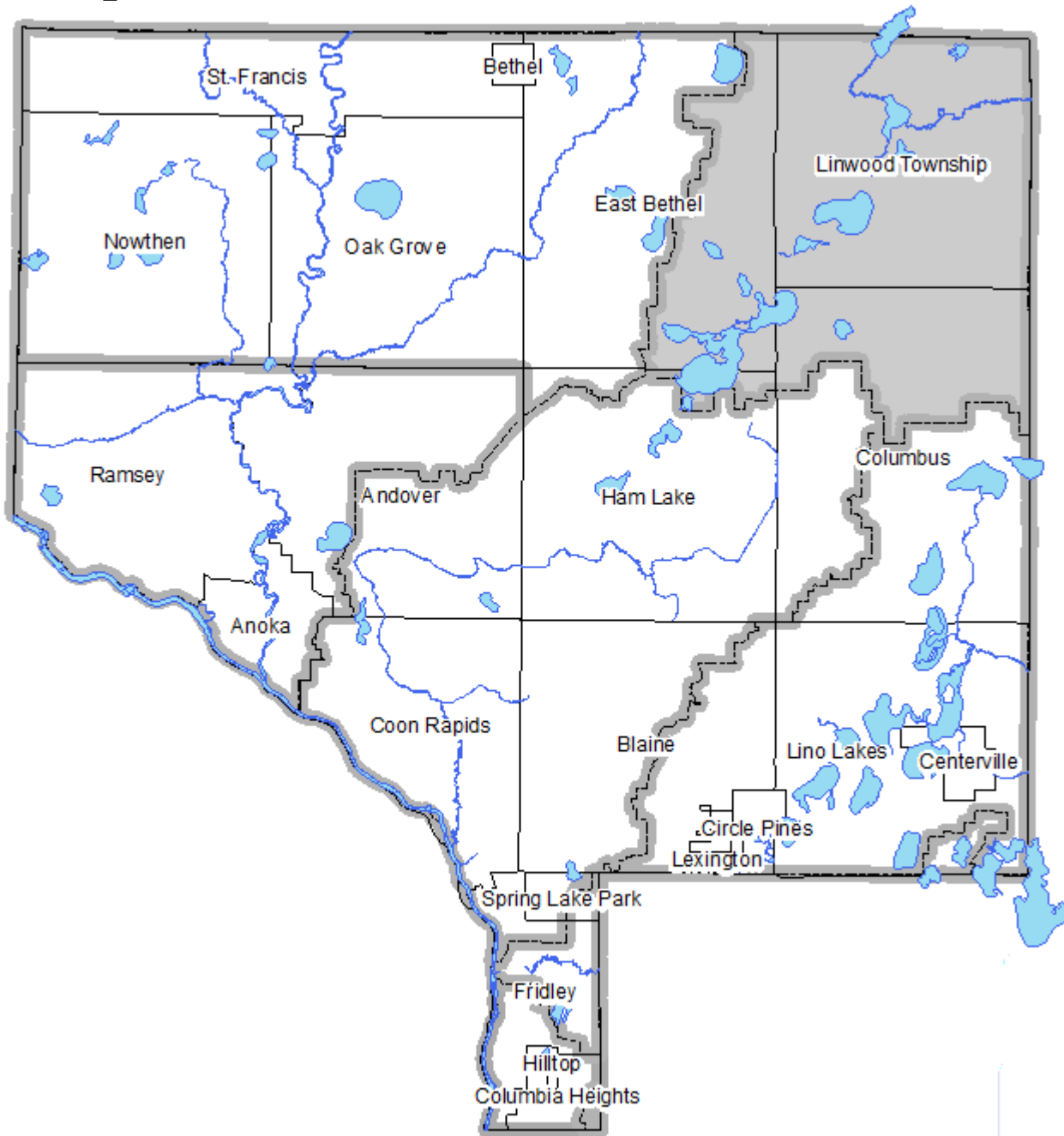


Excerpt from the 2019 Water Almanac

Chapter 2: Sunrise River Watershed












Prepared by the Anoka Conservation District

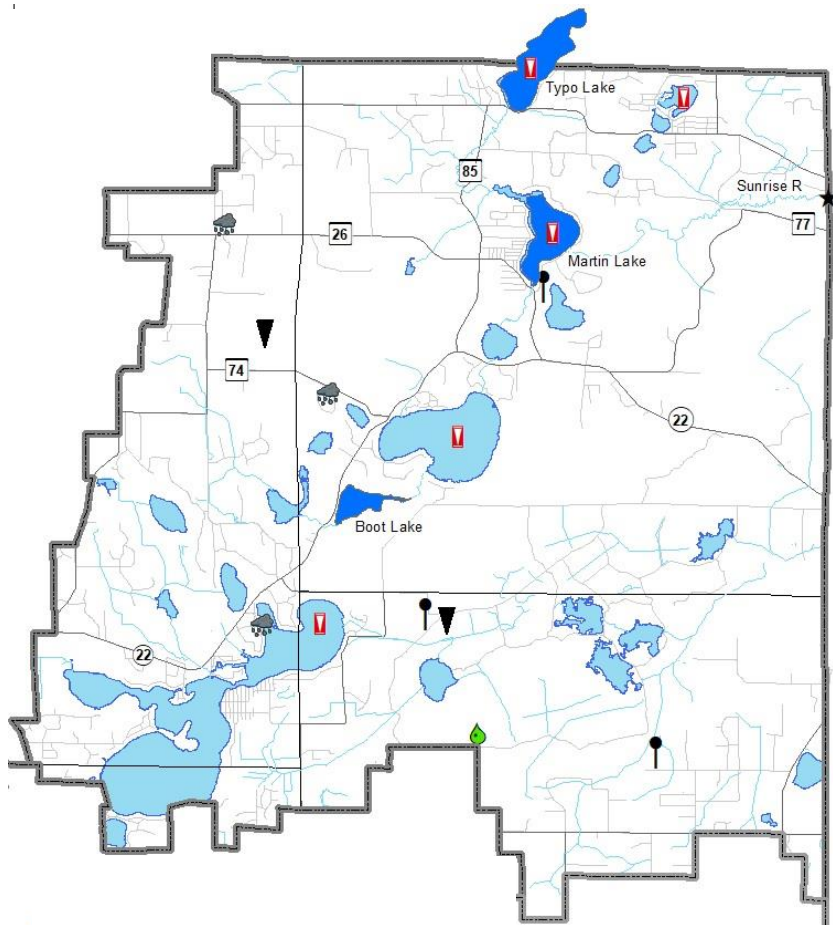
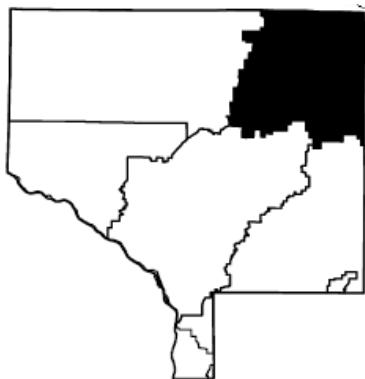
Chapter 2: Sunrise River Watershed

Table of Contents

Lake Level Monitoring.....	3
Lake Water Quality	6
Stream Water Quality	13
Wetland Hydrology	21
Water Quality Grant Fund	25
Martin and Typo Lake Carp Removal Project.....	26
Linwood Lake Carp Population Study	28
Annual Education Publication	29
SRWMO Website.....	30
Grant Searches and Applications.....	31
SRWMO Annual Report to BWSR and State Auditor.....	32
On-call Administrative Services.....	33
Financial Summary.....	34
Recommendations	35
Groundwater Hydrology (ob. wells).....	Chapter 1
Precipitation.....	Chapter 1

2019 Monitoring Sites

-  Lake Water Quality
-  Lake Levels
-  Stream Water Quality
-  Stream Hydrology
-  Volunteer Precipitation
-  Anoka County Weather
-  Wetland Hydrology
-  Groundwater Hydrology
-  Student Biomonitoring

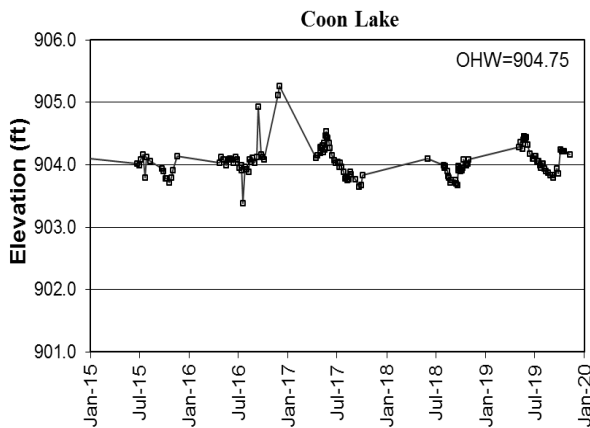


Lake Level Monitoring

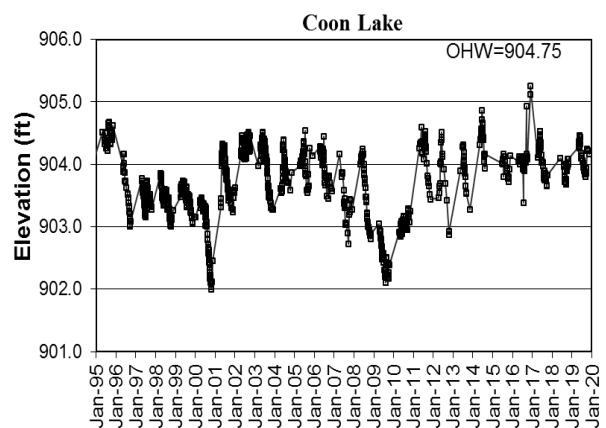
- Partners:** SRWMO, ACD, MN DNR, local volunteers
- Description:** Weekly water level monitoring in lakes. The past five and twenty-five years of data for each lake are illustrated below, and all historical data are available on the Minnesota DNR website using the “LakeFinder” feature (www.dnr.mn.us.state/lakefind/index.html).
- 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 gauges were installed by the Anoka Conservation District and surveyed by the MN DNR. In 2019, lakes followed the expected pattern of high levels in the spring, declining levels through the summer and then water levels beginning to rebound in the fall. Coon Lake and Fawn Lake both had higher water levels than in 2018 but only fluctuated 0.5 ft. throughout the season. Typo Lake and Martin Lake had the highest recorded levels in the past five years. Water levels on both lakes fluctuated widely throughout the season (Typo: 1.96 ft., Martin: 1.5 ft.). It’s notable that 2019 had the greatest precipitation total of any recorded year (data goes back to 1871) in the Twin Cities metro.

All lake level data can be downloaded from the MN DNR website’s LakeFinder feature (<https://www.dnr.state.mn.us/lakefind/index.html>). 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.

