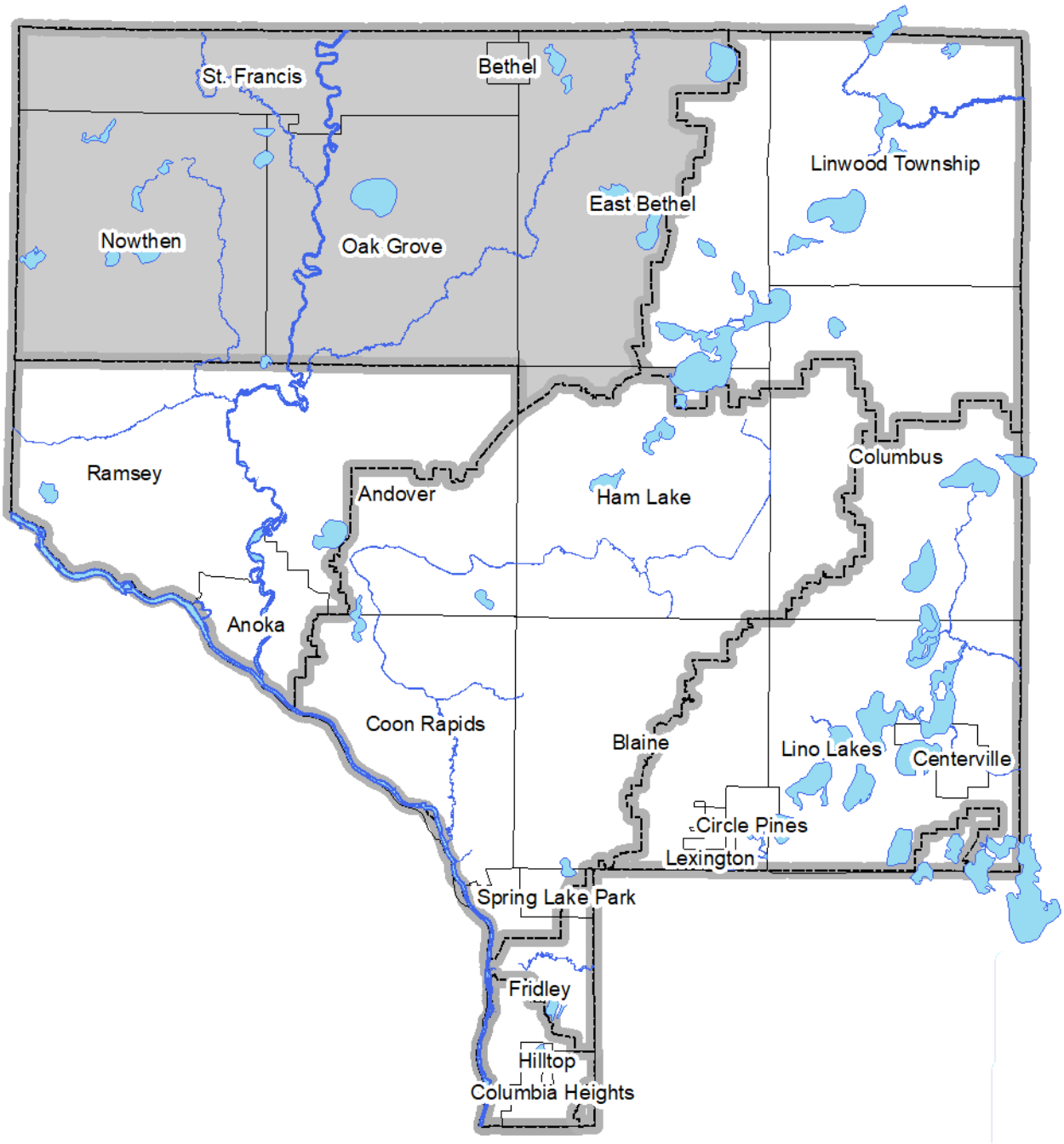
Excerpt from the 2022 Water Almanac

Chapter 3: Upper Rum River Watershed



Prepared by the Anoka Conservation District

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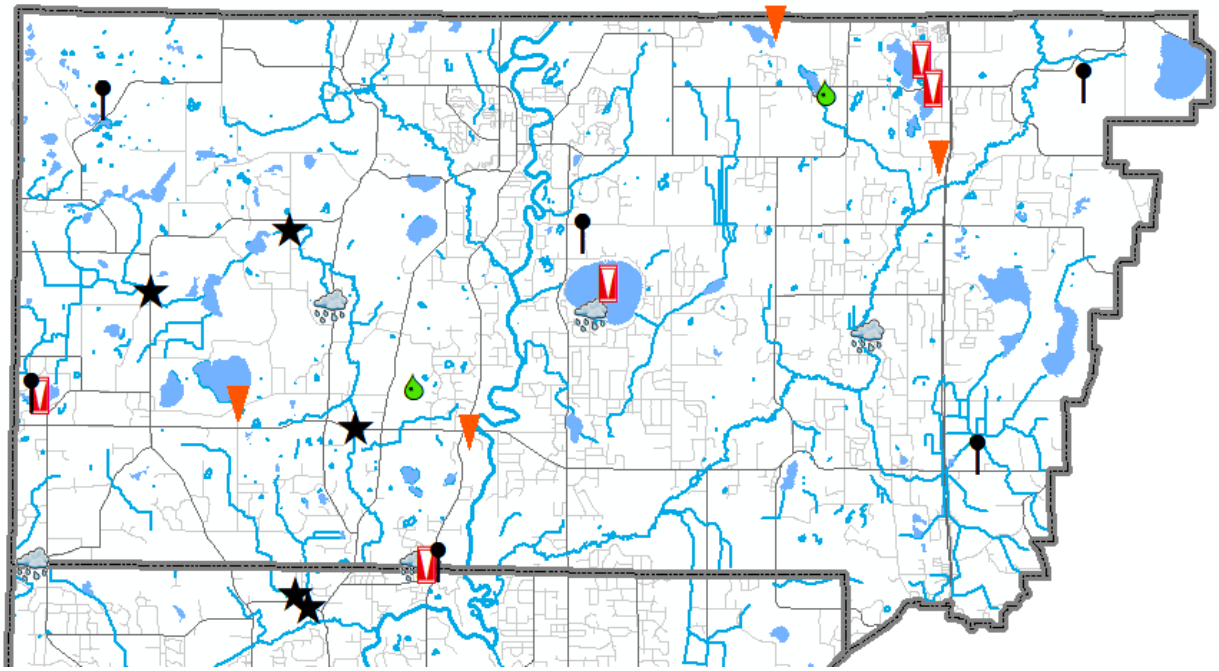
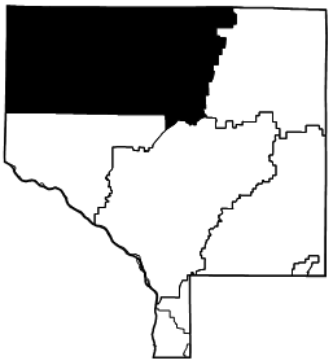
Recommendations

- **Maintain or reduce Rum River phosphorus**. Phosphorus levels are close to state water quality standards. It may be appropriate to review development and stormwater discharge ordinances to ensure phosphorus does not increase in coming years.
- **Protect Lake George water quality**. Measures include installing projects ranked in a 2022 study and ensuring robust stormwater retention/treatment for any new development in the subwatershed. Wetter years (which have become more frequent) drive poorer water quality in this lake due to stormwater and flushing of nutrient-rich wetland systems, and increases in runoff from new impervious surfaces will exacerbate the situation.
- **Monitor Lake George and Rum River** using the schedule in the URRWMO plan. At Lake Geroge, the Lake Improvement District, URRWMO, and Met Council plan are rotating the work amongst each other to ensure more frequent monitoring.
- **Promote groundwater conservation and protection.** Metropolitan Council models predict 3+ ft. drawdown of surface waters in parts of the URRWMO by 2030, and 5+ ft. by 2050. This indicates conservation actions will be required to ensure the groundwater supply stays sufficient. Infiltration practices should be highly prioritized, and unused wells on private and public lands should be sealed to prevent contamination.
- **Fund and install projects identified in the URRWMO Watershed Management Plan**. This prioritized list was created by the URRWMO Technical Advisory Committee:
    1. Rum Riverbank stabilizations*
    2. Anoka County Water Resources Outreach Collaborative*
    3. Perform stormwater retrofit analyses for the Rum River and subwatershed assessments*.
    4. Lake George shoreline stabilizations*
    5. Lake George iron-enhanced sand filter feasibility study
    6. Ditch 19 connector dredging

  * Indicates projects that have been initiated using State grant funds and URRWMO matching funds.
- **Promote Septic System Fix-up Grants** to landowners, particularly in shoreland areas. Grants are for low-income households.
- **Promote practices that limit road deicing salt applications** while keeping roads safe. Streams throughout the URRWMO have increasing specific conductance. Requiring municipal plow drivers to become certified through MN Pollution Control Agency deicing courses is recommended.
- **Periodically monitor chlorides in streams.** Monitoring every 3 years minimum is recommended.
- **In the East Twin and Pickerel Lake subwatersheds, protect undeveloped lands or implement rigorous water quality protection measures during development.** These lakes have good water quality. Because they have small drainage areas, land use in those areas is an especially important determinant of water quality.
- **Track activities of the Rum River Watershed Partnership**. That group developed a comprehensive plan for the watershed through the One Watershed, One Plan (1W1P) process and receives >$1M in state funds biennially to implement it. The URRWMO is not a member, but may wish to track activities in the upper watershed or collaborate. Project types identified in the URRWMO area include stormwater retrofits, riverbank stabilization, agricultural practices, public outreach, and others.

2022 Water Monitoring Sites: Upper Rum River Watershed





2022 Monitoring Sites

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

Lake Levels Monitoring

Partners: URRWMO, ACD, MN DNR, Volunteers

Description: Weekly water level monitoring conducted using staff gages installed in each lake. Staff gauges were installed by the Anoka Conservation District, surveyed by the MN DNR, and monitored by local volunteers. The past five and twenty-five years of data (if available) for each lake are illustrated below, and all historical data are available on the Minnesota DNR website using the "LakeFinder" feature (https://www.dnr.state.mn.us/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.

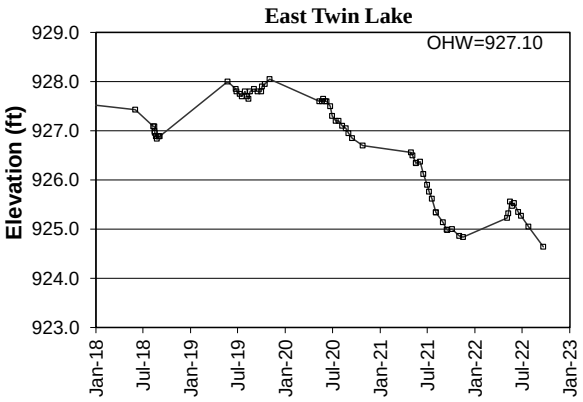
Location: East Twin, Rogers, Coopers, Minard, and Lake George

Results: In 2022 Anoka County was dry or in a state of drought throughout much of the growing season. Lake levels started near or below average and declined throughout the season. A water level rebound often seen in the fall was not observed.

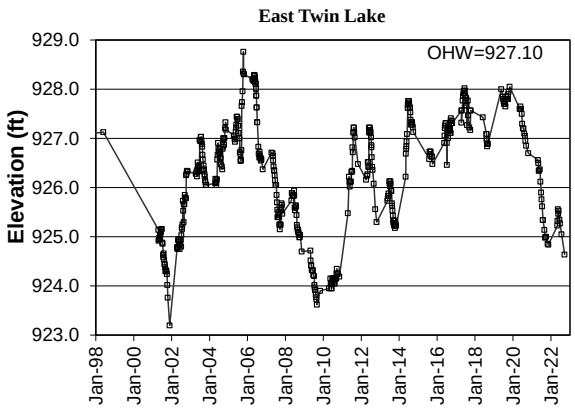
Water levels on East Twin Lake were the lowest since 2010 and averaged 2.01 feet less than the average recorded in 2020. Lake George and Minard Lake both had slight increases from 2021 levels, when water levels in Lake George were the lowest since 2012. Water levels in Lake George also fluctuated more than in previous years, spanning 1.30 feet. Roger Lake Levels increased from 2021 but it is worth noting that readings for Rogers were only recorded for the month of May and water levels on the lake were probably much lower later in the season. Water levels on Coopers Lakes were the lowest levels ever recorded dating back to 2011 when the lake was first monitored.

The Ordinary High Water Level (OHW) is listed for each lake on the corresponding graphs below. Anything work occurring below this elevation requires a DNR permit.

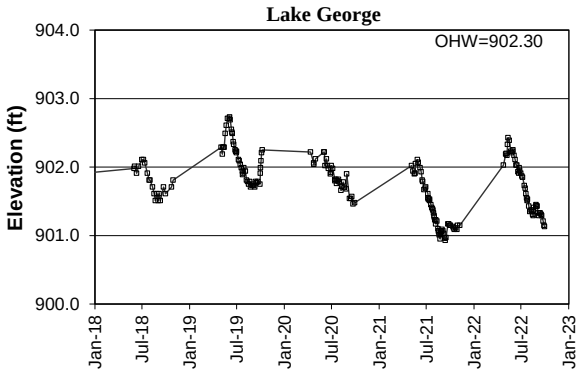
East Twin Lake Levels – last 5 years



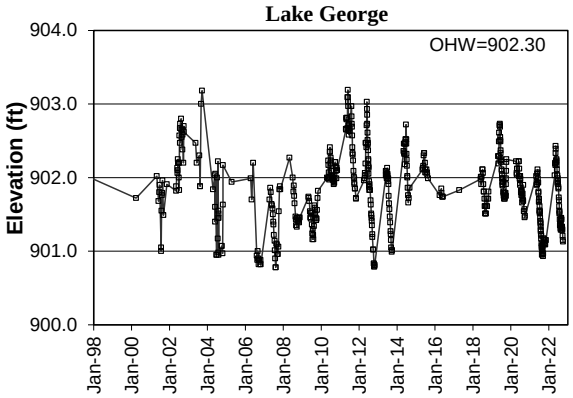
East Twin Lake Levels – Last 25 years



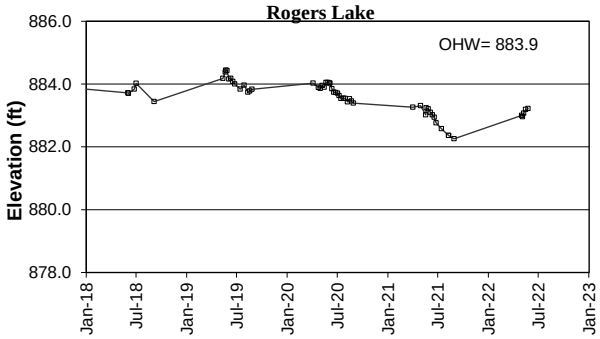
Lake George Levels – last 5 years



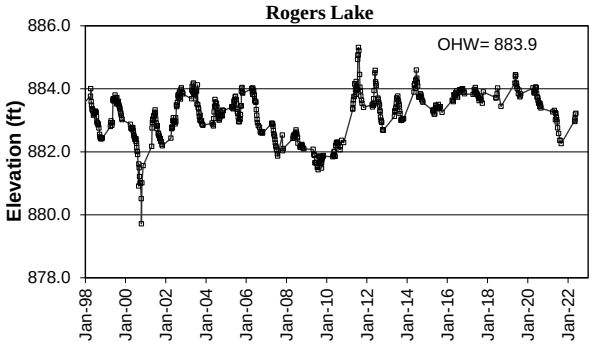
Lake George Levels – last 25 years



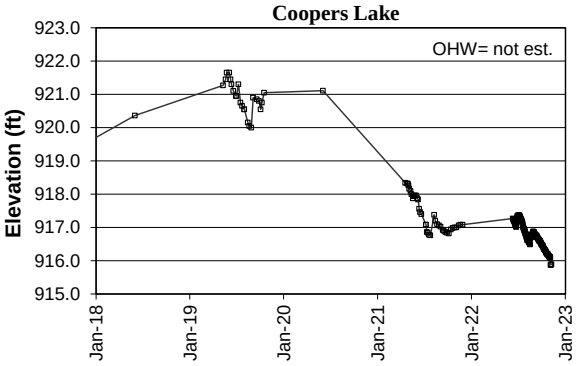
Rogers Lake Levels – last 5 years



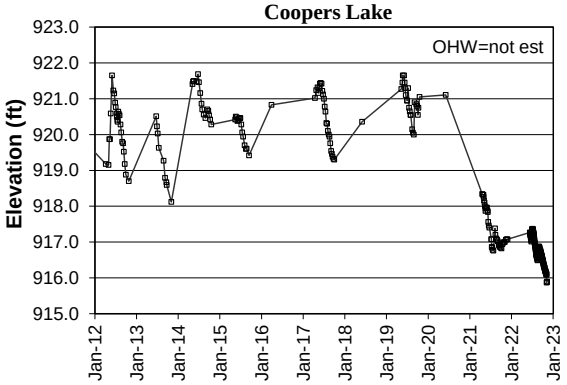
Rogers Lake Levels – last 25 years



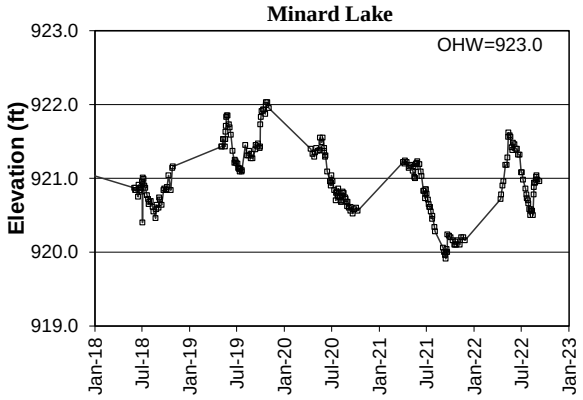
Coopers Lake Levels – last 5 years



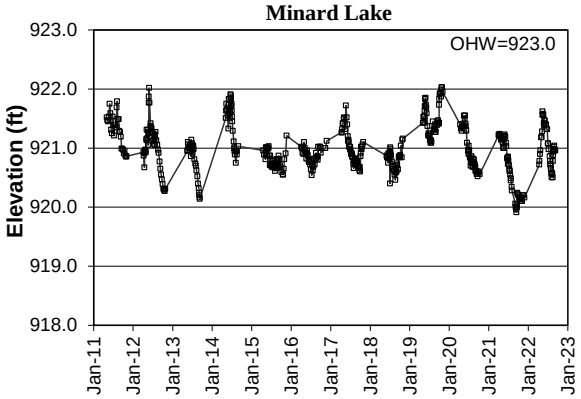
Coopers Lake Levels – last 10 years



Minard Lake Levels – last 5 years



Minard Lake Levels – last 10 years



Lake	Year	Average	Min	Max
Coopers	2018	N/A	N/A	N/A
	2019	920.90	920.00	921.65
	2020	N/A	N/A	N/A
	2021	917.40	916.76	918.34
	2022	916.73	915.87	917.37

Lake	Year	Average	Min	Max
East Twin	2018	927.00	926.84	927.43
	2019	927.83	927.65	928.05
	2020	927.28	926.70	927.65
	2021	925.65	924.84	926.56
	2022	925.27	924.64	925.56

Lake	Year	Average	Min	Max
Minard	2018	920.80	920.40	920.40
	2019	921.50	921.09	922.03
	2020	920.94	920.52	921.55
	2021	920.62	919.91	921.24
	2022	921.03	920.50	921.62

Lake	Year	Average	Min	Max
George	2018	901.79	901.51	902.11
	2019	902.12	901.71	902.73
	2020	901.86	901.46	902.22
	2021	901.39	900.93	902.11
	2022	901.71	901.13	902.43

