Excerpt from the
2019 Water Almanac
Chapter 3: Upper Rum River Watershed

Prepared by the Anoka Conservation District

Chapter: 3 Upper Rum River Watershed

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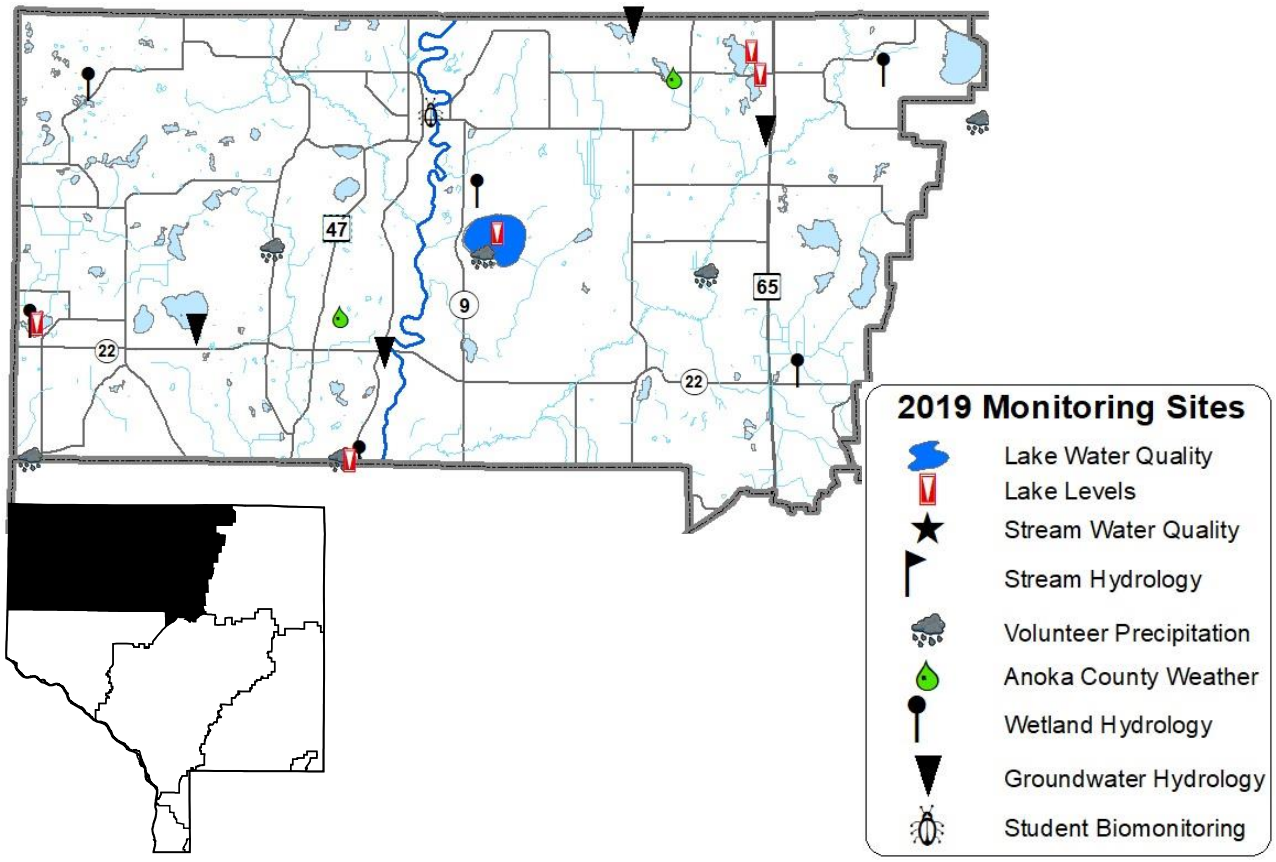


Lake Levels

Partners: URRWMO, ACD, MN DNR, volunteers

Description: Weekly water level monitoring in lakes. The past five years and twenty-five years 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).

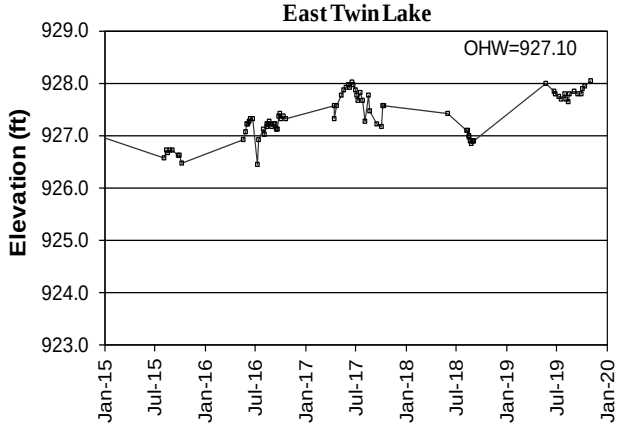
Purpose: To understand lake hydrology, including the impact of climate or other water budget changes. These data are useful for regulatory, building/development, and lake management decisions.

Locations: East Twin Lake, Lake George, Rogers Lake, Minard Lake, Coopers Lake

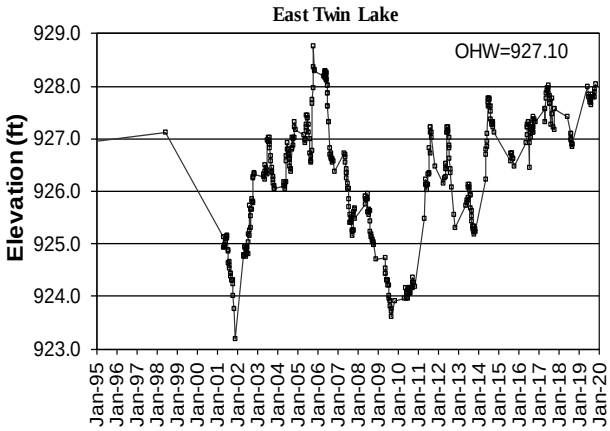
Results: Lake levels were measured by volunteers throughout the 2019 open water season. Lake gauges were installed and surveyed by the Anoka Conservation District and MN DNR. Lakes generally followed the expected trend of increasing water levels in spring and early summer and declining levels by mid-summer. Lakes generally experienced rebounding water levels starting in mid-September. Overall lake levels were near average though some were higher and some were lower.

All lake level data can be downloaded from the MN DNR website's Lakefinder feature. Ordinary High Water Level (OHW), the elevation below which a DNR permit is needed to perform work, is listed for each lake on the corresponding graphs below. All lakes monitored were lower than the OHW for much of the monitoring season.