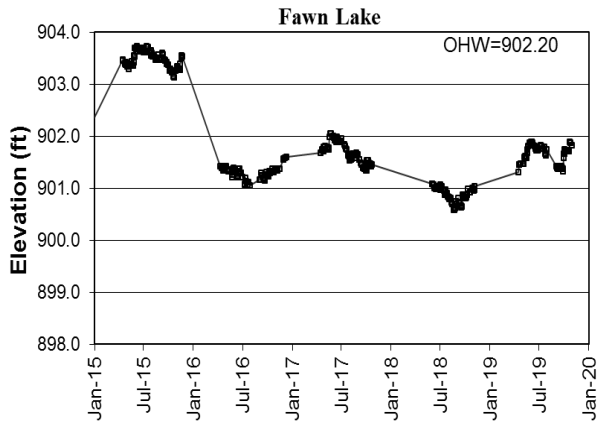
Coon Lake Levels – last 5 years



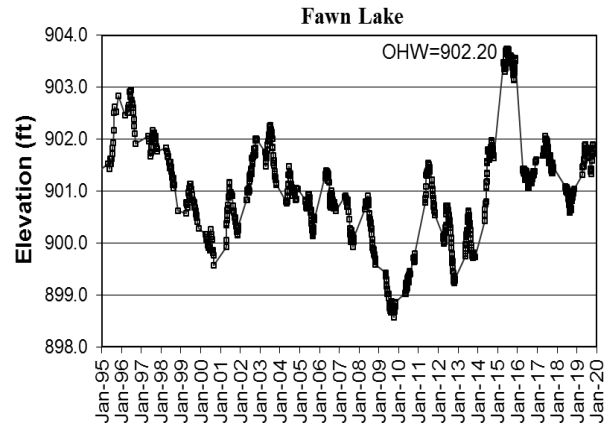
Coon Lake Levels – last 25 years



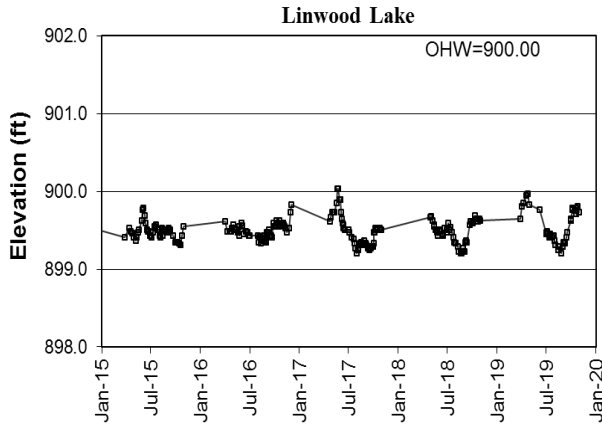
Fawn Lake Levels – last 5 years



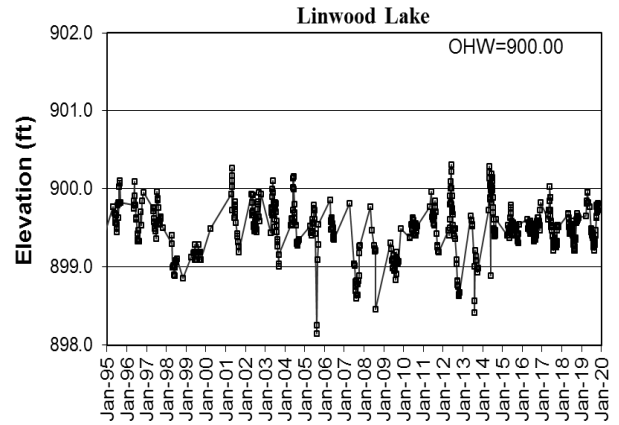
Fawn Lake Levels – last 25 years



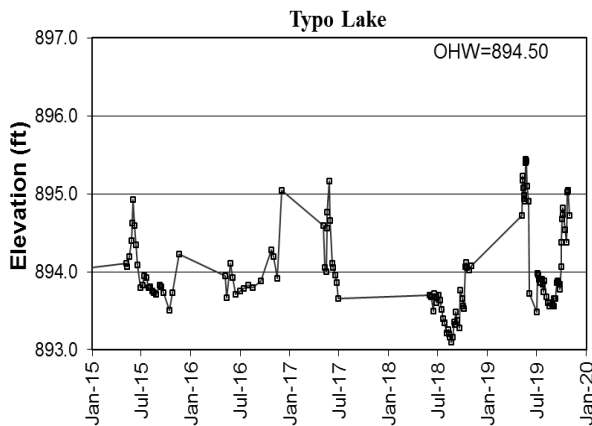
Linwood Lake Levels – last 5 years



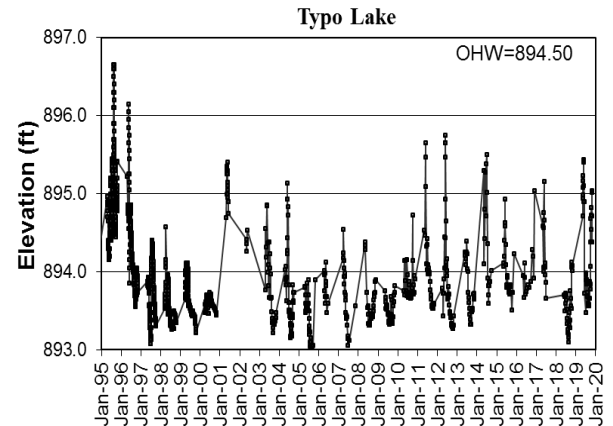
Linwood Lake Levels – last 25 years



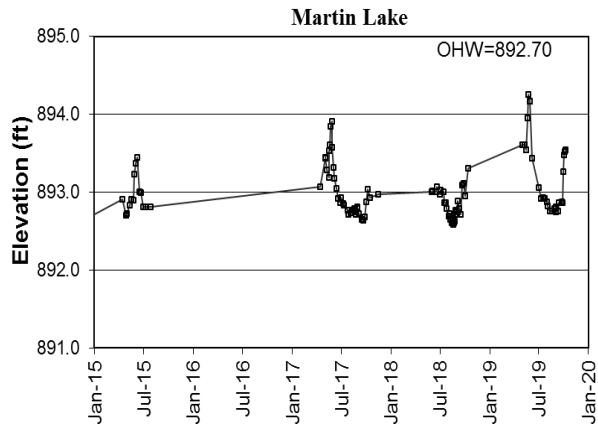
Typo Lake Levels – last 5 years



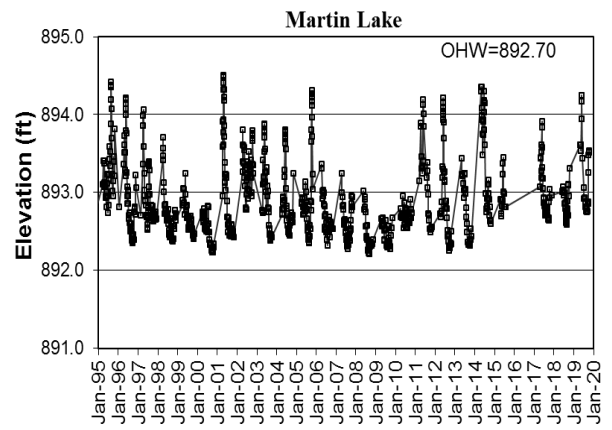
Typo Lake Levels – last 25 years



Martin Lake Levels – last 5 years



Martin Lake Levels – last 25 years



Lake Water Quality

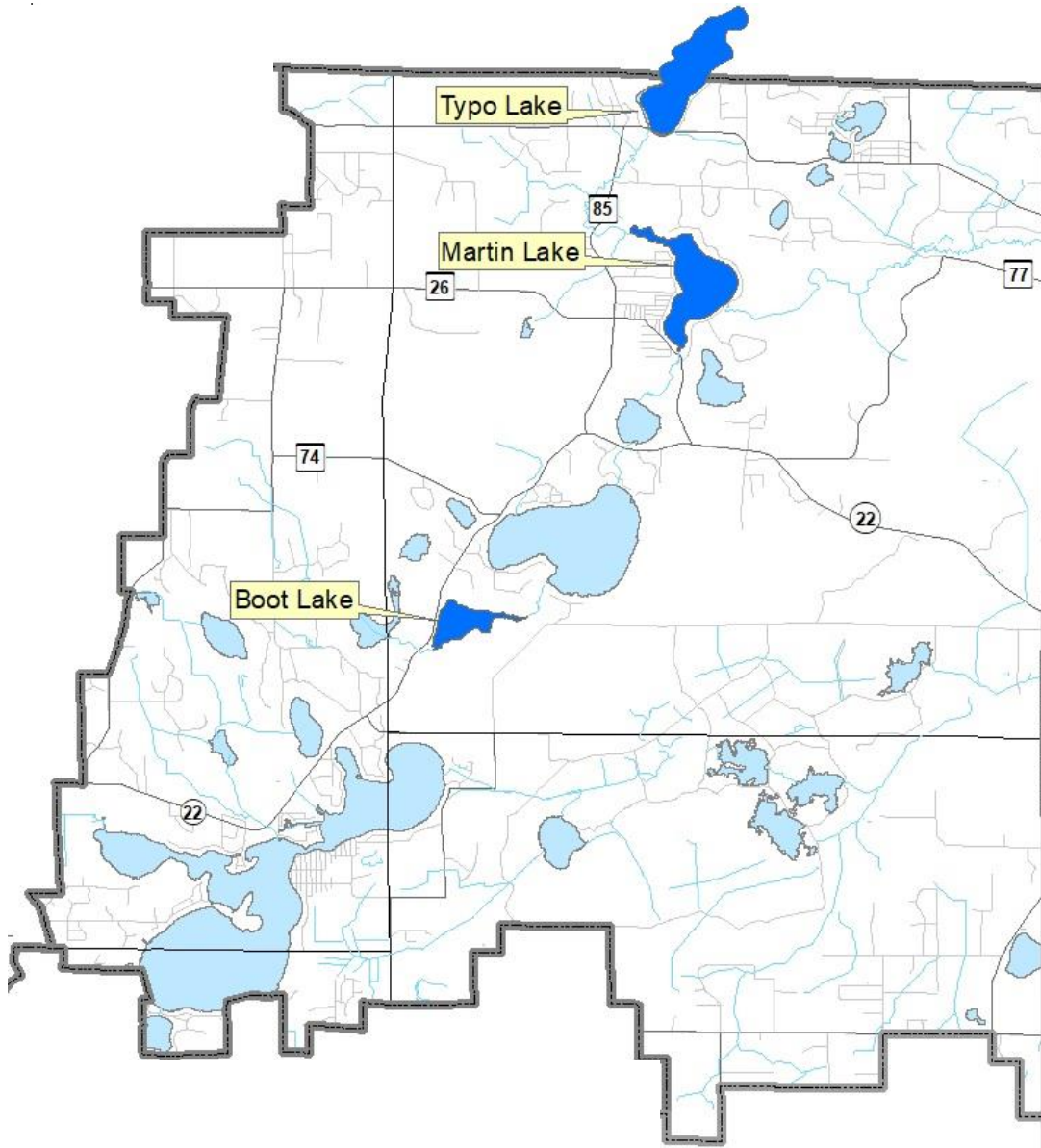
Description: May through September, every-other-week, monitoring is conducted for the following parameters: total phosphorus, chlorophyll-a, Secchi transparency, dissolved oxygen, turbidity, temperature, specific conductivity, pH, and salinity.

Purpose: To detect water quality trends and diagnose the cause of changes.

Locations: Boot, Typo, and Martin Lakes

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 Minnesota Pollution Control Agency (MPCA) (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.

2019 Sunrise River Watershed Lake Water Quality Monitoring Sites



BOOT LAKE

LINWOOD TOWNSHIP LAKE ID # 02-0028

Background

Boot Lake is located in the northeast portion of Anoka County and has a surface area of 92 acres. While nearly all of the lake is shallow with aquatic vegetation growing to the surface, there is one area with a depth of 23 ft. (7 m) where water quality monitoring occurs.

Boot Lake is within a Scientific and Natural Area (SNA) owned and administered by the Minnesota Department of Natural Resources. The Boot Lake SNA is 660 acres and includes the entire lake as well as the undeveloped shoreline. Access, including for ACD to conduct water quality monitoring, requires a special permit from the MN DNR.

Boot Lake has one primary stream inlet and one outlet. The inlet drains upstream lands that include undeveloped, sod fields and large-lot residential usage. The outlet stream goes to Linwood Lake.

Boot Lake was selected as a new monitoring site in 2018 for two reasons. First, Boot Lake is a contributing water source to Linwood Lake which is impaired for excess nutrients. Monitoring Boot Lake's water quality allows us to determine whether Boot Lake is degrading Linwood Lake's water quality. Secondly, Boot Lake is relatively undisturbed, and it is desirable to see what types of water quality conditions are in a rare, undeveloped lake in Anoka County.

2019 Results

Boot Lake's nutrient levels are typical of shallow lakes in the area. Average phosphorus levels in 2019 were 43.3 µg/L, average chlorophyll-a was 6.6 µg/L, and average Secchi transparency was 5.5 ft. (1.7 m). These are better than the state water quality standard for shallow lakes (total phosphorus <60 µg/L, chlorophyll-a <20 µg/L, Secchi transparency >1m), and earns Boot Lake an overall B letter grade on Met Council's grading scale for metro area lakes. This is an improvement from the C letter grade Boot Lake received in 2018. Boot Lake supports a rich plant community, and the lake attracts abundant waterfowl.

Trend Analysis

2019 was only second year of water quality monitoring for Boot Lake. Trend analysis is not yet possible. The earliest data about the lake is from a 1979 a resource inventory was completed for assessment of the site as a potential Scientific and Natural Area. The inventory did not include water quality monitoring.

Discussion

While Boot Lake is not subject to many of the potential negative impacts that occur on unprotected and/or developed lakes, its water quality is far from the pristine condition one might expect. Viking Boulevard runs near the western shore of the lake and may directly contribute pollutants. The contributing subwatershed includes some agriculture and scattered residential housing, which may also affect water quality in Boot Lake. Finally, in-lake nutrients can contribute to algal growth.

ACD monitored the water quality of the inlet to Boot Lake at Viking Boulevard in 2001 and 2003. Average total phosphorus in the inlet across both years was 117 µg/L, which is typical for the area but does exceed the state water quality standard of 100 µg/L, and is likely contributing to the nutrient load into Boot Lake.

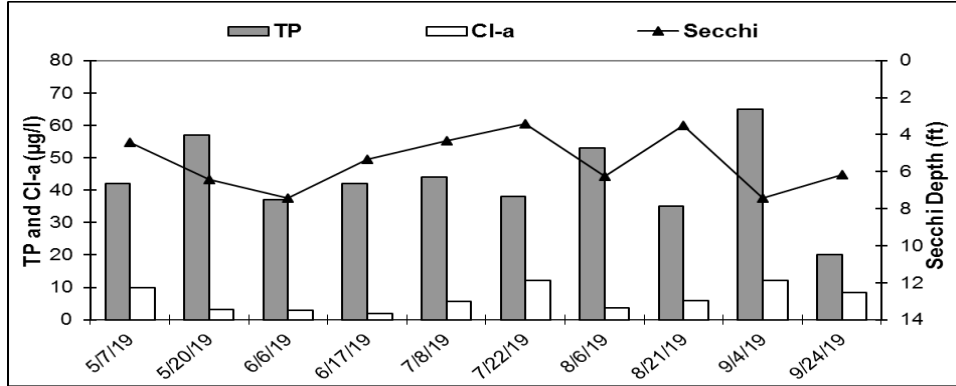
Carp can negatively impact lake water health, though their population appears low in Boot Lake. This is significant because carp reduction is a management goal for Linwood Lake. Boot Lake could be a source of carp, or spawning area for them. Dead common carp were observed in 2018 when ACD staff were monitoring water quality. Also in 2018 a trap netting survey for carp was done in Boot Lake but none were caught.

Boot Lake's impact on Linwood Lake downstream appears neutral, as its nutrient concentrations are similar. However, efforts to improve impaired Linwood Lake should be made with Boot Lake in mind. It often makes sense to manage the whole watershed, and especially upstream contributing waters.