Lake	Year	Average	Min	Max
Rogers	2018	883.74	883.44	884.02
	2019	884.08	883.74	884.44
	2020	883.76	883.39	884.05
	2021	882.88	882.26	883.31
	2022	883.09	882.96	883.22

2022 Aquatic Invasive Vegetation Mapping

Partners: Lake George LID, Lake George Conservation Club, MNDNR, ACD

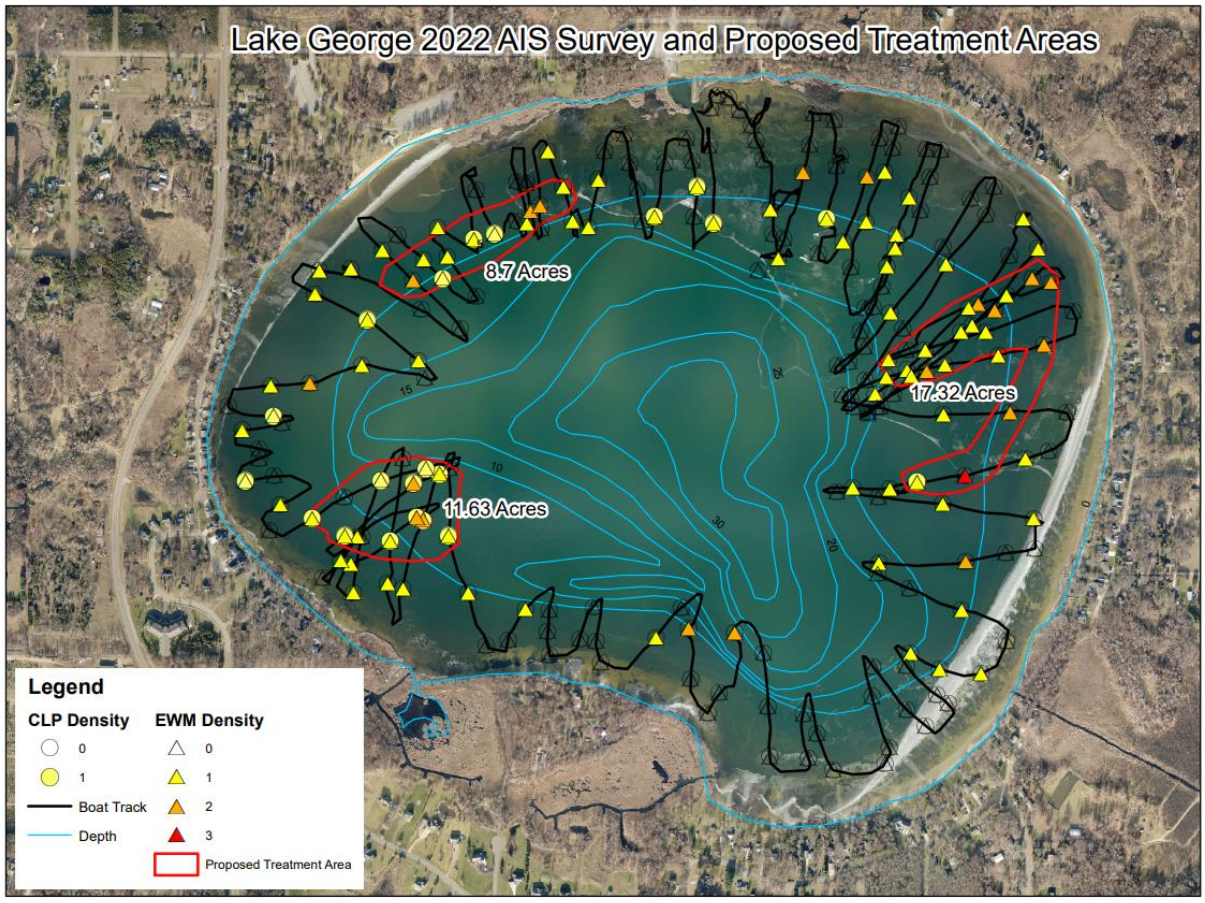
Description: The Anoka Conservation District (ACD) was contracted by the Lake George Lake Improvement District (GLID) to conduct an aquatic invasive vegetation delineation.

Purpose: To map out the presence of Curly Leaf Pondweed (CPL) and Eurasian Water Milfoil (EWM) as required for MN DNR herbicide treatment permits. The goal was to map these invasive species early in the growing season to allow for herbicide treatment as early as possible for reduced impacts on native plants and lessened possible impacts on water quality.

Locations: Lake George, City of Oak Grove

Results: The maps below were delivered to the MN DNR and Lake George Improvement District within 48 hours of the field surveys. These survey points were reviewed by the MN DNR and helped direct herbicide treatment efforts.

May 23, 2022 Lake George Curly Leaf Pondweed (CLP) and Eurasian Water Milfoil (EWM) Survey. DNR-selected proposed areas for herbicide treatment are also shown.



Lake Water Quality

Partners: ACD, Lake George LID and Conservation Club, URRWMO

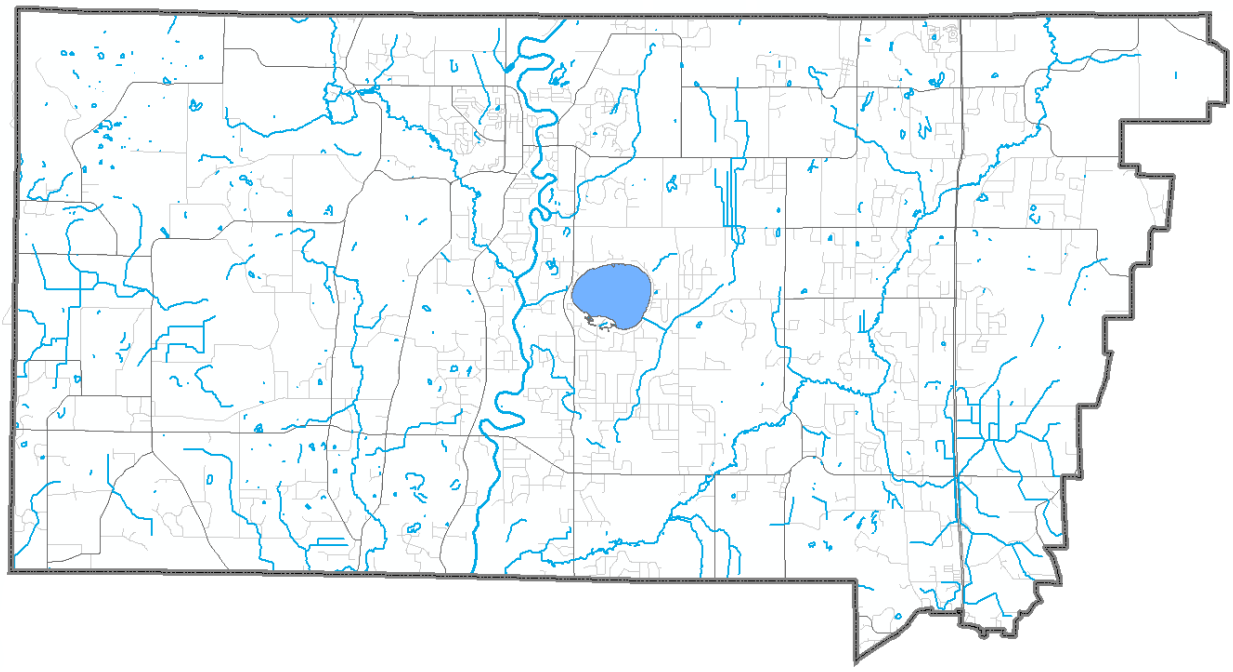
Description: Lake water quality monitoring was conducted ten times between May through September, approximately every two weeks. The monitoring parameters include total phosphorus, chlorophyll-a, Secchi transparency, dissolved oxygen, turbidity, temperature, specific conductance, pH, and salinity.

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

Locations: Lake George

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 on the Minnesota Pollution Control Agency (MPCA) electronic data access (EDA) website or from ACD. Refer to Chapter 1 for additional information on lake dynamics and interpreting the data.

2022 Upper Rum River Watershed Lake Water Quality Monitoring Sites



Lake George

CITY OF OAK GROVE, LAKE ID # 02-0091

Background

Lake George is located in north-central Anoka County. The lake has a surface area of 535 acres with a maximum depth of 32 feet (9.75 m). Public access is from Lake George County Park on the lake's north side, where there is both a swimming beach and a boat launch. About 70% of the lake is surrounded by homes; the remainder is county parkland. The watershed is mostly undeveloped or vacant, with some residential areas, particularly on the lakeshore and in the southern half of the watershed. Lake George is a highly valued lake due to its recreational opportunities and ecological quality. The lake has a large park, many lakeshore homes, and a notably diverse plant community (most metro area lakes have 10-12 different aquatic plant species; Lake George is home to 24).

The MN DNR conducted a standard fisheries survey of this lake in 2014. The lake contains a typical Largemouth Bass-Bluegill-Northern Pike fish community. Fish management efforts have attempted to establish a Walleye population through stocking but this assessment indicates poor recruitment of stocked fingerlings, likely due to the high Northern Pike population. Walleye stocking has not occurred in Lake George since 2014.

2022 Results

In 2022, Lake George had worse water quality then in 2021, receiving an overall B letter grade after receiving A letter grades the last four years. These results are similar to what was recorded between 2009 and 2017, when the majority of monitoring years scored an B letter grade, largely due to declining Secchi transparency during that period.

Results for individual water quality parameters varied. Total phosphorus in 2022 averaged 40.09 µg/L, nearly double the average recorded in 2021 and is the worst on record dating back to 1981. Average Secchi transparency was 7.16 ft (2.2m), which was 2.34 feet less than the previous year, and the lowest since 2011. Chlorophyll-a (Cl-a) averaged 10.20 µg/L, which was the highest since 2011. Cl-a, TP, and transparency were all poorest in August and September. Throughout the season, all three parameters were usually better than the state water quality standards for deep lakes in the region (NCHF Ecoregion).

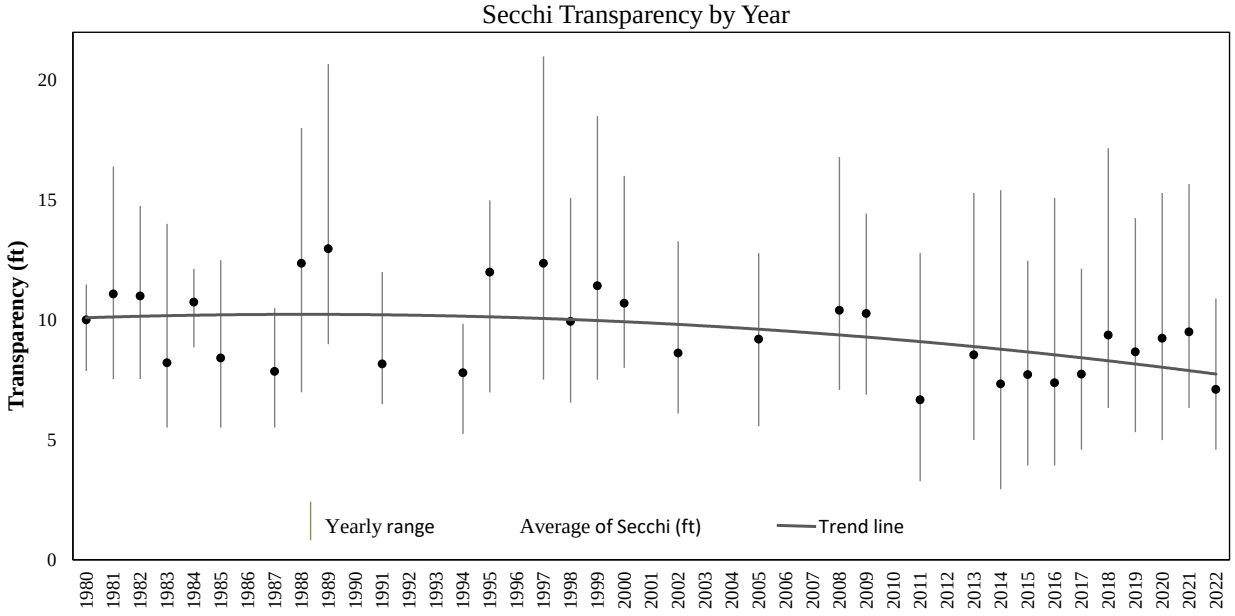
Although Lake George water quality remains better than state standards and is ranked good for a metro-county lake, simply adhering to these standards is not the goal for such an important water body. Decline of Lake George's Secchi transparency has been a cause for concern in recent years with a now twenty-one-year trend of decline in our statistical analyses. 2018-2021 had improved water clarity, but these results are most likely linked to below average precipitation.

Trend Analysis

The Metropolitan Council (between 1980 and 2009) and the Anoka Conservation District (1997, 1999, 2000, 2002, 2005, 2008, 2011, and 2013-2022) have collected over thirty-one years of water quality data. A broad analysis of overall water quality that simultaneously considers TP, Cl-a, and Secchi transparency did find a statistically significant trend looking at all years of data (repeated measures MANOVA with response variables TP, Cl-a, and Secchi transparency, p=<0.05). When parameters are isolated for individual analysis, there is no significant change in Cl-a or TP. However, during this same period there is a statistically significant trend of declining Secchi transparency (p=<0.001).

When the years 2011-2021 are isolated, a statistically significant trend of improving water quality for all parameters was present (repeated measures MANOVA with response variables TP, Cl-a, and Secchi transparency, p<0.05). When 2022 water quality results are included in the analysis, there is no longer a statistically significant trend (p=0.13). This is also the case when parameters are isolated for individual analysis.

Lake George Secchi Transparency Trend: Includes years with partial datasets not covering all open water months. Those years are excluded from ACD's statistical analysis and graphs later in this document.



Discussion

Lake George remains one of the clearest of the Anoka County lakes, but a trend of declining Secchi transparency from the mid-1990s through around 2016 caused concern. In 2018, an intensive study of the lake and its watershed was completed. Work for the study included monitoring of tributaries, modeling, and evaluation of projects to correct declining water quality. The Lake George Improvement District, Lake George Conservation Club, Anoka Conservation District, and a state Clean Water grant funded the study.

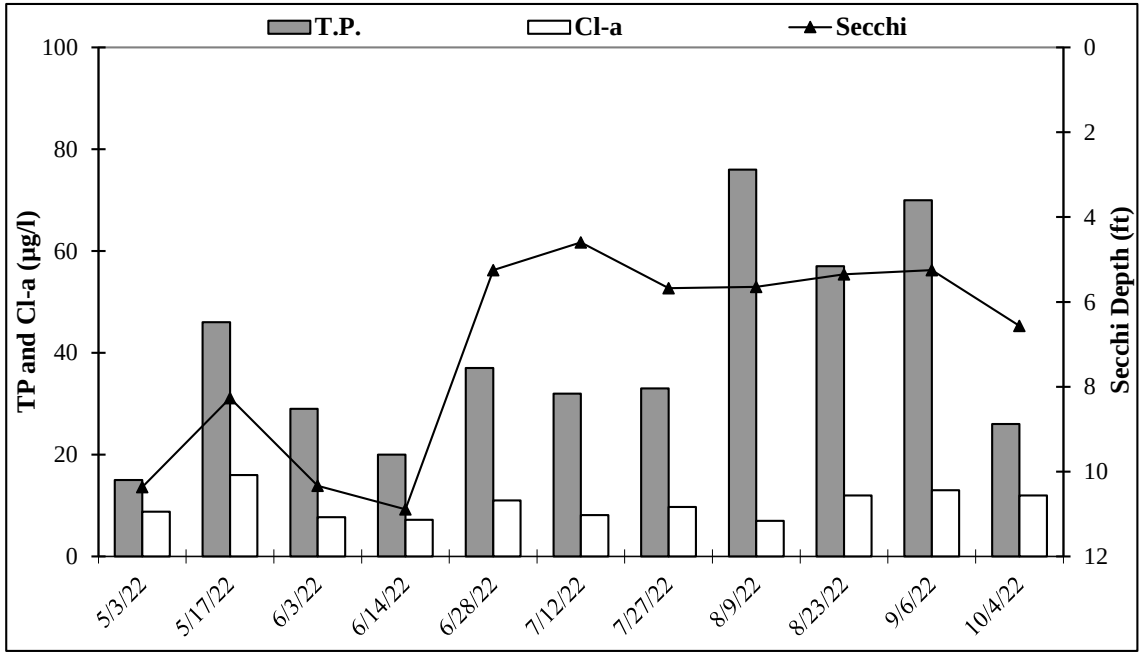
The aforementioned study provides some insight into the causes of transparency decline. While a number of factors may play a role, an increase in the average amount of precipitation is the most significant driver identified. Water years (Oct. 1 – Sept. 30) that are wetter than the 100-year 90th percentile result in increased volumes of runoff and nutrients into the lake from surrounding tributaries, and the lake has the poorer clarity in those years, or in immediately subsequent years. These "wet" years were more frequent during the period when lake transparency declined. Six out of sixteen years from 2001 to 2017 were "wet" with water year precipitation above the historical 90th percentile, with 1999 reaching just under the 90th percentile mark. Additionally, four of these six wet years occurred during the sustained low Secchi transparency period of 2010 through 2017.

Annual precipitation returned to normal levels in 2017 and 2018. The 2019 calendar year was the wettest on record, with Secchi results being only slightly poorer than in 2018, but that average was likely skewed by much higher readings earlier in the season. Annual precipitation in 2020-2022 was below average and the correlation between precipitation and Secchi clarity was again observed in 2020 and 2021 but not in 2022 which had low precipitation and poor Secchi transparency. There is concern that climate change and increased runoff from development in the watershed will drive poorer water quality in Lake George into the future.

The Ditch 19 weir just east of Lake George was replaced in 2020. This structure is an important hydrological control for the lake and this project may have offered some additional clarity benefit right away. The replaced outlet structure should result in reduced nutrient delivery to the lake during wet years, and the broader benefits of restoring lake hydrology and enhancing game fish spawning opportunities. Other actions identified in the 2018 study include agricultural best practices, an iron-enhanced sand filter in the County Park, public education, lakeshore restorations, enhanced stormwater standards for new developments in the lakeshed and others. While certain tributary subwatersheds do generate more nutrients than others, and therefore deserve special consideration for projects, it is also noted that some of these subwatersheds drain through large wetlands with some apparent pollutant removal ability. Projects nearest the lake are favored because they treat a larger upstream area and do not duplicate treatment that might already be provided by certain wetlands.

The MN DNR notes an additional concern for Lake George in the 2017 Rum River Watershed Fish-Based Lake IBI Stressor Identification Report. That report found Lake George's fish community was not impaired, but was one of special concern and deemed vulnerable. Lack of aquatic habitat and near-shore development disturbances were indicated as stressors. To help address this concern The Anoka Conservation District received a grant to implement lakeshore restoration projects on the lake in 2021-2022. These types of practices promote native lakeshore habitat while also reducing phosphorus loading into the lake.