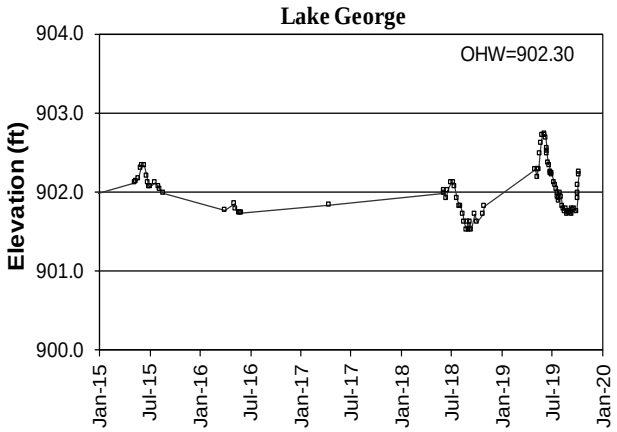
East Twin Lake Levels – last 5 years



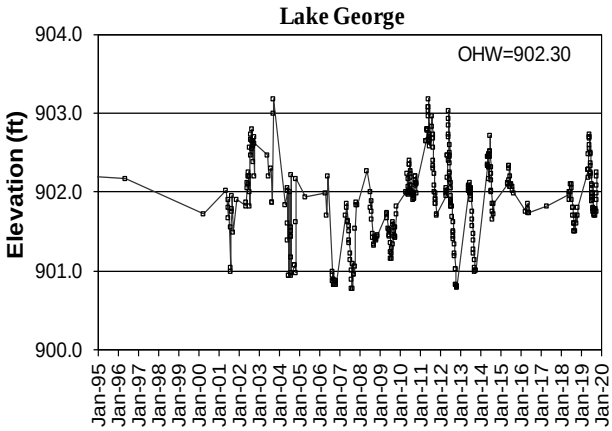
East Twin Lake Levels – last 25 years



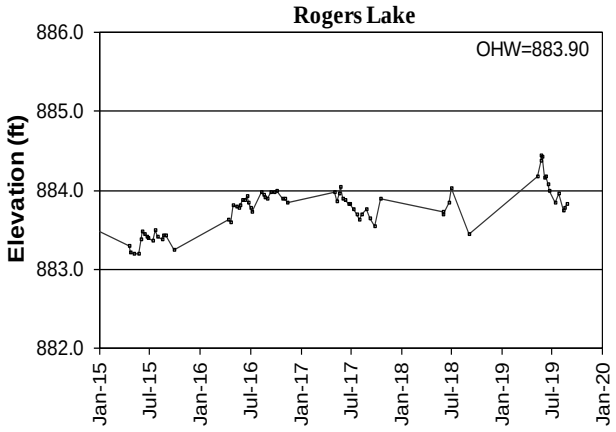
Lake George Levels– last 5 years



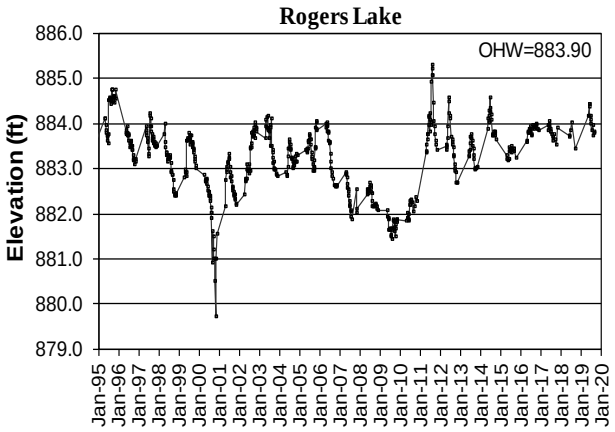
Lake George Levels – last 25 years



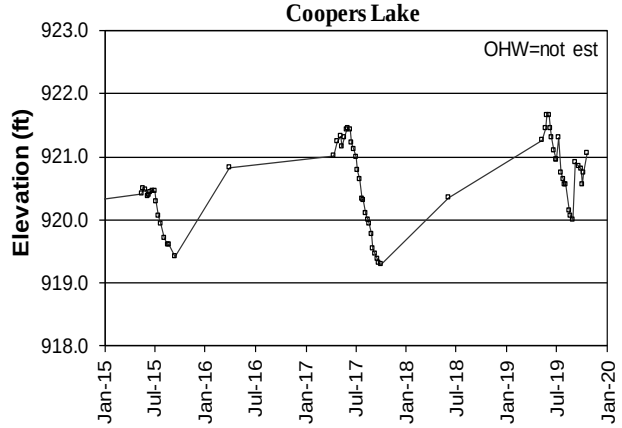
Rogers Lake Levels – last 5 years



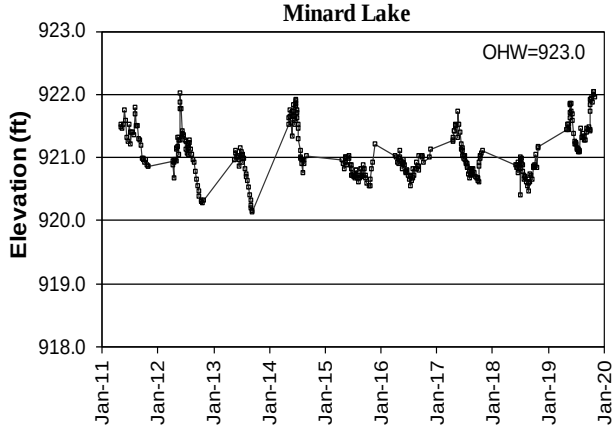
Rogers Lake Levels – last 25 years



***Coopers Lake Levels – last 5 years**



Minard Lake Levels – last 9 years



Lake Water Quality

Partners: ACD, Lake George LID

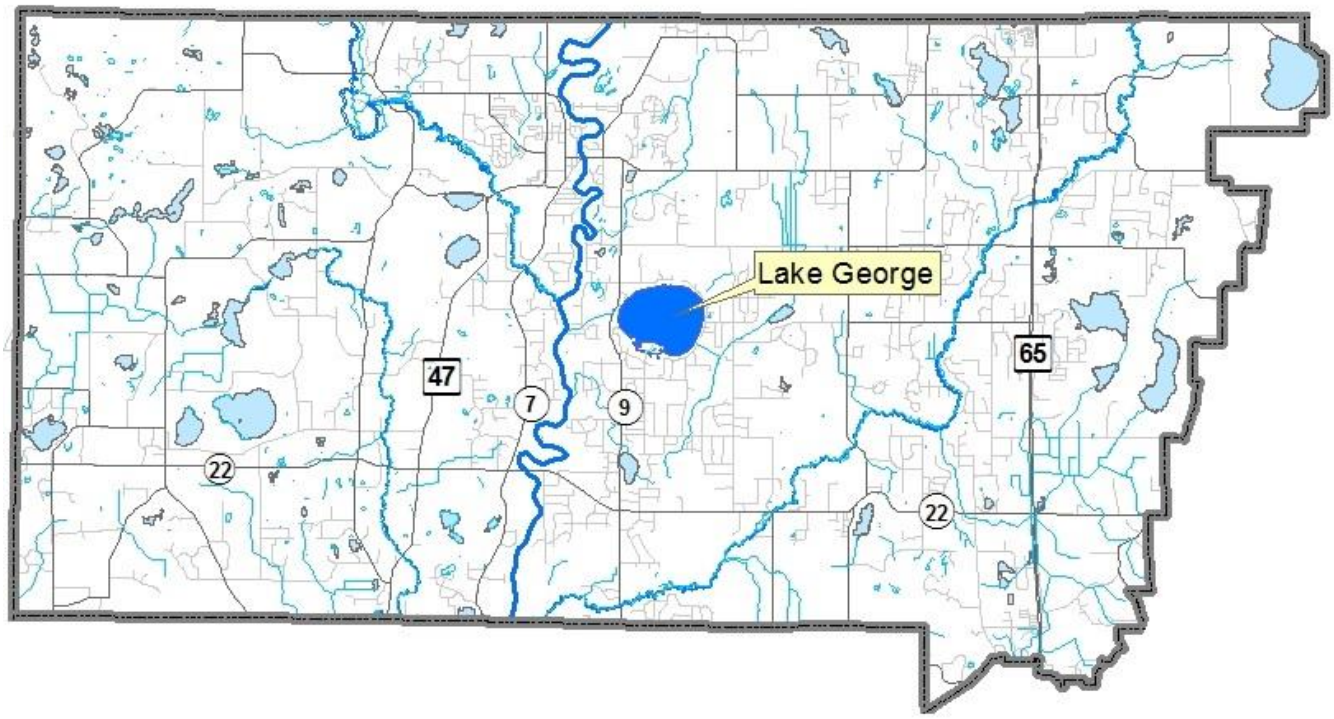
Description: May through September, every-other-week, monitoring is conducted for the following parameters: total phosphorus, chlorophyll-a, Secchi transparency, dissolved oxygen, turbidity, temperature, Specific Conductivity, pH, and salinity.

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

Locations: Lake George

Results: Detailed data for Lake George is provided on the following pages, including summaries of historical conditions and trend analysis. Previous years' data are available at the MPCA's electronic data access website. Refer to Chapter 1 for additional information on interpreting the data and on lake dynamics.

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 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. Two invasive aquatic plants are established in this lake, curly-leaf pondweed and Eurasian water milfoil. ACD does annual mapping of densities for each type of plant, and the Lake George Improvement District treats both with herbicide.

2019 Results

In 2019, Lake George had excellent water quality for this region of the state (NCHF Ecoregion), receiving an overall A letter grade, but Secchi transparency individually earned a B grade. These results are similar to what was recorded before 2009, when the majority of monitoring years scored an A letter grade.

Results for individual water quality parameters varied. Total phosphorus in 2019 averaged 21.4 µg/L, and is the lowest recorded average since 2005. Secchi transparency was high early in the season, but dropped to a low of 5.3 feet in early September. Average Secchi transparency was 8.7 feet, which was poorer than 2018. Chlorophyll-a (Cl-a) averaged 7.3 µg/L, which was similar to the last 5 years. Cl-a, TP and transparency were all poorest in early September, but throughout the season all three parameters were better than the State water quality standard for deep lakes in this region (<40 µg/L TP, <14 µg/L Cl-a, and >1.4 m (4.6 ft.) Secchi transparency).

Although Lake George water quality remains better than state standards and good for a metro-county lake, simply adhering to these standards isn't 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-year trend of decline bearing out in statistical analyses. The residents, managers, and users of Lake George are collectively looking for ways to reverse that decline and to maintain the very good water quality that all who utilize this prized lake have come to value.

