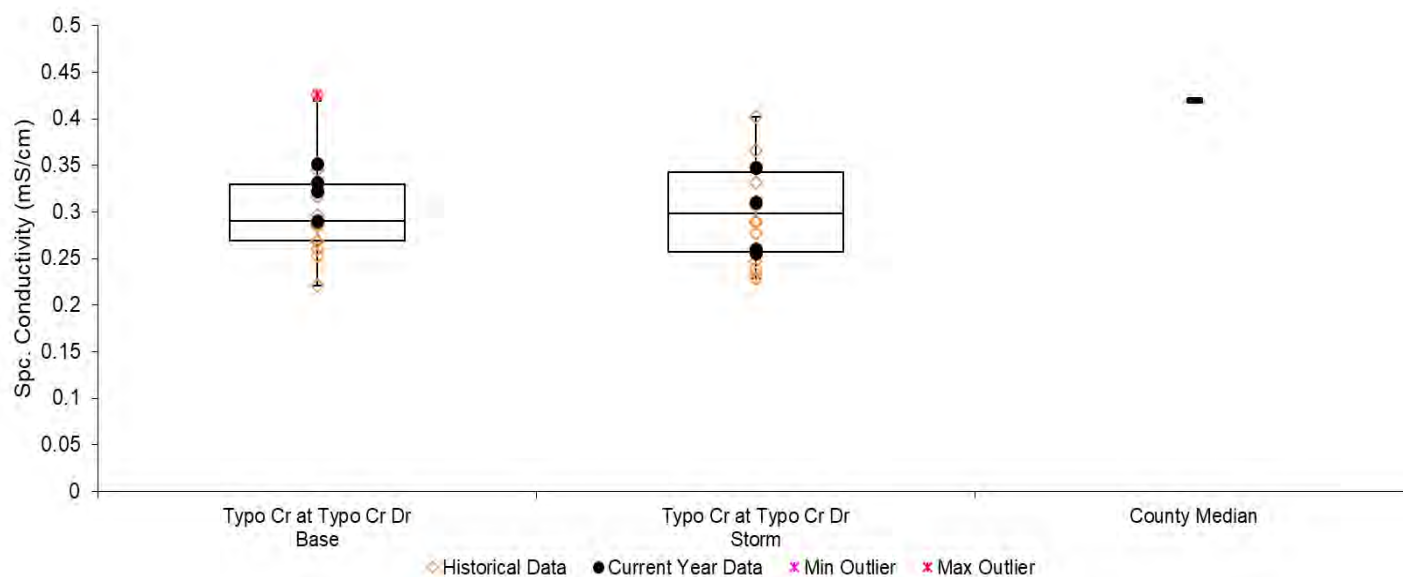
Conductivity and chlorides are measures of dissolved pollutants. Dissolved pollutant sources include urban road runoff and industrial chemicals, among many others. Metals, hydrocarbons, road salts, and others are often of concern in a suburban environment. Conductivity is the broadest measure of dissolved pollutants we used. It measures electrical conductivity of the water; pure water with no dissolved constituents has zero conductivity. Chlorides are the measure of chloride salts, the most common of which are road de-icing chemicals. Chlorides can also be present in other pollutant types, such as wastewater. These pollutants are of greatest concern because of the effect they can have on the stream's biological community.

Conductivity was higher than typical in Typo Creek, averaging 0.309 mS/cm over the 2017 sampling season. This is lower than the median for 34 Anoka County streams of 0.420 mS/cm (county-wide average is driven by urban areas with greater road density and road salting). In other years, Typo Creek conductivity has been similar to 2017. These conductivity levels are not problematic, but could become problematic if baseflow levels continue to increase.

Conductivity was slightly lower during storms, suggesting that stormwater runoff contains fewer dissolved pollutants than the surficial water table that feeds the river during baseflow. High baseflow conductivity has been observed in many other area streams with the largest cause believed to be road salts that have infiltrated into the shallow aquifer.

Chlorides were not tested in 2017, and were last sampled at this site in 2003. Chloride results in 2003 ranged between 8 mg/L and 12 mg/L, far below the Minnesota Pollution Control Agency's (MPCA) chronic standard for aquatic life of 230 mg/L. Given that conductivity has increased, it would be prudent to periodically monitor chlorides to determine if chlorides are a cause of increased conductivity.

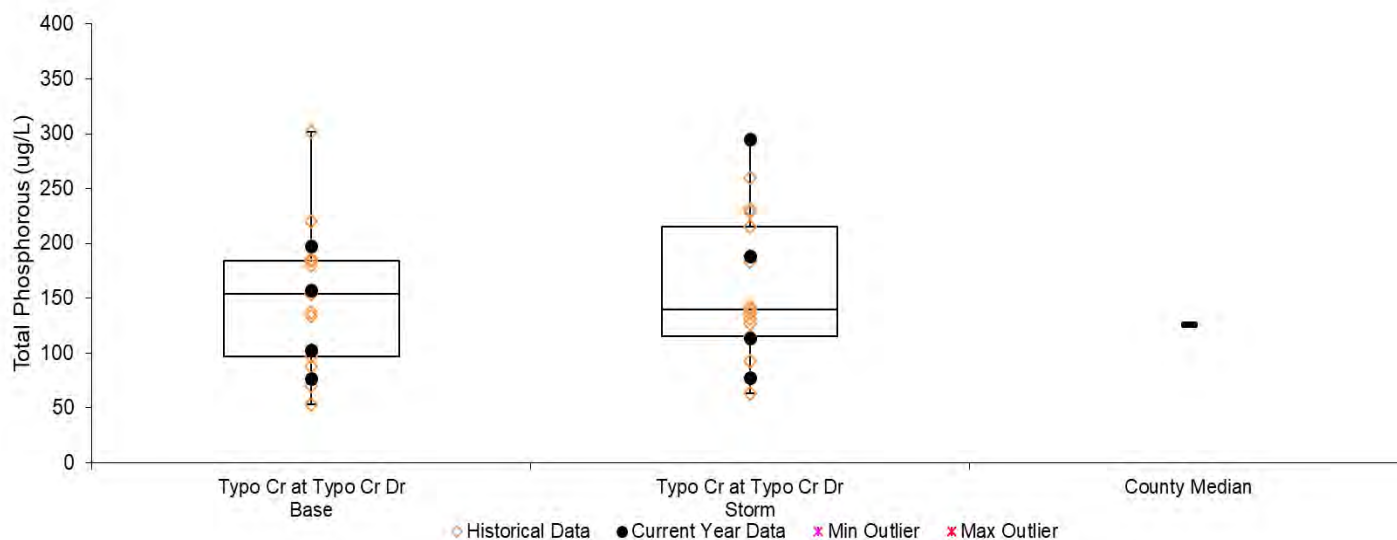
**Conductivity during baseflow and storm conditions** Orange diamonds are historical data from previous years and black circles are 2017 readings. Box plots show the median (middle line), 25<sup>th</sup> and 75<sup>th</sup> percentile (ends of box), and 10<sup>th</sup> and 90<sup>th</sup> percentiles (floating outer lines).



### Total Phosphorus

The nutrient phosphorus is one of the most common pollutants in our region, and can be associated with urban runoff, agricultural runoff, wastewater, and many other sources. The average total phosphorus concentration of Typo Creek in 2017 was 151  $\mu\text{g/L}$ , up from the 2016 average of 138  $\mu\text{g/L}$  and within the range observed since 2001.

**Total phosphorus during baseflow and storm conditions** Orange diamonds are historical data from previous years and black circles are 2017 readings. Box plots show the median (middle line), 25<sup>th</sup> and 75<sup>th</sup> percentile (ends of box), and 10<sup>th</sup> and 90<sup>th</sup> percentiles (floating outer lines).