Boot Lake

Linwood Township Lake ID # 02-0028

2019 Results



2019 Median

pH		7.73
Specific Conductivity	mS/cm	0.255
Turbidity	NTU	5.4
D.O.	mg/l	9.14
D.O.	%	107.8
Temp.	°F	71.1
Salinity	%	0.12
Cl-a	µg/L	5.7
T.P.	µg/l	42
Secchi	ft	4.76

Historical Report Card

Year	TP	Cl-a	Secchi	Overall
2018	C	B	C	C
2019	C	A	C	B
State Standards	60 ug/L	20 ug/L	>3.3 ft	

2019 Water Quality Data

	Units	Date:										Average	Min	Max	
		5/7/2019	5/20/2019	6/6/2019	6/17/2019	7/8/2019	7/22/2019	8/6/2019	8/21/2019	9/4/2019	9/24/2019				
	R.L.*	9:40	10:00	9:15	9:15	9:00	9:00	9:25	9:15	9:15	9:30				
pH		0.1	7.93	7.89	8.13	7.74	8.29	7.51	7.53	7.44	7.53	7.72	7.8	7.44	8.29
Specific Conductivity	mS/cm	0.01	0.218	0.239	0.215	0.234	0.250	0.272	0.286	0.261	0.275	0.260	0.3	0.22	0.29
Turbidity	NTU	1	N/A	0.02	0.20	2.60	5.40	4.300	0.00	3.60	2.10	2.20	2.3	0.00	5.40
D.O.	mg/l	0.01	10.32	9.29	9.00	8.83	11.28	8.01	8.76	8.84	10.36	14.10	9.9	8.01	14.10
D.O.	%	100	102.1	82.1	108.5	107.6	144.6	97.6	108.0	102.8	114.0	160.6	112.8	82.10	160.60
Temp.	°C	0.1	14.10	12.17	22.27	21.17	25.87	23.91	24.57	22.86	20.01	19.57	20.7	12.17	25.87
Temp.	°F	0.1	57.4	53.9	72.1	70.1	78.6	75.0	76.2	73.1	68.0	67.2	69.2	53.91	78.57
Salinity	%	0.01	0.10	0.11	0.10	0.11	0.12	0.13	0.14	0.13	0.13	0.12	0.1	0.10	0.14
Cl-a	µg/L	1	9.90	3.20	2.80	1.8	5.6	12.2	3.7	5.8	12.1	8.5000	6.6	1.80	12.20
T.P.	mg/l	0.005	0.042	0.057	0.037	0.042	0.044	0.038	0.053	0.035	0.065	0.020	0.0	0.02	0.07
T.P.	µg/l	5	42	57	37	42	44	38	53	35	65	20	43.3	20.00	65.00
Secchi	ft		4.41	6.41	7.41	5.33	4.33	3.41	6.3	3.5	7.4	6.2	5.5	3.41	7.41
Secchi	m		1.3	2.0	2.3	1.6	1.3	1.0	1.9	1.1	2.3	1.9	1.7	1.04	2.26
Physical			1.0	1.0	1.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	1.5	1.00	2.00
Recreational			2.0	1.0	2.0	1.0	3.0	3.0	2.0	3.0	2.0	2.0	2.1	1.00	3.00

*reporting limit

TYPO LAKE

LINWOOD TOWNSHIP, LAKE ID # 30-0009

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, and 28% wetlands, with the remainder being forested or grassland. Typo Lake is on the MPCA's list of impaired waters for excess nutrients.

2019 Results

In 2019 Typo Lake had poor water quality compared to other lakes in this region (NCHF Ecoregion), receiving an overall F letter grade. Average total phosphorus (TP) was 175.0 µg/L, which was an increase from the 2018 average of 160.3 µg/L. While total phosphorus levels continue to far exceed the 60 µg/L state standard, average concentrations appear to be staying well below averages from a decade ago (353.0 µg/L in 2009).

Chlorophyll-a (Cl-a) levels in 2019 averaged 74.4 µg/L. Though this is an increase from previous years, it is below the historical average for the lake of 110.3 µg/L. This is still many times higher than the state standard for Cl-a in shallow lakes of 20 µg/L.

Average Secchi transparency in 2019 was 1.5 feet, which is the second-highest average on record. In 2007 and 2009 a Secchi disk could be seen only 5-6 inches below the surface, on average. Transparency has improved throughout the last decade, but still remains poorer than the state standard for shallow lakes transparency of 1 meter (3.3 feet).

Trend Analysis

Nineteen years of water quality monitoring have been conducted by the MPCA (1993, '94, and '95) and the Anoka Conservation District (1997-2001, '03, '05, '07, '09, '12, 2014-2019). Overall, water quality has improved from 1993 to 2019 (excluding high nutrient outlier years 2007 and 2009) in a statistically significant way (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth; $F_{2, 14}=7.79$, $p=0.01$). 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 showing a statistically significant decline ($p=0.001$). A superficial look at graphs of these parameters suggests that total phosphorus is generally stable between 150 µg/L and 250 µg/L without a long-term trend. Secchi transparency in recent years is similar to averages from the early 1990s, an improvement from the late 1990s-2010. The major driver of improved water quality is decreasing Cl-a concentrations.

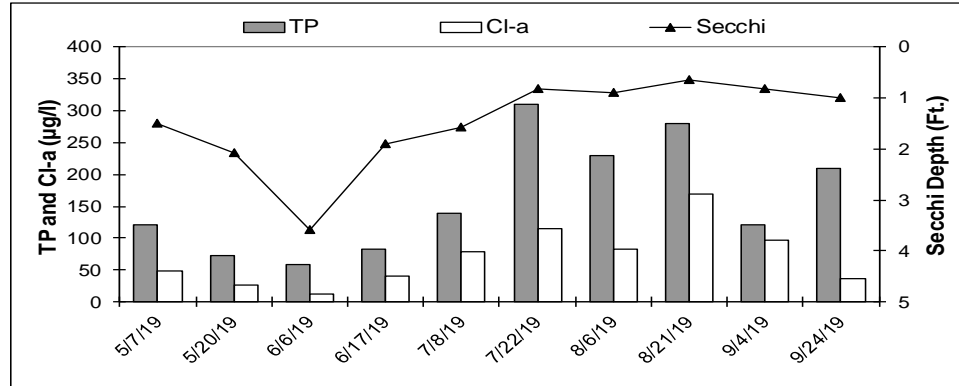
Discussion

Typo Lake, along with Martin Lake downstream was 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 forth lake rehabilitation strategies. Some factors impacting water quality in Typo Lake include rough fish, ditched wetland west of the lake, and lake sediments. Recent work has included installation of carp barriers (completed in 2016), carp removals (2017-19, to be continued in 2020), and a feasibility study of ditched wetland restorations upstream of Typo Lake (2018). The feasibility study was completed in early 2018 and identified 4 potential projects along Ditch 20 upstream of Type Lake. It also recommends that dredging of Ditch 20 not occur. Current shoreline conditions on Typo Lake were inventoried during a 2019 shoreline survey. This inventory will assist in identifying future lakeshore projects. For more information on these projects, contact the Anoka Conservation District.

TYPO LAKE

LINWOOD TOWNSHIP, LAKE ID # 30-0009

2019 Results



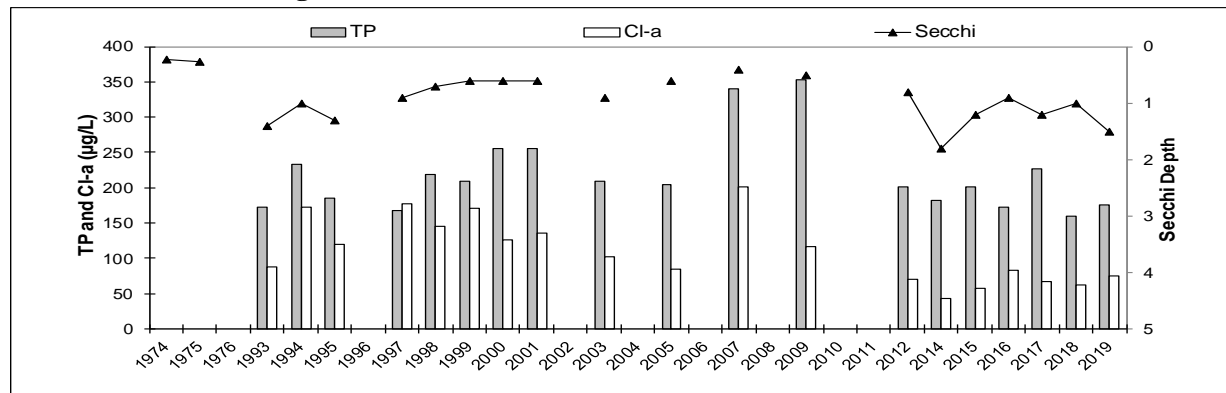
2019 Median Values

pH		8.46
Specific Conductivity	mS/cm	0.284
Turbidity	NTU	98.8
D.O.	mg/l	10.96
D.O.	%	114.95
Temp.	°F	71.6
Salinity	%	0.13
Cl-a	µg/L	63.55
T.P.	µg/l	130
Secchi	ft	1.25

Historical Report Card

Year	TP	Cl-a	Secchi	Overall
1974			F	F
1975			F	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
2018	F	D	F	F
2019	F	D	F	F
State Standards	60 ug/L	20 ug/L	>3.3 ft	

Historic Annual Averages



2019 Water Quality Data

Date	Time												Average	Min	Max		
	2/1/2019	2/15/2019	5/7/2019	5/20/2019	6/6/2019	6/17/2019	7/8/2019	7/22/2019	8/6/2019	8/21/2019	9/4/2019	9/24/2019					
Units	R.L.*																
pH	0.1		8.71	8.12	8.43	8.50	8.58	8.51	7.73	8.39	8.30	8.61	8.39	7.73	8.71		
Specific Conductivity	mS/cm	0.01		0.236	0.264	0.255	0.301	0.349	0.320	0.333	0.285	0.283	0.270	0.290	0.349		
Turbidity	FNRU	1		N/A	20.20	10.10	30.50	45.7	98.50	99.10	109.00	105.00	101.00	65	109		
D.O.	mg/l	0.01	16.91	12.57	12.01	10.36	9.22	8.94	16.68	13.75	5.24	11.56	10.30	15.03	11.59	5.24	16.91
D.O.	%	1	130.0	92.0	118.3	96.0	111.6	103.4	204.1	165.9	65.9	136.2	110.9	162.9	121.3	65.9	204.1
Temp.	°C	0.1		13.64	10.98	23.07	20.93	26.06	23.86	24.93	23.20	19.35	19.60	20.67	10.98	26.06	
Temp.	°F	0.1		56.6	51.8	73.5	69.7	78.9	74.9	76.9	73.8	66.8	67.3	69.2	51.8	78.9	
Salinity	%	0.01		0.11	0.12	0.12	0.14	0.17	0.16	0.11	0.14	0.13	0.13	0.1	0.1	0.2	
Cl-a	µg/l	1		49.10	26.50	11.90	40.00	78.00	115.00	83.30	169.00	97.20	36.10	74.4	11.9	169.0	
T.P.	mg/l	0.005		0.120	0.072	0.059	0.083	0.140	0.310	0.230	0.280	0.120	0.210	0.175	0.059	0.310	
T.P.	µg/l	5		120	72	59	83	140	310	230	280	120	210	175	59	310	
Secchi	ft	0.1		1.50	2.08	3.58	1.91	1.58	10.00	0.9	0.7	0.8	1.0	2.6	0.7	10.0	
Secchi	m	0.1		0.5	0.6	1.1	0.6	0.5	3.0	0.3	0.2	0.3	0.3	0.8	0.2	3.0	
Physical				3.0	3.0	3.0	3.00	3.00	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recreational				3.0	3.0	3.0	3.00	4.00	3.0	3.0	3.0	4.0	4.0	3.3	3.0	4.0	

*reporting limit

Martin Lake

Linwood Township, Lake ID # 02-0034

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 remaining 82% 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 MPCA's list of impaired waters for excess nutrients.

2019 Results

In 2019 Martin Lake had a C letter grade. During 2016-2018 the lake had a pattern of declining phosphorus levels, including a record low of 53.1 µg/L in 2018. In 2019 total phosphorus levels were higher, averaging 64.1 µg/L. Even though total phosphorus levels were higher in 2019, they are better than the average of 92.7 µg/L during 1997-2015 or even higher. 2019 was the wettest year on record for the area, and increased runoff from the watershed may have played a role in higher 2019 phosphorus.

In 2019, chlorophyll-a averaged 32.8 µg/L, an increase from the 2018 average of 27.6 µg/L. Cl-a levels have been on a fairly steady incline since 2014 which had the lowest recorded average of 15.5 µg/L. While the 5-year (2015-2019) average (26.5 µg/L) has been much lower than the 2005-2009 average (108.3 µg/L), it remains above the impairment standard of 14 µg/L.

Average Secchi transparency was 3.3 feet in 2019, an improvement from the historical average of 2.9 feet for the lake. Secchi transparency remains about 30% below the State impairment threshold of 4.6 feet. The ACD staff continues to note green water during late summer months.

Trend Analysis

Nineteen years of water quality data have been collected by the MPCA (1983), Metropolitan Council (1998, 2008), and the ACD (1997, 1999-2001, 2003, 2005, 2007, 2009, 2012-2019). 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 poor, water quality in Martin Lake has shown an improvement from 1983 to 2019 that is statistically significant (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth; $F_{2,15}=5.26$, $p < 0.02$). This is especially true for the last decade. Further examination of the data shows that while TP and Secchi transparency have not changed in the long-term since 1983, chlorophyll-a has shown a statistical decrease ($p < 0.01$) over this time. Water quality in Martin Lake declined through the late 1990s and reached its worst in 2007. In the nine years sampled since 2007, both TP and Secchi transparency have improved on a statistically significant basis (TP $p < 0.01$, Secchi $p < 0.01$).

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 sources 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.