LAKE GEORGE
2022 Results



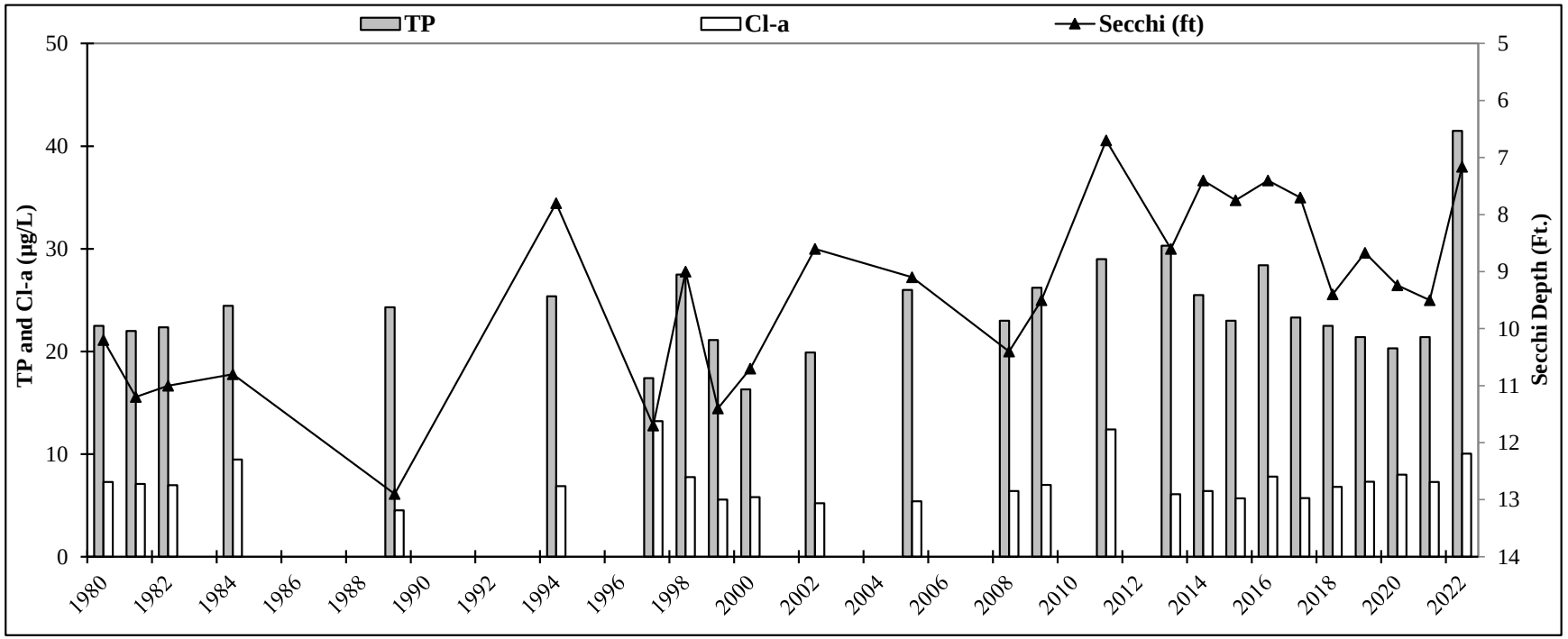
2022 Median Results

pH		8.61
Specific Conductance	mS/cm	0.24
Turbidity	NTU	1.59
D.O.	mg/l	8.60
D.O.	%	99.45
Temp.	°F	73.83
Cl-a	µg/L	9.25
T.P.	µg/l	35.00
Secchi	ft	5.66

Lake George
2022 Water Quality Data

			Date:	5/3/2022	5/17/2022	6/3/2022	6/14/2022	6/28/2022	7/12/2022	7/27/2022	8/9/2022	8/23/2022	9/6/2022	10/4/2022			
			Time:	11:48	11:40	12:23	12:19	9:05	11:51	10:14	12:06	10:30	10:37	11:19			
	Units	R.L.*		Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Average	Min	Max
pH		0.1		8.38	8.79	8.26	8.29	8.52	8.69	8.47	8.86	8.87	8.75	8.66	8.59	8.26	8.87
Specific Conductance	mS/cm	0.01		0.240	0.238	0.238	0.237	0.229	0.225	0.224	0.222	0.219	0.220	0.223	0.229	0.219	0.240
Turbidity	NTU	1			1.51	1.11	0.95	1.39	1.590	1.63	2.02	2.25	2.11	1.82	1.68	1	2
D.O.	mg/l	0.01		12.20	10.79	8.83	8.33	8.46	8.09	7.28	8.74	9.62	8.07	10.13	9.14	7.28	12.20
D.O.	%	1		104.1	113.8	93.4	96.4	100.3	98.6	87.0	104.9	114.5	93.4	103.4	100.9	87.0	114.5
Temp.	°C	0.1		8.38	17.89	18.52	22.60	23.88	25.35	24.33	24.52	24.05	22.57	16.31	20.8	8.4	25.4
Temp.	°F	0.1		47.1	64.2	65.3	72.7	75.0	77.6	75.8	76.1	75.3	72.6	61.4	69.4	47.1	77.6
Cl-a	mg/m³	1		8.80	16.00	7.70	7.20	11.00	8.10	9.70	7.00	12.00	13.00	12.00	10.23	7.0	16.0
T.P.	mg/l	0.005		0.015	0.046	0.029	0.020	0.037	0.032	0.033	0.076	0.057	0.070	0.026	0.040	0.015	0.076
T.P.	µg/l	5		15	46	29	20	37	32	33	76	57	70	26	40.09	15	76
Secchi	ft			10.4	8.3	10.3	10.9	5.2	4.6	5.7	5.6	5.3	5.2	6.6	7.11	4.6	10.9
Secchi	m			3.16	2.52	3.15	3.32	1.60	1.40	1.73	1.72	1.63	1.60	2.00	2.2	1.4	3.3
Physical				1.0	3.0	2.0	2.0	2.0	3.0	3	2.0	4	3.0	3.0	2.5	1.0	4.0
Recreational				1.0	2.0	2.0	2.0	1.0	2.0	2	2.0	3	2.0	4.0	2.1	1.0	4.0

Historical Annual Averages



Historical Report Card

Year	TP	Cl-a	Secchi	**Overall**
1980	A	A	A	**A**
1981	A	A	A	**A**
1982	A	A	A	**A**
1984	B	A	A	**A**
1989	B	A	A	**A**
1994	B	A	B	**B**
1997	A	B	A	**A**
1998	B	A	B	**B**
1999	A	A	A	**A**
2000	A	A	B	**A**
2002	A	A	B	**A**
2005	B	A	B	**B**
State Standards	40 ug/L	14 ug/L	>4.6 ft	

Year	TP	Cl-a	Secchi	**Overall**
2008	B+	A	A	**A**
2009	B	A	B	**B**
2011	B	B	C	**B**
2013	B	A	B	**B**
2014	B	A	B	**B**
2015	A	A	B	**A**
2016	B	A	B	**B**
2017	B	A	B	**B**
2018	A	A	B	**A**
2019	A	A	B	**A**
2020	A	A	B	**A**
2021	A	A	B	**A**
2022	C	B+	B-	**B**
State Standards	40 ug/L	14 ug/L	>4.6 ft	

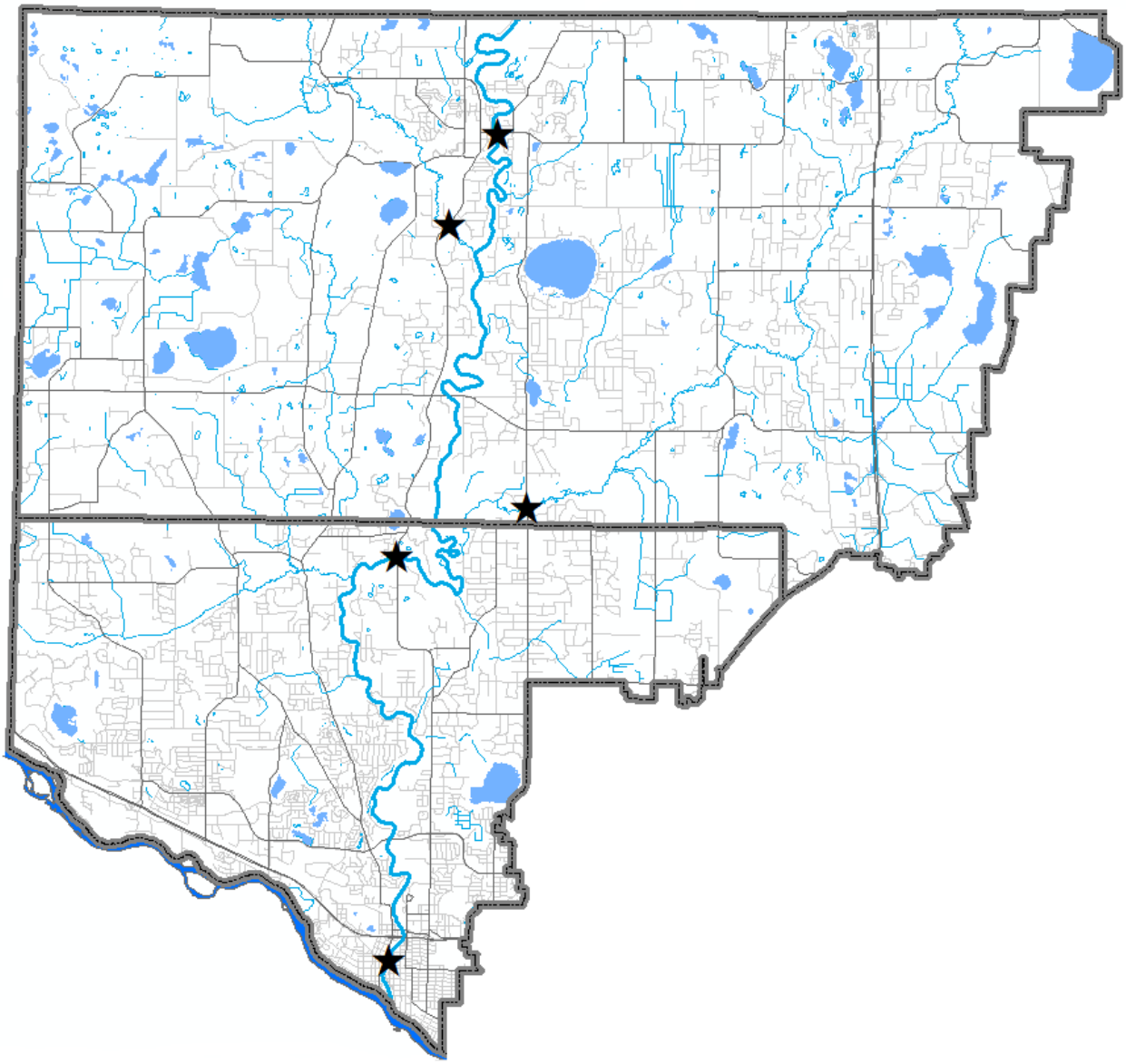
Stream Water Quality Monitoring

Partners: ACD, LRRWMO, and URRWMO

Locations: Rum River at C.R. 24, Seeyle Brook at C.R. 7, Cedar Creek at Hwy 9, Rum River at C.R. 7, Rum River at Anoka Dam (sites listed upstream to downstream)

Description: Water quality monitoring was conducted eight-times between May – September, four times following storm events and four times during baseflow conditions. The monitoring parameters includes total phosphorus, total suspended solids, dissolved oxygen, turbidity, temperature, specific conductance, pH, and salinity.

2022 Rum River Monitoring Sites



Rum River Stream Water Quality

Rum River at Co. Rd. 24 (Bridge St), St. Francis	STORET Site ID = S000-066
Seelye Brook at Co. Rd. 7, St. Francis	STORET Site ID = S003-203
Cedar Creek at Hwy 9, Oak Grove	STORET Site ID = S003-203
Rum River at Co. Rd. 7 (Roanoke St), Ramsey	STORET Site ID = S004-026
Rum River at Anoka Dam, Anoka	STORET Site ID = S003-183

[1]monitored by the Metropolitan Council

Background

The Rum River is one of Anoka County's most valuable water resources. The river is designated as a state "scenic and recreational" river until it reaches southern Anoka County and is used extensively for all types of recreation. A large portion of western Anoka County drains to the Rum River including the subwatershed of Seelye Brook, Trott Brook, Ford Brook, and Cedar Creek. Additional sites monitored by the Anoka Conservation District (ACD) have been included in this report to provide further context to water quality conditions in the Rum River.

In 2004, 2009-2011 and 2014-2021, water quality monitoring was conducted at various sites along the Rum River and tributaries. In 2022, monitoring was completed at three Rum River sites and two tributary sites that input into the Rum River in northwestern Anoka County. The objective of this data is to help determine how water quality changes in the Rum River system as it moves through Anoka County and where these changes might be occurring. The data is reported for all sites, side-by-side, for a more comprehensive analysis of water quality in the Rum River, upstream to downstream. Land use surrounding the river changes dramatically from rural residential in the upstream portions of Anoka County to suburban and urbanized in the downstream areas. Sites included:

Rum River at C.R. 24 is located in northern Anoka County, the City of St. Francis with the Isanti County border just upstream. This location is the best available site to monitor the upstream extent of the Upper Rum River Watershed Management Organization and Anoka County.

Cedar Creek at C.R. 9 is a tributary originating in south central Isanti County, flowing southwest before entering the Rum River. Cedar Creek flows through north central Anoka County, progressing through lands with high-quality natural communities, including the Cedar Creek Ecosystem Science Reserve. Habitat in the lower stretches of the stream are of moderate quality but the stream is listed as an impaired water for excessive *E. coli* bacteria. Cedar Creek is one of the larger streams in Anoka County, reaching 25-feet wide and regularly having depths greater than 2-feet during baseflow conditions. The stream bottom is primarily silt. The watershed is moderately developed with scattered single-family homes but the area continues to develop rapidly.

Seelye Brook at Hwy 7 is a tributary stream originating in southwestern Isanti County, flowing south through northwestern Anoka County before entering the Rum River. This stream is low gradient, like most other local streams. Seelye Brook has a silty or sandy bottom and lacks riffle-pool sequences. It is a moderate to large stream for Anoka County, with a typical baseflow width of 20-25 feet.

Rum River at Hwy 7 is an approximate mid-way point for the Rum River's length in Anoka County. It is at the approximately dividing line between the Upper and Lower Watershed Management Organizations and the costs for monitoring this sites are shared by those organizations.

Rum River at Anoka Dam represents the downstream extent of the Rum River in Anoka County before it enters the Mississippi River. While the Rum River technically extends farther downstream, monitoring occurs at this location to avoid backwater influences of the Mississippi River. This site is monitored by the Metropolitan Council (Met Council), and annual monitoring has occurred back to 1996.

Methods

In 2022, grab samples were collected on eight sampling occasions half during baseflow conditions and half following storm events. All sites were monitored by ACD staff, except for Rum River at the Anoka Dam was monitored by the Metropolitan Council following a different schedule and sampling protocol. Metropolitan Council data is still included in this report for comparison purposes.

Storms were generally defined as one-inch or more of rainfall within a 24-hour period, or a significant snowmelt event combined with rainfall. In some years, smaller storms were sampled because of low precipitation totals. This was the case in 2022 but all storms sampled were significant runoff events. Key parameters tested with multi-parameter probes included pH, specific conductivity, turbidity, temperature, salinity, and dissolved oxygen. Parameters analyzed by a state-certified lab included total phosphorus, total suspended solids, and chlorides at Rum River C.R. 7 and Rum River at the Anoka Dam.

The intention of this report is to provide a comparison of water quality in the Rum River as it moves upstream to downstream. This report only includes parameters that were tested in 2022 and does not include any additional parameters tested by the Met Council or any of their additional sampling. For more detailed information, see Met Council reports at https://eims.metc.state.mn.us/. All raw data can be obtained from ACD's online database (https://maps.barr.com/Anoka/Home/Chart/), and is also available through the MPCA's EQuIS database, (https://www.pca.state.mn.us/data/environmental-quality-information-system-equis).

Results Summary

This report includes data from 2022 and an overview of historical data. The following is a summary of results.

- Dissolved constituents were measured by specific conductivity and chlorides. Specific conductivity in the Rum River is lower than other Anoka County streams and within the healthy range. Chlorides are a regional concern and proactive measures to ensure it does not become elevated in the Rum River watershed is recommended. Periodic monitoring every 2-5 yrs. is recommended.
- pH was within a healthy range (6.5-8.5) at all monitoring sites in in 2022.
- Dissolved oxygen remained above the state standard of 5 mg/L in 2022 and throughout previous monitored years at all monitoring sites. No concerns.
- Phosphorus levels in the Rum River in recent years have regularly exceeded the state standard of 100 µg/L at all sampled sites, but on average been slightly lower than this threshold. 2022 total phosphorus in the Rum River in 2022 averaged 78.8, 83.3, and 86.0 µg/L at sampled sites from upstream to downstream. Reducing phosphorus levels in the Rum River is a regional priority.
- Suspended solids and turbidity remained at acceptable levels in the Rum River, Cedar Creek, and Seelye Brook. Robust stormwater treatment within new developments and continued surveillance monitoring is recommended.
- Overall – The priority for the Rum River is reducing phosphorus. A 5% reduction is a top goal identified in local and regional plans. Achieving it will require work throughout the watershed, including upstream of Anoka County.

Below the data is presented and discussed for each parameter in greater detail. Management recommendations for each parameter is included in individual sections.

Specific Conductivity and Chlorides

Conductivity and chlorides are measures of dissolved pollutants. Dissolved pollutant sources include urban road runoff and industrial chemicals, among many others. Conductivity is a broad measure of dissolved pollutants. It measures electrical conductivity of the water pure water with no dissolved constituents has zero conductivity. Significant changes in water conductivity may indicate new pollutant sources to a waterbody. Some common sources of this type of pollution are road salts, water softeners, septic leaks, and agricultural chemicals.

Specific conductivity was acceptably low in the Rum River including in 2022. Conductivity at Rum River sites was similar, and in nearly all years it increases slightly upstream to downstream. Average specific conductivity from upstream to downstream in 2022 (all conditions) was 0.299 mS/cm, 0.310 and 0.298 mS/cm, respectively. This consistent trend of increasing conductivity from upstream to downstream likely reflects higher road densities and greater deicing efforts with salt application as well as other pollutant sources associated with higher road density and development. All three sites had levels lower than the historical median for Anoka County streams of 0.561 mS/cm.

In past monitoring years, conductivity was usually higher during baseflow conditions but this was not the case in 2022. Lower conductivity following a storm event suggests 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 area streams with the largest source believed to be road salts that have infiltrated into the shallow aquifer. Water softening salts and geologic materials can also be contributors. Lower baseflow conductivity than storm conductivity in 2022 could be influenced by low water levels in the river, variabilities in precipitation and/or runoff, or the timing when the sampling occurred.

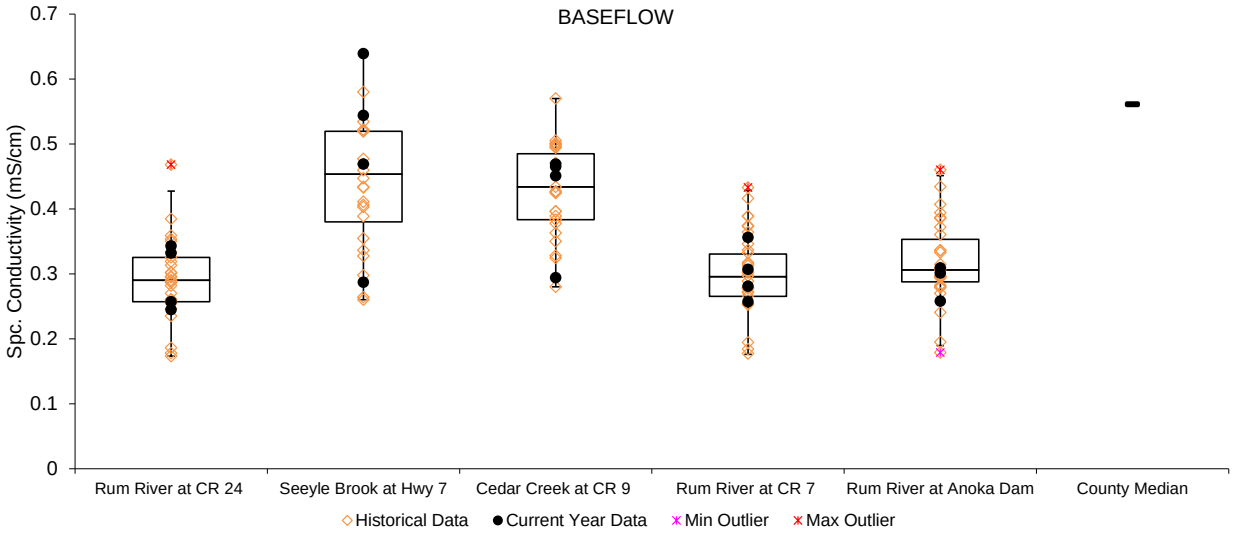
Specific conductivity is higher in Seeyle Brook and Cedar Creek compared to the Rum River but still remains lower than the median for Anoka County streams (0.561 mS/cm). Average conductivity (all years, all conditions) was 0.508 mS/cm at Seeyle Brook and 0.452 mS/cm at Cedar Creek.