### ***Turbidity and Total Suspended Solids (TSS)***

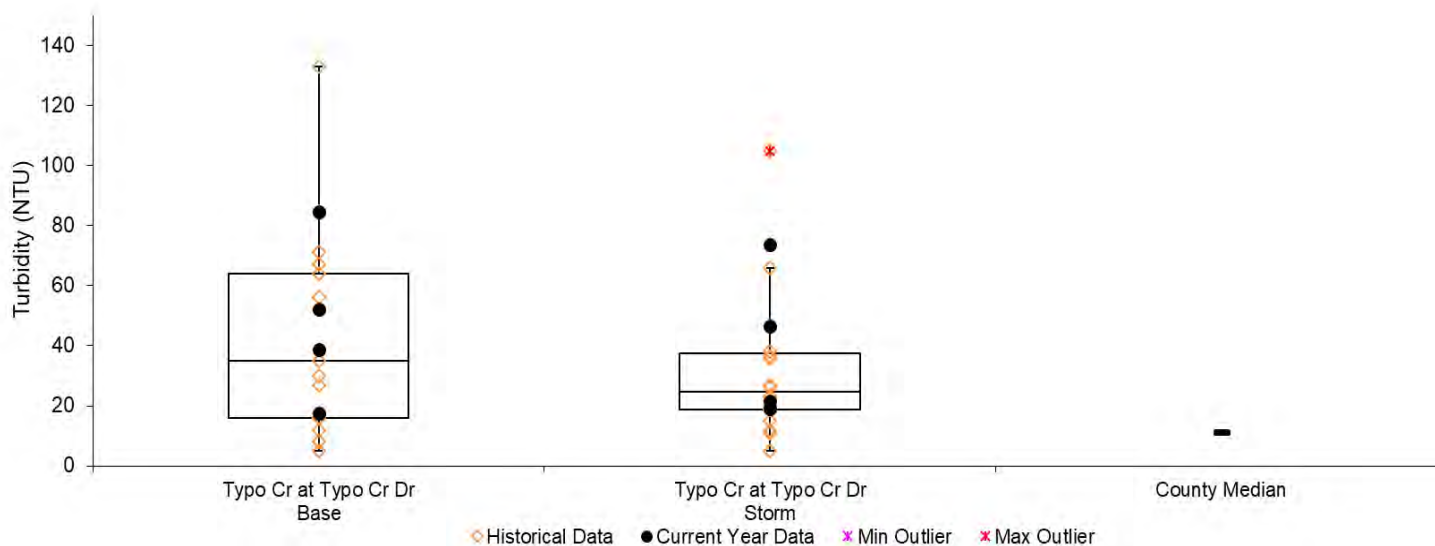
Turbidity and total suspended solids (TSS) are two different measurements of solid material suspended in the water. Turbidity is measured by refraction of a light beam passed through a water sample and is most sensitive to large particles. TSS is measured by filtering solids from a water sample and weighing the filtered material. The amount of suspended material is important because it affects transparency and aquatic life, and because many other pollutants are attached to particles. Many stormwater treatment practices such as street sweeping, sumps, and stormwater settling ponds target sediment and attached pollutants.

It is important to note that suspended solids can come from sources both internal and external of the stream. Sources on land include soil erosion, road sanding, and many others. Internally, bank erosion and movement of the bottom substrate also contributes to suspended solids. Algal production and sediment disturbance in upstream lakes, like Typo Lake, also contribute strongly to Typo Creek.

Typo Creek has been on the MPCA Impaired Waters List for high turbidity since 2006. The threshold is 25 NTU turbidity. If a stream exceeds this value on three occasions and at least 10% of all sampling events it is declared impaired for turbidity. Based on all years of ACD sampling, Typo Creek has exceeded 25 NTU turbidity on 19 of 35 sampling occasions, or 54% of the time. In both 2016 and 2017 five of eight samples had turbidity in excess of 25 NTU, with levels over 70 NTU measured each year. The average turbidity in 2017 was 44 NTU.

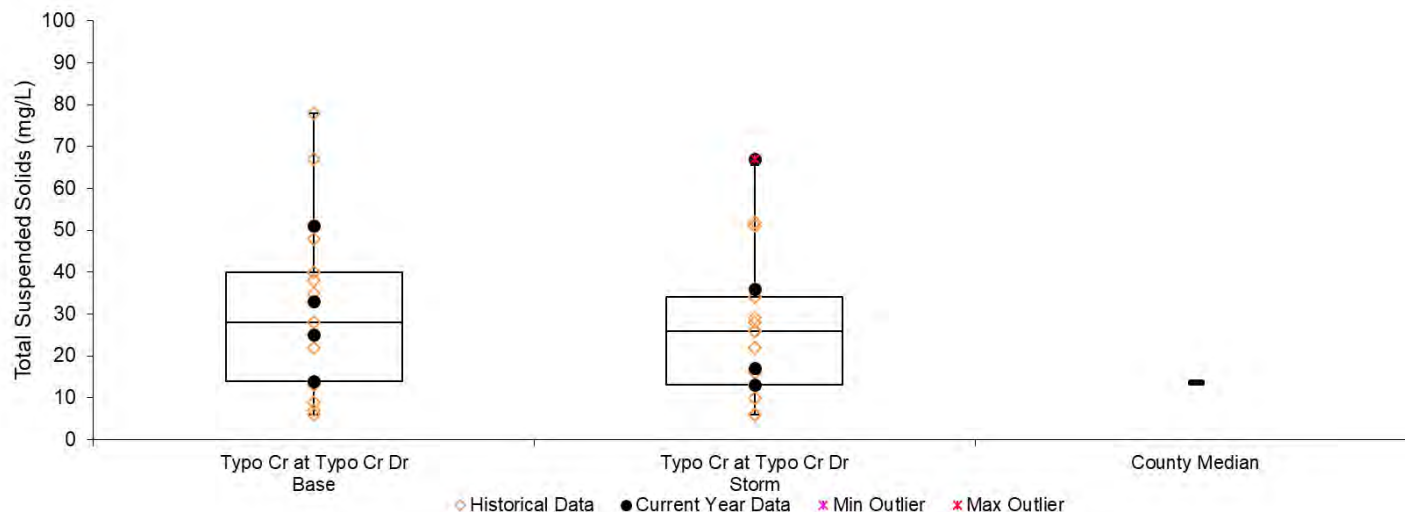
The high turbidity levels in Typo Creek are likely due to many factors within the watershed. Typo Lake upstream is hypertrophic, and Typo Creek therefore has high algal levels. Additionally, Typo Creek and Typo Lake each have a very loose, unconsolidated, silty bottom that easily mixes with the water column and readily remains suspended. Rough fish are abundant in this system and disturb the sediments.

**Turbidity during baseflow and storm conditions** Orange diamonds are historical data from previous years and black circles are 2017 readings. Box plots show the median (middle line), 25<sup>th</sup> and 75<sup>th</sup> percentile (ends of box), and 10<sup>th</sup> and 90<sup>th</sup> percentiles (floating outer lines).





**Total suspended solids during baseflow and storm conditions** Orange diamonds are historical data from previous years and black circles are 2017 readings. Box plots show the median (middle line), 25<sup>th</sup> and 75<sup>th</sup> percentile (ends of box), and 10<sup>th</sup> and 90<sup>th</sup> percentiles (floating outer lines).

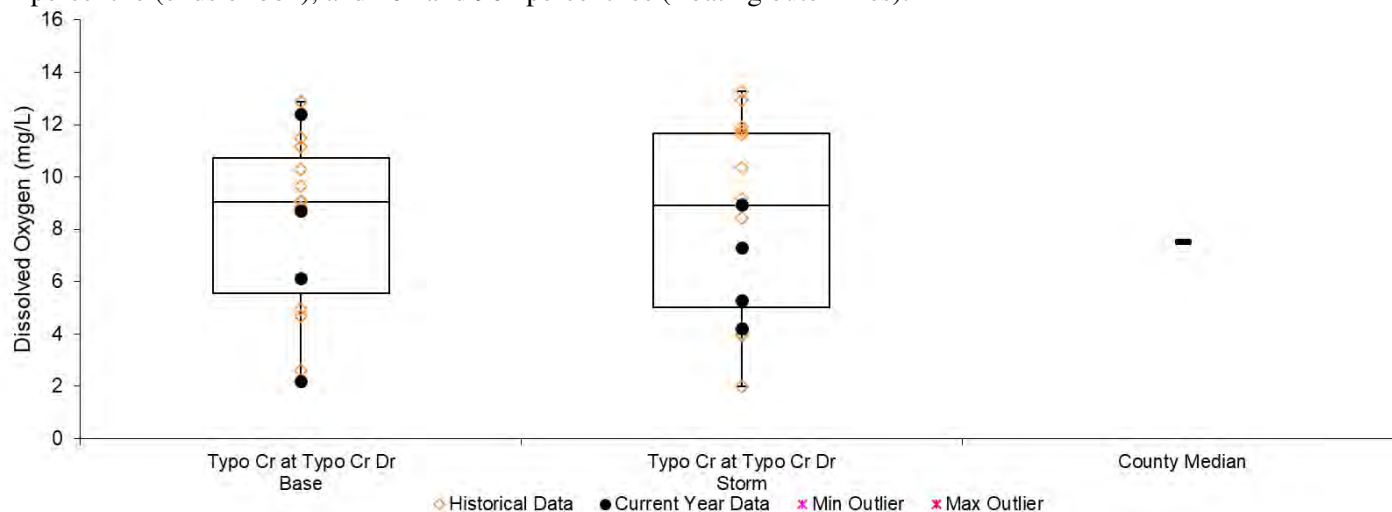


### *Dissolved Oxygen*

Dissolved oxygen is necessary for aquatic life, including fish. Decomposition of organic materials or organic pollution causes oxygen to be consumed. If oxygen levels fall below 5 mg/L aquatic life begins to suffer, therefore, the state water quality standard is a daily minimum of 5 mg/L. A stream is considered impaired if 10% of observations are below this level in the last 10 years. Dissolved oxygen levels are typically lowest in the early morning because of decomposition consuming oxygen at night without offsetting oxygen production by photosynthesis.