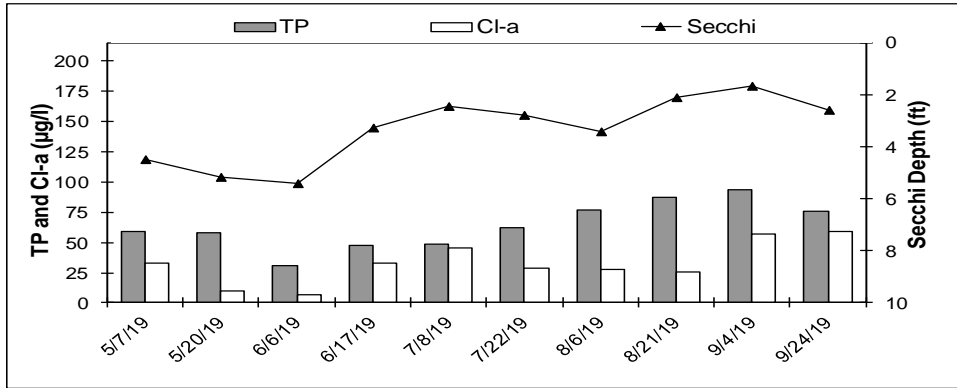
Upstream of Typo Lake, a feasibility study was completed in early 2018 regarding restoration of ditched wetlands (Ditch 20). This study identified 4 potential projects and also recommends that dredging of Ditch 20 not occur.

Carp removals and other management efforts are taking place in 2017-2020 and additional stormwater retrofits are planned in 2020-2021. Current shoreline conditions on Martin Lake were inventoried during a 2019 shoreline survey. This inventory will assist in identifying future lakeshore projects. Recent water quality monitoring results suggest these management approaches are improving conditions in these lakes, but reaching goals will require additional effort and time.

MARTIN LAKE

LINWOOD TOWNSHIP, LAKE ID # 30-0009

2019 Results



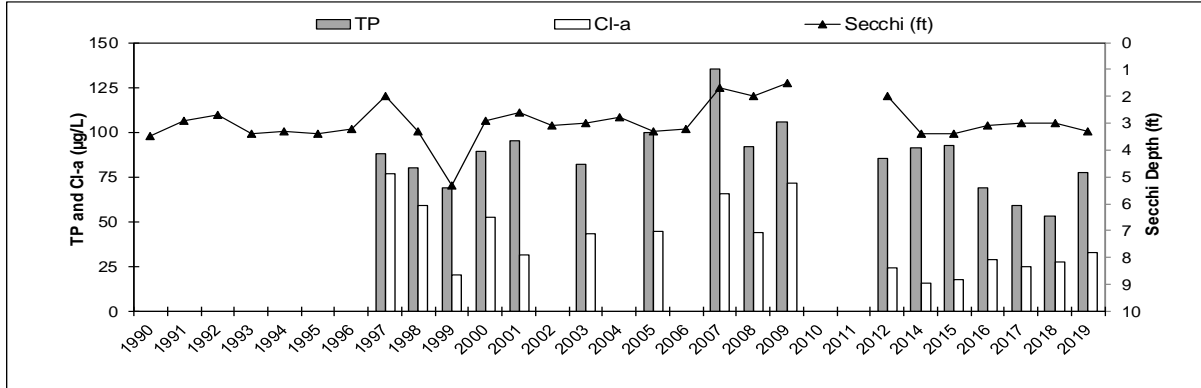
2019 Median Values

pH		8.04
Specific Conductivity	mS/cm	0.315
Turbidity	NTU	17
D.O.	mg/l	10.85
D.O.	%	125.55
Temp.	°F	70.5
Salinity	%	0.14
Cl-a	µg/L	31.1
T.P.	µg/l	60.5
Secchi	ft	3.3

Historical Report Card

Year	TP	Cl-a	Secchi	Overall
1996			D	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
2018	C	C	D	C
2019	C	C	D	C
State Standards	40 ug/L	14 ug/L	>4.6 ft	

Historic Annual Averages



2019 Water Quality Data

	Units	Date:										Average	Min	Max	
		5/7/2019	5/20/2019	6/6/2019	6/17/2019	7/8/2019	7/22/2019	8/6/2019	8/21/2019	9/4/2019	9/24/2019				
		Time:													
		10:45	10:30	9:50	9:50	10:00	9:50	10:10	9:45	9:50	10:10				
		R.L.*													
pH		0.1	8.20	7.80	7.95	8.07	8.38	8.02	8.39	7.97	7.79	8.25	8.08	7.79	8.39
Specific Conductivity	mS/cm	0.01	0.285	0.299	0.272	0.290	0.332	0.363	0.360	0.334	0.340	0.299	0.317	0.272	0.363
Turbidity	FNRU	1	N/A	4.40	2.10	17.00	21.40	13.50	12.30	22.60	27.00	35.60	16.11	2.10	35.60
D.O.	mg/l	0.01	13.33	8.56	8.95	9.72	12.18	10.21	14.08	10.46	11.24	16.14	11.49	8.56	16.14
D.O.	%	1	125.7	83.3	105.7	112.6	156.5	125.4	178.9	124.7	127.5	172.5	131.3	83.3	178.9
Temp.	°C	0.1	12.72	13.09	21.94	20.82	25.71	25.18	25.91	23.85	20.31	20.14	21.0	12.7	25.9
Temp.	°F	0.1	54.9	55.6	71.5	69.5	78.3	77.3	78.6	74.9	68.6	68.3	69.7	54.9	78.6
Salinity	%	0.01	0.13	0.14	0.13	0.14	0.16	0.17	0.10	0.16	0.16	0.14	0.14	0.10	0.17
Cl-a	µg/L	1	33.20	10.10	7.00	33.40	46.00	29.00	27.90	25.20	56.60	59.10	32.8	7.0	59.1
T.P.	mg/l	0.005	0.059	0.058	0.031	0.048	0.049	0.062	0.077	0.087	0.094	0.076	0.064	0.031	0.094
T.P.	µg/l	5	59	58	31	48	49	62	77	87	94	76	64.1	31	94
Secchi	ft	0.1	4.50	5.16	5.41	3.25	2.41	2.75	3.4	2.1	1.7	2.6	3.3	1.7	5.4
Secchi	m	0.1	1.4	1.6	1.6	1.0	0.7	0.8	1.0	0.6	0.5	0.8	1.0	0.5	1.6
Physical			1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.0	2.0
Recreational			1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	2.0	1.0	3.0

*reporting limit

Stream Water Quality

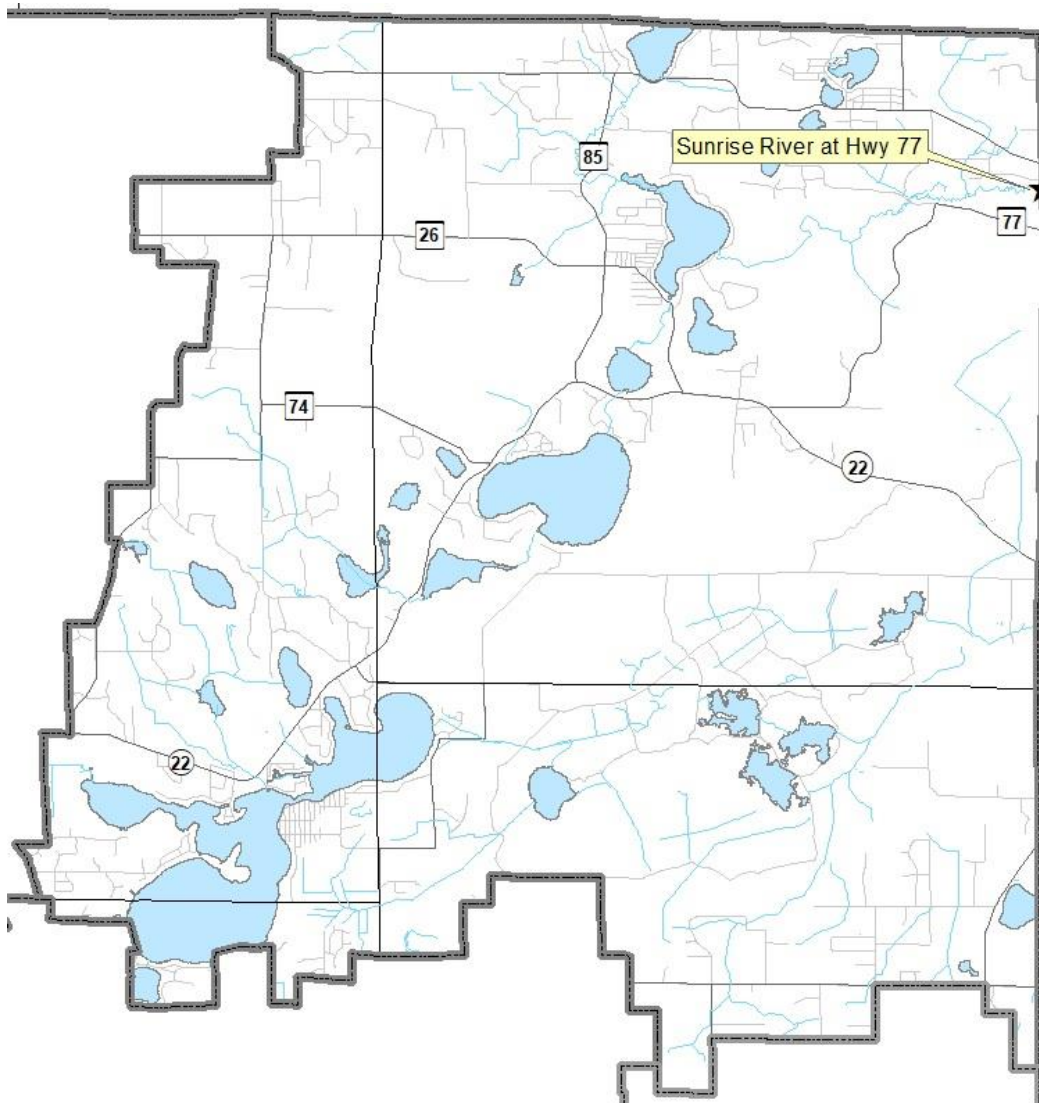
Description: In 2019 and 2020, the Sunrise River water quality monitoring site at Highway 77 is being monitored using funds from a MPCA Surface Water Assessment Grant (SWAG). Stream water quality was monitored on twelve occasions in 2019, including five grab samples. The selected site is at the furthest downstream limit of the Sunrise River Watershed Management Organization's jurisdictional area, and the Anoka County border. Parameters monitored include water level, pH, specific conductivity, turbidity, chlorides, transparency, dissolved oxygen, total phosphorus, and total suspended solids.

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

Location: Sunrise River at Hwy 77

Results: Results are presented on the following pages.

2019 Sunrise River Watershed Stream Water Quality Monitoring Sites



Stream Water Quality Monitoring

SUNRISE RIVER AT HWY 77

Near Fawn Lake Dr. NE, Linwood Township

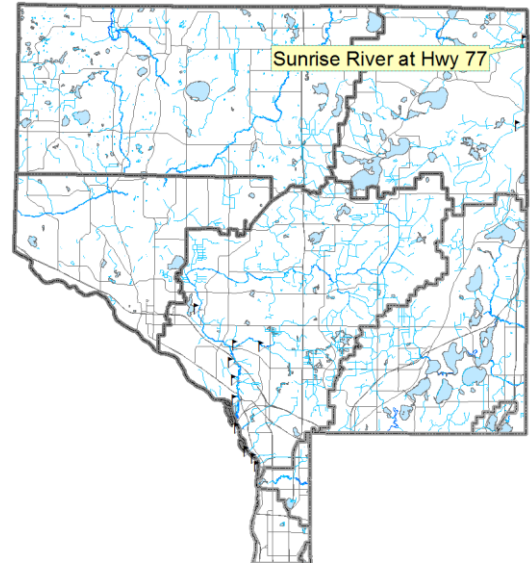
STORET SiteID = S001-424

Years Monitored

2001, 2003, 2006, 2012, 2015, 2018, 2019

Background

This monitoring site is near the bottom of the Sunrise River Watershed in Anoka County, at the Chisago County border. Upstream, this river drains through Boot, Linwood, Island, Martin, and Typo Lakes. The Sunrise River Watershed Management Organization historically monitors this site because it is where the river leaves their jurisdiction. Additionally, monitoring is considered important because this portion of the river is impaired for aquatic life with turbidity identified as a stressor. This site is included in the MN Pollution Control Agency's Cycle II Monitoring for the Lower St. Croix Watershed which began in 2019 and will run through 2020. A TMDL study was completed in 2013.



Methods

The river was monitored on 12 occasions. All monitoring during 2019 was completed during baseflow conditions. Parameters tested with portable meters included pH, specific conductivity, turbidity, temperature, dissolved oxygen, and salinity. Parameters tested by water quality grab samples sent to a state-certified lab included total phosphorus, chlorides, and total suspended solids. Grab samples were taken and analyzed by a laboratory at the beginning of each month monitored.

Summarized Results

Summarized water quality monitoring findings and management implications include:

- Specific conductivity was below the county median of 0.420 mS/cm. The median specific conductivity was 0.362 mS/cm. The median specific conductivity for all years at this site is 0.306 mS/cm. For management considerations see chlorides.
- Chlorides were measured at this site in all years, except 2015. In 2019, the median chloride concentration was 17.2 mg/L. The median for all years at this site is 15.65 mg/L and the countywide median is 13.29 mg/L which are both well below the state standard of 230 mg/L
Management discussion: Road deicing salts are a concern region-wide. Chlorides are measurable in area streams year-round, including in the Sunrise River. While chloride levels may be low compared to state standards, excessive salt use should be avoided.
- Suspended solids and turbidity levels were similar in 2019 compared to other years monitored. The 2019 median TSS concentration was 12.0 mg/L, a decrease from 20.1 mg/L in 2018. The median for all years at this site is 17 mg/L. These levels are higher than most other Anoka County streams, but still below the state standard of 30 mg/L TSS.
Management discussion: Efforts to reduce suspended material in upstream lakes will help decrease turbidity and suspended solids throughout the Sunrise River.
- Phosphorus has fluctuated above and below the water quality standard for the Central River Nutrient Region of ≤ 100 $\mu\text{g/L}$. The 2019 median for TP was 72.0 $\mu\text{g/L}$, which was much lower than the 2018 median of 101.5 $\mu\text{g/L}$. The median TP for all years at this site is 87 $\mu\text{g/L}$.
Management discussion: Management in upstream lakes will help reduce phosphorus in the river.
- pH was within the range considered normal and healthy for streams in this area. The median pH was 7.56.
- Dissolved oxygen (DO) was typically within the range considered normal and healthy at the time of sample collection.