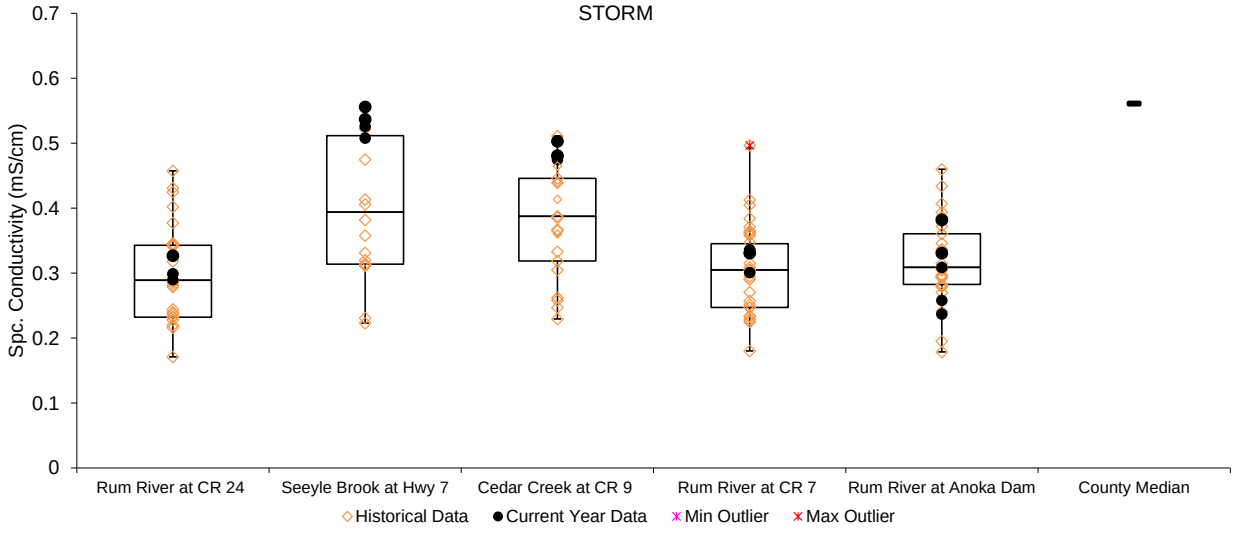
Chlorides are the measure of chloride salts, the most common of which are road de-icing chemicals or water softener discharge. Chlorides can also be present in other types of wastewater. These pollutants are concerning because of the effect they can have on the stream's biological community. While chloride levels are currently low, they should continue to be monitored and proactive prevention practices should be implemented to limit them in the future.

In 2022, chlorides were monitored in the Rum River at C.R. 7 (on 4 of 8 sampling occasions) and the Anoka Dam only. These sites were last sampled in 2018. Chloride results in 2022 ranged between 12.75 mg/L and 14.85 mg/L, far below the state's chronic standard for aquatic life (230 mg/L). Sampling did not occur during snowmelt, when chloride is likely to be highest.

For water resource management, it is important to note that the sources of dissolved pollutants are generally the same for both stormwater and baseflow it is only the timing of delivery to the waterway that is different. Preventing the release of dissolved pollutants into the environment and treating them before infiltration occurs should be a high priority. Training and equipment that minimize road salting while still maintaining safe roads safe is being increasingly emphasized by watershed managers. The MPCA now provides a training program where organizations and employees to obtain a smart-salting certification, which then has to be renewed every few years.

Specific Conductivity during Baseflow and Storm Conditions. Orange diamonds are historical data from previous years and black circles are 2022 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



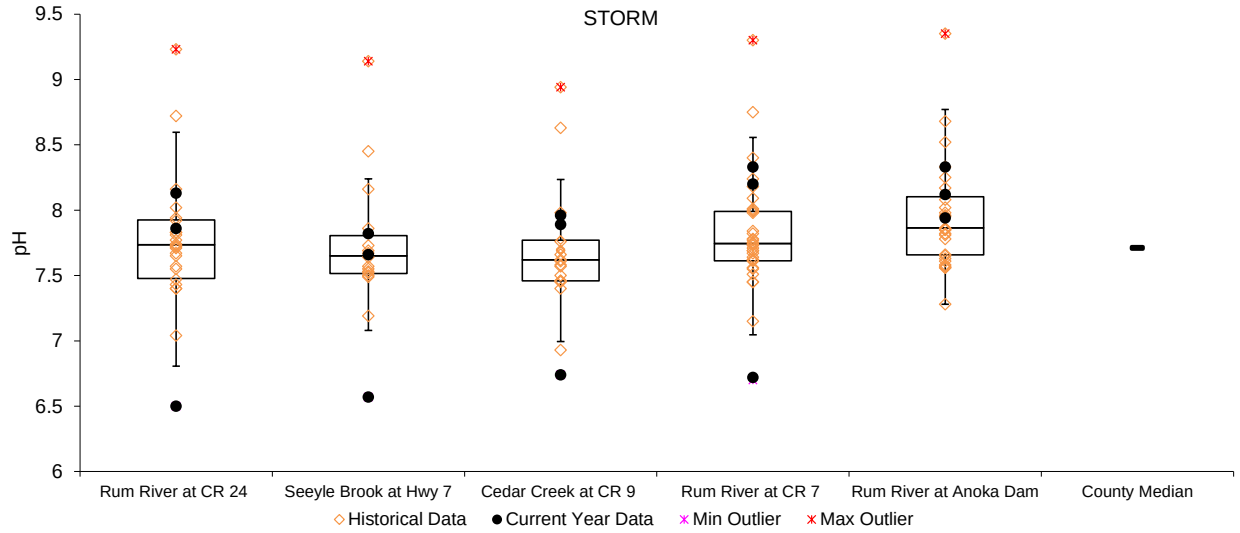


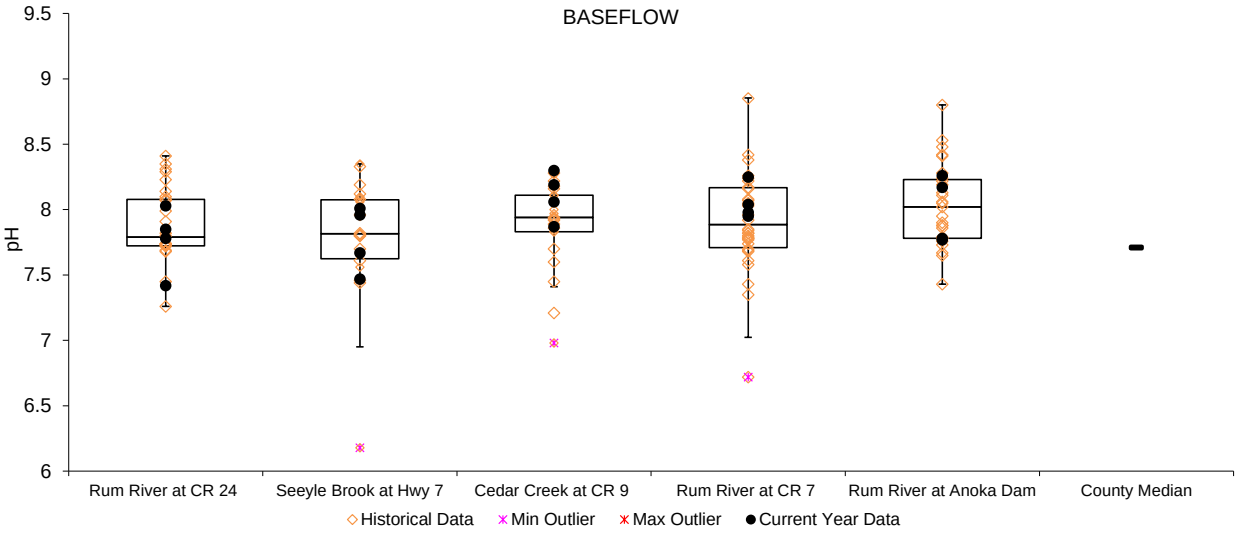
pH

pH refers to the acidity of the water. The state standard for pH is between 6.5 - 8.5 and pH is generally lower during storm events than during baseflow conditions because the pH of rain is typically lower (more acidic). While acid rain is a longstanding problem, its effect on this aquatic system is minimal. pH in the Rum River is generally within the healthy range and has only exceeded 8.5 on a few occasions in the past. The rare occasion when pH does exceed the state standard should not be concerning.

pH in Cedar Creek and Seeyle Brook were both within the normal healthy range in 2022. Cedar Creek has only exceeded 8.5 on two occasions historically. Seeyle Brook has only exceeded the state range (6.5-8.5) on one sampling occasion. Discharge of nutrient rich algae waters from lakes or wetlands into waterways is a factor that could influence spikes in pH. Spikes over 8.5 seem to be happening more frequently in recent years, although it is a positive development that they did not occur this year.

pH during Baseflow and Storm Conditions. Orange diamonds are historical data from previous years and black circles are 2022 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



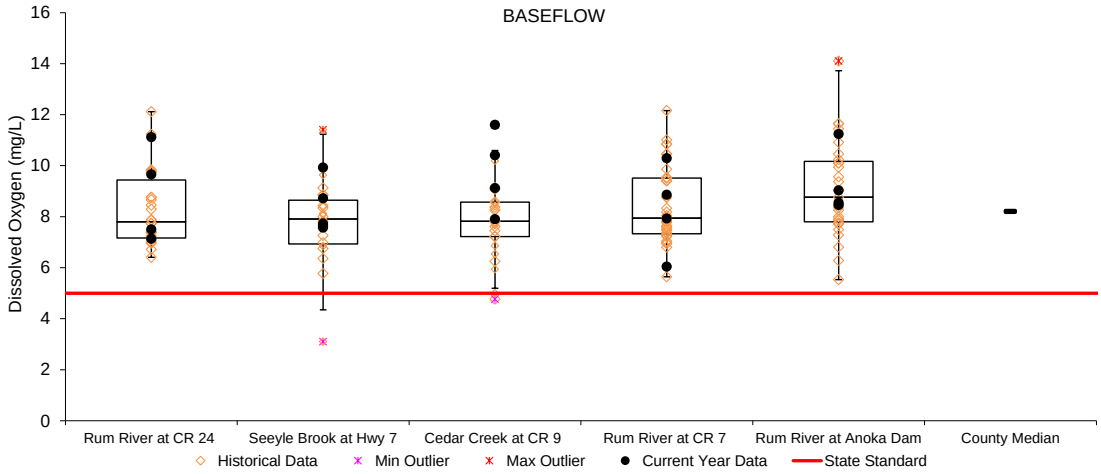


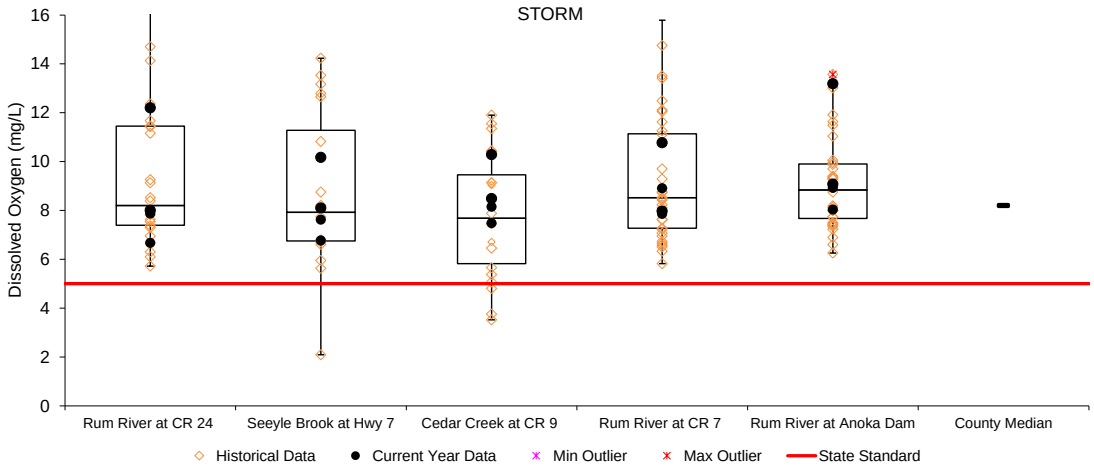
Dissolved Oxygen

Dissolved oxygen is necessary for aquatic life, including fish. Organic pollution causes oxygen to be consumed during decomposition. If oxygen levels in water fall below 5 mg/L, aquatic life begins to suffer. A stream is considered impaired if 10% of observations are below 5 mg/L in the last 10-years. Dissolved oxygen levels are typically lowest in the early morning because of decomposition consuming oxygen at night without the offsetting of oxygen production by photosynthesis. In 2022, all measurements of dissolved oxygen in the Rum River were above 5 mg/L. Dissolved oxygen has never been observed below the state standard (5 mg/L) at any of the Rum River sites. Only on a handful of occasions has dissolved oxygen been recorded below 6.0 mg/L and many of these results were recorded during the same storm event.

2022 dissolved oxygen measurements in Cedar Creek and Seeyle Brook were all above 5 mg/L. Median dissolved oxygen, for all years and all conditions, was 7.82 mg/L for Cedar Creek and 7.91 mg/L at Seeyle Brook. Only a few readings of dissolved oxygen below 5 mg/L have ever been recorded at either of these sites and there is no management concern at this time. Decreases in dissolved oxygen levels may be a result of increased nutrients in the system. Managing phosphorus and nitrogen loading to the streams will help ensure healthy dissolved oxygen levels.

Dissolved Oxygen during Baseflow and Storm Conditions. Orange diamonds are historical data from previous years and black circles are 2022 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

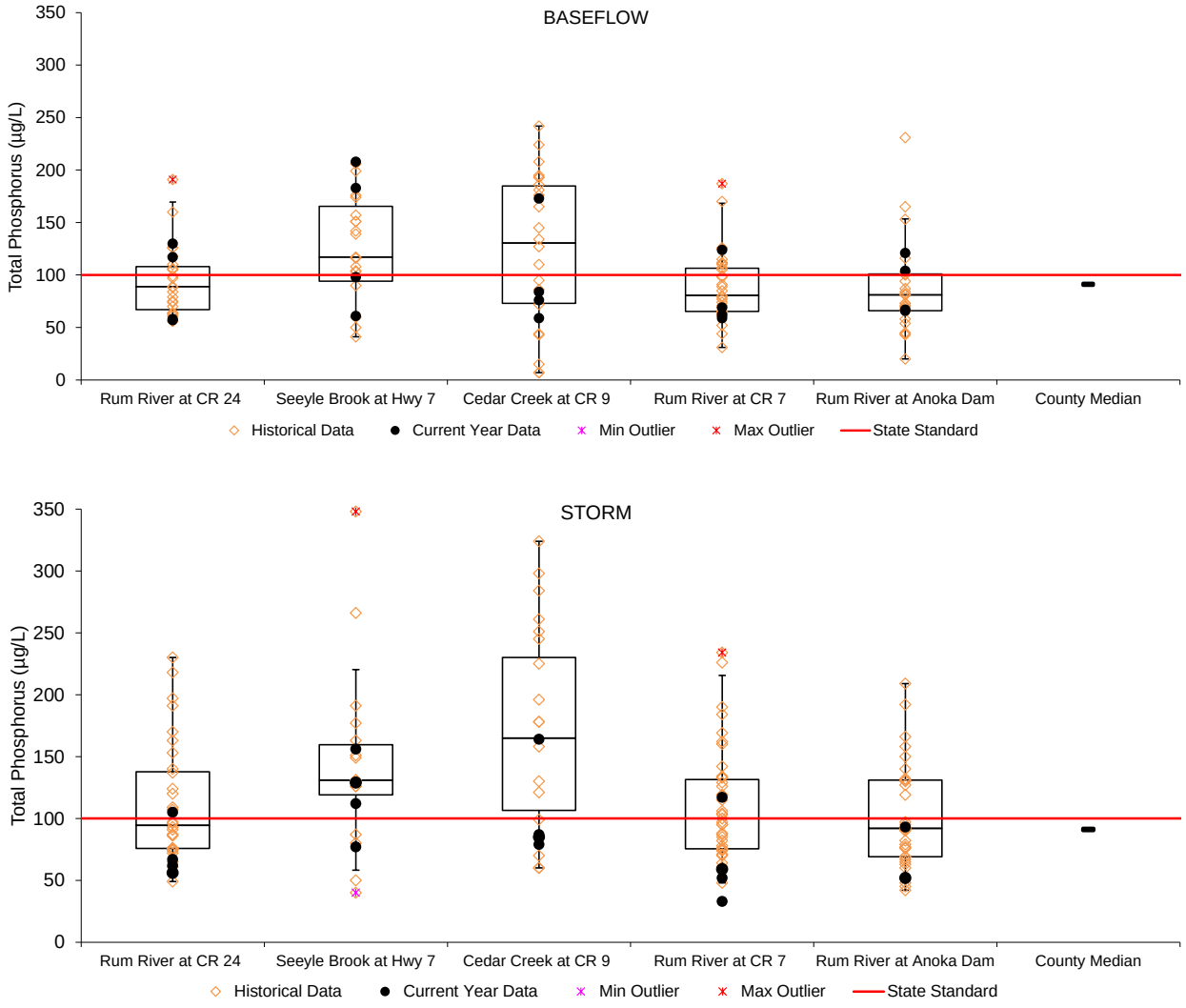
The nutrient phosphorus is one of the most common pollutants to local waterways, and can be associated with stormwater runoff, wastewater, fertilizers, soil loss, and many other sources. Since it is an essential nutrient in the natural ecosystem, even a slight increase of phosphorus levels in a waterway can result in harmful algae blooms, accelerated plant growth, low dissolved oxygen levels and other negative effects to fish, macroinvertebrates, and other aquatic animals. Phosphorus levels in the Rum River are nearing the state impairment thresholds. Average phosphorus concentrations at the three Rum River monitoring sites regularly exceeds the state standard for impairment (100 µg/L) but on average is slightly lower. In 2022, average phosphorus concentrations at the Rum River sites for all conditions, upstream to downstream, were 81.5, 71.87 and 84.75 µg/L, respectively. Phosphorus during storm flows is higher than base flows. For example, at County Road 7 the average TP across all years monitored is 87.5 µg/L during base flow and 108.1 µg/L during storms. Of the 86 samples taken across all years at that site there have been twelve exceedances of the state standard during baseflow and 21 during storm flows.

Cedar Creek had TP similar to the Rum River in 2022 but was higher in previous years. The 2022 total phosphorus levels in Cedar Creek averaged 104.0 µg/L during all conditions. The median phosphorus concentration in Cedar Creek at CR 9 (all years) is 124 µg/L during baseflow and 169 µg/L post-storm. The median for Anoka County streams is 91 µg/L and the state standard is 100 µg/L. Historically, 33 of the 50 measurements taken at the Cedar Creek site have been greater than 100 µg/L, with an average of 146 µg/L and median of 151 µg/L. Individual results over 200 µg/L have been a near-annual occurrence since 2015 but were not observed in 2022.

Seelye Brook TP is higher than the Rum River or Cedar Creek. In 2022, total phosphorus concentration in Seelye Brook was 135 µg/L across all conditions. It averaged 137.50 µg/L during baseflow and 118.5 µg/L post-storm. The median phosphorus concentration in Seelye Brook at Hwy 7 for all years is 126 µg/L during baseflow, 144 µg/L during storm events, and 134 µg/L across all events. 74% of samples taken since 1998 have had TP concentrations above the state standard.