In three years of sampling from 2000-2003, Typo Creek only had a DO level below 5 mg/L on one occasion. In 2016, five of eight samples yielded sub-5 mg/L results. This result was concerning and one reason for continued monitoring in 2017. In 2017, two of eight samples were <5mg/L. Average DO concentrations were over 6.5mg/L in 2016 and 2017. This suggests a mildly impaired condition. High algal production in upstream Typo Lake and subsequent decomposition is a likely cause.

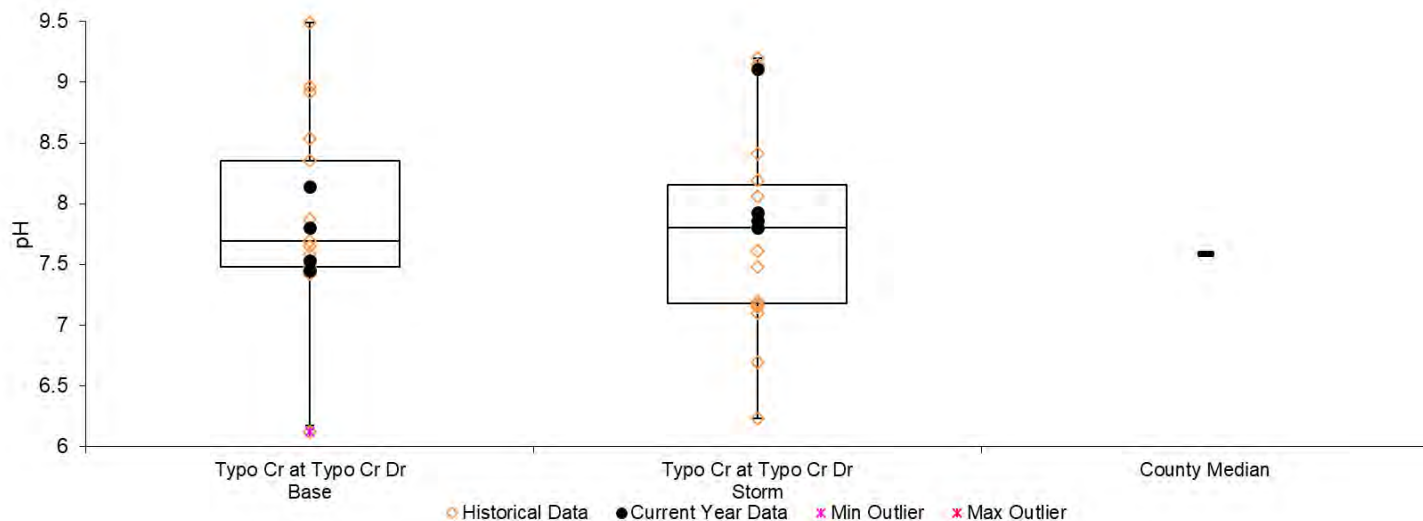
**Dissolved oxygen results during baseflow and storm conditions** Orange diamonds are historical data from previous years and black circles are 2017 readings. Box plots show the median (middle line), 25<sup>th</sup> and 75<sup>th</sup> percentile (ends of box), and 10<sup>th</sup> and 90<sup>th</sup> percentiles (floating outer lines).



## pH

pH refers to the acidity of the water, and has an effect on a stream's ability to support aquatic life. The Minnesota Pollution Control Agency's water quality standard is for pH to be between 6.5 and 8.5. Typo Creek has been listed as impaired for pH since 2006 due to great swings both above and below the state standard range. In 2016, however, pH was much more stable, ranging from 7.10 to 8.06. In 2017, pH on average was higher than in 2016, but only one measurement occurred above 8.5 (9.11). These recent results are an improvement.

**pH results during baseflow and storm conditions** Orange diamonds are historical data from previous years and black circles are 2017 readings. Box plots show the median (middle line), 25<sup>th</sup> and 75<sup>th</sup> percentile (ends of box), and 10<sup>th</sup> and 90<sup>th</sup> percentiles (floating outer lines).



## Recommendations

A Total Maximum Daily Load (TMDL) plan was approved in 2012 for Typo Creek for pH and turbidity. Water quality issues in Typo Creek are driven by the nutrient loading, eutrophication and carp activity in upstream Typo Lake. Projects including the Martin and Typo Lake carp barriers (completed in 2016), carp removal (2017-19) and projects in ditched wetlands upstream of Typo Lake (feasibility study completed early 2018) aim to address these issues. Conditions in Typo Creek are not likely to improve until the water quality of Typo Lake upstream improves.

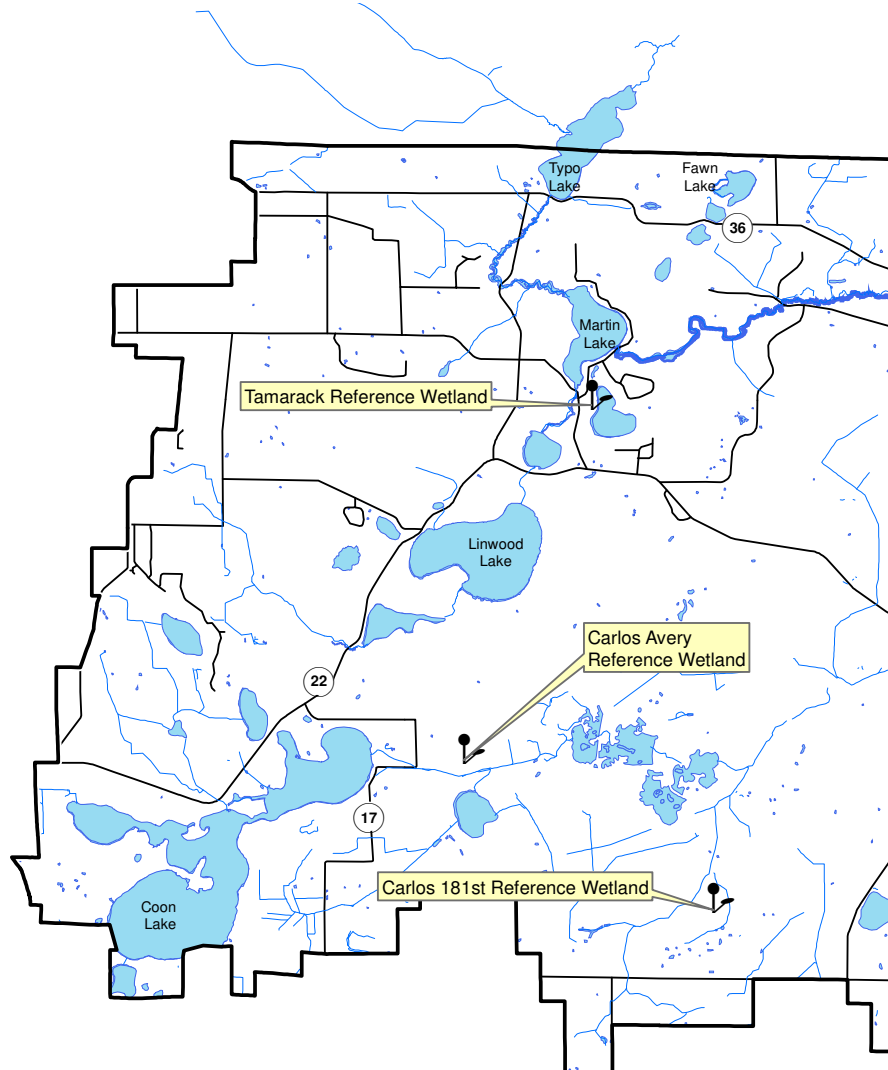


## Wetland Hydrology

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- Description:** Continuous groundwater level monitoring at a wetland boundary. Countywide, the ACD maintains a network of 23 wetland hydrology monitoring stations.
- Purpose:** To provide understanding of wetland hydrology, including the impacts of climate and land use. These data aid in delineation of nearby wetlands by documenting hydrologic trends including the timing, frequency, and duration of saturation.
- Locations:** Carlos Avery Reference Wetland, Carlos Avery Wildlife Management Area, City of Columbus  
Carlos 181<sup>st</sup> Reference Wetland, Carlos Avery Wildlife Management Area, City of Columbus  
Tamarack Reference Wetland, Linwood Township
- Results:** See the following pages.