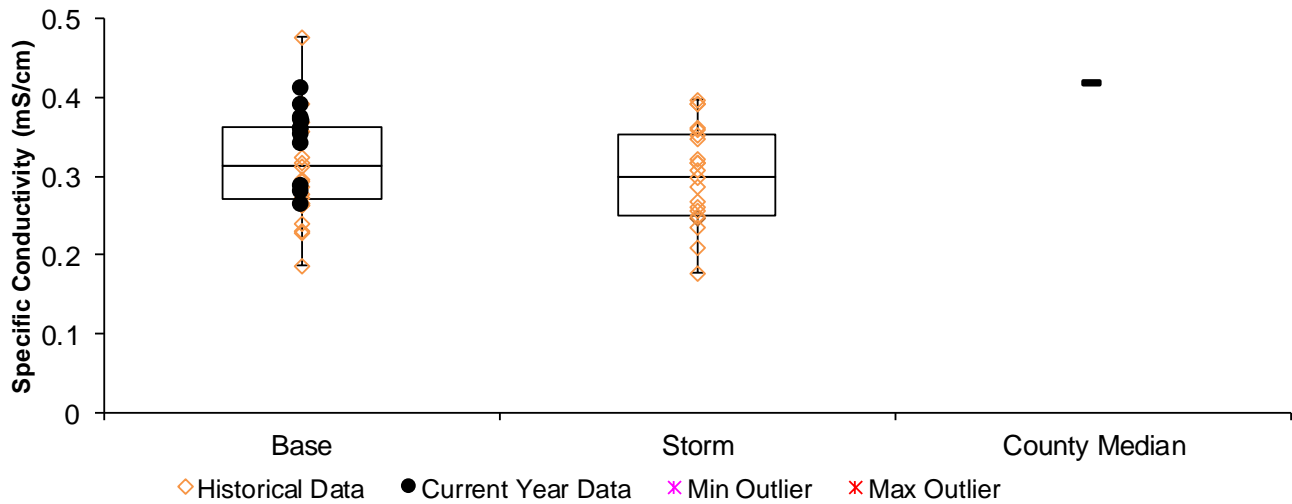
Below the data are presented and discussed for each parameter in greater detail. Management recommendations will be included at the conclusion of this report.

Specific conductivity

Specific conductivity and chlorides are measures of dissolved pollutants. Dissolved pollutant sources include urban road runoff, industrial chemicals, and others. Metals, hydrocarbons, and road salts are often of concern in a suburban environment. Specific conductivity is the broadest measure of dissolved pollutants we use. It measures electrical conductivity of water standardized for temperature; pure water with no dissolved constituents has zero specific conductivity.

Specific conductivity was acceptably low in the West Branch of the Sunrise River. Median specific conductivity for 2019 was 0.362 mS/cm. Some of the highest specific conductivity samples were observed in 2019 but the median for the site was lower than the median for Anoka County streams (0.420 mS/cm). Specific conductivity has historically been lower during storms, suggesting that stormwater runoff contains fewer dissolved pollutants than the surficial water table that feeds the river during baseflow. Increased specific conductivity levels during baseflow conditions has been observed in many Anoka County streams. This has been studied leading to the determination that the largest contributor to rising specific conductivity levels is road deicing salts that have infiltrated into the shallow aquifer.

Specific conductivity during baseflow and storm conditions. Orange diamonds are historical data from previous years and black circles are 2019 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).

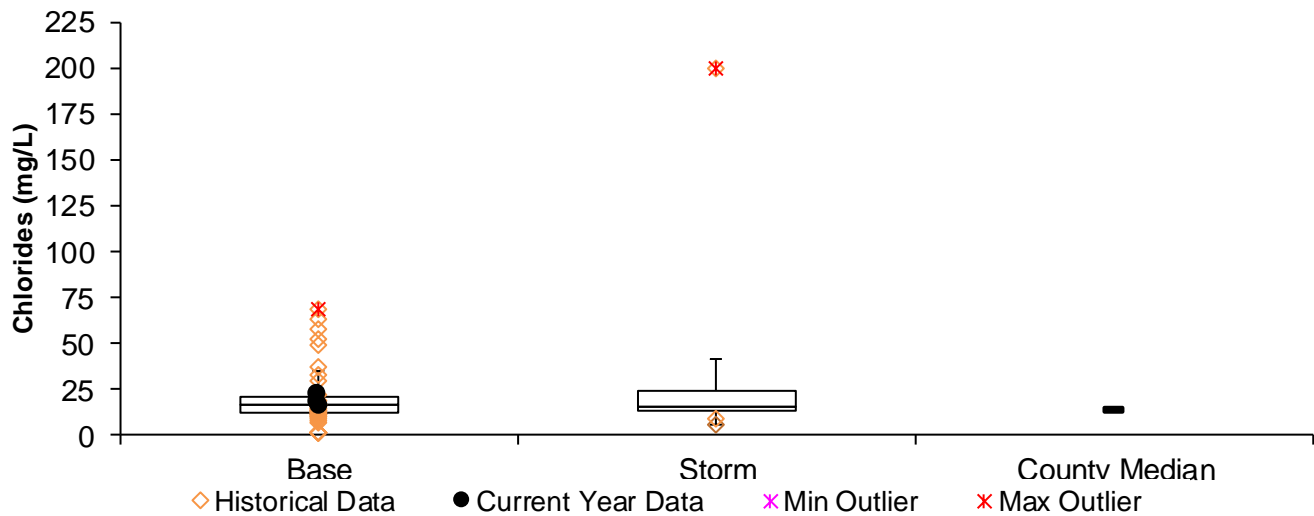


Chlorides

Chlorides are the measure of chloride salts, the most common of which are road de-icing chemicals and those used in water softening. Chlorides can also be present in other pollutant types, such as wastewater. These pollutants are of concern because of the effect they can have on the stream’s biological community. Specific Conductivity data, reported above, is commonly used as an indicator for chlorides, with higher specific conductivity generally corresponding to higher chlorides.

Chlorides in the West Branch of the Sunrise River are higher than the median for Anoka County (13.29 mg/L). In 2019 the median chloride concentration was 17.2 mg/L, slightly less than in 2018 and well below the state standard of 230 mg/L. A waterbody is considered impaired if two or more samples exceed the state standard in a three-year period. This mirrors the pattern seen in specific conductivity with higher readings during baseflow conditions and further supports the finding that road deicing salts seeping into the shallow aquifer are a primary cause of higher baseflow chloride and specific conductivity readings.

Chlorides during baseflow and storm conditions. Orange diamonds are historical data from previous years and black circles are 2019 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th 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 the refraction of a light beam passed through a water sample. It is most sensitive to large particles. Total suspended solids are 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 within the river itself or outside of the river from the contributing watershed. Sources from the watershed include soil erosion, road sanding, and others. In-stream sources of TSS include riverbank erosion and movement of the river bottom. Finally, algae from the river and upstream lakes contribute to suspended solids.

Turbidity is no longer used to determine if a stream is impaired. Instead, total suspended solids is used. Turbidity is still a helpful and easy to measure parameter. Generally, turbidity below 25 NTU is acceptable; previously this was the State’s standard. When that standard was in place a stream was impaired if it exceeded this value on three occasions and at least 10% of all sampling events. Including all years of data, the West Branch of the Sunrise River has exceeded 25 NTU on 14 of 60 sampling occasions (23%). Turbidity decreased in 2019, with only one of twelve samples surpassing the state standard (8.3%) at 49.7 NTU.

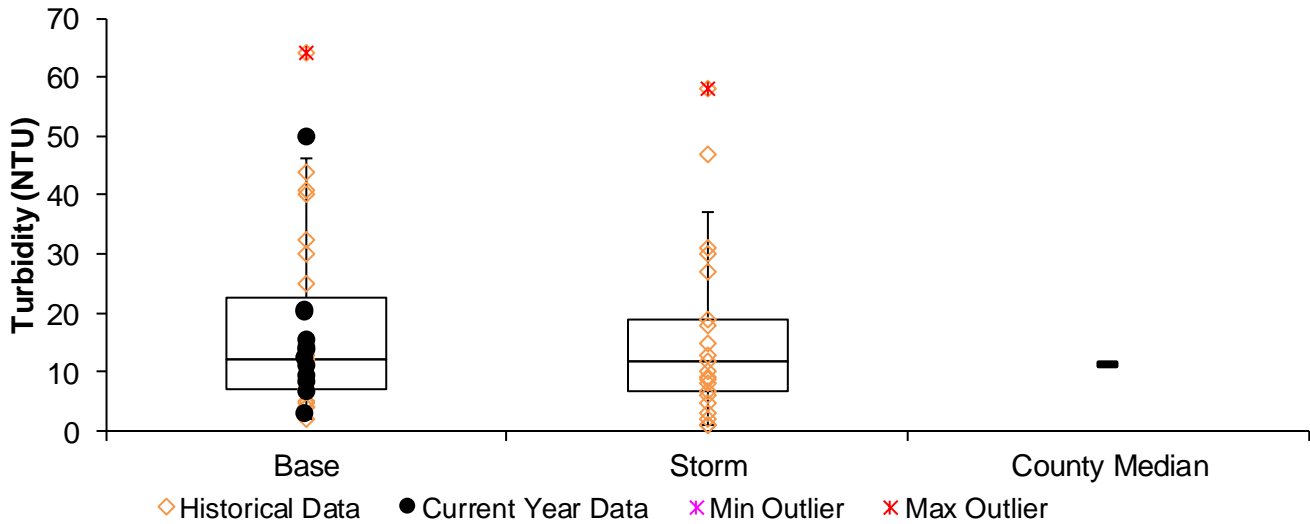
The most obvious source of turbidity is algae from upstream lakes. Three upstream lakes are impaired for excess nutrients and high algae. They include Linwood, Martin, and Typo Lakes. The river sampling site is 3 miles downstream from Martin Lake. The area between the lake and sampling site is wide floodplain fringe and forest with little human impact that would not be expected to add much sediment to the river. Therefore, efforts to reduce suspended material in the river should focus on the upstream lakes. It is also worth noting that this section of the river has unconsolidated bottom material which can re-suspend and contribute to turbidity.

Total suspended solids in the West Branch of the Sunrise River has exceeded the State standard for this region. The standard is no more than 10% of samples exceeding 30 mg/L during April 1-September 30. Over all years monitored the West Branch exceeded the standard on 17% of sampling occasions (9 of 53).

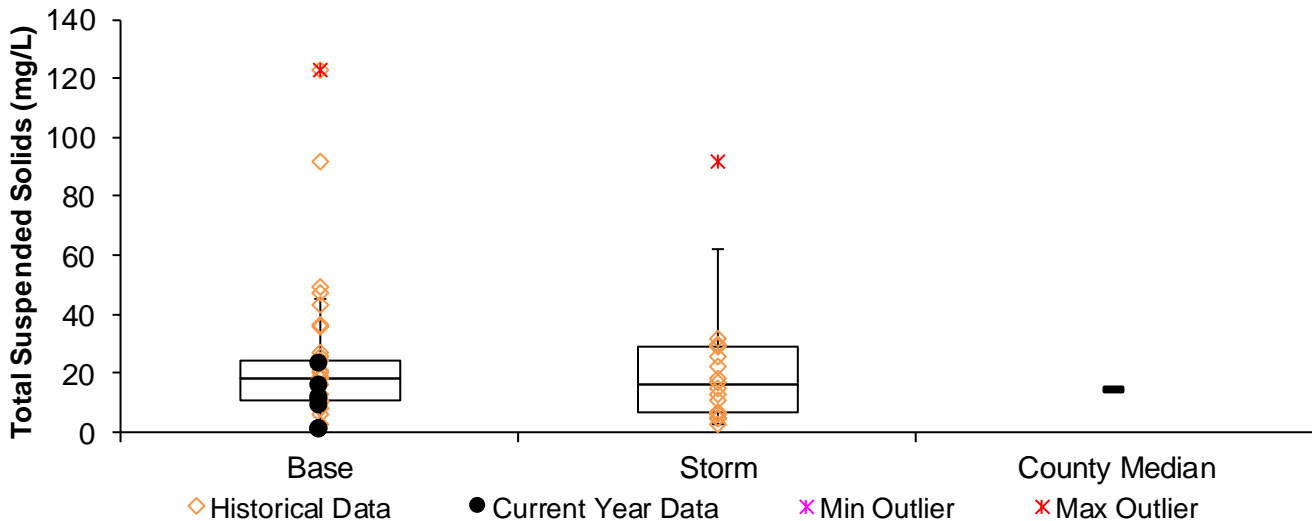
In 2019 total suspended solid levels decreased compared to 2018 and no samples exceeded the standard. In 2019, unlike previous years, all samples were taken during baseflow. Other years of sampling included storm events. This suggests that storm runoff may contribute suspended solids, in addition to the algae coming from upstream

lakes. It's also important to recognize that the unconsolidated river bottom sediments may contribute to high TSS, especially during times of higher flow. There it little land runoff to this river downstream of Martin Lake.

Turbidity during baseflow and storm conditions Orange diamonds are historical data from previous years and black circles are 2019 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Total suspended solids during baseflow and storm conditions Orange diamonds are historical data from previous years and black circles are 2019 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).