Phosphorus in both Cedar Creek and Seelye Brook are at concerning levels. Because Cedar Creek's subwatershed has rural residential development, little stormwater infrastructure or agriculture, and abundant wetlands it is reasonable to think that natural sources and wetlands are a significant phosphorus source. Seelye Brook has more agriculture including at least one feedlot, a City of St. Francis wastewater treatment plant that was upgraded in 2017, and wetlands its phosphorus sources may be more mixed. Continued monitoring and efforts to reduce phosphorus are needed throughout the watershed. Areas to focus can include ensuring robust stormwater treatment in residential development and agricultural best management practices. Keeping the Rum River off of the state impaired water's list is a priority for the area.

Total Phosphorus during Baseflow and Storm Conditions. Orange diamonds are historical data from previous years and black circles are 2022 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 refraction of a light beam passed through a water sample and is sensitive to larger particles. TSS is measured by filtering solids from a water sample and weighing the filtered material. The amount of suspended material present in water is important because it affects water transparency, aquatic life, and because many other pollutants are attached to sediment particles. Stormwater treatment practices such as street sweeping, sumps, and stormwater settling ponds target sediment and attached pollutants. Suspended solids in the waterway can come from both internal and external sources. External sources can include a variety of particles in stormwater runoff. Internally, bank erosion and movement of the bottom substrate contribute to suspended sediments. A moderate amount of this type of internal loading is natural. In 2022, turbidity and TSS levels in the Rum River were lower than the historical median for Anoka County streams.

Turbidity is generally low in the river but increases are observed after storm events. There is no clear trend of changing turbidity or suspended solids from upstream to downstream. In 2022 average turbidity (all conditions) for sites upstream to downstream were 7.2, 19.4, and 3.85 NTU. The historical median for Anoka County streams is 8.9 NTU. Turbidity was elevated on a few occasions, especially following storm events. In 2022 water levels were low most of the year, except in spring.

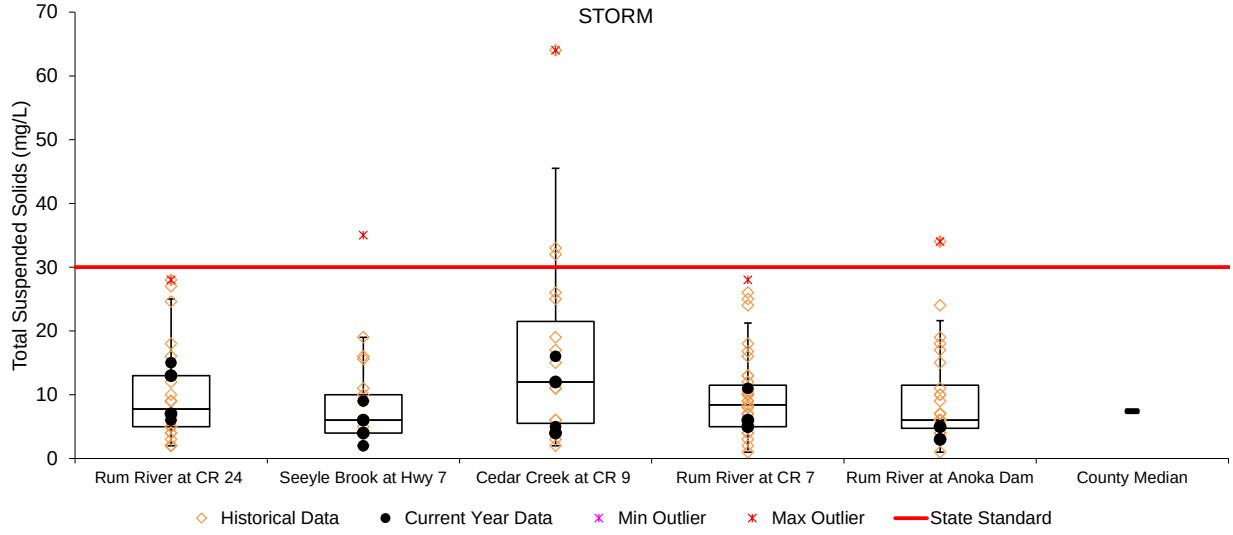
TSS results were similar to those for turbidity. In 2022, average TSS results (all conditions) upstream to downstream were 9.9, 7.1, and 5.6 mg/L. These results were generally lower than the Anoka County stream median for TSS of 7.4 mg/L and also better than the state standard of 30 mg/L. The highest TSS level recorded in 2022 was 24 mg/L. ACD has not collected a sample over 30 mg/L since 2010.

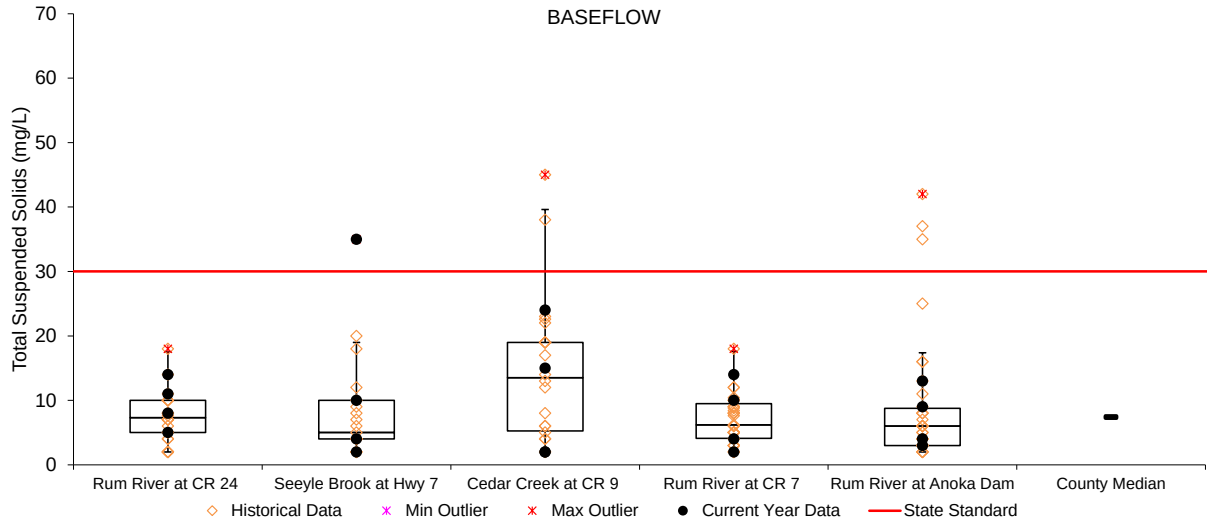
Turbidity and TSS were low in Cedar Creek in 2022 and in most other years. Turbidity in 2022 averaged 3.96 NTU during baseflow and 4.27 NTU post-storm. 2022 TSS levels were also low, averaging 10.75 mg/L during baseflow and 9.25 mg/L post-storm. Median TSS in Cedar Creek (all years) has been 13.5 mg/L during baseflow and 12.0 mg/L following storm events, higher than the median for all Anoka County streams (7.4 mg/L) but below the state standard (30 mg/L). Reasons for low suspended material likely include the relative lack of manmade stormwater outfalls and the fact that the creek slowly meanders through broad floodplain wetlands.

Turbidity and TSS have also been low in Seelye Brook. In 2022 turbidity in Seelye Brook averaged 4.1 NTU across all conditions. The median turbidity (all years) has been 5.45 NTU during baseflow and 6.2 NTU post-storm, much lower compared to other local streams. TSS in Seeyle Brook was also observed at healthy levels with medians for all years being 5.00 mg/L during baseflow and 6.00 mg/L post-storm, well below the state standard of 30 mg/L.

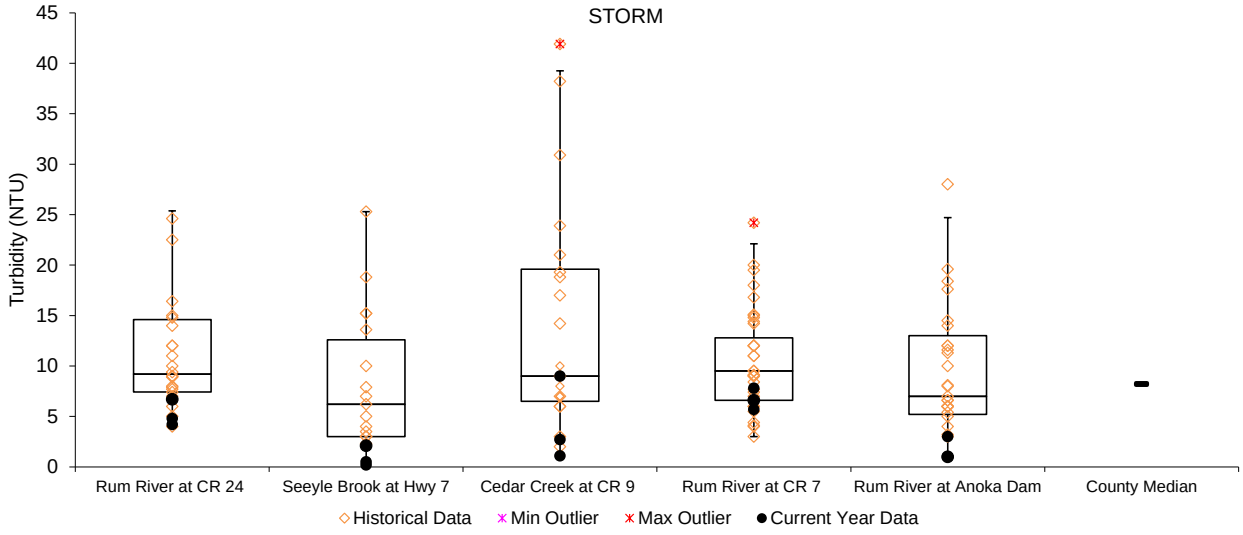
While the Rum River and these tributaries remain well under the impairment threshold for TSS, rigorous stormwater treatment in new developments should be a priority in the coming years. There are also opportunities to better treat current runoff from developed and agricultural landscapes. The Anoka Conservation District and partners currently have a well-funded riverbank stabilizations program because it offers multiple benefits to water quality, habitat, and protecting property. Surveillance monitoring of turbidity and TSS in the Rum River watershed should continue. These are critical parameters to monitor in their own right, but also because many other pollutants can be associated with suspended solids.

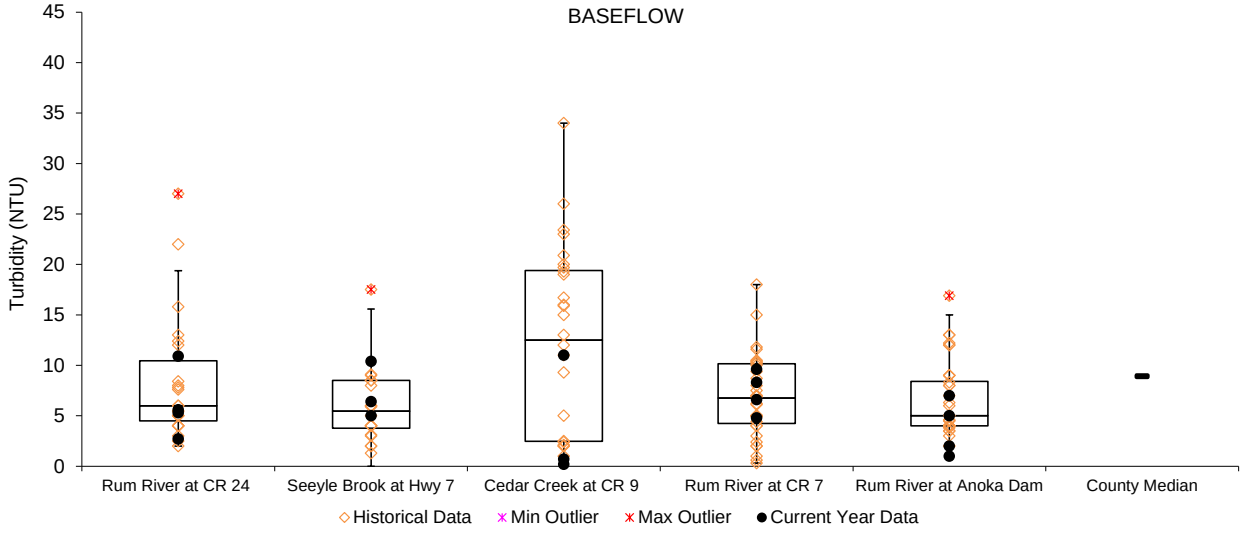
Total Suspended Solids during Baseflow and Storm Conditions. Orange diamonds are historical data from previous years and black circles are 2022 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).





Turbidity during Baseflow and Storm Conditions. Orange diamonds are historical data from previous years and black circles are 2022 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).





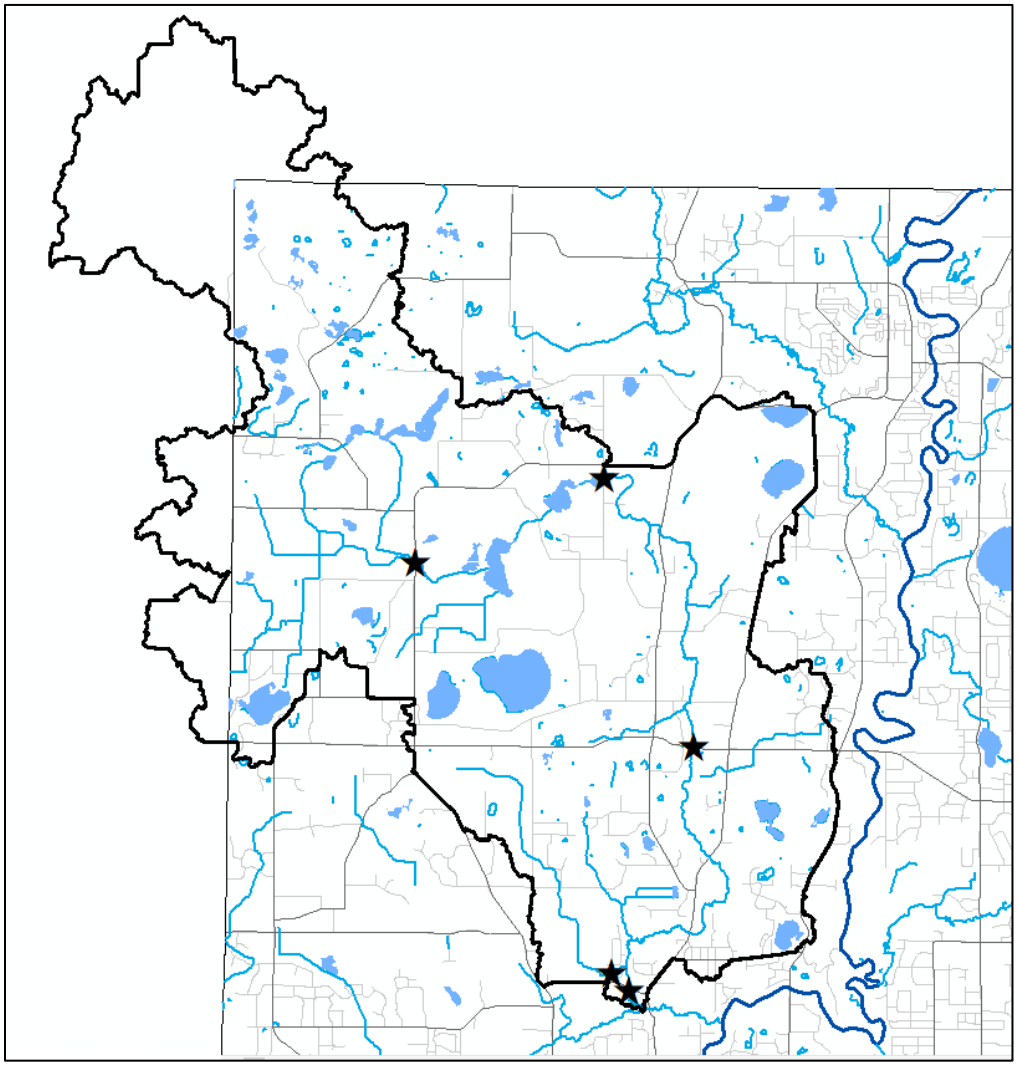
Ford Brook Water Quality Monitoring

Partners: URRWMO and ACD

Locations: Ford Brook at Nowthen Blvd, Ford Brook at Xeon St, Ford Brook at Viking Blvd, Tributary at Vanadium St, Ford Brook at C.R. 63 (sites listed upstream to downstream)

Description: Water quality monitoring was conducted eight-times between May – September, four times following storm events and four times during baseflow conditions. The monitoring parameters includes total phosphorus, total suspended solids, dissolved oxygen, turbidity, temperature, specific conductance, pH, and salinity. Please reference the Rum River Stream Water Quality section found earlier in the chapter for more information about the methods used.

2022 Ford Brook Monitoring Sites



Background

Ford Brook originates at Goose Lake in northwestern Anoka County and flows south. Ford Brook is a tributary to the Rum River, joining Trott Brook Creek just prior to merging with the Rum River. The Ford Brook watershed encompasses over 24,000 acres throughout northwestern Anoka County, and portions of Sherburne and Isanti Counties. Land use in this region is characterized by agricultural operations and rural residentail development. Ford Brook was identified as a priority waterbody in the Rum River One Watershed One Plan (1W1P) due to its nutrient load contributions to the Rum River.

In 2022, the Anoka Conservation District (ACD) completed a subwatershed analysis (SWA) study for the purpose of identifying and ranking water quality improvement projects throughout the Ford Brook watershed. Total phosphorus was the target pollutant for this analysis, with a total reduction goal of 5% at the Ford Brook outlet.

The Ford Brook SWA included water quality monitoring at several sites throughout the Ford Brook system as well as two small tributaries. Of these sites, Ford Brook at County Road 63 has been monitored periodically since 1998 and other sites have not been previously monitored. Since 2022 was the first year water quality data was collected at many of the sites, additional monitoring should be completed in order to determine any trends.

Weather conditions affected 2022 monitoring. After spring rains, drought developed during the remainder of the growing season. Low water levels were common, and the streambed at several of the monitoring sites ran dry at various times. As a result, some sites were sampled less than planned.

Results Summary

This report includes data from 2022 and an overview of historical data. For more general information on individual water quality parameters please reference the Rum River Stream Water Quality section found earlier in the chapter.

- Dissolved constituents at new monitoring sites were observed at high levels compared to other regional streams. At the Ford Brook at C.R. 63 site, dissolved constituents were higher than other previously monitored years and above average when compared to similar Anoka County streams.
- pH was generally within the acceptable range for all readings in 2022, only slightly exceeding 8.5 on two occasions.
- Dissolved oxygen averaged within the healthy range but did fall below the state standard (5 mg/L) on several occasions.
- Total phosphorus in Ford Brook was in excess of the state standard (100 µg/L) by more than 40%, during baseflow conditions and >80% during storm conditions. Phosphorus reduction efforts should be applied throughout the watershed, including stormwater treatment at new developments and the implementation of agricultural BMP's on cultivated fields. Focus areas should be downstream of Goose and Pinnaker Lakes. These efforts could help keep Ford Brook and the Rum River off the state list of impaired waters.
- Suspended solids and turbidity levels both averaged low. Total suspended solids was below the state standard of 30 mg/L. There is no current management concern.
- Overall – The primary water quality goal at Ford Brook is total phosphorus, both for Ford Brook itself as well as the Rum River downstream.

Below the data is presented and discussed for each parameter in greater detail. Specific management recommendations for each parameter is included in individual sections.