### Sunrise Watershed Wetland Hydrology Monitoring Sites



## Wetland Hydrology Monitoring

### CARLOS AVERY REFERENCE WETLAND

Carlos Avery Wildlife Management Area, City of Columbus

#### Site Information

**Monitored Since:** 1997  
**Wetland Type:** 3  
**Wetland Size:** >300 acres  
**Isolated Basin?** No  
**Connected to a Ditch?** Yes

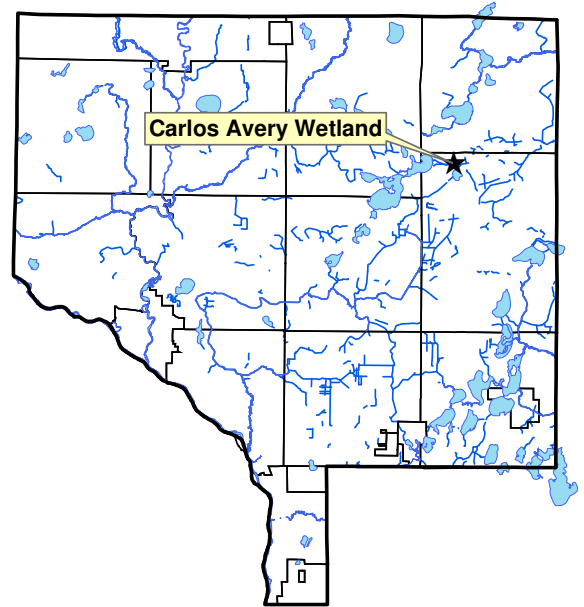
#### Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
Oa	0-4	N2/0	Organic	-
Bg	4-25	10yr 5/2	Sandy Loam	25% 10yr 5/6 with organic streaking

**Surrounding Soils:** Lino loamy fine sand

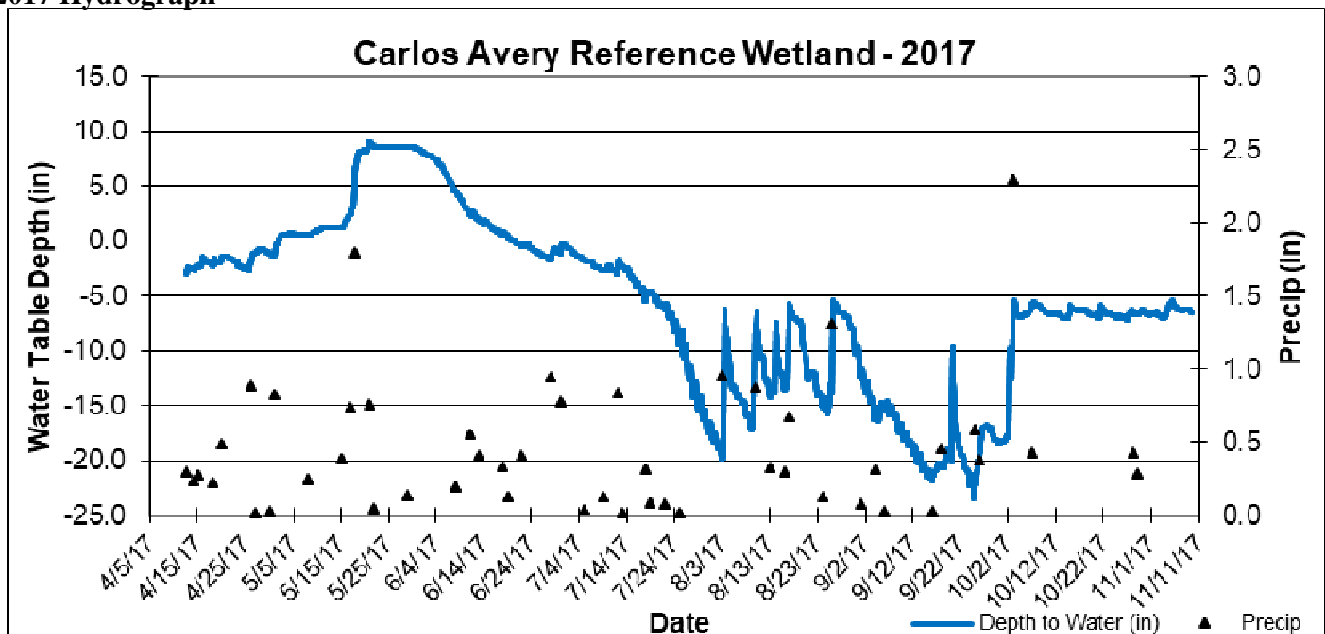
#### Vegetation at Well Location:

Scientific	Common	% Coverage
Phalaris arundinacea	Reed Canary Grass	80
Carex Spp	Sedge undiff.	40
Quercus macrocarpa	Bur Oak	40
Sagittaria latifolia	Broad-leaf Arrowhead	20
Cornus stolonifera	Red-osier Dogwood	20



**Other Notes:** This is a broad, expansive wetland within a state-owned wildlife management area. Cattails dominate within the wetland.

#### 2017 Hydrograph



## Wetland Hydrology Monitoring

### CARLOS 181ST REFERENCE WETLAND

Carlos Avery Wildlife Management Area, City of Columbus

#### Site Information

**Monitored Since:** 2006  
**Wetland Type:** 2-3  
**Wetland Size:** 3.9 acres (approx)  
**Isolated Basin?** Yes  
**Connected to a Ditch?** Roadside swale only

#### Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
Oa	0-3	N2/0	Sapric	-
A	3-10	N2/0	Mucky Fine Sandy Loam	-
Bg1	10-14	10yr 3/1	Fine Sandy Loam	-
Bg2	14-27	5Y 4/3	Fine Sandy Loam	-
Bg3	27-40	5y 4/2	Fine Sandy Loam	-

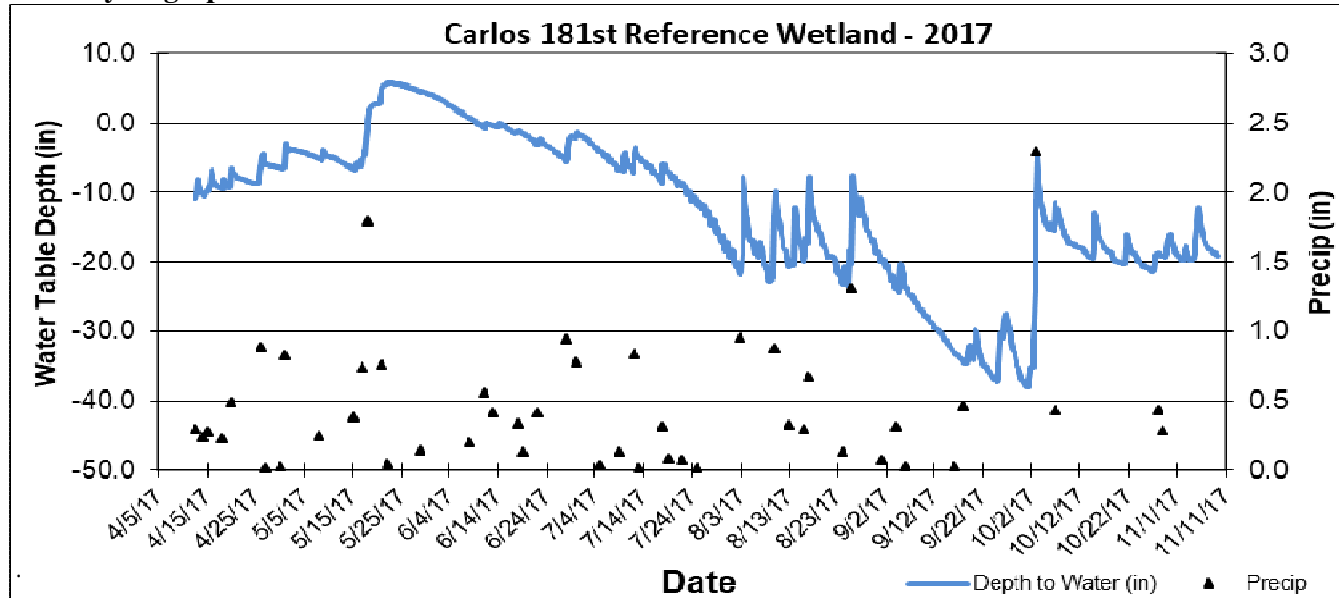
**Surrounding Soils:** Soderville fine sand

#### Vegetation at Well Location:

Scientific	Common	% Coverage
Phalaris arundinacea	Reed Canary Grass	100
Rhamnus frangula (S)	Glossy Buckthorn	40
Ulmus american (S)	American Elm	15
Populus tremuloides (T)	Quaking Aspen	10
Acer saccharum (T)	Silver Maple	10

**Other Notes:** The site is owned and managed by the MN DNR. Access is from 181<sup>st</sup> Avenue.

#### 2017 Hydrograph



## Wetland Hydrology Monitoring

### TAMARACK REFERENCE WETLAND

Martin-Island-Linwood Regional Park, Linwood Township

#### Site Information

**Monitored Since:** 1999  
**Wetland Type:** 6  
**Wetland Size:** 1.9 acres (approx)  
**Isolated Basin?** Yes  
**Connected to a Ditch?** No