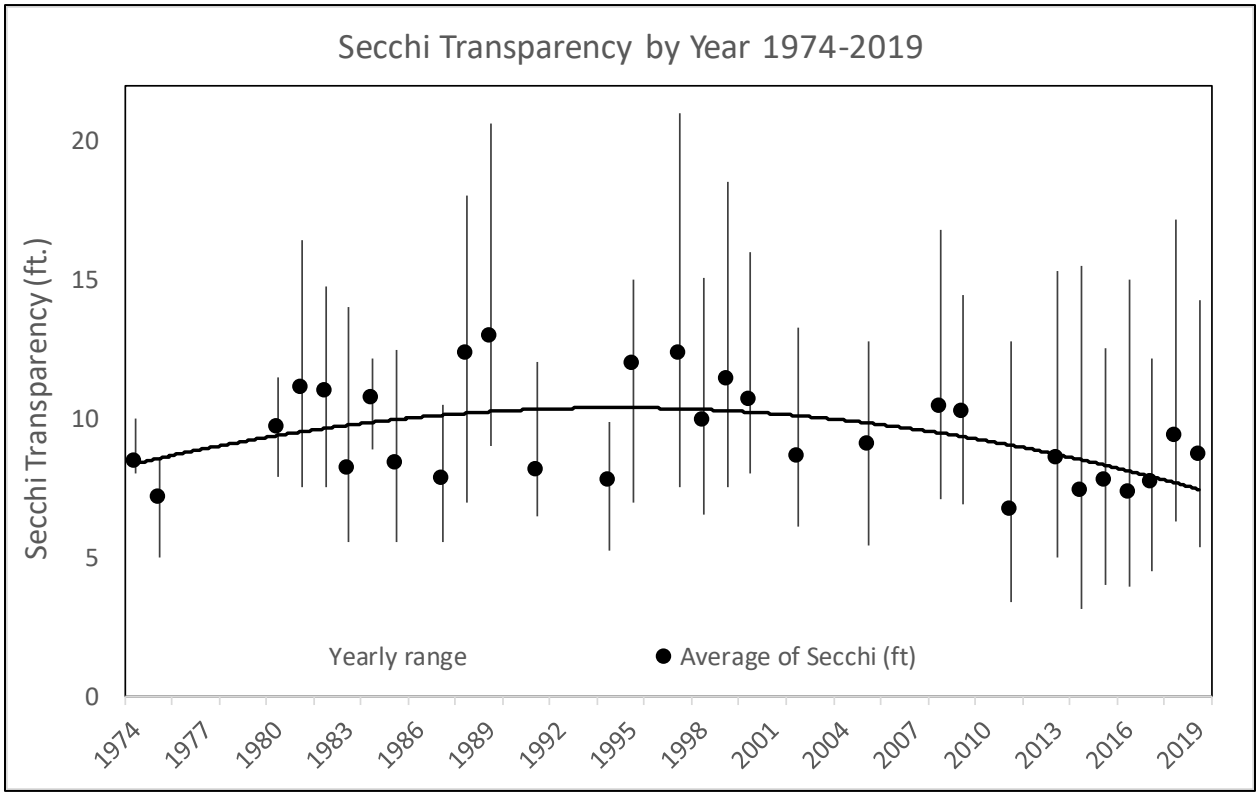
Trend Analysis

Thirty years of water quality data have been collected by the Metropolitan Council (between 1980 and 2009) and the Anoka Conservation District (1997, 1999, 2000, 2002, 2005, 2008, 2011, 2013- 2019). A broad analysis of overall water quality that simultaneously considers TP, Cl-a and Secchi transparency did not find a statistically significant trend looking at all years of data (repeated measures MANOVA with response variables TP, Cl-a, and Secchi transparency, $F_{2,19}$=1.21, p=0.31). When parameters are isolated for individual analysis, there is no significant change in Chlorophyll-a. However, during this period there is a statistically significant trend of declining Secchi transparency (one-way ANOVA $F_{1,22}$= 15.09, p=<0.01). This trend is particularly apparent from the mid-1990s to 2017. When sampling years' 1995-2017 are isolated declining Secchi transparency again shows a strong statistically significant decline (one-way ANOVA $F_{1,14}$=10.92, p=<0.01). We also find a statistically significant trend of increasing TP during this period (one-way ANOVA $F_{1,14}$=5.55, p=<0.05)

Lake George

CITY OF OAK GROVE, LAKE ID # 02-0091

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 the document.



Discussion

Lake George remains one of the clearest of the Anoka County lakes, but its trend of declining Secchi transparency since the mid-1990s has caused concern. 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).

In 2018 a special study of this lake titled "Lake George Water Quality Improvement Assessment" was completed. Work from 2016-2018 included intensive monitoring of tributaries, modeling, and evaluation of projects to correct transparency declines. The work focused on the watershed, and a "phase 2" study of in-lake processes may occur in the future. The study was funded by the Lake George Improvement District, Lake George Conservation Club, Anoka Conservation District, and a State Clean Water Fund grant.

The aforementioned study provides some insight into the causes of transparency decline. While a number of factors may play a role in transparency declines, an increase in the average amount of precipitation falling 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 poorer clarity in those years, or in immediately subsequent years.

These "wet" years were more frequent during the period that lake transparency has 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.

Water year precipitation returned to normal levels in 2017 and 2018, causing a temporary rebound in average Secchi transparency during the most recently monitored years. The 2019 calendar year was the wettest on record. Secchi results in 2019 were only slightly poorer than the improved 2018 results, but that average was likely skewed by much higher readings earlier in the season, with poorer readings later. If the relationship between precipitation and Secchi holds true, 2020 results may show even further decline in Secchi clarity driven by the heavy rainfall throughout 2019.

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. Among the recommendations of the 2018 study are replacing the deteriorating Ditch 19 weir just east of Lake George which is an important hydrological control for the lake. The weir was replaced in early 2020. This work offers modest benefits of reduced nutrient delivery to the lake in wet years, and the broader benefits of restoring lake hydrology and enhancing game fish spawning opportunities. Other actions include agricultural best practices, an iron-enhanced sand filter, 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 which must be considered when siting projects. Projects nearest the lake are favored because they treat a larger upstream area and don't duplicate treatment that might already be provided by certain wetlands.

An additional concern for Lake George is noted in *the 2017 Rum River Watershed Fish-Based Lake IBI Stressor Identification Report* by the MN DNR. 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.

Two exotic invasive plants are present in Lake George, curly-leaf pondweed and Eurasian water milfoil. The Lake George Improvement District works to control these plants, and multiple years of localized treatments have occurred. In coordination with the MN DNR, the Lake Improvement District continually works to achieve control of these invasive plants without harming native plants or water quality. Water quality has been monitored immediately before and after herbicide treatments in some recent years, and no obvious causal relationship between weed treatment and water quality was found.

Historical Summertime Mean Values

Agency	MC	MC	MC	MC	MC	MC	ACD	MC	ACD	ACD	ACD
Year	1980	1981	1982	1984	1989	1994	1997	1998	1999	2000	2002
TP	22.5	22.0	22.3	24.4	24.3	25.4	17.4	27.5	21.1	16.3	19.9
Cl-a	7.3	7.1	7.0	9.5	4.5	6.9	13.2	7.8	5.6	5.8	5.2
Secchi (m)	3.1	3.4	3.4	3.3	3.9	2.4	3.6	2.7	3.5	2.8	2.6
Secchi (ft)	10.2	11.2	11.0	10.8	12.9	7.8	11.7	9.0	11.4	10.7	8.6
Carlson's Trophic State Indices											
TSIP	49	49	49	50	50	51	45	52	48	44	47
TSIC	50	50	50	53	45	50	56	51	48	48	47
TSIS	44	42	43	43	40	48	42	45	42	45	46
TSI	48	47	47	49	45	49	48	49	46	46	47

Lake George Water Quality Report Card

Year	1980	1981	1982	1984	1989	1994	1997	1998	1999	2000	2002
TP	ACD A	ACD A	MC A	MC B	ACD A	ACD C	ACD B	ACD B	ACD A	ACD A	ACD A
Cl-a	A	A	A	A	A	A	B	A	A	A	A
Secchi	A	A	A	A	A	B	A	B	A	B	B
Overall	**A**	**A**	**A**	**A**	**A**	**B**	**A**	**B**	**A**	**A**	**A**

Agency	ACD	ACD	MC	MC	ACD	ACD	ACD	ACD	ACD	ACD	ACD
Year	2005	2008	2009	2011	2013	2014	2015	2016	2017	2018	2019
TP	26.0	23.0	26.2	29.0	30.3	25.5	21.4	28.4	23.3	22.5	21.4
Cl-a	5.4	6.4	7.0	12.4	6.1	6.4	2.7	7.8	5.7	6.8	7.3
Secchi (m)	2.8	3.2	2.9	1.8	2.6	2.2	2.6	2.3	2.4	2.9	2.64
Secchi (ft)	9.1	10.4	9.5	6.7	8.6	7.4	8.7	7.4	7.7	9.4	8.67
Carlson's Trophic State Indices											
TSIP	51	49	51	53	53	51	48	52	50	49	48
TSIC	47	49	50	55	48	49	40	51	48	49	50
TSIS	45	43	45	52	46	49	46	48	48	45	46
TSI	48	47	49	53	49	49	45	50	48	48	48