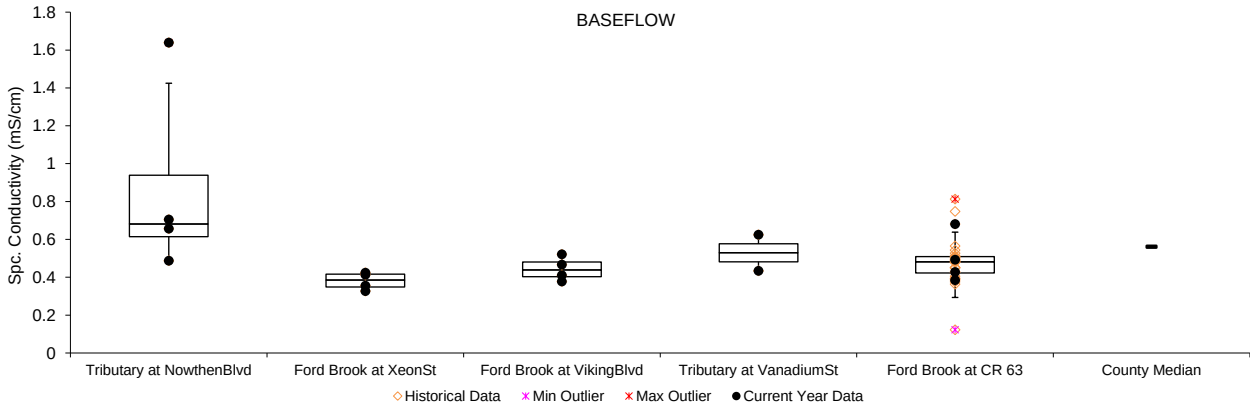
Specific Conductivity

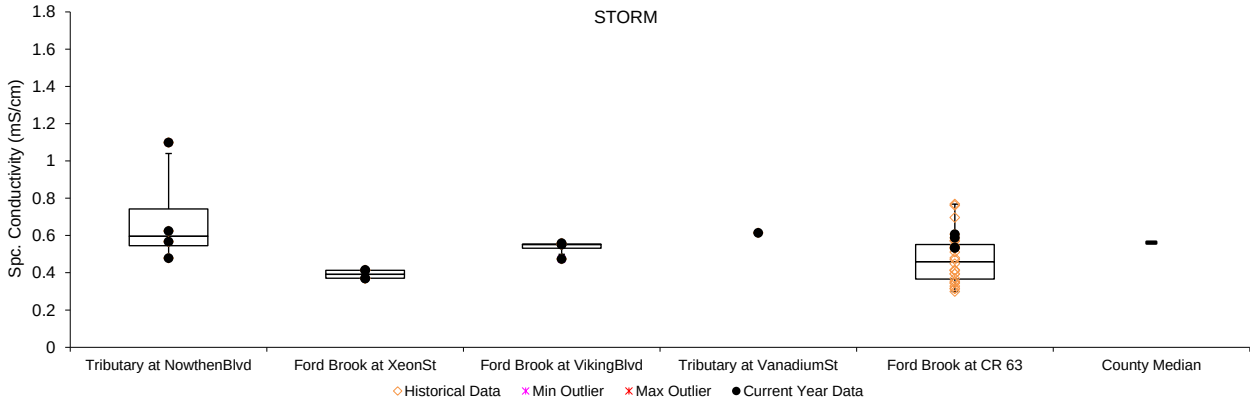
Median specific conductivity in Ford Brook was similar to other streams in the vicinity. Specific conductivity was the highest at the most upstream monitoring site, then declined and was observed at similar levels at the rest of the sites. Most individual sites averaged below the median for Anoka County streams (0.561 mS/cm). The overall median in 2022 for all sites was 0.451 mS/cm during baseflow and 0.551 mS/cm after storm events.

Comparing baseflow and storm flow specific conductivity can lend some insight into potential pollutant sources. In past monitoring years at Ford Brook, conductivity has usually been lower during storm flow conditions, but this was not observed in 2022. Lower conductivity following a storm event suggests that stormwater runoff contains fewer dissolved pollutants than the surficial water table that feeds the stream during baseflow. The surficial water table can contain dissolved materials of both natural origin (such as those from geologic materials) or pollutants (road deicing salt is one locally common example). It appears that both stormwater and the surficial groundwater contribute mild or moderate amounts of dissolved materials to Ford Brook.

For water resource management, it is important to note that the sources of dissolved pollutants are generally the same for both stormwater and during baseflow, it is only the timing of delivery to the waterway that is different. Preventing the release of dissolved pollutants into the environment and treating them before infiltration occurs should be a high priority. Training and equipment that minimize road salting while still maintaining safe roads safe is being increasingly emphasized by watershed managers. The MPCA now provides a smart-salting training and certifications. High specific conductivity is not problematic today, but could become an issue in the future. Periodic chloride sampling is recommended to verify if observed specific conductivity increases are due to salts.

Specific Conductivity at Ford Brook. Orange diamonds are historical data from previous years and black circles are 2022 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

In 2022, average phosphorus concentrations at all of the Ford Brook monitoring sites regularly exceeded the state standard for impairment (100 µg/L) during both baseflow conditions and after storm events. In 2022, average phosphorus concentrations in Ford Brook, for all sites, was 142.0 µg/L (baseflow) and 185.0 µg/L (post-storm). Individual results exceeded 200 µg/L on five other occasions through the 2022 season. In 2022, approximately 85% of samples collected, during baseflow and post-storm, exceeded the state standard (100.0 µg/L) and were above the median for Anoka County streams (91 µg/L).

It is not new to understand that Ford Brook has elevated phosphorus, but it is new to understand the extent of that phosphorus in the stream system. Previous monitoring, only at County Road 63, commonly found elevated phosphorus (50 of 59 measurements >100 µg/L, averaging 157.8 µg/L, for all years and all conditions). In 2022 we found high phosphorus at all sites except one. High phosphorus appears to be from dispersed non-point sources across the drainage area.

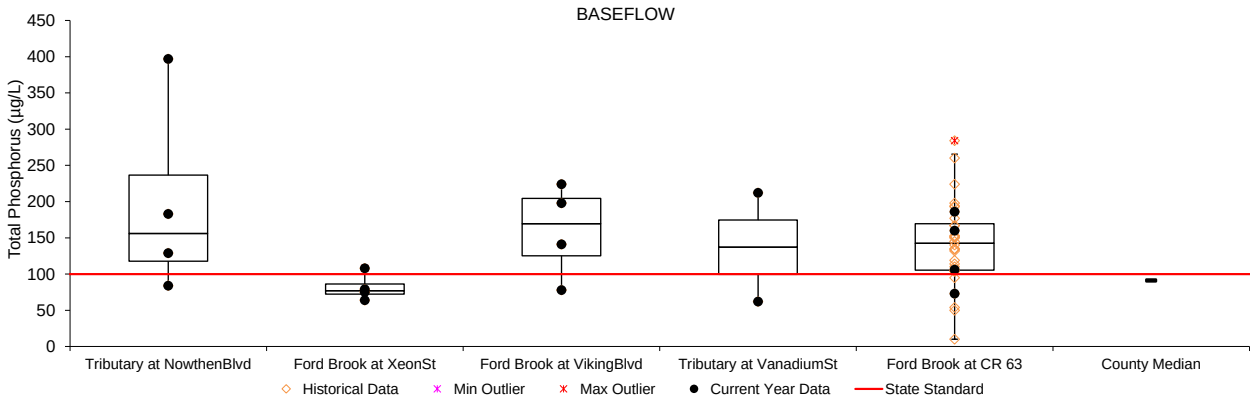
Goose and Pinnaker Lakes appear to be responsible for lower phosphorus at Xenon Street. Phosphorus is high just upstream of the lakes (at Nowthen Blvd) and lower just downstream (at Xenon St). It is suspected that the lakes are capturing particulate material by settling (also observed in the particulate solids data) and consumption of dissolved phosphorus.

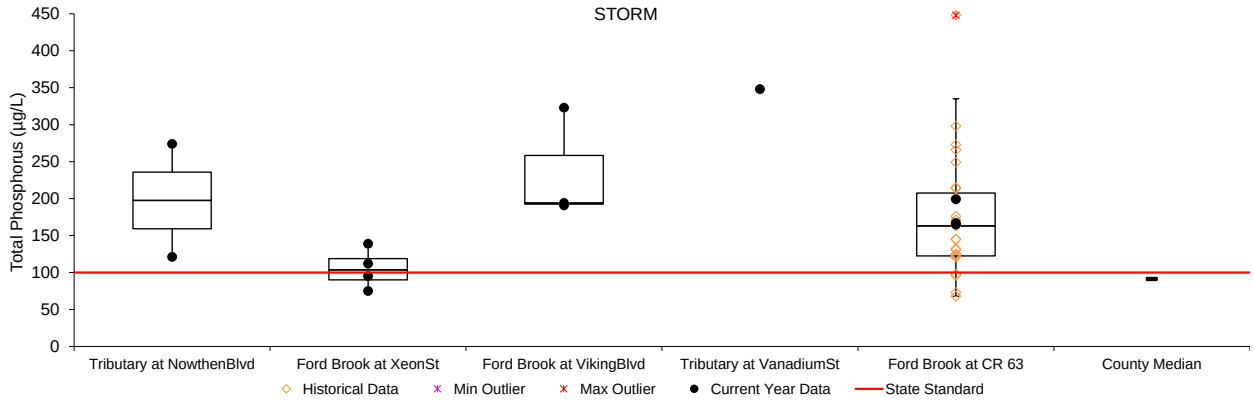
A substantial fraction of the phosphorus is likely dissolved. Total suspended solids measurements are not elevated at most sites. Higher phosphorus downstream of Xenon St does not coincide with notably higher suspended solids or turbidity.

The Ford Brook watershed has a significant amount of agricultural lands, and achieving phosphorus reduction goals will likely require additional agricultural best management practices (BMP's). Projects are being identified and ranked by cost effectiveness in a Ford Brook Subwatershed Assessment study that will be completed in early 2023. It includes projects that are not agricultural, such as wetland restorations that can help address other phosphorus sources. Targeting practices downstream of Pinnaker Lake is recommended because it appears that much of the phosphorus generated upstream of the lake is captured within the lake. The top priority for water quality work is the downstream receiving water: the Rum River.

Robust stormwater treatment in any new residential development is also important. The watershed is developing. Municipalities are responsible for stormwater treatment standards, provided they achieve the minimum required by watershed management organizations.

Total Phosphorus at Ford Brook. Orange diamonds are historical data from previous years and black circles are 2022 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 (TSS) and Turbidity

In Ford Brook, both TSS and turbidity were generally low level, similar to other streams in the region, and remained below state water quality standards. Suspended solids in the waterway can come from both internal and external sources. External sources can include a variety of particles in stormwater runoff. Internally, bank erosion and movement of the bottom substrate contribute to suspended sediments. A moderate amount of this type of internal loading is natural.

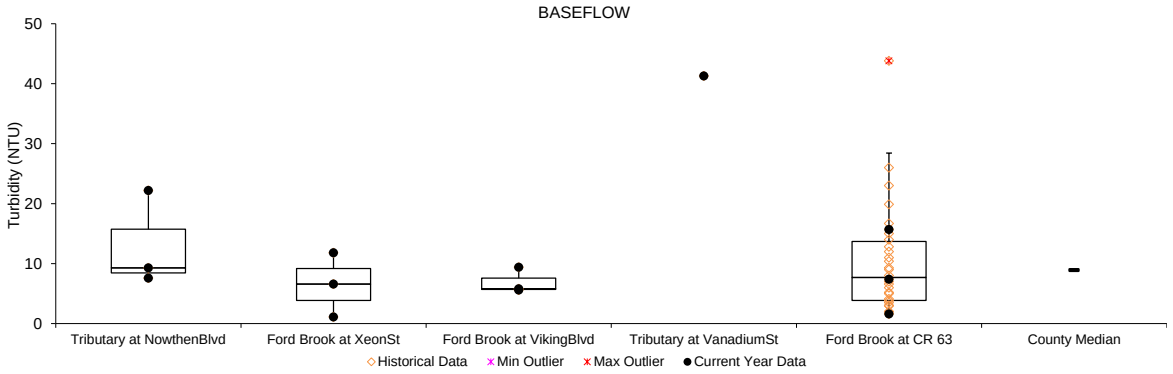
Average turbidity for all sites in 2022 was 11.16 NTU post-storm and 11.18 NTU during base flow. Both are similar to the historical median for Anoka County streams (8.9 NTU). Turbidity was elevated on a few occasions, especially following storm events. In 2022, seasonal water levels in the Ford Brook system were low most of the year, and several of the monitoring sites were unable to be sampled at the same frequency as others.

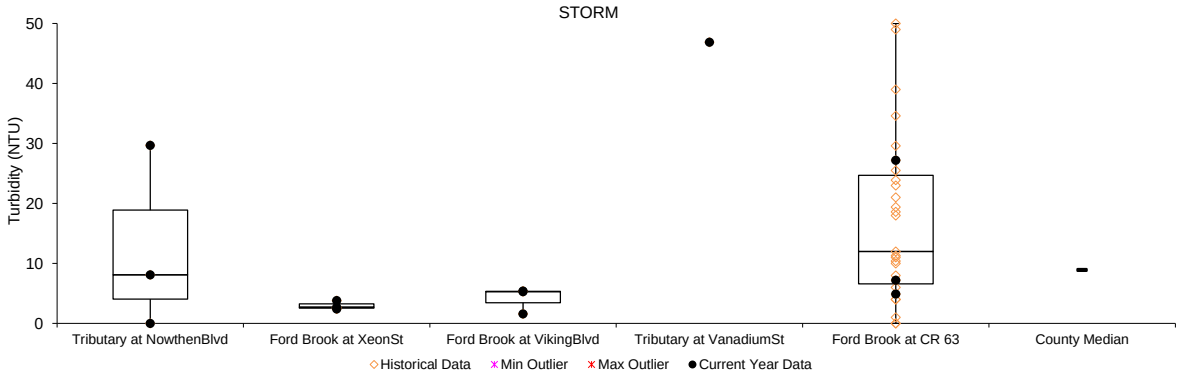
TSS results were also low in 2022, averaging 12.84 mg/L during baseflow and 19.35 mg/L post-storm, for all monitoring sites. These results were higher than the Anoka County median for TSS (7.4 mg/L) but remained below the state standard (30 mg/L). Historically, at the Ford Brook at C.R. 63 site, only 8 out of the 60 sampling events, exceeded the state standard and TSS at the downstream site averaged 15.90 mg/L, across all years and all conditions.

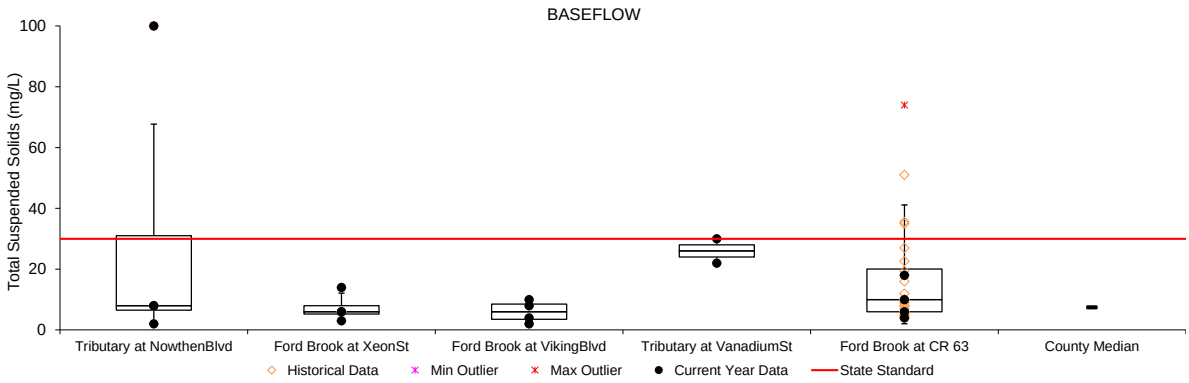
Goose and Pinnaker Lakes appear to reduce suspended solids in Ford Brook and those benefits are sustained for miles below the lakes. Generally, TSS and turbidity were highest at the one site upstream of the lakes. They dropped markedly immediately downstream of the lakes. Farthest downstream the levels increased modestly and not with regularity.

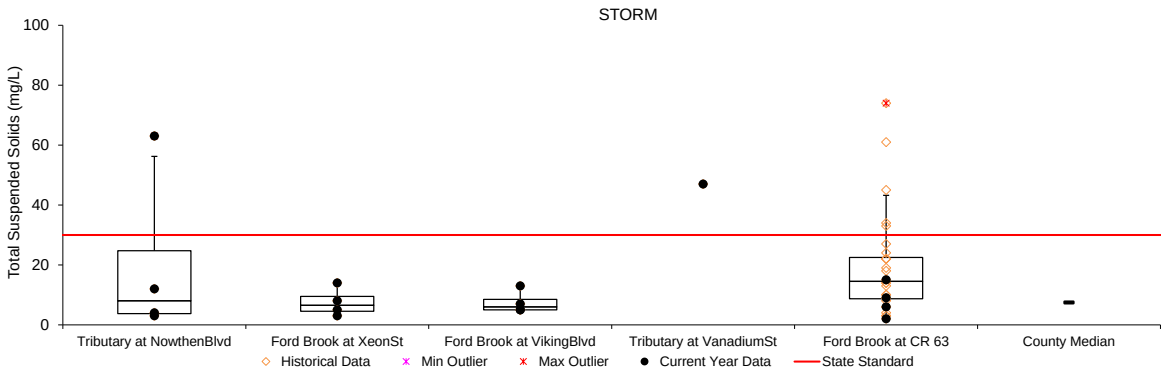
Management recommendations are to focus on phosphorus as the primary pollutant of concern. Those efforts will have secondary benefits of further reducing suspended solids.

Turbidity and TSS at Ford Brook. Orange diamonds are historical data from previous years and black circles are 2022 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).





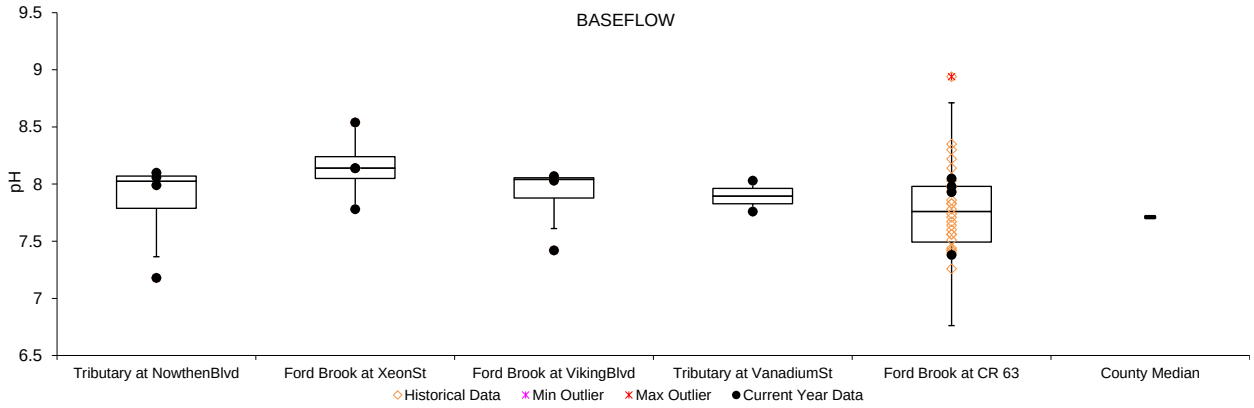


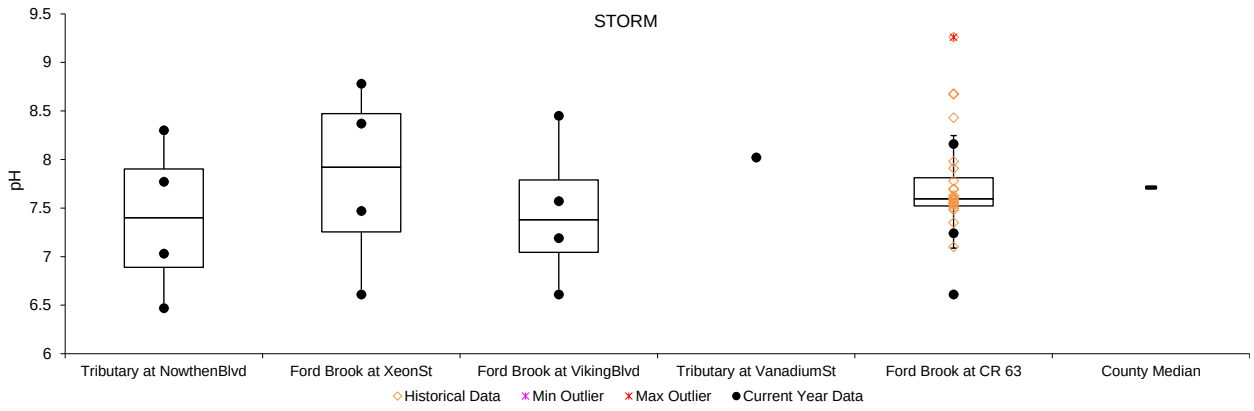


pH

According to state standards pH in a healthy stream should fall between 6.5 and 8.5. In 2022, pH in Ford Brook was usually within the healthy range but did exceed 8.5 occasionally, as in other previous monitoring years. The rare occasions when pH does exceed the state standard should not be concerning unless it begins to occur more frequently.

pH at Ford Brook. Orange diamonds are historical data from previous years and black circles are 2022 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).