#### Soils at Well Location:

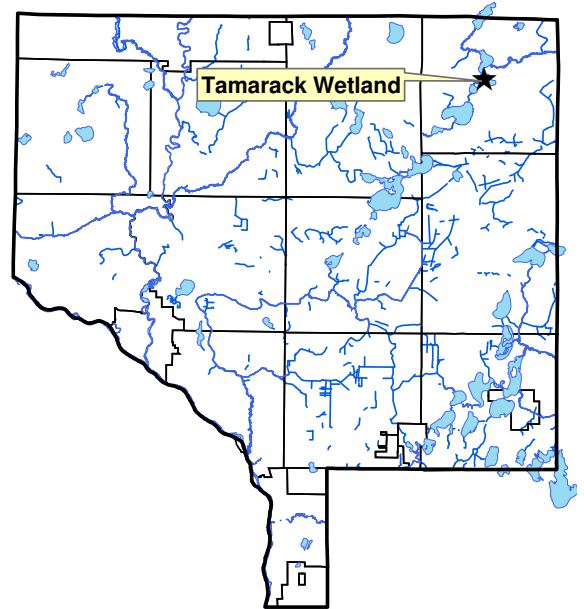
Horizon	Depth	Color	Texture	Redox
A	0-6	N2/0	Mucky Sandy Loam	-
A2	6-21	10yr 2/1	Sandy Loam	-
AB	21-29	10yr 3/2	Sandy Loam	-
Bg	29-40	2.5y5/3	Medium Sand	-

**Surrounding Soils:** Sartell fine sand

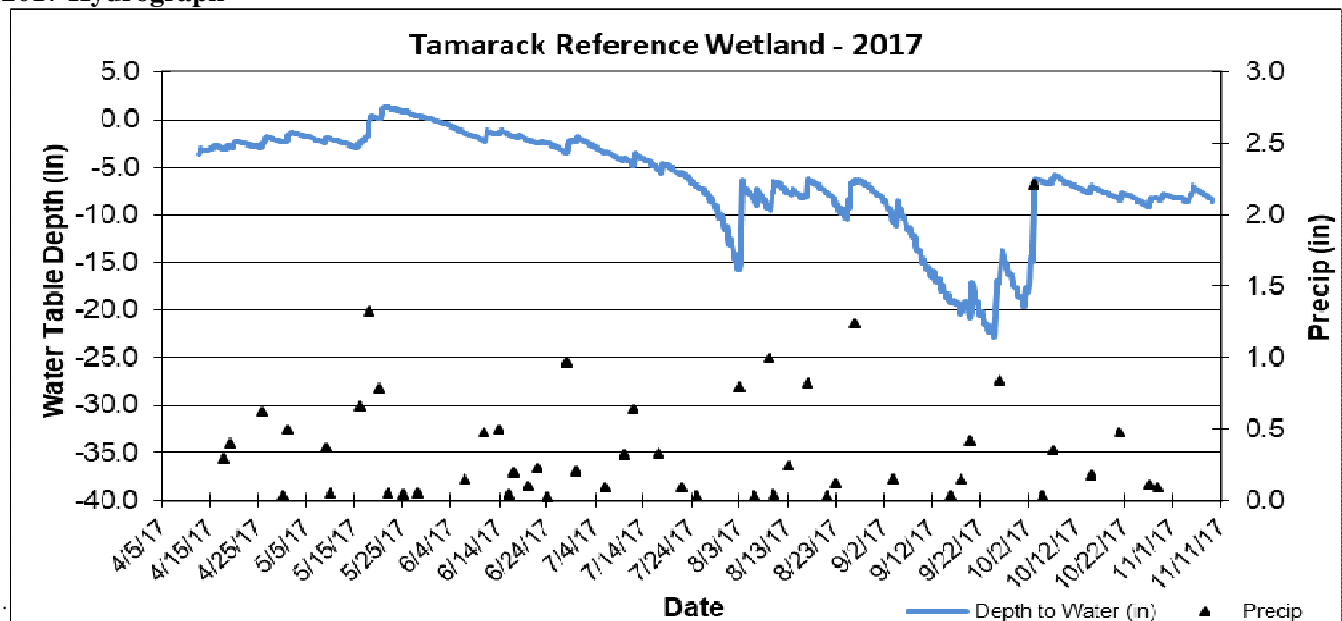
#### Vegetation at Well Location:

Scientific	Common	% Coverage
Rhamnus frangula	Common Buckthorn	70
Betula alleghaniensis	Yellow Birch	40
Impatiens capensis	Jewelweed	40
Phalaris arundinacea	Reed Canary Grass	40

**Other Notes:** The site is owned and managed by Anoka County Parks.



#### 2017 Hydrograph



## Water Quality Grant Fund

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- Description:** The Sunrise River Watershed Management Organization (SRWMO) offers cost share grants to encourage projects that will benefit lake and stream water quality. These projects include lakeshore restorations, rain gardens, erosion correction, and others. These grants, administered by the ACD, offer 50-70% cost sharing of the materials needed for a project. The landowner is responsible for the remaining materials expenses, all labor, and any aesthetic components of the project. The ACD assists interested landowners with design, materials acquisition, installation, and maintenance.
- Purpose:** To improve water quality in area lakes, streams, and rivers.
- Locations:** Throughout the watershed.
- Results:** Projects reported in the year they are installed.

### SRWMO Cost Share Fund Summary

2005 SRWMO Contribution	+	\$1,000.00
2006 SRWMO Contribution	+	\$1,000.00
2006 Expense - Coon Lake, Rogers Property Project	-	\$ 570.57
2007 – no expenses or contributions		\$ 0.00
2008 SRWMO Contribution	+	\$2,000.00
2008 Expense - Martin Lake, Moos Property Project	-	\$1,091.26
2009 SRWMO Contribution	+	\$2,000.00
2010 SRWMO Contribution	+	\$1,840.00
2011 SRWMO Contribution	+	\$2,000.00
2012 SRWMO Contribution	+	\$2,000.00
2012 Expense – Linwood Lake, Gustafson Property Project	-	\$ 29.43
2012 Expense – Transfer to Martin-Typo Lakes Carp Barriers	-	\$4,300.00
2013 – no expenses or contributions		\$ 0.00
2014 SRWMO Contribution	+	\$2,000.00
2015 SRWMO Contribution		\$ 0.00
2016 SRWMO Contribution		\$ 0.00
2016 Expense – Voss Rain Garden	-	\$1,229.31
2017 Expense – Voss Rain Garden Plants	-	\$ 654.50
2017 SRWMO Contribution	+	\$1,000.00
2018 Surplus Funds Returned from ACD to SRWMO Gen Fund	-	\$2,000.00
2018 Anticipated Expense – Gunnink Coon Lakeshore	-	\$1,148.40
<b>Fund Balance</b>		<b>\$3,816.53</b>

## Martin and Typo Lake Carp Removal Project

**Description:** Martin and Typo Lakes fail to meet state water quality standards due to excessive phosphorus, which fuels algae blooms. As a result, the lakes are often strongly green or brown and the game fishery is depressed. Carp are a major cause of poor water quality in these lakes, diminishing their value for swimming, boating, and fishing. Efforts to manage and reduce carp are being undertaken to improve water quality and improve the fishery.



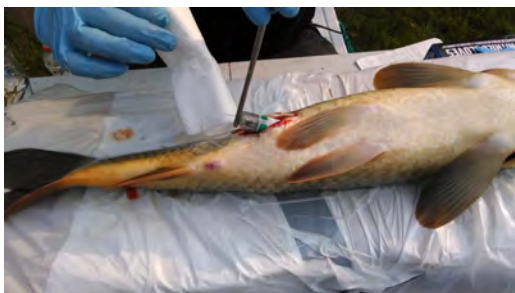
In 2015-2016 carp barriers were installed at four strategic locations near the inlets and outlets of both lakes to prevent carp migration, overwintering and spawning. In 2017-2018 carp are being removed. Additionally, a detailed assessment of the carp population, age structure and spawning history is being completed. A long-term management plan for carp will be prepared in 2019.

**Purpose:** To improve water quality in Typo and Martin Lakes, as well as downstream waterways.

**Location:** Typo and Martin Lakes

**Results:** In 2017 the following work was completed:

- 20 carp were radio tagged and released back into each Typo and Martin Lakes. These carp are being tracked monthly. They will also be used to locate schools in the winter for commercial harvest.
- 209 carp heads were preserved for aging during winter 2017-18. Fish age is determined by internal balance organs called otoliths. The population age structure reveals the spawning history.
- 2,100 carp were removed from Typo Lake using box nets.



**Radio transmitter being surgically implanted in a carp.** A Total of 40 carp were implanted with radio loggers, 20 from each Typo and Martin Lakes. Radio loggers will help track the schooling, feeding, and movement patterns of the carp to aide in future harvesting efforts.



**A sprung box net in Typo Lake.** Nets were set, baited and sprung at three sites in Typo Lake for a total of 17 nettings on seven different days from August through October, 2017.



**A boat full of harvested carp.** A total of 2,100 carp were removed from Typo Lake during the fall of 2017. Harvest efforts in both lakes will continue through 2019.

## Ditch 20 Feasibility Study

**Description:** In 2016-17 a feasibility study was undertaken to improve understanding of how wetland adjacent to Ditch 20 exported phosphorus that negatively affected downstream lakes. The study identified and ranked projects that would reduce this problem.