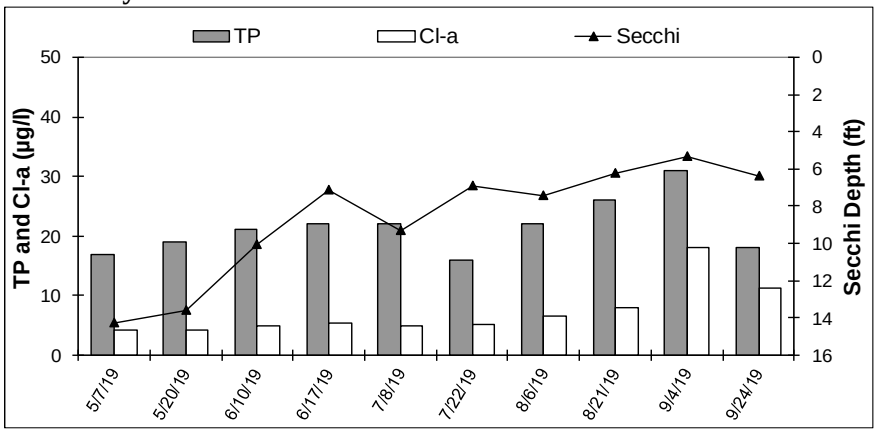
Lake George Water Quality Report Card

Year	2005	2008	2009	2011	2013	2014	2015	2016	2017	2018	2019
TP	B	B	B	B	B	B	A	B	B	A	A
Cl-a	A	A	A	B	A	A	A	A	A	A	A
Secchi	B	A	B	C	B	B	B	B	B	B	B
Overall	**B**	**A-**	**B**	**B**	**B**	**B**	**A**	**B**	**B**	**A**	A

Lake George

CITY OF OAK GROVE, LAKE ID # 02-0091

2019 Daily Results



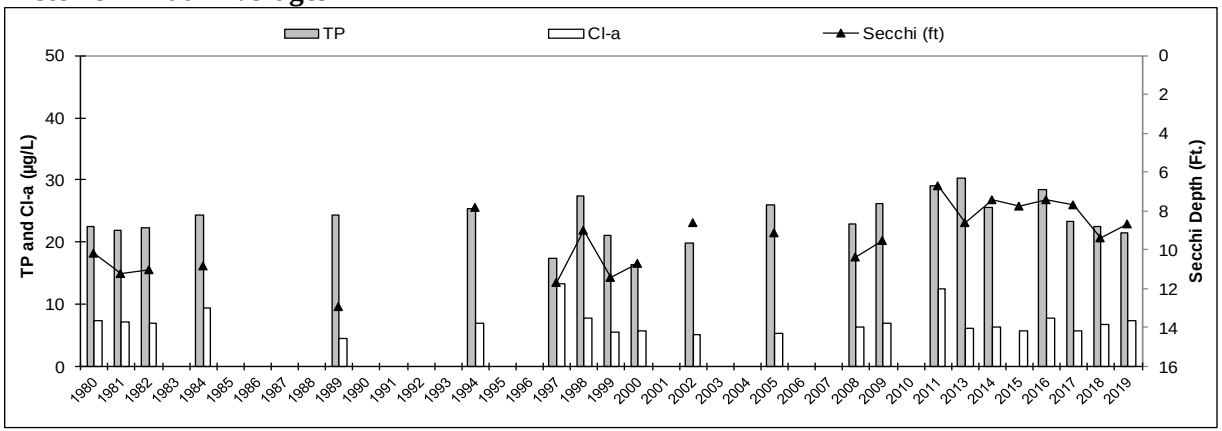
2019 Median Values

pH		8.25
Specific Conductivity	mS/cm	0.23
Turbidity	NTU	2.7
D.O.	mg/l	11.365
D.O.	%	126.15
Temp.	°F	70.772
Salinity	%	0.11
Cl-a	µg/L	5.25
T.P.	µg/l	21.4
Secchi	ft	7.29

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**
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**
State Standards	40 ug/L	14 ug/L	>4.6 ft	

Historic Annual Averages



Lake George
2019 Water Quality Data

	Units	R.L.*	Date: 5/7/2019	5/20/2019	6/10/2019	6/17/2019	7/8/2019	7/22/2019	8/6/2019	8/21/2019	9/4/2019	9/24/2019	Average	Min	Max
			Time: 12:20	12:45	9:20	11:45	11:30	11:15	11:45	11:15	11:30	11:45			
			Results	Results	Results	Results	Results	Results	Results	Results	Results	Results			
pH		0.1	8.48	8.09	7.71	8.17	8.34	8.18	8.46	8.34	8.05	8.31	8.21	7.71	8.48
Specific Conductivity	mS/cm	0.01	0.225	0.236	0.243	0.219	0.234	0.241	0.238	0.211	0.217	0.199	0.226	0.199	0.243
Turbidity	NTU	1	N/A	0.00	2.30	4.30	1.00	2.100	0.00	4.40	4.10	3.10	2.15	0	4
D.O.	mg/l	0.01	11.89	9.67	8.44	8.98	11.67	10.16	11.75	11.36	11.37	11.62	10.69	8.44	11.89
D.O.	%	1	116.4	95.0	98.4	105.8	150.4	127.3	151.7	129.9	125.0	131.1	123.1	95.0	151.7
Temp.	°C	0.1	13.20	13.29	21.69	21.39	26.61	25.84	26.95	24.08	20.66	20.81	21.5	13.2	27.0
Temp.	°F	0.1	55.8	55.9	71.0	70.5	79.9	78.5	80.5	75.3	69.2	69.5	70.6	55.8	80.5
Salinity	%	0.01	0.11	0.11	0.12	0.10	0.11	0.12	0.11	0.10	0.10	0.10	0.11	0.10	0.12
Cl-a	µg/L	1	4.30	4.3	4.9	5.3	4.8	5.2	6.5	7.9	18.0	11.3	7.3	4.3	18.0
T.P.	mg/l	0.005	0.017	0.019	0.021	0.022	0.022	0.016	0.022	0.026	0.031	0.018	0.021	0.016	0.031
T.P.	µg/l	5	17	19	21	22	22	16	22	26	31	18	21.40	16	31
Secchi	ft		14.3	13.6	10.1	7.2	9.3	6.9	7.4	6.3	5.3	6.4	8.67	5.3	14.3
Secchi	m		4.3	4.1	3.1	2.2	2.8	2.1	2.3	1.9	1.6	2.0	2.6	1.6	4.3
Physical			1.0	1.0	1.0	1.0	1.0	1.0	1	1.0	1	1.0	1.0	1.0	1.0
Recreational			1.0	1.0	1.0	1.0	1.0	1.0	1	1.0	1	1.0	1.0	1.0	1.0

*reporting limit

2019 Aquatic Invasive Vegetation Mapping

Lake George
City of Oak Grove, Lake ID # 02-0091

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

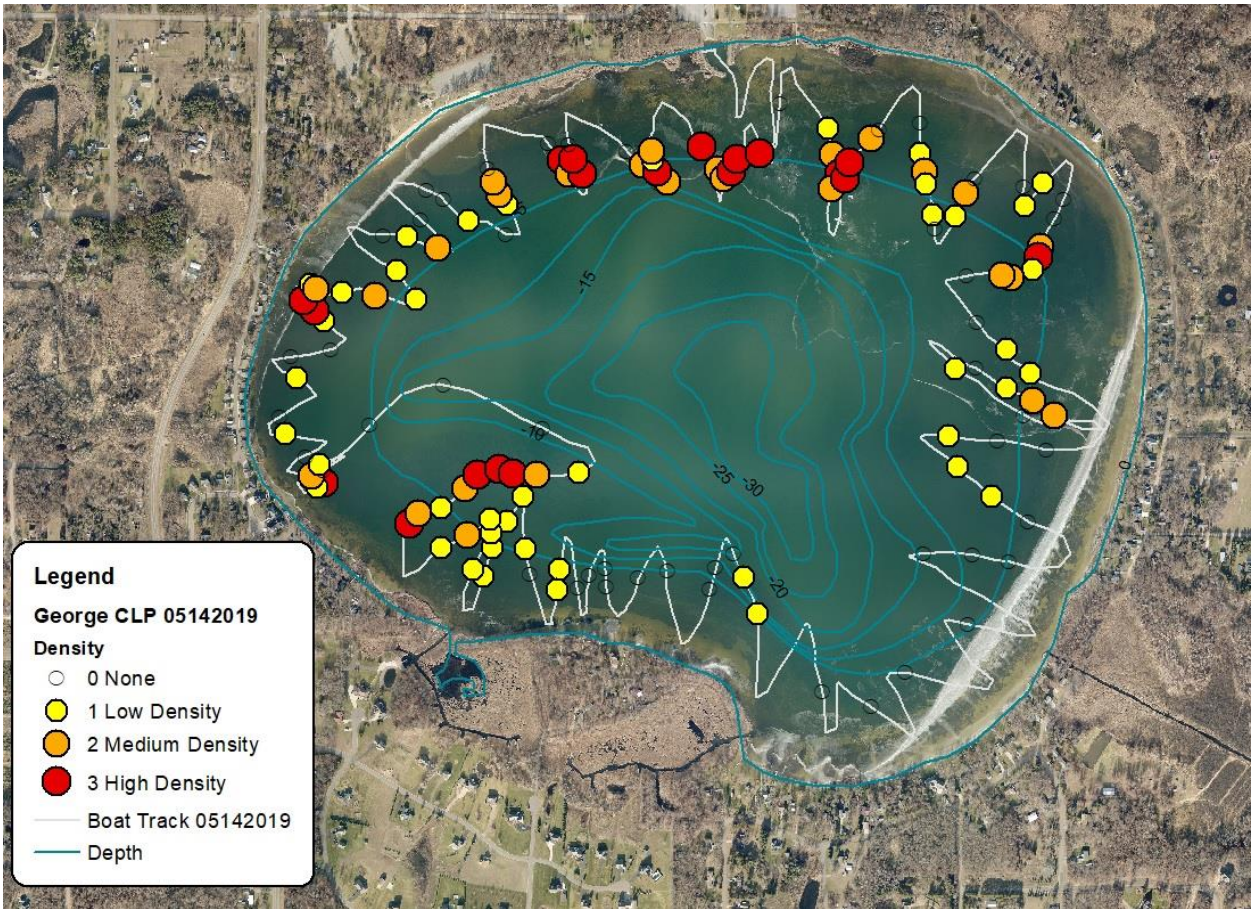
Description: The Anoka Conservation District (ACD) was contracted by the Lake George Lake Improvement District (LID) to conduct an aquatic invasive vegetation delineation.