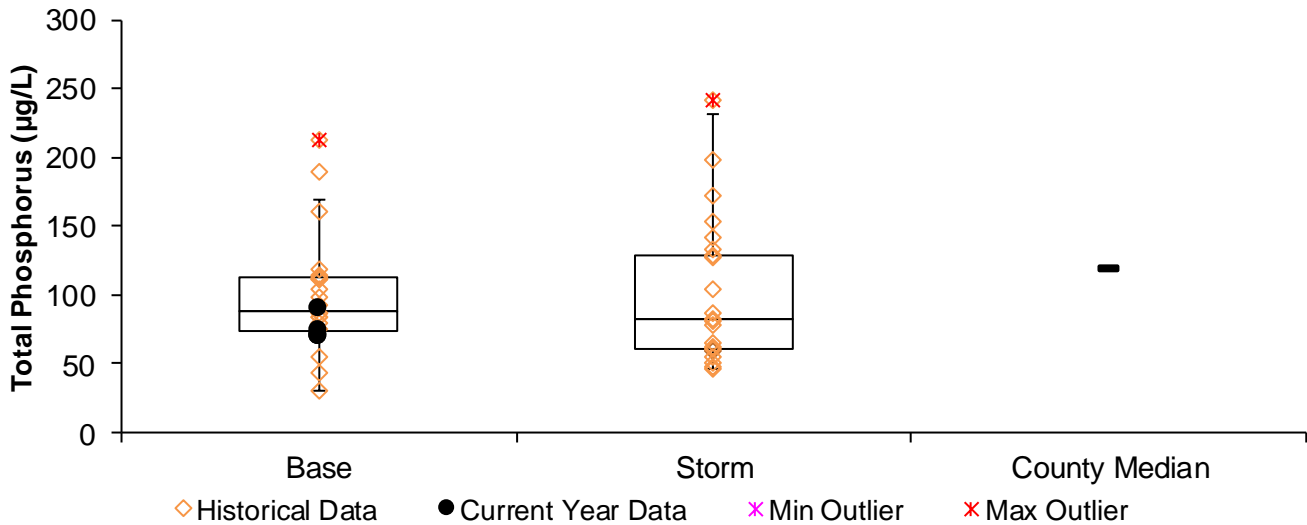


Total Phosphorus

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. Total phosphorus (TP) in the West Branch of the Sunrise River often exceeds the state standard of 100 µg/L. In 2019 the median phosphorus concentration was 72.0 µg/L and did not exceed the state standard in any of the five sampling events. This was a decrease from the 2018 median of 101.5 µg/L. The median phosphorus concentration in the West Branch of the Sunrise River across all years monitored is 87.0 µg/L. Over all years sampled, 21 of 53 samples (39%) have exceeded the standard of 100 µg/L. There has generally not been a large difference between storm and baseflow TP concentrations, though all 2019 sampling occurred during baseflow conditions. This likely contributed to a lower median concentration.

These phosphorus levels are common for the area. In the case of the West Branch of the Sunrise River phosphorus levels are, at least in part, reflective of conditions of Martin Lake located 3 miles upstream from the sampling site. Martin Lake is impaired for excess phosphorus, with a summertime average of 79.2 µg/L over the last 10 years. Water quality improvements to Martin Lake will benefit the river downstream. Recent upstream projects including carp barriers, carp harvests, and stormwater retrofits, coincide with improved conditions in upstream lakes, but those benefits are not yet apparent in the West Branch of the Sunrise River.

Total phosphorus during baseflow and storm conditions. Orange diamonds are historical data from previous years and black circles are 2019 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



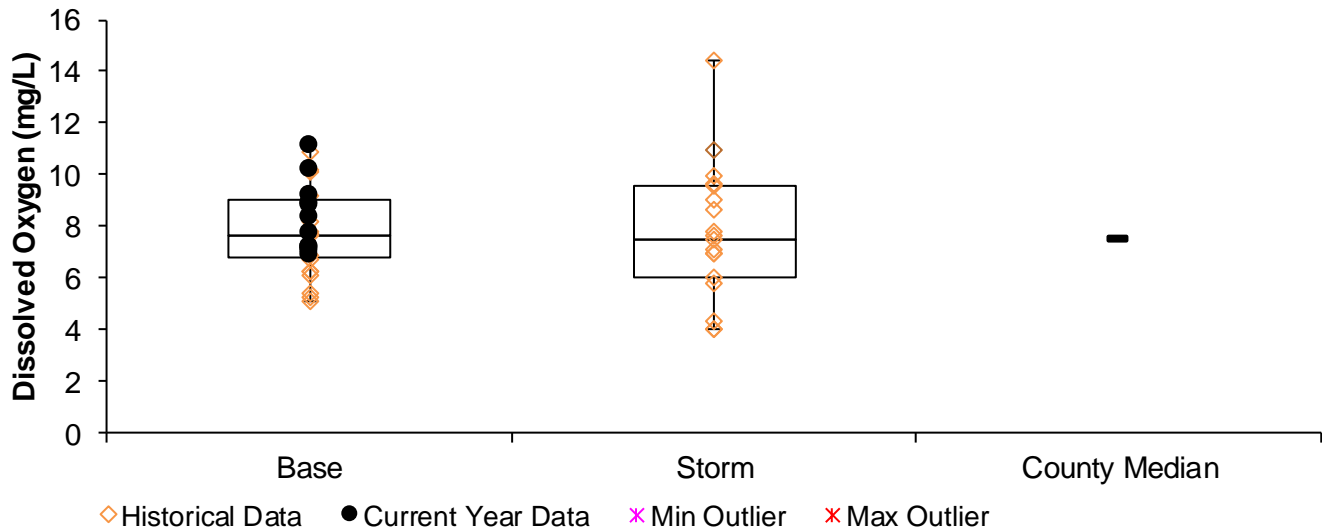
Dissolved Oxygen

Dissolved oxygen is necessary for aquatic life, including fish. Organic pollution causes oxygen consumption when it decomposes. 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. The stream is 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.

For the West Branch of the Sunrise River there are two datasets to consider. First, spot measurements were taken with the other water quality monitoring described in this report. Dissolved oxygen has been found at less than 5 mg/L on three out of 52 occasions. All were during storm events, occurring in 2003, 2012 and 2015. In 2019, there were no instances of DO dipping below 5 mg/L, but sampling did not occur in early morning, or during storms flows.

The second data set is around-the-clock DO measurements for eight days in 2012 by the MPCA. They found DO dipped below 5 mg/L every morning. The river has been designated as impaired for poor fish and invertebrate communities. Although it is not listed as impaired for DO specifically, low DO concentration occurring each morning in this stream is a likely stressor on these organisms.

Dissolved oxygen results during baseflow and storm conditions Orange diamonds are historical data from previous years and black circles are 2019 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).

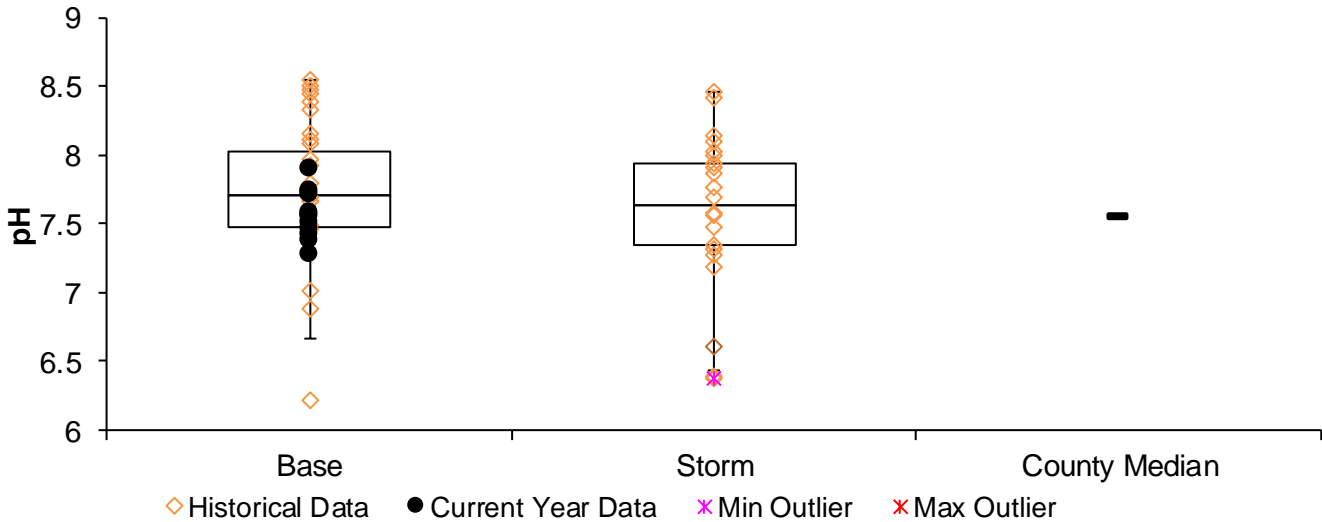


pH

pH refers to the acidity of the water. The MPCA’s water quality standard is for pH to be between 6.5 and 8.5. The West Branch of the Sunrise River is regularly within this range (see figure below). It often has slightly higher pH than other streams because of the impact of algal production in upstream lakes.

It is interesting to note that pH is generally lower during storms than during baseflow. This is because the pH of rain is typically lower (more acidic). While acid rain is a longstanding problem, its effect on this aquatic system is small. In 2018, there was one occurrence of sub-standard pH in October when pH was 5.66. This is not overly concerning. pH was within the normal range (7.28 to 7.90) for all samples in 2019.

pH results during baseflow and storm conditions Orange diamonds are historical data from previous years and black circles are 2019 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



Recommendations

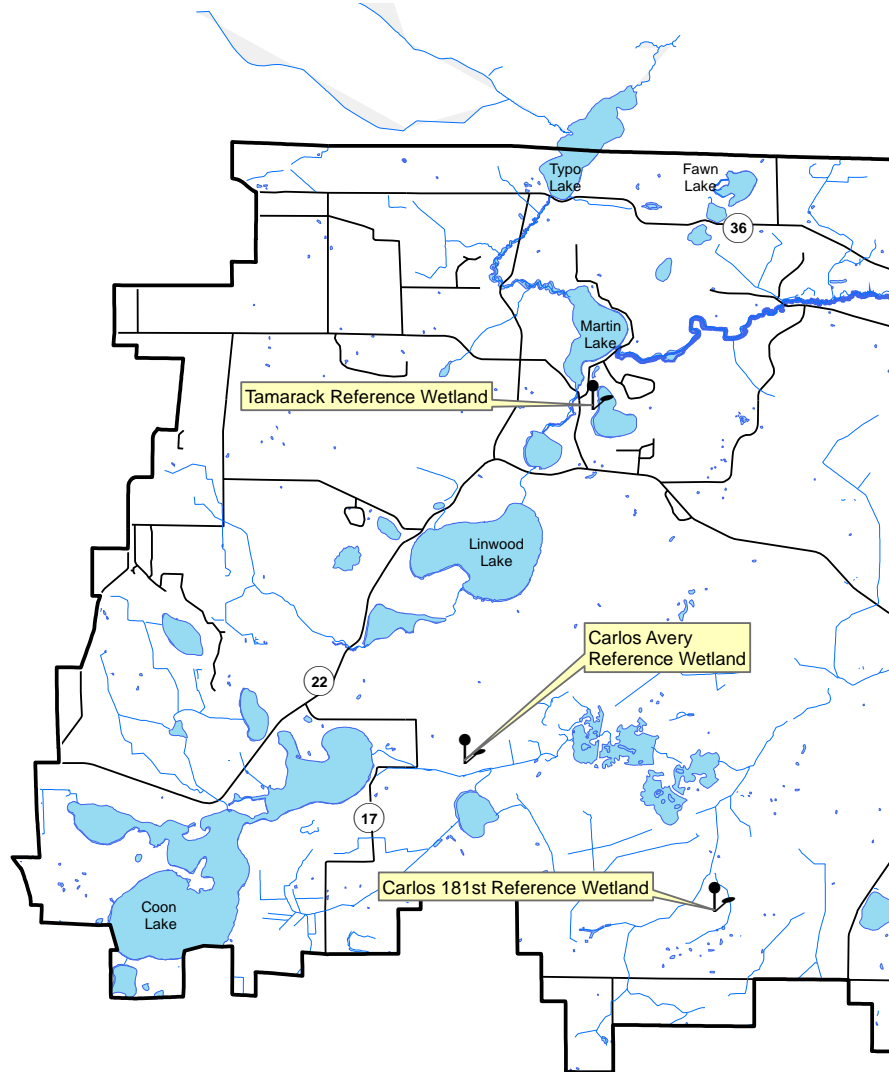
Water quality in the West Branch of the Sunrise River is lower than ideal. A Total Maximum Daily Load (TMDL) study was completed in 2013 to determine impairments of this river. The study found that aquatic life in this river was struggling with turbidity identified as the main stressor. Low dissolved oxygen may also be a stressor contributing to aquatic life impairment. At this time, it appears that many of the issues in the river would be best addressed with water quality improvement projects targeted at upstream lakes. These lakes are likely the main sources of nutrients and suspended solids in this river.

Dissolved oxygen is not low in the lakes, however, and low nighttime levels in the river may be related to decomposition occurring in the large wetland floodplain. With regards to water quality improvements in the lakes, there are a number of ongoing projects including carp removals in Typo and Linwood lakes. For more information, see the Martin and Typo Lake Carp Removal section of the 2019 Water Almanac.

Wetland Hydrology

- 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 181st Reference Wetland, Carlos Avery Wildlife Management Area, City of Columbus
Tamarack Reference Wetland, Linwood Township
- Results:** See the following pages.