This project was undertaken because Ditch 20 was identified as a significant contributor of phosphorus to impaired waters during Total Maximum Daily Load (TMDL) studies for Martin and Typo Lakes. Ditch 20 flows to Typo Lake, Martin Lake, the Sunrise River and St. Croix River



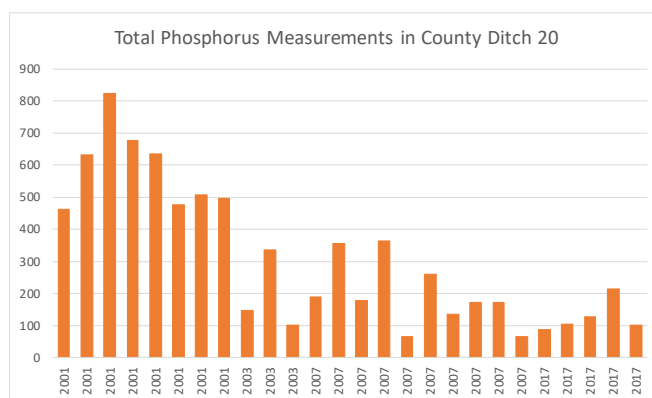
**Purpose:** To identify and evaluate projects that will reduce phosphorus export from lands adjacent to Ditch 20, thereby benefitting water quality in downstream impaired waterbodies including Typo Lake and Martin Lake.

**Location:** Ditch 20 subwatershed – northeastern Anoka, southeastern Isanti Counties

**Results:** A suite of four projects were identified which are cost effective, feasible and have landowner support. Concept designs and cost estimates were developed. Projects were ranked by cost effectiveness at reducing phosphorus. A full report was produced and is available from the Anoka Conservation District.

### Water Monitoring

Water quality and quantity were monitored at two locations in the main channel of Ditch 20 and in one lateral ditch throughout the summer of 2017. Previous monitoring had been conducted in the Ditch 20 and Data Creek system in 2001-2007. Initial years of monitoring found extremely high phosphorus (see figure to right). Subsequently, total phosphorus has decreased without any management activity or landscape changes. In fact, in 2017 phosphorus levels averaged 127.6 µg/L, which is only slightly worse than the State water quality standard and right at the median of Anoka County streams (126 µg/L). This may lead watershed managers to make projects on Ditch 20 a lower priority.



### Identification and Ranking of Potential Water Quality Projects

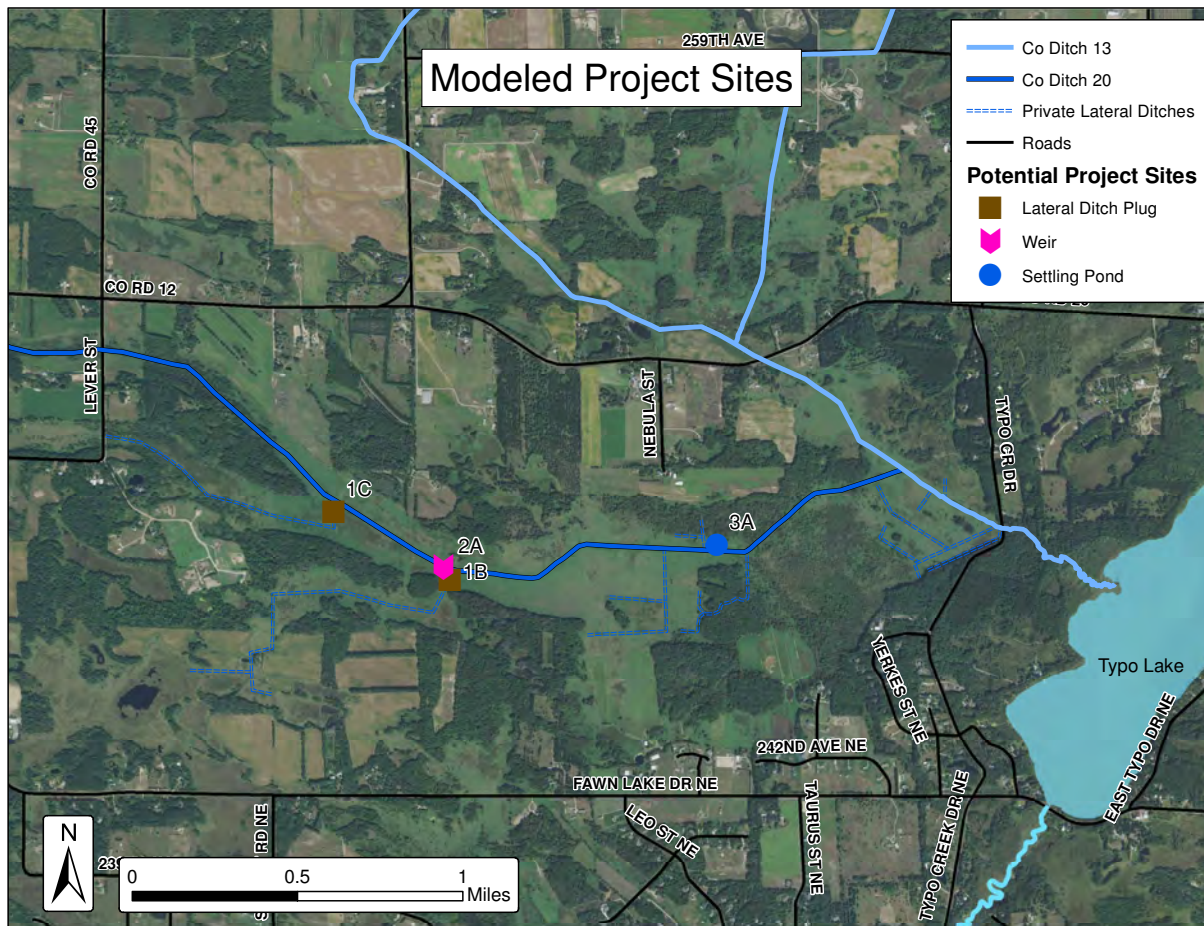
During this feasibility study a number of possible water quality projects were examined. Projects that appeared most feasible and had landowner support were explored in detail through hydrologic modeling, concept designs, phosphorus reduction estimation, and cost estimation. Those projects (see map below) included two lateral ditch plugs and one weir on Ditch 20 that restore wetland hydrology to ditched wetland. We also explored constructing a settling pond through which the ditch would flow.

From a cost effectiveness standpoint, all of these projects are favorable. We calculated cost effectiveness by comparing the total costs of permitting, design, construction and maintenance over a 30-year lifespan and estimated phosphorus reductions during the same period. Costs per pound of phosphorus removed were <\$100 for each project.

There is uncertainty in these cost effectiveness estimates. First, phosphorus reductions from wetland restorations can vary widely, and even result in phosphorus increases. While we utilized a typical result, actual results found in the literature vary widely. Moreover, construction of certain projects may require new bypass ditches, which, if built, may cause more drainage than the current condition and result in overall greater phosphorus export.



Permitting costs also carry uncertainty. Permitting of projects that may affect upstream drainage and impact wetlands is a substantial undertaking. Needed permits may include County (wetland impacts, mining) and the US Army Corps of Engineers. Several years of hydrological monitoring may be needed in advance of any construction to assure permitting agencies that there will be no negative hydrological repercussions. Moreover, permitting agencies will want there to be an entity willing to own and maintain these practices, and all likely entities have so far expressed disinterest.



## Recommendations

Because they may offer cost effective habitat restoration and water quality projects, the projects identified by this study are worth pursuing. Given the uncertainties with phosphorus reduction and challenges with permitting, maintenance and construction, it might be best to view these primarily as wetland restoration projects with secondary water quality benefits. The MN Board of Water and Soil Resources has a program for wetland restorations, and these projects may be a good fit. That program's staff would be best equipped to address the technical challenges. The program also offers financial benefits to cooperating landowners.

Four entities should pursue these projects: Anoka Conservation District, Sunrise River Watershed Management Organization, Isanti Soil and Water Conservation District and Isanti County. Each should consider including these projects in their comprehensive plans.

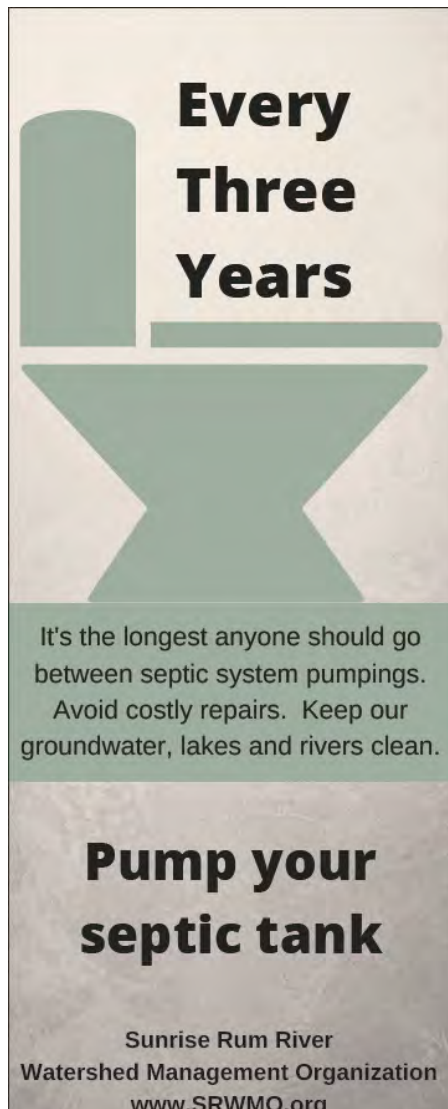
Full results of this feasibility study are available from the Anoka Conservation District.