Purpose: To map out the presence of Curly Leaf Pondweed (CLP) and Eurasian Water Milfoil (EWM) as required for MN DNR herbicide treatment permits. A goal was to map these invasive species as early as possible 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.

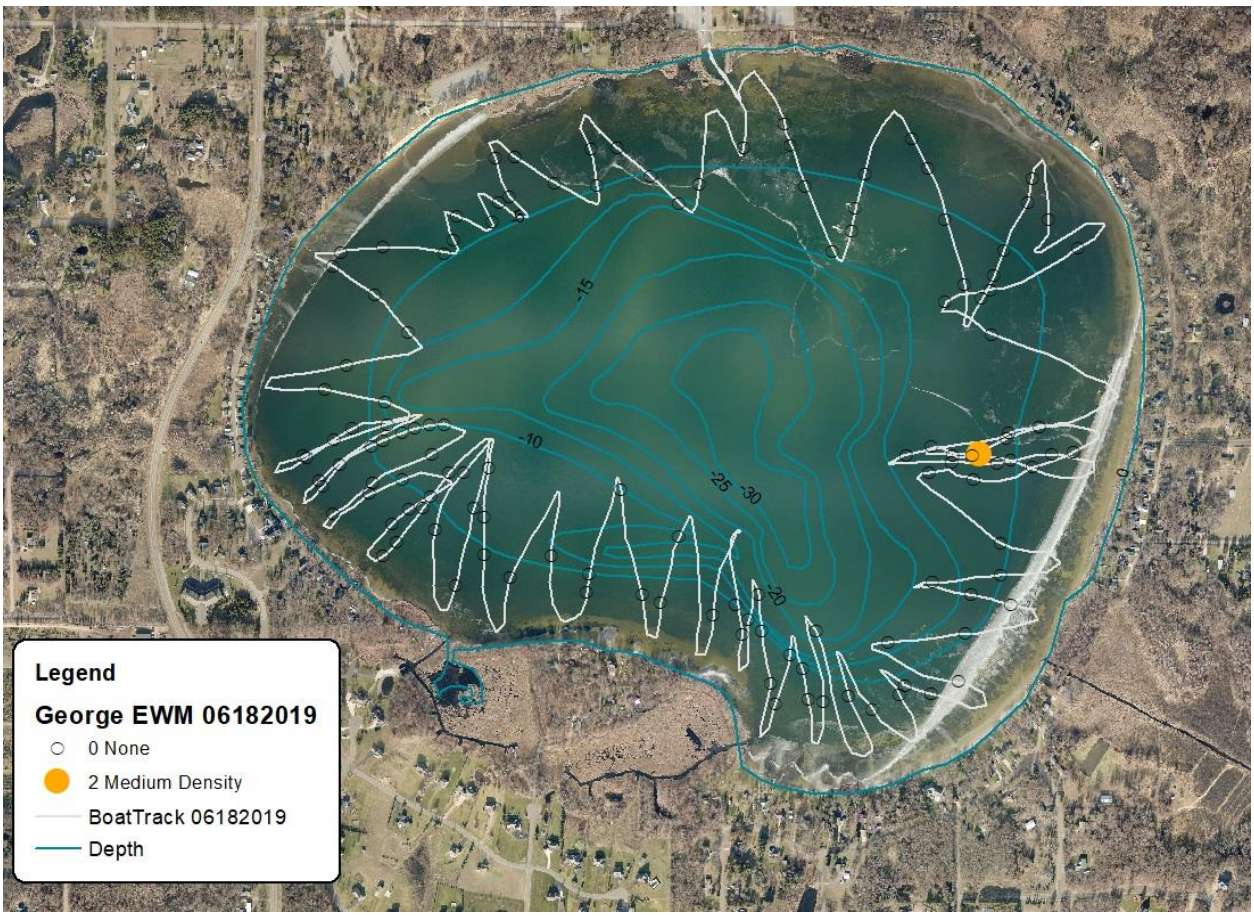
Locations: Lake George

Results: Maps presented 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 MNDNR and herbicide treatment was approved for curly-leaf pondweed on 120.3 acres of Lake George. No treatment of Eurasian watermilfoil occurred in 2019 due to low densities.

May 14, 2019 Lake George Curly Leaf Pondweed (CLP) survey



June 18, 2019 Lake George Eurasian Water Milfoil (EWM) Survey



Stream Water Quality – Biological Monitoring

Partners: St. Francis American Legion Post #622

Description: This program combines environmental education and stream monitoring. Under the supervision of the ACD staff, high school science classes collect aquatic macroinvertebrates from a stream, identify their catch to the family level, and use the resulting numbers to gauge water and habitat quality. These methods are based upon the knowledge that different families of macroinvertebrates have different water and habitat quality requirements. The families collectively known as EPT (Ephemeroptera, or mayflies; Plecoptera, or stoneflies; and Trichoptera, or caddisflies) are generally pollution intolerant. Other families can thrive in low quality water. Therefore, a census of stream macroinvertebrates yields information about stream health.

Purpose: To assess stream quality, both independently as well as by supplementing chemical data. To provide an environmental education service to the community.

Location: Rum River at Rum River North County Park

Results: Results for each site are detailed on the following pages.

Tips for Data Interpretation

Consider all biological indices of water quality together rather than looking at each alone, because each gives only a partial picture of stream condition. Compare the numbers to county-wide averages. This gives some sense of what might be expected for streams in a similar landscape, but does not necessarily reflect what might be expected of a minimally impacted stream. Some key numbers to look for include:

Families — Number of invertebrate families. Higher values indicate better quality.

EPT — Number of families of the generally pollution-intolerant orders Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies). Higher numbers indicate better stream quality.

Family Biotic Index (FBI) — An index that utilizes known pollution tolerances for each family. Lower numbers indicate better stream quality.

FBI	Stream Quality Evaluation
0.00-3.75	Excellent
3.76-4.25	Very Good
4.26-5.00	Good
5.01-5.75	Fair
5.76-6.50	Fairly Poor
6.51-7.25	Poor
7.26-10.00	Very Poor

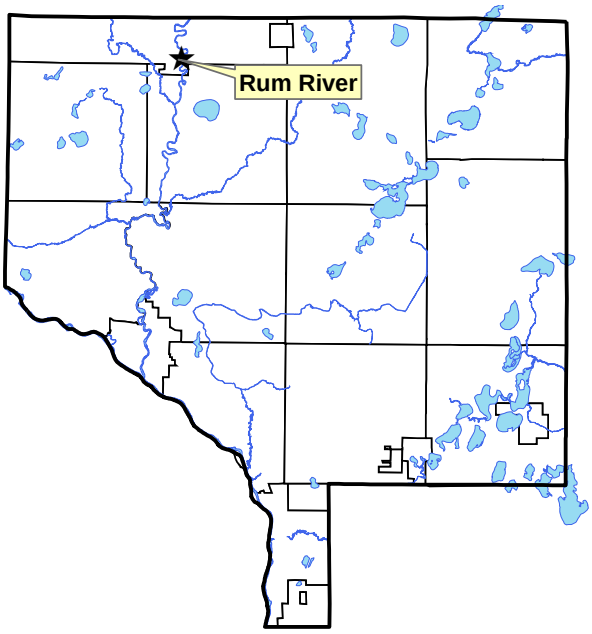
Population Attributes Metrics

% EPT: This measure compares the number of organisms in the EPT orders (Ephemeroptera - mayflies: Plecoptera - stoneflies: Trichoptera - caddisflies) to the total number of organisms in the sample. A high percent of EPT is good.