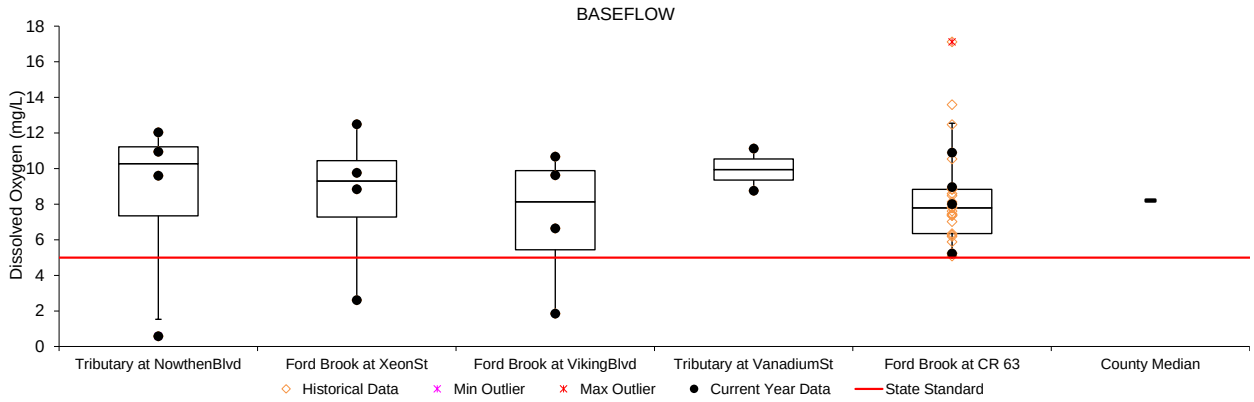


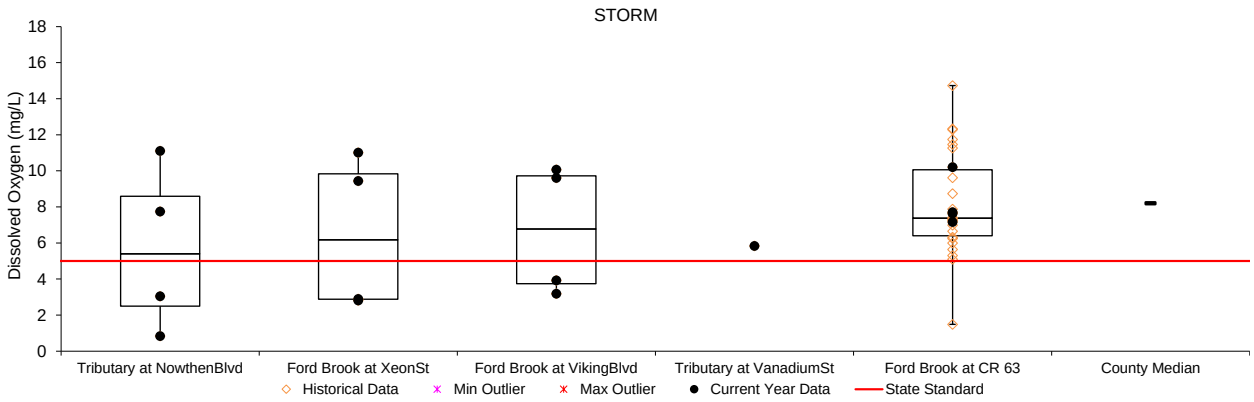
Dissolved Oxygen

In 2022, dissolved oxygen levels in the Ford Brook system were mostly at healthy levels but occasionally fell below the state standard (5 mg/L). The median in 2022, for all sites and all conditions, was 8.76 mg/L. This is slightly higher than the median for all Anoka County stream (8.2 mg/L) but well above the state standard. All readings less than 5 mg/L were recorded in the month of August which was a period of drought.

Due to below average rainfall, water levels throughout the Ford Brook watershed were increasingly low throughout the season and some stream sections even ceased to have flow. Faster flowing water contains more dissolved oxygen because it has more contact with the air, and will likely replenish depleted oxygen levels in the stream. More stagnant waters lack this mixing to replenish oxygen, but do have ongoing decomposition that can lower oxygen. Other factors, such as nutrient enrichment can also contribute to low oxygen. Because oxygen below 5 mg/L was not observed in previous years, we suspect it was driven by low flows and not a continuous water quality concern.

Dissolved Oxygen at Ford Brook. Orange diamonds are historical data from previous years and black circles are 2022 readings. Box plots show the median (middle line), 25th and 75th percentile (ends of box), and 10th and 90th percentiles (floating outer lines).





Wetland Hydrology

Partners: URRWMO, ACD

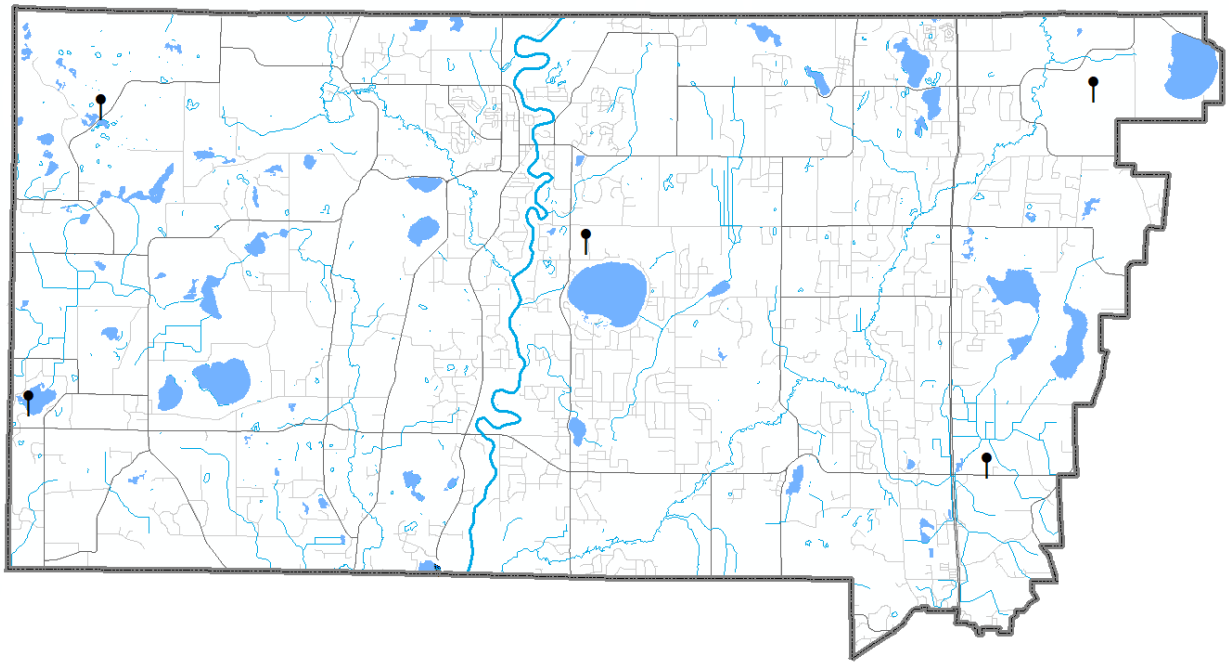
Description: Continuous groundwater level monitoring at a wetland boundary. Countywide, ACD maintains a network of 23 wetland hydrology monitoring stations.

Locations: Alliant Tech Wetland, East Twin Wetland, Lake George Wetland, Cedar Creek Wetland, Viking Meadows Wetland.

Purpose: To provide understanding of wetland hydrology, including the impacts of climate and land use change. These data aid in delineation of nearby wetlands by documenting hydrologic trends including the timing, frequency, and duration of saturation.

Results: See the following pages.

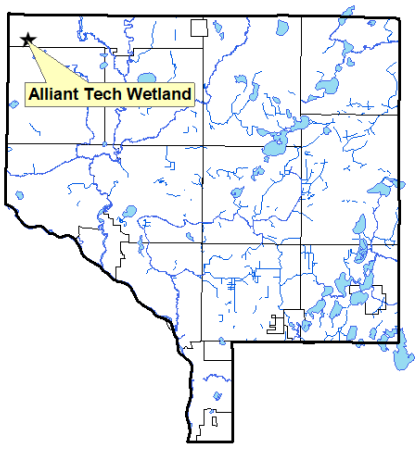
2022 URRWMO Wetland Hydrology Monitoring Site



ALLIANT TECH REFERENCE WETLAND

Alliant Tech Systems Property, St. Francis

Site Information



Monitored Since: 2001

Wetland Type: 5

Wetland Size: ~12 acres

Isolated Basin: Yes

Connected to a Ditch: No

Surrounding Soils: Emmert

Soils at Well Location:

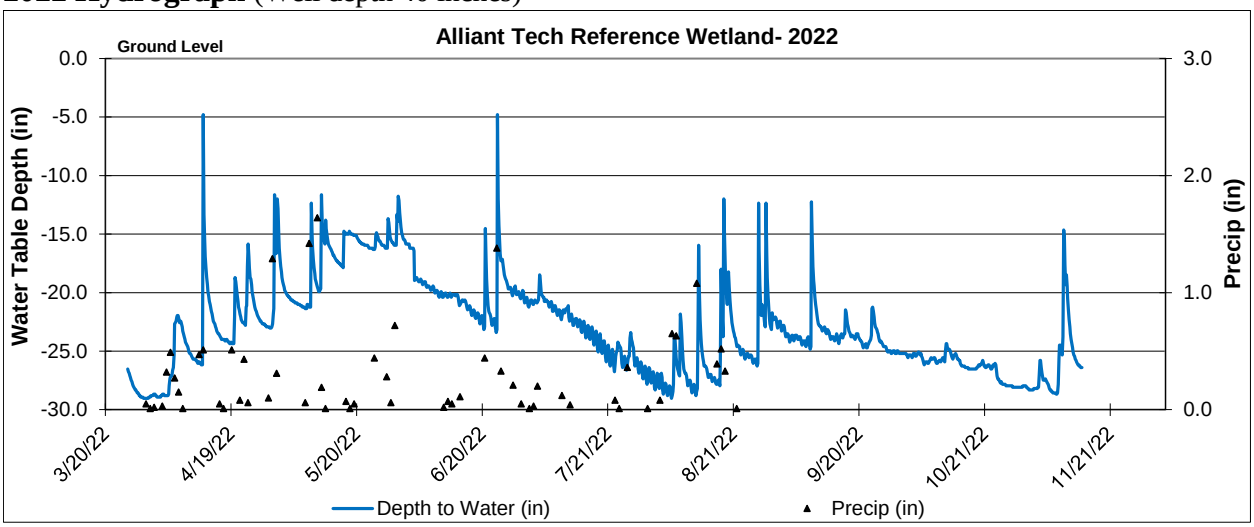
Horizon	Depth	Color	Texture	Redox
A	0-8	N2/0	Murky loam	-
Bg	8-35	5y5/1	Sandy Loam	-

Vegetation at Well Location:

Scientific	Common	% Coverage
Carex Spp	Sedge undiff.	90
Lycopus americanus	American Bungleweed	20
Phalaris arundinacea	Reed Canary Grass	5

Other Notes: This wetland lies next to the highway in a low area surrounded by hilly terrain. The boring is located on the wetland edge. The basin holds water throughout the year.

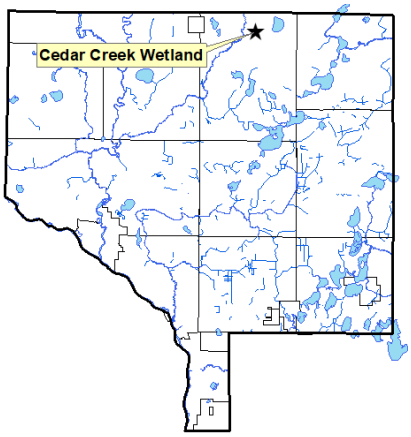
2022 Hydrograph (Well depth 40 inches)



CEDAR CREEK REFERENCE WETLAND

Cedar Creek Ecosystem Science Reserve, East Bethel

Site Information



Monitored Since: 1996

Wetland Type: 6

Wetland Size: >150 acres

Isolated Basin: No

Connected to a ditch: No

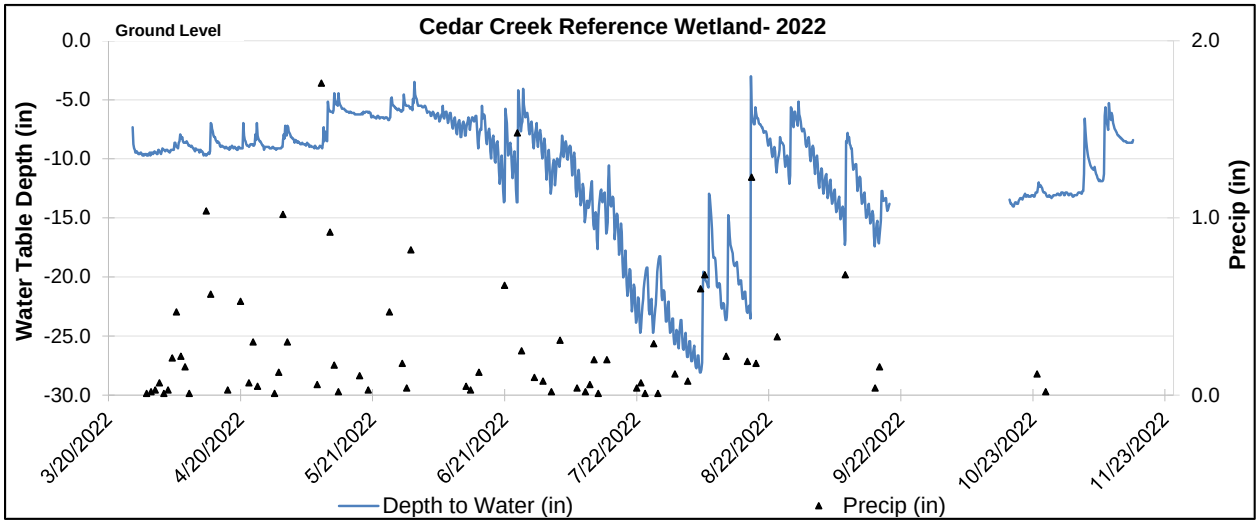
Surrounding Soils: Zimmerman

Soils at Well Location: Not yet available

Vegetation at Well Location: Not yet available

Other Notes: This wetland is located within a science research reserve, operated by the University of Minnesota. Much of this area, including the area surrounding the monitoring site, is in a natural state. This wetland probably has some hydrologic connection to the floodplain of Cedar Creek.

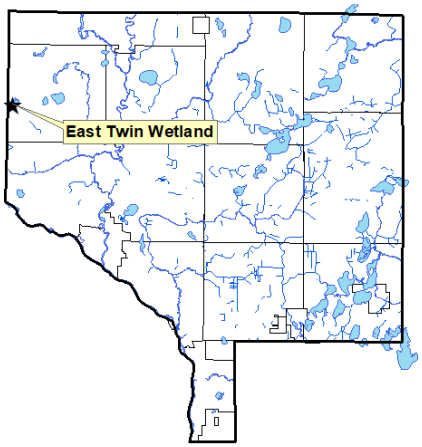
2022 Hydrograph (Well depth 40 inches)



EAST TWIN REFERENCE WETLAND

Twin Lake City Park, Nowthen

Site Information



Monitored Since: 2001

Wetland Type: 5

Wetland Size: ~5.9 acres

Isolated Basin: Yes

Connected to a Ditch: No

Surrounding Soils: Lake Beach, Growton and Heyder fine sandy loam

Soils at Well Location:

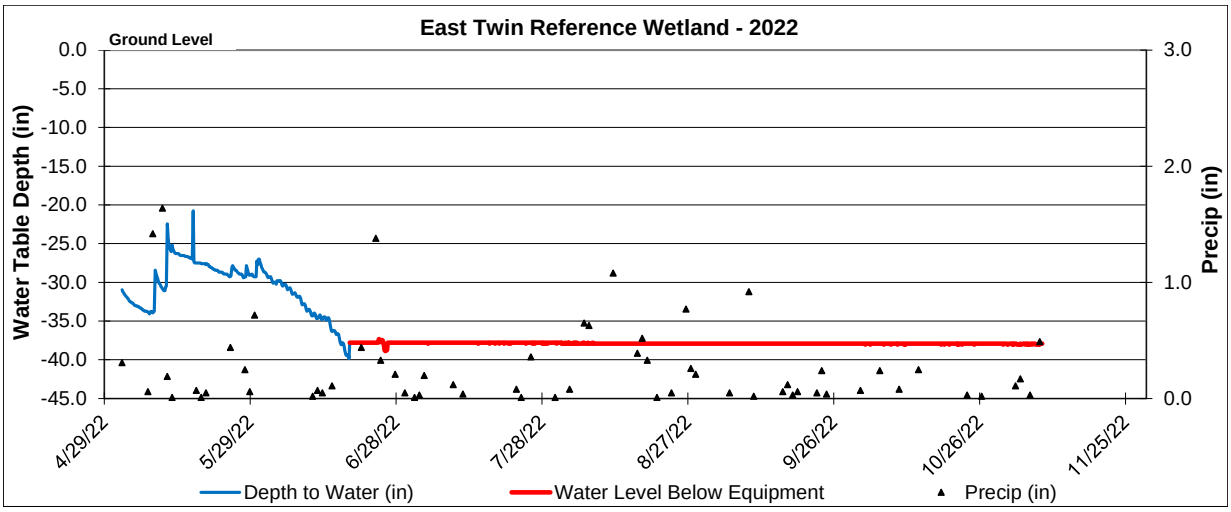
Horizon	Depth	Color	Texture	Redox
A	0-8	10yr 2/1	Mucky Loam	-
Oa	Aug-40	N2/0	Organic	-

Vegetation at Well Location:

Scientific	Common	% Coverage
Phalaris arundinacea	Reed Canary Grass	100
Cornus amomum	Silky Dogwood	30
Fraxinus pennsylvanica	Green Ash	30

Other Notes: This wetland is located near East Twin Lake in the community park and lake levels influence the hydrology of the wetland. Anoka County was in a state of drought throughout the year and the boring was dry for most of the year.