## Annual Education Publication

<b>Description:</b>	An annual newsletter article about the SRWMO is required by MN Rules 8410.010 subpart 4, and planned in the SRWMO Watershed Management Plan.
<b>Purpose:</b>	To improve citizen awareness of the SRWMO, its programs, accomplishments and water quality issues.
<b>Location:</b>	Watershed-wide
<b>Results:</b>	In 2017 the SRWMO contracted with the ACD to prepare its annual education publication. Instead of a traditional newsletter article, the WMO decided to utilize an infographic after presenting this approach to the MN Board of Water and Soil Resources, which oversees WMOs. This method is more likely to be consumed by the public and better fits within the limited publishing space available. To ensure broad distribution and manage costs, educational materials are provided to the SRWMO's member communities for publication in their newsletters. SRWMO Board chose to focus their 2017 education infographic on septic system maintenance.

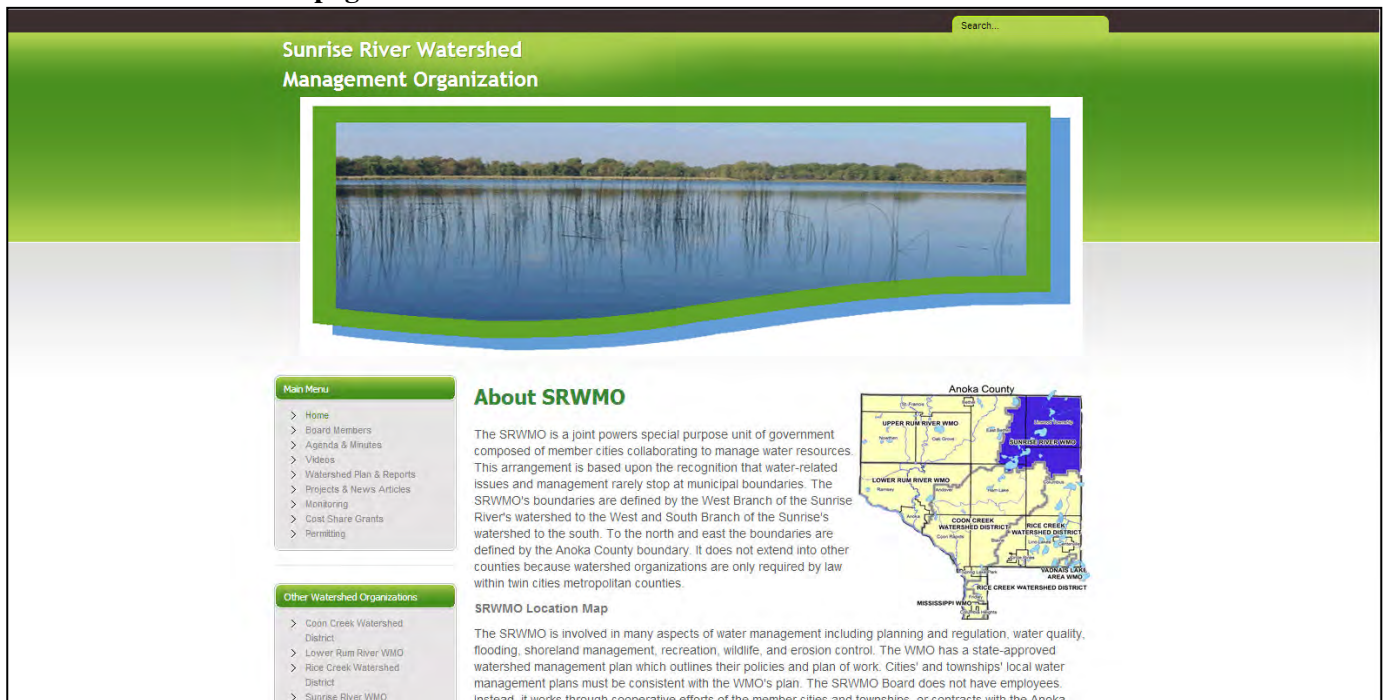
### SRWMO 2017 Education Infographic



## SRWMO Website

- Description:** The Sunrise River Watershed Management Organization (SRWMO) contracts the Anoka Conservation District (ACD) to maintain a website about the SRWMO and the Sunrise River watershed.
- Purpose:** To increase awareness of the SRWMO and its programs. The website also provides tools and information that helps users better understand water resources issues in the area. The website serves as the SRWMO's alternative to a state-mandated newsletter.
- Location:** [www.SRWMO.org](http://www.SRWMO.org)
- Results:** In 2013, the ACD re-launched the SRWMO website.
- Regular website updates occurred throughout 2017. The SRWMO website contains information about both the SRWMO and about natural resources in the area.
- Information about the SRWMO includes:
- a directory of board members,
  - meeting minutes and agendas,
  - the watershed management plan and information about plan updates,
  - descriptions of work that the organization is directing,
  - highlighted projects.

### SRWMO Website Homepage



## Grant Searches and Applications

**Description:** The Anoka Conservation District (ACD) partners with the SRWMO with the preparation of grant applications. Several projects in the SRWMO Watershed Management Plan need outside funding in order to be accomplished.

**Purpose:** To provide funding for high priority local projects that benefit water resources.

**Results:** In 2017 a grant application was prepared for a Martin and Typo Lakes Carp Harvest Project. A \$99,000 grant from the MN DNR Conservation Partners Legacy Grant Program was secured. Work to secure the grant included:

- Securing matching funds from the SRWMO (\$5,000), Martin Lakers Association (\$4,900) and the Anoka Conservation District (\$5,000).
- Negotiating and securing a contract with Carp Solutions, Inc.
- Preparing the grant application.

Since 2014 the following grants have been secured for SRWMO projects though the assistance of the Anoka Conservation District:

2014 Martin and Typo Lake Carp Barriers, site 2	MN DNR CPL	\$ 35,770
2014 Martin and Typo Lake Carp Barriers, sites 1,3,4	MN DNR CPL	\$399,983
2014 Coon Lake Area Stormwater Retrofits	BWSR CWF	\$ 42,987
2015 Ditch 20 Wetland Restoration Feasibility Study	BWSR CWF	\$ 72,400
2017 Martin and Typo Lake Carp Harvests	MN DNR CPL	\$ 99,000
2017 Septic System Fix Up Fund*	MPCA	<u>\$ 25,931</u>
TOTAL		\$676,071

\*Septic system fix up funds are available county-wide but the grant application was prompted by septic system inventory work by Linwood Township and the SRMWO.

## SRWMO Annual Report to BWSR and State Auditor

**Description:** The Sunrise River Watershed Management Organization (SRWMO) is required by law to submit an annual report to the Minnesota Board of Water and Soil Resources (BWSR), the state agency with oversight authorities. This report consists of an up-to-date listing of SRWMO Board members, activities related to implementing the SRWMO Watershed Management Plan, the status of municipal water plans, financial summaries, and other work results. The SRWMO bolsters the content of this report beyond the statutory requirements so that it also serves as a comprehensive annual report to SRWMO member communities. The report is due annually 120 days after the end of the SRWMO's fiscal year (April 30<sup>th</sup>).

The SRWMO must also submit an annual financial report to the State Auditor. They accept unaudited financial reports for financial districts with annual revenues less than \$185,000.

**Purpose:** To document progress toward implementing the SRWMO Watershed Management Plan and to provide transparency of government operations.

**Locations:** Watershed-wide

**Results:** Anoka Conservation District (ACD) assisted the SRWMO with preparation of an annual Sunrise River WMO Annual Report. The ACD drafted the report and cover letter. After SRWMO Board review the final draft was forwarded to BWSR. A sufficient number of copies of the report were sent to each member community to ensure that each city council person and town board member would receive a copy. The report is available to the public on the SRWMO website.