% Dominant Family: This measures the percentage of individuals in the sample that are in the sample's most abundant family. A high percentage is usually bad because it indicates low evenness (one or a few families dominate, and all others are rare).

RUM RIVER

at Rum River North County Park, St. Francis



Last Monitored

By St. Francis High School in 2019

Monitored Since

2000

Student Involvement

40 students in 2019, approximately 1,375 since 2000

Background

The Rum River originates from Lake Mille Lacs, and flows south through western Anoka County where it joins the Mississippi River in the City of Anoka. Other than the Mississippi, this is the largest river in the county. In Anoka County the river has both rocky riffles as well as pools and runs with sandy bottoms. The river's condition is generally regarded as excellent. Portions of the Rum in Anoka County have a state "scenic and recreational river" designation.

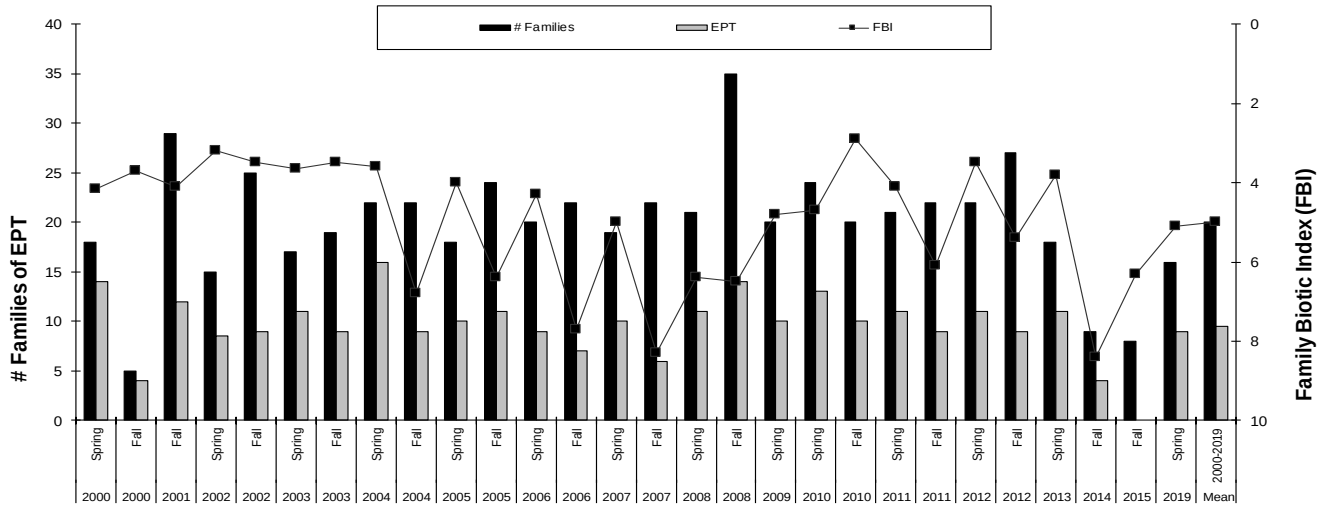
The sampling site is in Rum River North County Park. This site is typical of the Rum in northern Anoka County, having a rocky bottom with numerous pool and riffle areas.

Results

St. Francis High School classes monitored the Rum River in the spring of 2019, with ACD oversight and funding from the St. Francis American Legion. Results for 2019 are similar to results in most previous years. By contrast, the most recent previous years of 2014 and 2015 had invertebrate captures that indicated a poor ecological condition. In 2019 captures indicated a moderate-to-healthy ecological condition despite high water levels and fast flows which typically lower sampling success the students.

Multiple years should cumulatively be considered when interpreting biomonitoring data. Water levels, weather, site conditions and differences in class sizes and student capabilities can all contribute to different results in any one year. Based on the multi-year dataset it appears that Rum River ecological health at this site is good.

Summarized Biomonitoring Results for Rum River North County Park, St. Francis (samplings by St. Francis High School and Crossroads Schools in 2002-2003 are averaged)



Biomonitoring Data for Rum River at Rum River North County Park, St. Francis

Data presented from the most recent five years. Contact the ACD to request archived data.

Table of most recent five years

Year	2012	2013	2014	2015	2019	Mean
Season	Fall	Spring	Fall	Fall	Spring	2000-2019
FBI	5.4	3.8	8.4	6.3	5.1	5.0
# Families	27	18	9	8	16	20.0
EPT	9	11	4	0	9	9.6
Date	27-Sep	20-May	24-Oct	22-Jul	19-May	
Sampled By	SFHS	SFHS	SFHS	4-H	SFHS	
Sampling Method	MH	MH	MH	MH	MH	
Mean # Individuals/Rep.	333	247.5	219	23	139	
# Replicates	1	2	1	1	1	
Dominant Family	veliidae	Baetiscida	Corixidae	Cambaridae	Siphlonuridae	
% Dominant Family	13.8	34.7	86.3	34.8	32.4	
% Ephemeroptera	34.2	54.1	3.7	0	46	
% Trichoptera	4.2	6.3	0.5	0.0	0	
% Plecoptera	11.1	30.3	2.3	0	18	

Discussion

Historically, both chemical and biological monitoring indicate the good water quality of this river. Poorer results in 2014 and 2015 may reflect varying site and sampling conditions rather than a shift in the biological community. Habitat is ideal for a variety of stream life, and includes a variety of substrates, plenty of woody snags, riffles, and pools. Taxa that are extremely sensitive to pollution are still being collected. Water chemistry monitoring done at various locations on the Rum River throughout Anoka County indicates that water quality is also good. Continued biological monitoring is recommended both as an education program and for long-term ecological condition monitoring.

Wetland Hydrology

Partners: URRWMO, ACD

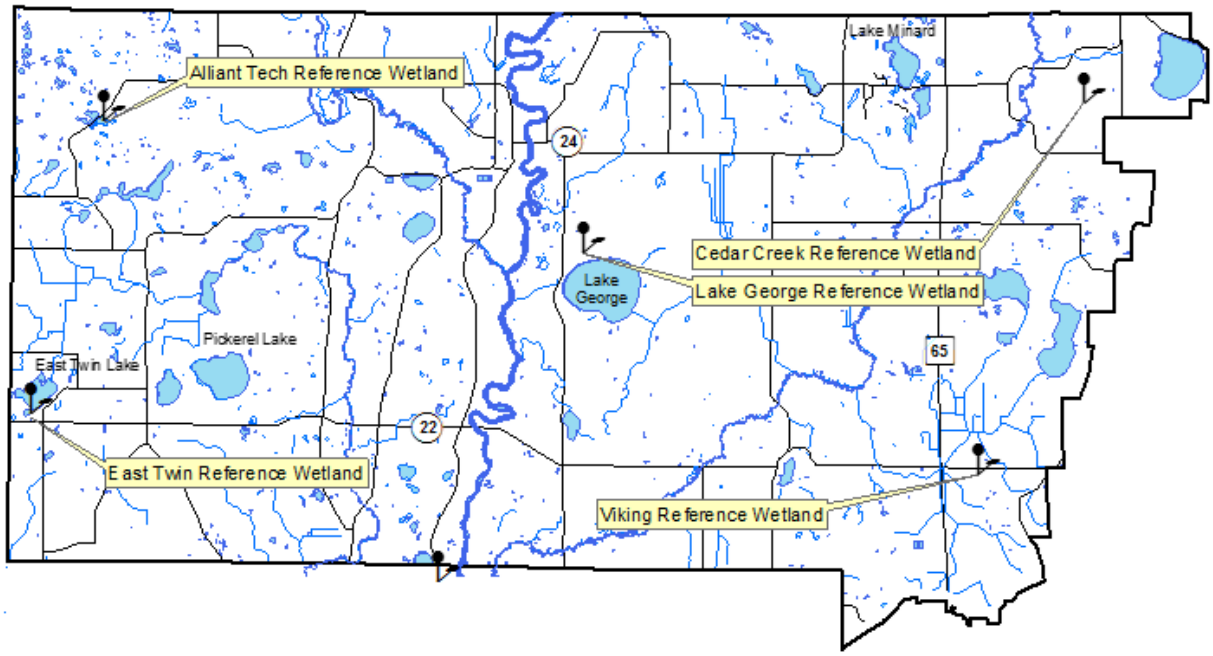
Description: Continuous groundwater level monitoring at a wetland boundary, to a depth of 40 inches. Countywide, the ACD maintains a network of 23 wetland hydrology monitoring stations.