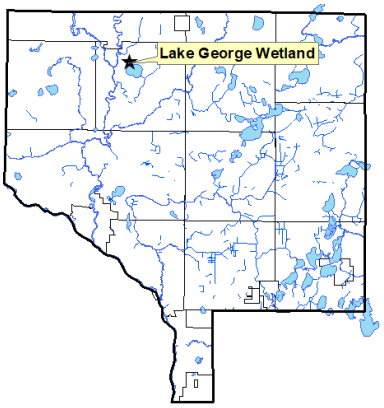
2022 Hydrograph (Well depth 38 inches)



LAKE GEORGE REFERENCE WETLAND

Lake George County Park, Oak Grove

Site Information



Monitored Since: 1997

Wetland Type: 3/4

Wetland Size: ~9 acres

Isolated Basin: Yes

Connected to a Ditch: No

Surrounding Soils: Lino loamy fine sand and Zimmerman fine sand

Soils at Well Location:

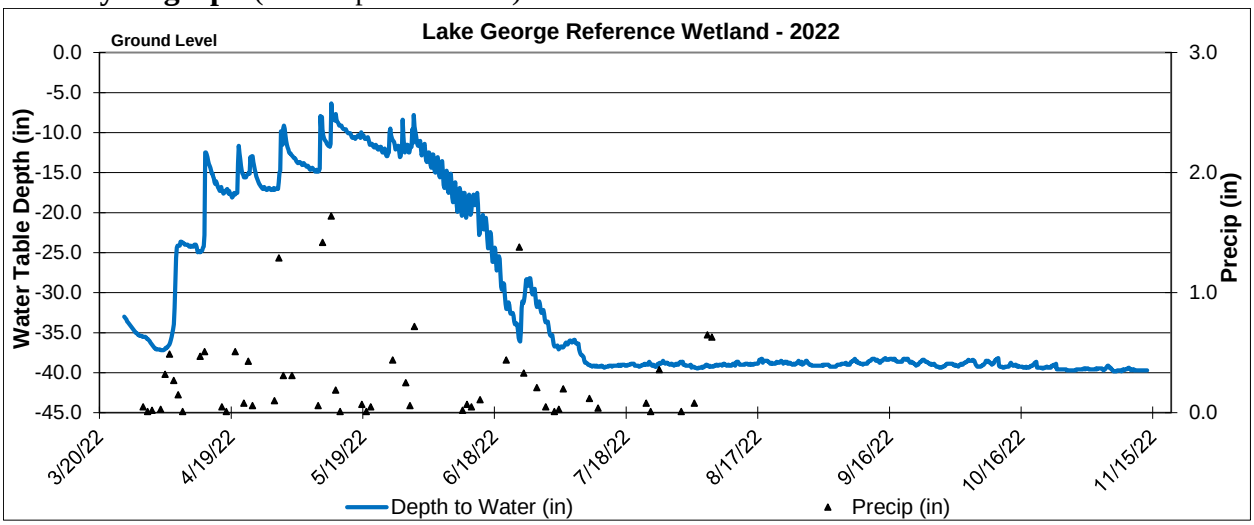
Horizon	Depth	Color	Texture	Redox
A	0-8	10yr2/1	Sandy Loam	-
Bg	8-24	2.5y5/2	Sandy Loam	20% 10yr5/6
2Bg	24-35	10gy 6/1	Silty Clay Loam	10% 10yr 5/6

Vegetation at Well Location:

Scientific	Common	% Coverage
Cornus stolonifera	Red-osier Dogwood	90
Populus tremuloides	Quaking Aspen	40
Quercus rubra	Red Oak	30
Onoclea sensibilis	Sensitive Fern	20
Phalaris arundinacea	Reed Canary Grass	10

Other Notes: This wetland is located near Lake George. Anoka County was dry or in a state of drought throughout most of the 2022 season.

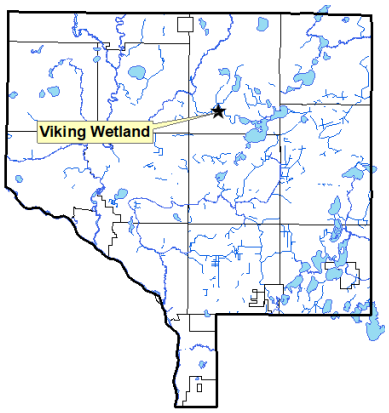
2022 Hydrograph (Well depth 40 inches)



VIKING MEADOWS REFERENCE WETLAND

Viking Meadows Gold Course, East Bethel

Site Information



Monitored Since: 1999

Wetland Type: 2

Wetland Size: ~0.7 acres

Isolated Basin: No

Connected to a Ditch: Yes

Surrounding Soils: Zimmerman fine sand

Soils at Well Location:

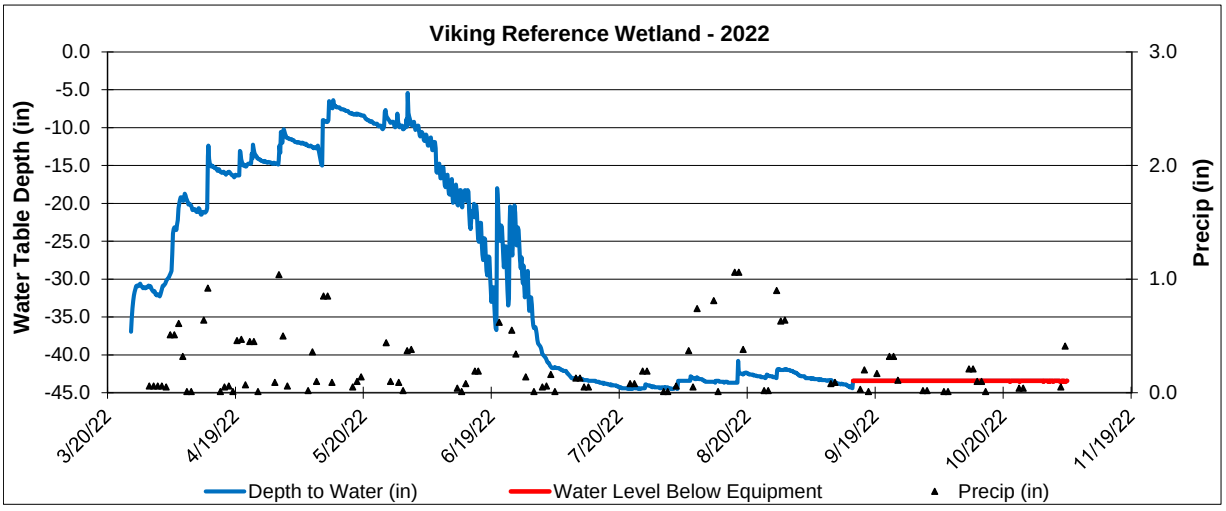
Horizon	Depth	Color	Texture	Redox
A	0-12	10yr2/1	Sandy Loam	-
Ab	12-16	N2/0	Sandy Loam	-
Bg1	16-25	10yr4/1	Sandy Loam	-
Bg2	25-40	10yr4/2	Sandy Loam	5% 10yr5/6

Vegetation at Well Locations:

Scientific	Common	% Coverage
Phalaris arundinacea	Reed Canary Grass	100
Acer rubrum (T)	Red Maple	75
Acer negundo (T)	Boxelder	20

Other Notes: This wetland is located at the entrance to Viking Meadows Golf Course, and is located on the wetland edge. The boring was dry in the fall season due to abnormally dry conditions throughout Anoka County.

2022 Hydrograph (Well depth 44 inches)



URRWMO Annual Report to BWSR and State Auditor

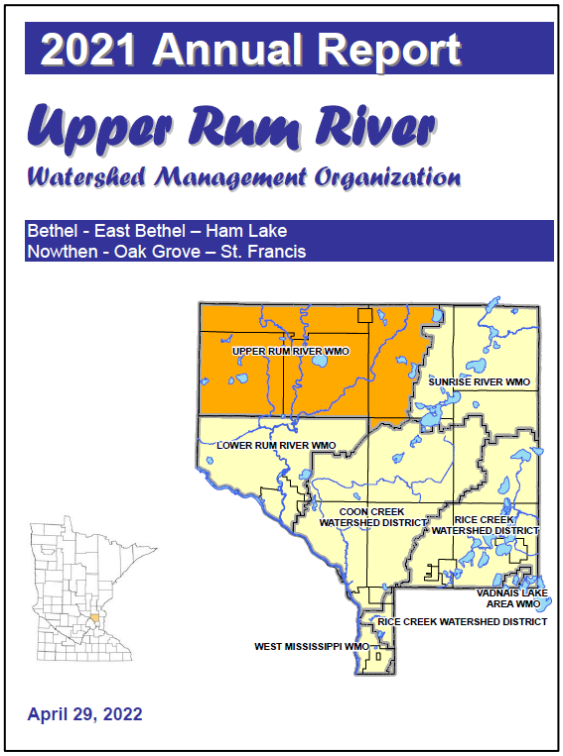
Partners: URRWMO, ACD

Description: The Upper Rum River Watershed Management Organization (URRWMO) is required by law to submit an annual report to the Minnesota Board of Water and Soil Resources (BWSR), which is state agency with oversight authority. This report consists of an updated list of all URRWMO Board members, work activities related to the URRWMO Watershed Management Plan, current status of municipal water plans, financial summaries, and other work results. The report is due annually, 120 days after the end of the URRWMO's fiscal year (April 30th). The URRWMO must also submit an annual financial report to the State Auditor. This includes submitting a financial report and filling out a multi-worksheet form.

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

Location: Watershed-wide

Results: ACD prepared the URRWMO annual report to BWSR and reporting to the State Auditor. They are available on the URRWMO website.



Administrative Services

Partners: URRWMO, ACD

Description: The Anoka Conservation District (ACD) serves as the URRWMO Watershed Coordinator. This includes providing a variety of administrative services. Tasks are limited to those defined in the contractual agreement.

Purpose: To ensure day-to-day operations of the URRWMO and attended to between regular meetings.

Results: Administrative assistance provided to the URRWMO by ACD included:

- Prepared meeting packets for and facilitated six URRWMO meetings.
- Developed annual budgets.
- Prepared URRWMO activity summary report for board members and cities.
- Requested & received biomonitoring funding for the American Legion.
- Represented URRWMO interested during Rum River One Watershed One Plan (1W1P) staff level meetings. Consulted URRWMO board in the Rum 1W1P implementation process.
- Advised cities regarding completion of a culvert inventory by the end of 2022.
- Worked with cities to bring ordinances into compliance with URRWMO standards.
- Presented housekeeping amendments to the URRWMO joint powers agreement.
- Fielded questions from developers, the county highway department, and others regarding URRWMO stormwater and wetland standards.
- Grant applications to complete URRWMO priorities. Funding secured in 2022 from the state Watershed Based Implementation Funding including:
    - Projects identified in subwatershed studies, which are anticipated to be used for stormwater retrofits in St. Francis. $175,882
    - Septic system fix ups for low income homeowners.* $62,000
    - Critical area plantings that benefit water quality.* $65,275
    - Wetland restorations.* $30,000

  *available in both the Upper and Lower Rum River WMOs.
- Facilitated the URRWMO technical advisory committee.
- Updated each city's percent contribution to URRWMO expenditures, using the newest available market valuations data.

Website

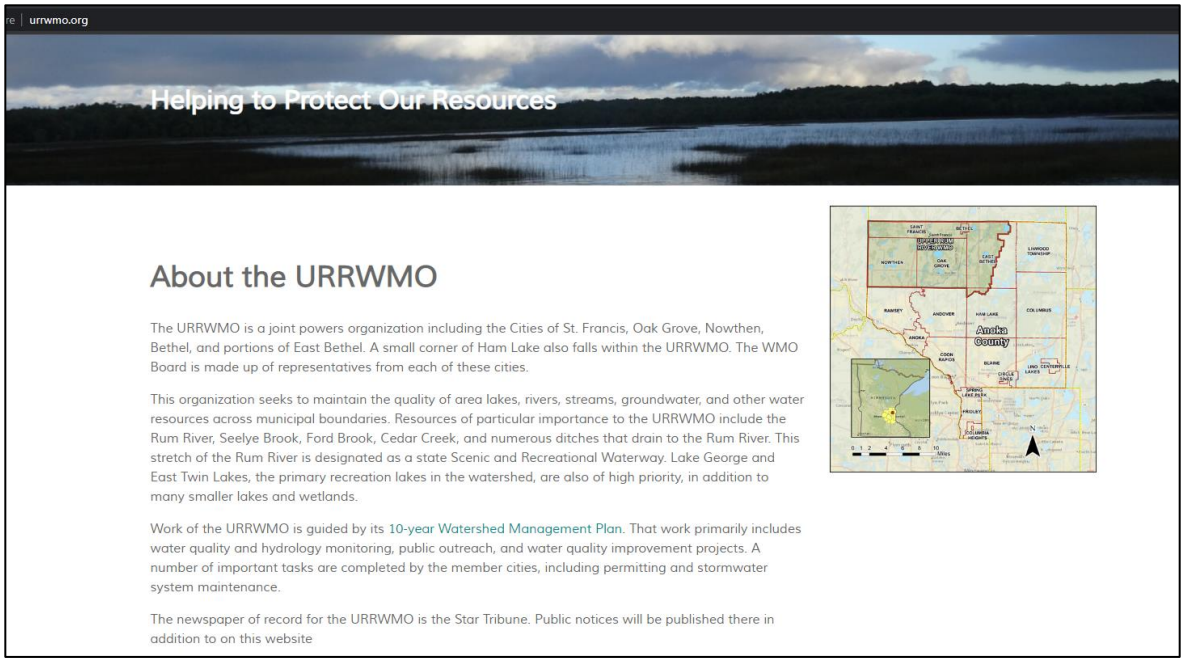
Partners: URRWMO, ACD

Description: The Upper Rum River Watershed Management Organization contracted the Anoka Conservation District to maintain the URRWMO website.

Purpose: To increase awareness of the URRWMO and its programs. The website also provides tools and information that helps users better understand water resource issues in the watershed.

Locations: www.URRWMO.org

Results: In 2022, ACD maintained the existing URRWMO website, paid the domain registration and hosting fees, and posted meeting minutes and agendas.



Outreach

Partners: ACD, URRWMO

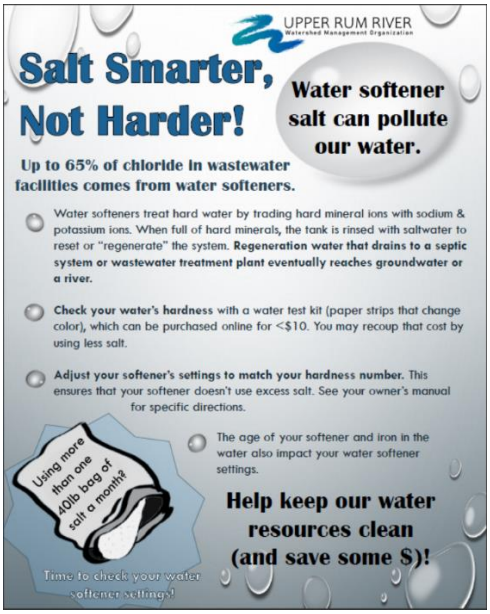
Description: ACD prepared public education and outreach material based on the URRWMO Watershed Management Plan.

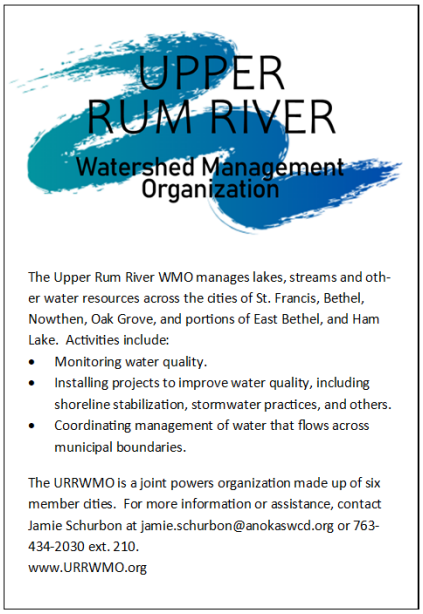
Purpose: To increase public awareness of the URRWMO and its programs, and receive input.

Location: Watershed-wide

Results: ACD completed specific contracted tasks and additional tasks from the Anoka County Water Resource Outreach Collaborative (AWROC) priorities that were consistent with the URRWMO plan. Completed work included:

- Facilitated a pontoon tour at Lake George for the URRWMO board, Lake George Conservation Club board, and Lake Improvement District board. (photo below)
- Presented updated water monitoring results & recent lakeshore projects at the Lake George Conservation Club meeting this past October.
- Smart salting training information promoted to city leaders.
- "Our River Connection" animated video.
- City newsletter content:
  - "Salt Smarter, Not Harder" infographic about water softener salt.
  - Article about the URRWMO.
  - Article about grant funds available for riverbank stabilization.





Projects as Detailed in the URRWMO 10-Year Plan

Description: The URRWMO pledges match of approximately $15,375 annually toward priority projects in its Watershed Management Plan. These funds are often match for grants. Priority projects include Rum River and Lake George shoreline stabilizations, a middle Ford Brook subwatershed assessment study, and stormwater retrofits ranked in subwatershed studies.

Purpose: To improve water quality in lakes, streams, and rivers.

Location: Watershed-Wide

Results: Completed and ongoing projects include:

Lake George Shoreline Stabilizations

Funding: $85,000 Rum metro WBIF grant, $8,875 URRWMO grant match

Previously Accomplished: 7 lakeshores totaling almost 500 linear ft

New accomplishments: A contract for vegetation establishment help has been executed with MN Native Landscapes, the installer. They will visit each site twice in 2023 to do weeding and other vegetation management, with time set aside to "coach" the owners on how to do it. This will help ensure the projects are beautiful!

Upcoming: Vegetation establishment

Rum Riverbank Stabilizations

Funding:	$816K OHF grant phase 1 – Anoka Co Rum watershed $1.6M OHF grant phase 2 – whole Rum watershed, includes river corridor projects not just shoreline $440K Clean Water Fund grant $200K Conservation Partners Legacy grant phase 1 cedar tree revetments $100K Conservation Partners Legacy grant phase 2 cedar tree revetments $400K Anoka Co grant match $15K URRWMO grant match
Previously Accomplished:	Miller site in Oak Grove (visible S from Viking Blvd bridge)
New accomplishments:	Rum River Central Park boat landing area 5,100 lf cedar tree revetments in Anoka Co (1,300 lf in 2022) Designs and agreements for 2022 construction Secured OHF and Conservation Partners Legacy phase 2 grants
Upcoming:	Dellwood Community Park in St. Francis Martz/Hanson property in Oak Grove – needs a larger funding solution Cedar Creek Conservation Area 2023 cedar tree revetments

Rum Central Park boat landing area project

Before

After

Example cedar tree revetment project

St. Francis Stormwater Retrofits

Funding: $175,882 Rum metro WBIF grant

$8,400 URRWMO grant match

Previously Accomplished: Candidate project identification

New accomplishments: Three projects have been explored:

1. **St. Francis High School north stormwater pond expansion**. Surveyed and investigated feasibility. Found current pond is adequate. Project dropped.
2. **St. Francis High School roadside swale check dams**. Along Rum River Blvd. Receives water from much of the school building and parking lot. Surveyed and design underway.
3. **225th Lane and 226th Ave rain gardens**. This is the only neighborhood in the "urbanized" part of St. Francis which discharges to the Rum River with no stormwater treatment. Candidate rain garden sites have been identified.

Upcoming: St. Francis High School roadside swale check dams – Design

225th Lane and 226th Ave rain gardens – landowner outreach

225th Lane and 226th Ave rain gardens area

Middle Ford Brook Subwatershed Assessment Study

ACD has completed a study to identify and rank water quality improvement projects to benefit Ford Brook and the Rum River downstream. Study components include water monitoring to identify priority areas, modeling, project identification, cost benefit analysis for each project, and project ranking. The study is paid for by a State Watershed Based Implementation Fund grant and URRWMO matching funds. Completion is expected in early 2023.

Ford Brook study area map