Cover

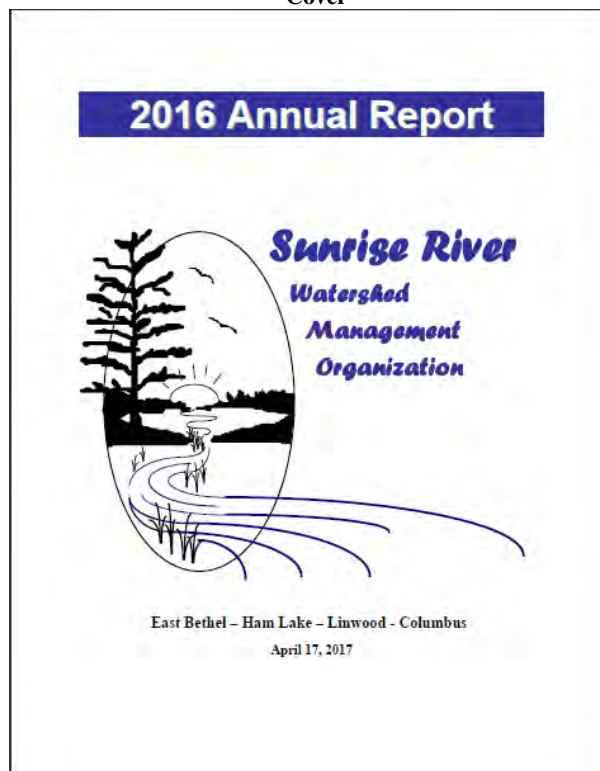


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## On-call Administrative Services

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- Description:** The Anoka Conservation District Watershed Projects Manager provides limited, on-call administrative assistance to the SRWMO. Tasks are limited to those defined in a contractual agreement.
- Purpose:** To ensure day-to-day operations of the SRWMO are attended to between regular meetings.
- Results:** In 2017 a total of 77 hours of administrative assistance were provided to the SRWMO by the Anoka Conservation District. The following tasks were accomplished:
- **Meeting prep** - Planned 5 SRWMO meeting agendas, prepared meeting packets and emailed them to the board a week in advance.
  - **Meeting attendance** - Attended 5 SRWMO meetings to provide project updates and advise the board.
  - **Plan addendum** - Prepared a required SRWMO Watershed Plan addendum to incorporate new state buffer law information and presented it to the board for approval.
  - **Funding updates** - Emailed Watershed Based Funding (aka fund the plan) to SRWMO board members and city staff.
  - **State inquiries** - Responded to the State Campaign Finance Board regarding failure of a board member to complete required Campaign Finance Disclosure forms. The member resigned over objections to the form as an intrusion.
  - **Boundary adjustments** – Addressed proposals for 3 SRWMO boundary adjustments sought by the City of Ham Lake. They were contentious, and included several meetings with city and watershed district staff. The proposals were mapped and presented to the SRWMO board. None of the adjustments was finalized.
  - **Regional reporting** – Reported SRWMO projects to the St. Croix River Partnership to document TMDL progress.
  - **Inquiries** – Fielded approximately 8 inquiries from developers, landowners and others about SRWMO permitting (there is none), grants and other programs.
  - **1W1P** - Attended 4 Lower St. Croix “One Watershed, One Plan” meetings to represent the SRWMO. Nearly all other WMOs, watershed districts, counties and SWCDs also had staff present.
  - **2018 budget** – Completed the 2018 budget through revisions directed by the board, providing it to cities for ratification, and tracking city ratification.
  - **2019 budget** – Prepared the 1<sup>st</sup> draft 2019 budget to present to the board.

## Financial Summary

The ACD accounting is organized by program and not by customer. This allows us to track all of the labor, materials and overhead expenses for a program. We do not, however, know specifically which expenses are attributed to monitoring which sites. To enable reporting of expenses for monitoring

conducted in a specific watershed, we divide the total program cost by the number of sites monitored to determine an annual cost per site. We then multiply the cost per site by the number of sites monitored for a customer.

### Sunrise River Watershed Financial Summary

Sunrise River Watershed	SRWMO Admin/Reporting/Grant Search	County, City, SWCD Asst (no charge)	WMO Asst (no charge)	SRWMO Promo/Website	Volunteer Precip	Reference Wetlands	DNR Groundwater Wells	Lake Levels	Lake Water Quality	Stream Levels	Stream Water Quality	Shoreland - NRBG - Linwood Lake SSTS	Martin/Typo Lake Carp Barriers	Carp Management - Typo and Martin Lakes	Coon Lake Retrofits	Ditch 20 Analysis	Inventory - Linwood Lake SSTS	Total
<b>Revenues</b>																		
SRWMO	4040			1305		1725		1250	3500	1350	1400			2350	131	4881		21932
State - Other							280					2615				41836		44731
MPCA																		0
DNR OHF																		0
DNR CPL													43778	37473				81251
BWSR Cons Delivery	1669	417	416				295								101			2897
BWSR Capacity Staff														5289			4126	9414
BWSR Capacity Direct																		0
BWSR Cost Share																		0
BWSR Cost Share TA																		0
BWSR Local Water Planning	207		175	58	219				165	371					10			1205
Metro ETA & NPEAP																		0
Metro AWQCP																		0
Regional/Local															524			524
Anoka Co. General Services	32	336	416									29		2630	242	1653		5338
County Ag Preserves/Projects																5000	958	5958
Service Fees															600			600
Investment Dividend																		0
Rents																		0
Product Sales																		0
<b>TOTAL</b>	<b>5947</b>	<b>754</b>	<b>1006</b>	<b>1363</b>	<b>219</b>	<b>1725</b>	<b>575</b>	<b>1250</b>	<b>3665</b>	<b>1721</b>	<b>1400</b>	<b>2644</b>	<b>43778</b>	<b>47742</b>	<b>1608</b>	<b>53371</b>	<b>5083</b>	<b>173851</b>
<b>Expenses</b>																		
Capital Outlay/Equip	225	19	59	51	10	50	39	48	140	47	21	3	209	223	130	1065	69	2409
Personnel Salaries/Benefits	5299	680	874	962	180	1421	459	1160	2309	1348	423	137	6272	9281	1217	27808	4529	64359
Overhead	235	27	41	49	12	107	40	68	157	106	30	7	252	319	86	1316	178	3029
Employee Training	16	3	3	2	1	12	3	6	18	11	2	1	11	61	3	126	30	308
Vehicle/Mileage	52	8	5	10	3	43	10	22	48	38	10	2	83	112	6	361	59	871
Rent	120	17	24	24	6	75	24	42	115	61	19	3	160	273	37	779	106	1886
Project Installation													18754		22			18775
Project Supplies				266	7	17		13	878	69	271	2491	9588	37473	109	22553	112	73848
McKay Expenses																		0
<b>TOTAL</b>	<b>5947</b>	<b>754</b>	<b>1006</b>	<b>1363</b>	<b>219</b>	<b>1726</b>	<b>575</b>	<b>1359</b>	<b>3665</b>	<b>1680</b>	<b>776</b>	<b>2644</b>	<b>35328</b>	<b>47742</b>	<b>1608</b>	<b>54009</b>	<b>5083</b>	<b>165484</b>
<b>NET</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-1</b>	<b>0</b>	<b>-109</b>	<b>0</b>	<b>41</b>	<b>624</b>	<b>0</b>	<b>8450</b>	<b>0</b>	<b>0</b>	<b>-638</b>	<b>0</b>	<b>8367</b>

## Recommendations

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- **Begin update of the SRWMO Watershed Management Plan** no later than May 2018 in order to complete by December 2019 when the current plan expires.
- **Engage in the Lower St. Croix One Watershed, One Plan process.** This plan will identify regional priorities.
- **Secure new Watershed Based Funding for SRWMO priority projects.** This new program replaces some competitive grants and is aimed at projects in approved water plans. \$826,000 is available in Anoka County to be divided by mutual agreement of eligible entities by June 30, 2018.
- **Pursue Linwood Lake management activities.** The association has recently become more active, and has requested partnerships to manage aquatic invasive species and improve water quality. Ongoing and upcoming projects include 2018 Boot Lake water quality monitoring, 2017-18 septic system outreach. Projects to consider include an assessment of the carp population and alum dosing.
- **Support the Linwood Lake Association.** The association has recently become more active, and has requested partnerships to manage aquatic invasive species and improve water quality. The SRWMO may be able to help with identifying and promoting projects, or assisting with fundraising.
- **Forward wetland restoration projects near Ditch 20 by connecting landowners with State wetland banking programs.** A feasibility study was recently completed. Three identified wetland restorations would likely benefit water quality in Typo and Martin Lakes. These are challenging projects from a feasibility and permitting standpoint, but the State wetland banking program may provide the resources and expertise.
- **Continue installation of stormwater retrofits around Coon and Martin Lakes** where completed studies have identified and ranked projects.
- **Promote newly available Septic System Fix Up Grants to landowners,** particularly in shoreland areas.
- **Identify likely ailing septic systems in shoreland areas.** Work done at Linwood Lake in 2017-18 can serve as a model.
- **Bolster lakeshore landscaping education efforts.** The SRWMO Watershed Management Plan sets a goal of three lakeshore restorations per year. Few are occurring. Fresh approaches should be welcomed.
- **Encourage communities to report water quality projects to the SRWMO.** An overarching goal in the SRWMO Plan is to reduce phosphorus by 20% (986 lbs). State oversight agencies will evaluate efforts toward this goal. Both WMO and municipal project benefits should be counted.