2019 Sunrise River Watershed Wetland Hydrology Monitoring Sites



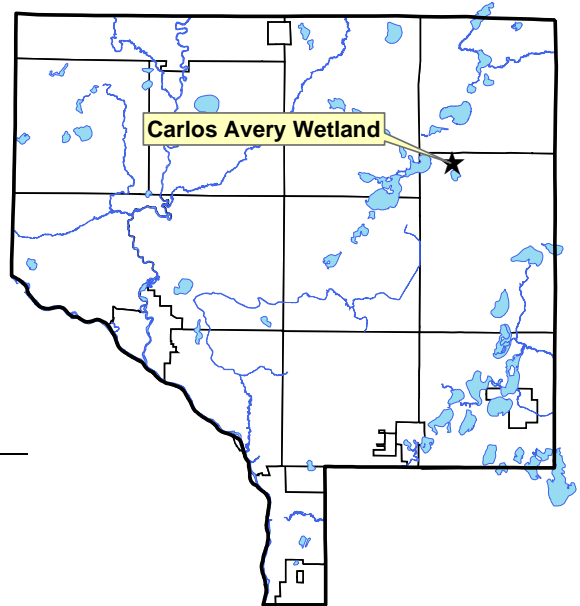
Wetland Hydrology Monitoring

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

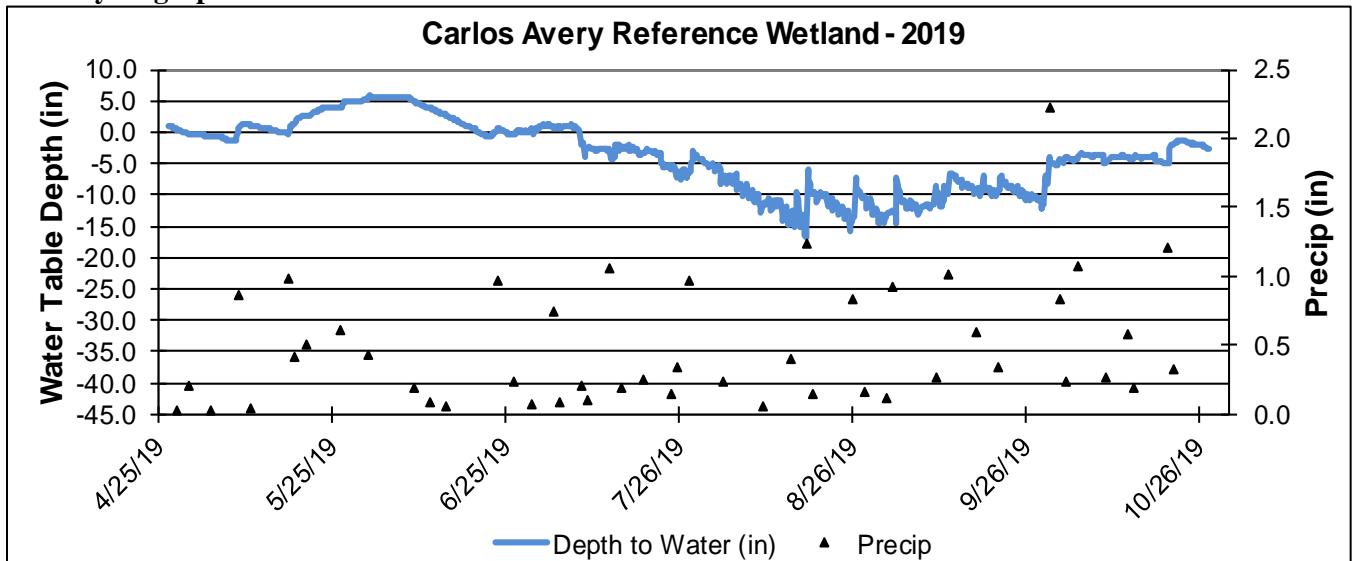
Surrounding Soils: Lino loamy fine sand

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.

2019 Hydrograph



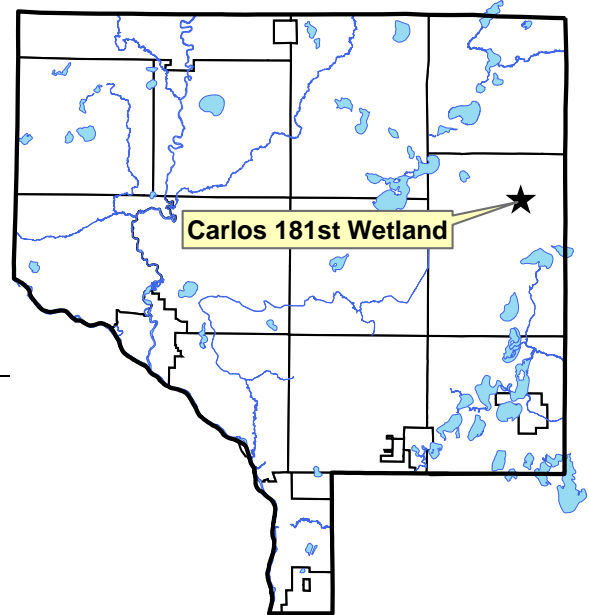
Wetland Hydrology Monitoring

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	-

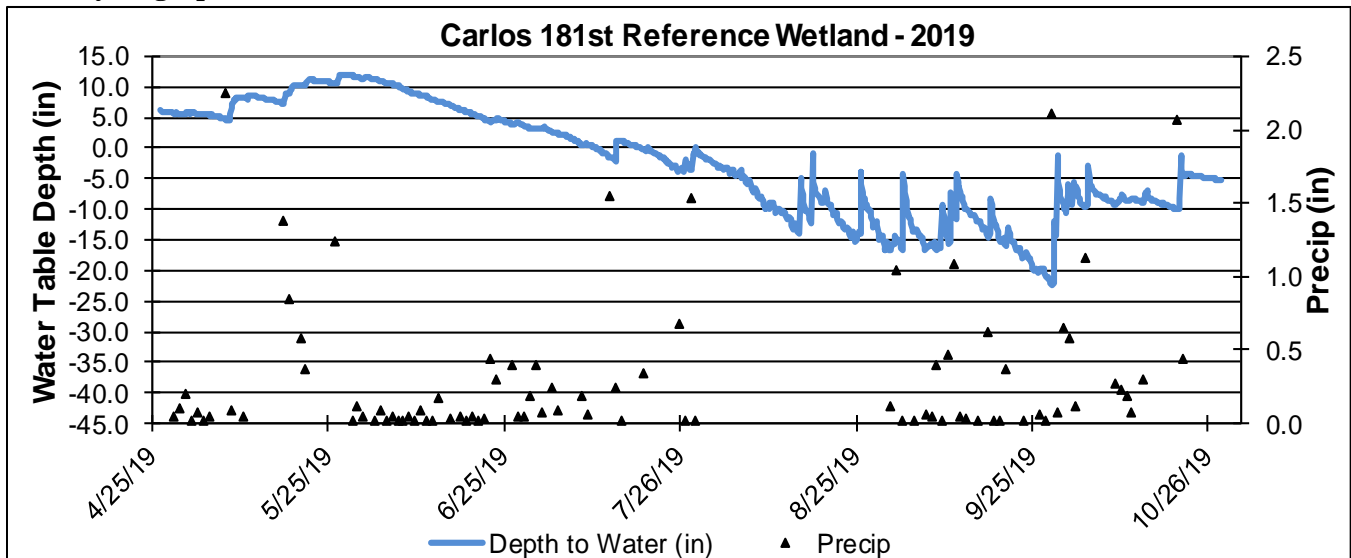
Surrounding Soils: Soderville fine sand

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 181st Avenue.

2019 Hydrograph



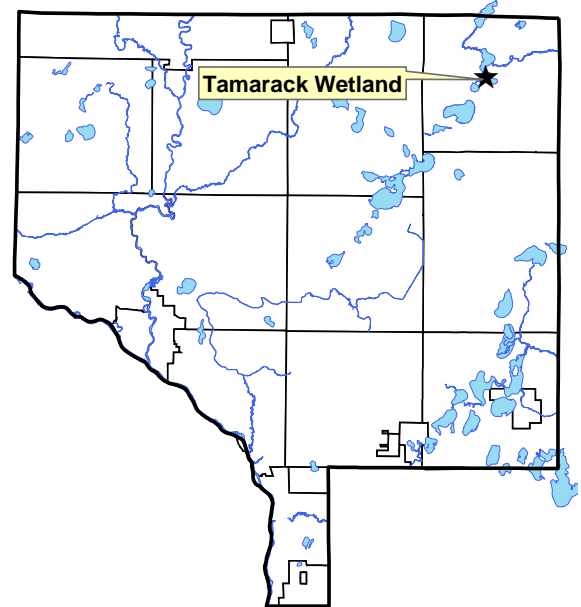
Wetland Hydrology Monitoring

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	10yr3/2	Sandy Loam	-
Bg	29-40	2.5y5/3	Medium Sand	-

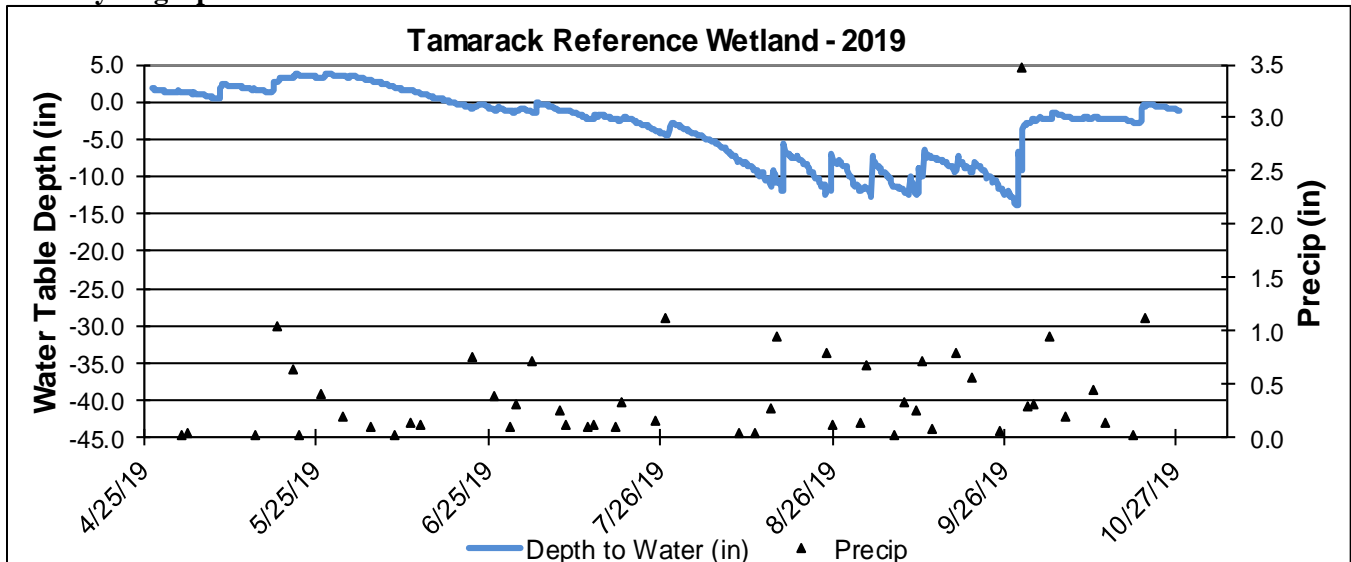
Surrounding Soils: Sartell fine sand

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.

2019 Hydrograph



Water Quality Grant Fund

- 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 cost sharing of the materials needed for a project. The landowner is responsible for some expenses. 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 Expense – Gunnink Coon Lakeshore	-	\$1,148.40
2019 SRWMO Contribution		\$ 0.00
Fund Balance		\$3,816.53

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 both water quality and 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 2017-2019 carp were actively removed from the lakes. Additionally, a detailed assessment of the carp population, age structure, and spawning history is being completed. A long-term management plan for carp was 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 2019 the following work was completed:

- Radio telemetry monitoring of carp in Typo and Martin Lakes.
- 1,863 carp were removed from Martin Lake and 999 carp were removed from Typo Lake. Total three-year total of carp removed from these lakes is now 11,879.
- Completed a long term carp management plan.
- Fully expended and closed the DNR Conservation Legacy Program grant for this project.
- Secured a new State Clean Water Fund grant to fund carp removals in 2020-2022, bringing these lakes, plus Linwood Lake, to carp density goals.
- Presented results at the annual Martin Lakers Association meeting.



Volunteers and Carp Solutions LLC staff with carp removed at Martin Lake. 40 carp were implanted with radio loggers, 20 each from 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 multiple sites each in Typo and Martin Lake for a total of 24 nettings on 7 different days from June through October, 2019.

Martin and Typo Lake Carp Removal Project continued



Example Telemetry Map from April 30, 2019. Radio tagged carp are periodically located to help determine seasonal movements that can direct management, such as when and where to attempt carp harvests.



First place 2019 Martin Lakers Association boat parade float. The float celebrated carp removal to improve lake water quality.

Linwood Lake Carp Population Study

Description: Linwood Lake has relatively poor water quality, modestly worse than state water quality standards. The lake often has a green or brown tinge to it. Carp are a major cause of poor water quality in Typo and Martin Lake, and the goal of this study was to determine how much of a role carp play in causing poor water quality in Linwood Lake.

Purpose: Estimate carp abundance and population age structure; identify likely carp nursery sites; map carp movement using radio telemetry

Location: Linwood Lake

Results: A “Linwood Lake Carp Management Feasibility Assessment” was completed by Carp Solutions LLC and the Anoka Conservation District. Work included electrofishing surveys to determine carp populations, box netting surveys for young carp in Linwood and Boot Lakes, determining the age structure and recruitment history of the carp population, radio tracking 20 tagged carp, and a cost-benefit comparison of options available to improve lake water quality. The resulting data was used to develop management recommendations.