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: Alliant Tech Reference Wetland, Alliant Tech Systems property, St. Francis
Cedar Creek, Cedar Creek Natural History Area, East Bethel
East Twin Reference Wetland, East Twin Township Park, Nowthen
Lake George Reference Wetland, Lake George County Park, Oak Grove
Viking Meadows Reference Wetland, Viking Meadows Golf Course, East Bethel

Results: See the following pages. Raw data and updated graphs can be downloaded from www.AnokaNaturalResources.com using the Data Access Tool.

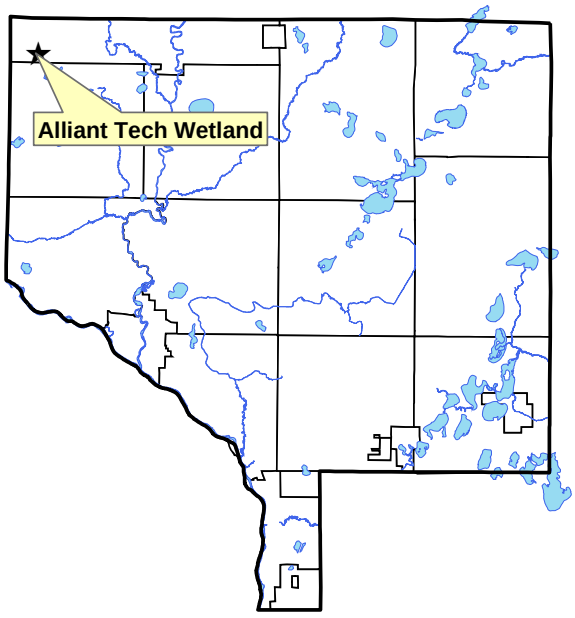
Upper Rum River Watershed Wetland Hydrology Monitoring Site



ALLIANT TECH REFERENCE WETLAND

Alliant Techsystems Property, St. Francis

Site Information



Monitored Since: 2001

Wetland Type: 5

Wetland Size: ~12 acres

Isolated Basin? Yes

Connected to a Ditch? No

Soils at Well Location:

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

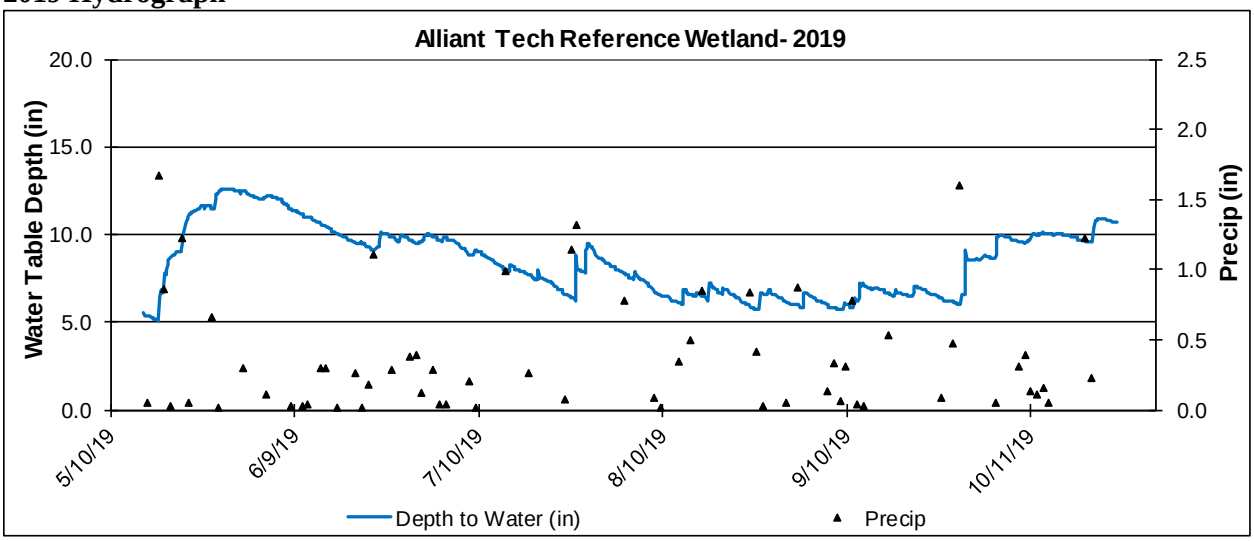
Surrounding Soils: Emmert

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. It holds water throughout the year, and has a beaver den.

2019 Hydrograph



CEDAR CREEK REFERENCE WETLAND

Univ. of Minnesota Cedar Creek Natural History Area, East Bethel

Site Information

Monitored Since: 1996

Wetland Type: 6

Wetland Size: unknown, likely >150 acres

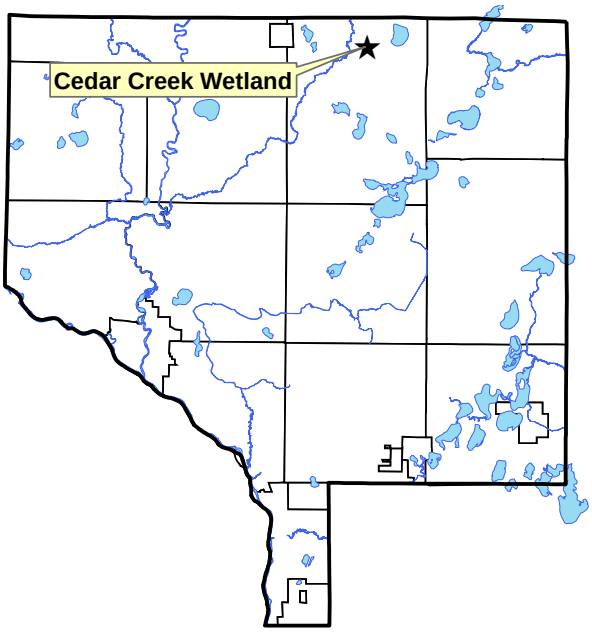
Isolated Basin? No

Connected to a Ditch? No

Soils at Well Location: not yet available

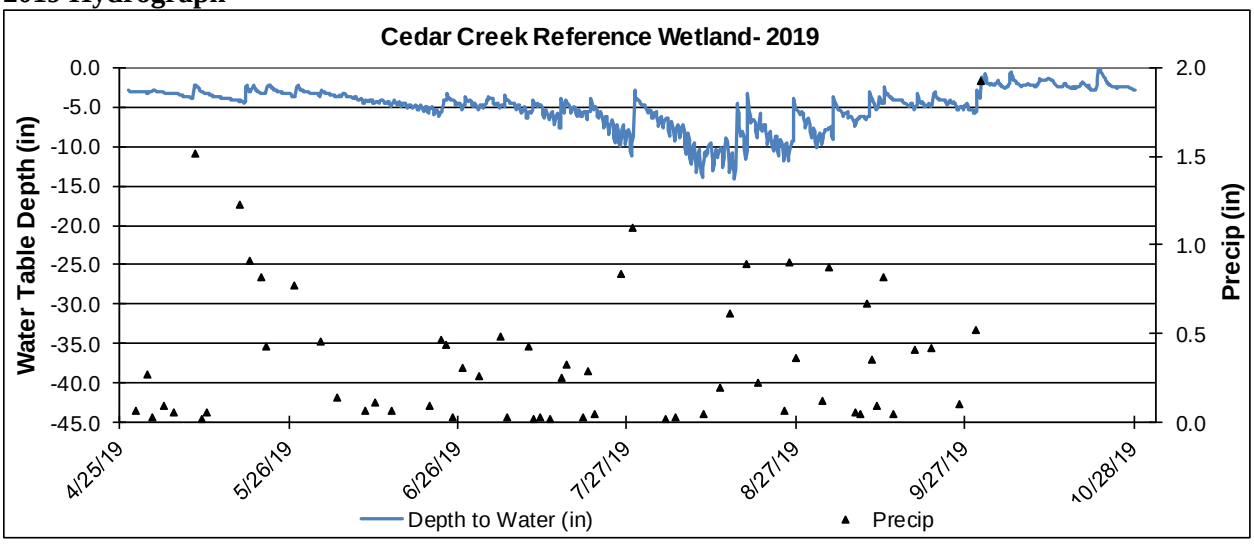
Surrounding Soils: Zimmerman

Vegetation at Well Location: not yet available



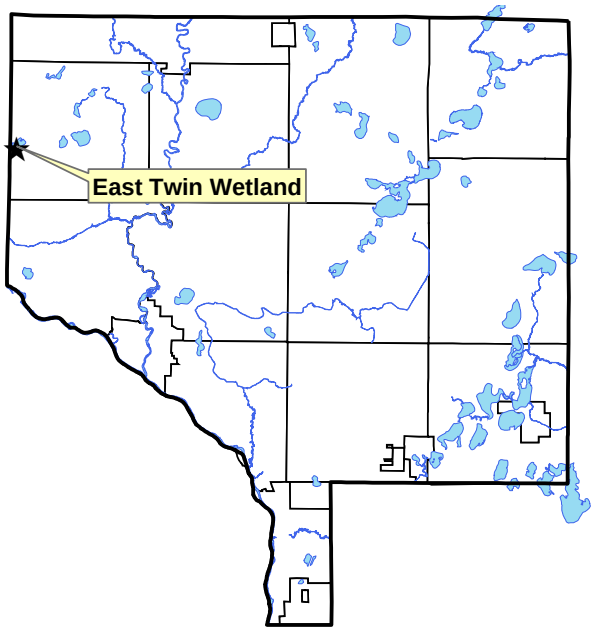
Other Notes: The Cedar Creek Ecosystem Science Reserve, where this wetland is located, is a University of Minnesota research area. Much of this area, including the area surrounding the monitoring site, is in a natural state. This wetland probably has some hydrologic connection to the floodplain of Cedar Creek, which is 0.7 miles from the monitoring site.