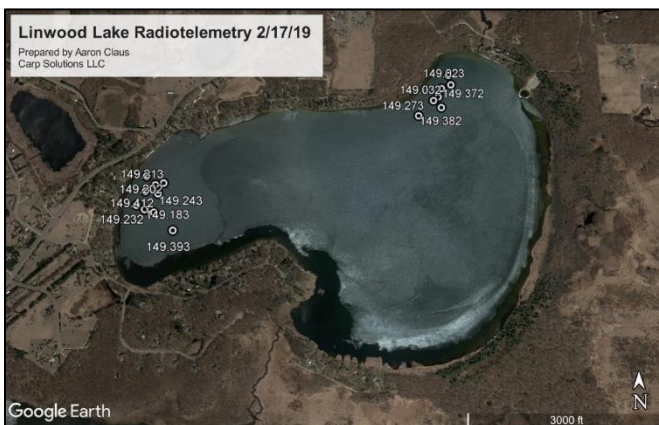


In summary, the study found that Linwood Lake has a carp density of 98 lbs/ac, which is only modestly above the threshold of 89 lbs/ac, above which carp significantly affect lake health. The carp population is relatively young; 56% are age 7 or younger. Because the population is near goals but seems prime to increase substantially, preventive carp removals were recommended. This carp management feasibility study was used to successfully apply for a State Clean Water Fund to do the recommended management.

The full feasibility study report is available from the Anoka Conservation District.



Surgical implantation of a radio tracking device in a carp at Linwood Lake.




Map of carp radio tracking showing aggregations in Linwood Lake.

Annual Education Publication

- Description:** An annual newsletter article about the SRWMO is required by MN Rules 8410.010 subpart 4, and included in the SRWMO Watershed Management Plan.
- Purpose:** To improve citizen awareness of the SRWMO, its programs, accomplishments and water quality issues.
- Location:** Watershed-wide
- Results:** In 2019 the SRWMO contracted with the ACD to prepare its annual education publication. This year’s newsletter was used to update the public on the priorities in the then-draft SRWMO Watershed Management Plan. The article shown below or an abbreviated version was published in community newsletters.

Education Material Produced for 2019



Full Length Version

The next 10 years for local water resources...

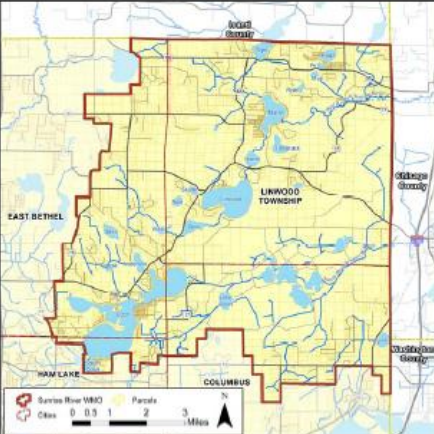
The Sunrise River Watershed Management Organization (SRWMO) is finalizing its new 10-year watershed management plan in 2019.

Priorities include:

- ⇒ Lake and stream water quality projects. Goals include improving Linwood, Martin and Typo Lakes which are designated by the State as “impaired” due to excessive nutrients and algae. Others, like Coon Lake, are major recreational hubs where protecting already good water quality is a priority. Projects will include common carp management, stormwater treatment, agricultural projects and others.
- ⇒ Grants to landowners. Where cost effective projects can be done on private property to improve the community’s water, we’ll help with the cost. Common projects are lakeshore buffers and rain gardens.
- ⇒ Monitor lakes and streams. Detecting water quality trends early is a key to successful management. Waterbodies are monitored for nutrients and other common pollutants that affect fish and recreation.
- ⇒ Secure funding. The SRWMO area is richer in water than money. A goal is to continue securing grants for >50% of expenses.
- ⇒ Public outreach. Our lakes and streams reflect what we all do on the land. We’ll work with residents to find ways that we can all help our lakes and streams.
- ⇒ Other topics including aquatic invasive species, septic systems, development, regional coordination, stormwater, groundwater, chlorides from road deicing salts, drainage, habitat and others.

The draft 10-year watershed management plan will be finalized by December 2019. This plan updated every 10 years. Plan materials can be obtained at www.SRWMO.org or by calling Jamie Schurbon at 763-434-2030 ext. 12. Comments are welcomed.

The SRWMO is a partnership of the cities of Ham Lake, East Bethel, Columbus and Linwood Township charged with managing water resources on a watershed level.



Map of the SRWMO which includes Linwood Township and portions of Columbus, East Bethel and Ham Lake.

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.

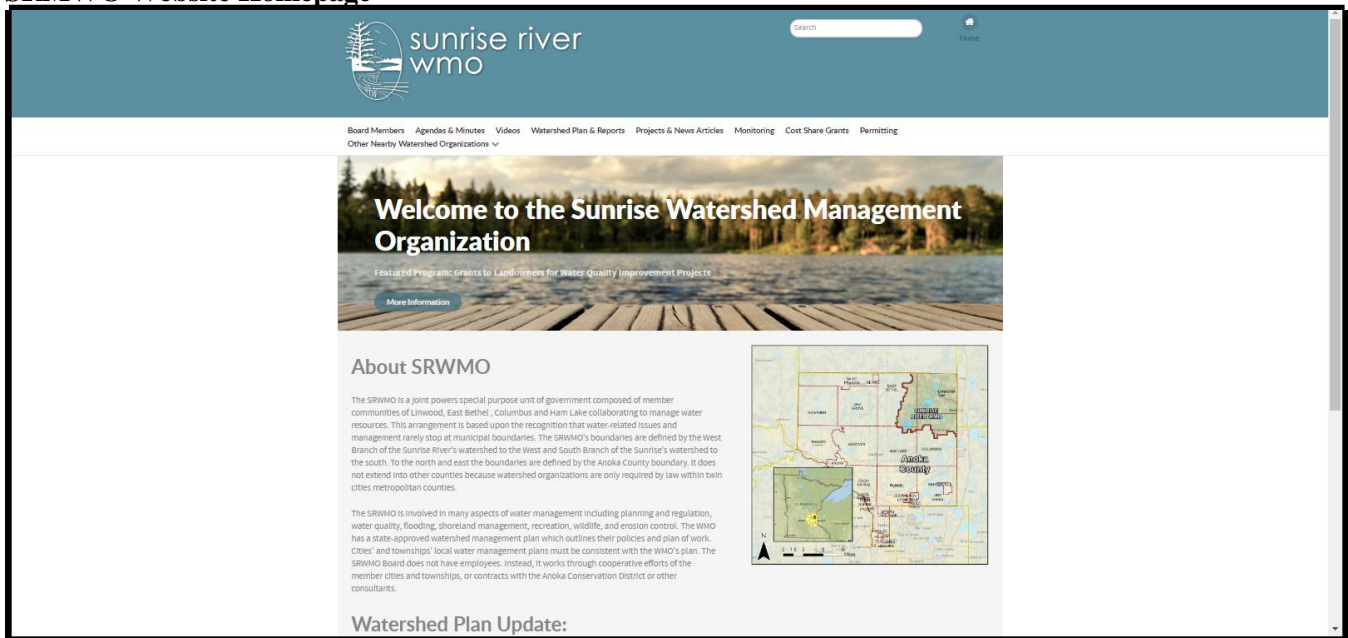
Location: www.SRWMO.org

Results: In 2019 routine SRWMO website updates were performed. The new website includes:

- Directory of board members,
- Meeting minutes and agendas,
- Watershed management plan and annual reports,
- Descriptions of work that the organization is directing,
- Highlighted projects,
- Informational videos,
- Maps of the URRWMO.

The website is regularly updated throughout the year.

SRWMO Website Homepage



Grant Searches and Applications

Description: The Anoka Conservation District (ACD) partners with the SRWMO for 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 2019 the SRWMO pursued several grants and positioned itself for others. They included:

1. **A competitive State Clean Water Fund grant was secured for \$148,000 for carp management in Linwood, Martin and Typo Lakes.** The Anoka Conservation District was the grant applicant and fiscal agent. The SRWMO is a critical partner and the largest source of grant matching funds.
2. **A MPCA grant for \$40,000 was secured to fix up failing septic systems** for low-income homeowners. The Anoka Conservation District holds this grant, which must be used county-wide. At least one septic system in the SRWMO at Martin Lake is anticipated to be fixed using this grant.
3. **A MPCA grant for \$5,102 to monitor water quality in the West Branch of the Sunrise River at County Road 77.** Monitoring this site is a priority for the SRWMO because it is one of two major discharge points from the SRWMO.
4. **The SRWMO positioned itself for 2020 Watershed Based Implementation Funds.** This non-competitive State grant funds projects in the SRWMO Watershed Management Plan, the Lower St. Croix One Watershed One Plan (1W1P) and a few other eligible plans. The SRWMO positioned itself for these funds by participating in the 1W1P process and updating the SRWMO Watershed Management Plan. Funding amounts will be decided in 2020 and every two years thereafter.

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

2014 Martin and Typo Lake Carp Barriers, site 2	MN DNR CLP	\$ 35,770
2014 Martin and Typo Lake Carp Barriers, sites 1,3,4	MN DNR CLP	\$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 CLP	\$ 99,000
2017 Septic System Fix Up Fund*	MPCA	\$ 23,040
2018 Watershed Based Funding	BWSR WBF	\$156,750
2018 Septic System Fix Up Fund*	MPCA	\$ 27,055
2019 Septic System Fix Up Fund*	MPCA	\$ TBD
2019-20 Surface Water Monitoring Grant, Sunrise R	MPCA	\$ 5,102
2019 Sunrise River Chain of Lakes Carp Mgmt	BWSR CWF	\$148,000
	TOTAL	\$1,010,087

*Septic system fix up funds are available county-wide. Only the amount used in the SRWMO is reported.

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 30th).

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

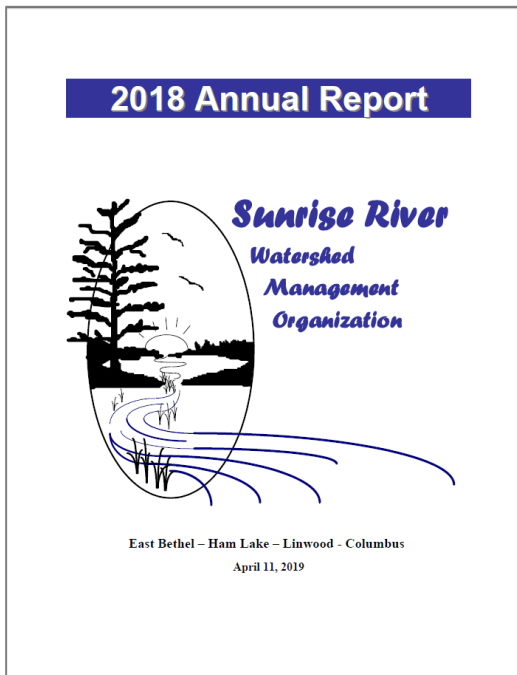


Table of Contents

Table of Contents	
I. Introduction to this Report	2
II. About the Sunrise River WMO	2
III. Activity Report	
a. Current Board Members	4
b. Day to Day Contact	5
c. Employees and Consultants	5
d. Highlighted Recent Projects	6
e. Public Outreach	12
f. Water Quality Trends	14
g. Evaluation of Watershed Management Plan Implementation	16
h. 2019 Work Plan	21
i. Status of Local Ordinances Plan Adoption and Implementation	23
j. Solicitations for Services	25
k. Permits, Variances, and Enforcement Actions	25
IV. Financial and Audit Report	
a. 2018 Financial Report	26
b. Financial Report Audit	26
c. 2019 Budget	26
Appendix A – 2018 Financial Report	
Appendix B - 2018 Water Monitoring and Management Work Results	

On-call Administrative Services

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 2019 administrative assistance provided to the SRWMO by the Anoka Conservation District included:

- Prepared board meeting packets. Facilitated meetings and meeting planning.
- Fielded questions from board members on a variety of issues affecting the SRWMO.
- Represented the SRWMO at staff level meetings of the Lower St. Croix One Watershed One Plan.
- Prepared a draft 2020 budget for the SRWMO and subsequent revisions.
- Addressed questions arising from the City of Ham Lake's desire to modify how costs of the SRWMO are split amongst member communities.
- Reviewed all four SRWMO member communities' local water plans and facilitated approvals by the SRWMO.
- Prepared requests for proposals for 2020 water monitoring and management.
- Fielded permitting questions from the county highway department and builders.
- Prepared a display for community events staffed by the SRWMO board.
- Reviewed and edited meeting minutes.
- Wrote meeting minutes when the Recording Secretary was absent.

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 2019 Financial Summary

To be added...

Recommendations

- **Implement the SRWMO Watershed Management Plan that was approved in 2019.** The plan reflects the latest science and includes schedules for various projects.
- **Continue engaging in the Lower St. Croix One Watershed, One Plan process** to ensure SRMWO priorities are reflected. This is necessary to ensure access to future Watershed Based Funding grants.
- **Continue carp removals at Martin and Typo Lakes and begin carp management at Linwood Lake.** A State Clean Water Fund grant will support this work in 2020-2022.
- **Collaborate with the Anoka County Outreach Coordinator.** This new position in 2018 seeks efficiency and consistent messaging across many cities and natural resources agencies.
- **Continue installation of stormwater retrofits around Coon and Martin Lakes** where completed studies have identified and ranked projects.
- **Update the SRWMO joint powers agreement** to address out of date material and the lack of a dispute resolution mechanism.
- **Continue prioritizing strategic water quality monitoring** to assess baseline conditions, diagnose problems and determine the effectiveness of new water quality projects. The data help with strategically implementing grant funds and local funds to provide the largest water quality benefit possible at the lowest cost.
- **Create a new SRWMO display for use at community events.** This projects is planned and budgeted for in 2020.
- **Encourage development of septic system point of sale ordinances.** Columbus has such an ordinance. East Bethel and Linwood are developing it in 2020 with assistance from the Anoka Conservation District. Ham Lake is not interested at this time.
- **Promote Septic System Fix Up Grants to landowners,** particularly in shoreland areas.
- **Bolster lakeshore landscaping education efforts.** The SRWMO Watershed Management Plan sets a goal of three lakeshore restorations per year. Lakeshores were mapped in 2019 by the Anoka Conservation District so that future outreach can be targeted.