2019 Hydrograph



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

Soils at Well Location:

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

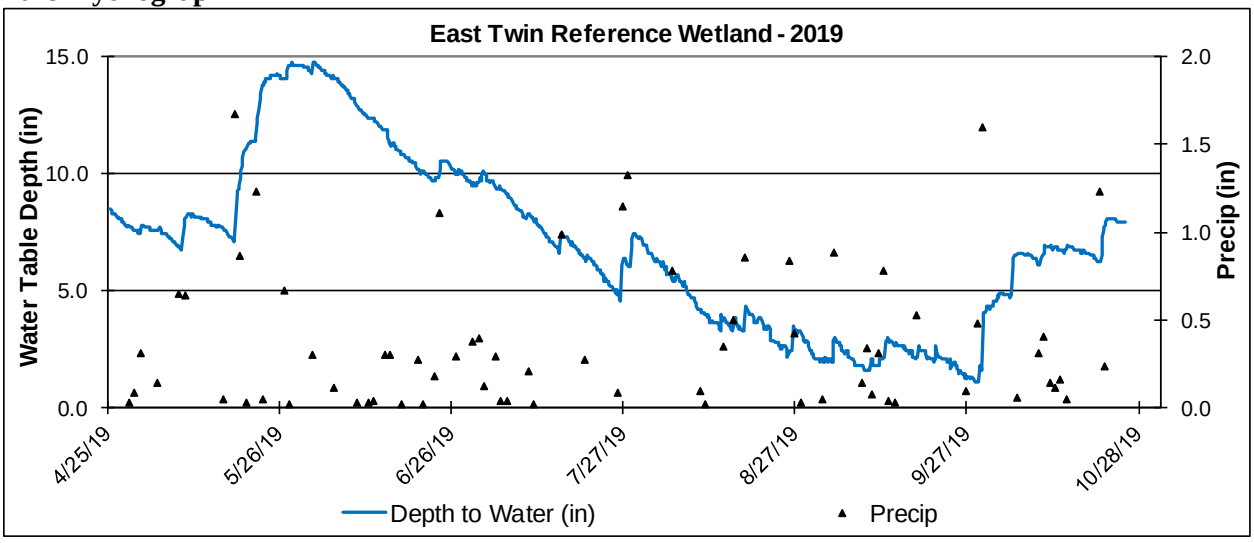
Surrounding Soils: Lake Beach, Growton and Heyder fine sandy loams

Vegetation at Well Location:

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

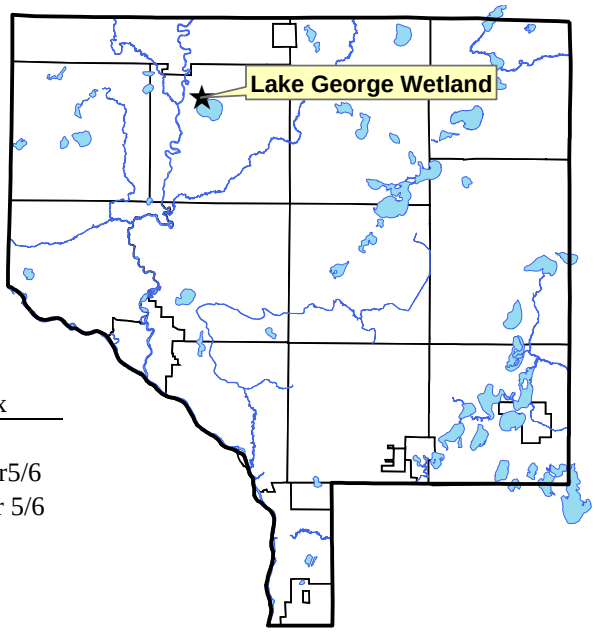
Other Notes: This wetland is located within Twin Lakes City Park, and is only 180 feet from the lake itself. Water levels in the wetland are influenced by lake levels.

2019 Hydrograph



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, but only separated from wetland complexes by roadway.

Connected to a Ditch? No

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

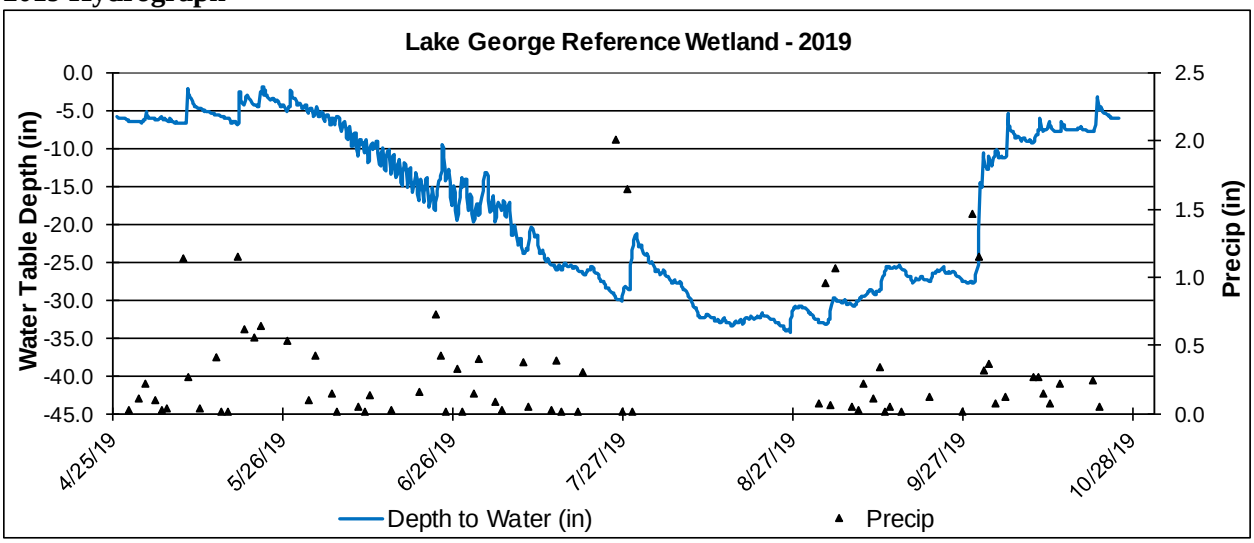
Surrounding Soils: Lino loamy fine sand and Zimmerman fine sand

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 within Lake George County Park, and is only about 600 feet from the lake itself. Much of the vegetation within the wetland is cattails.

2019 Hydrograph

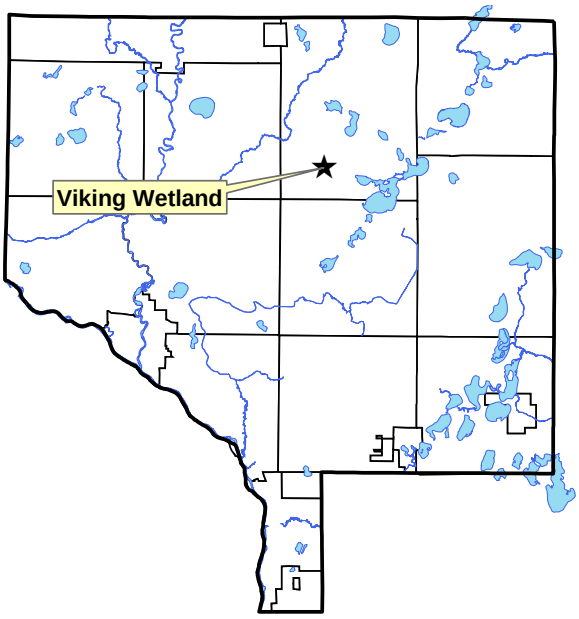


Wetland Hydrology Monitoring

VIKING MEADOWS REFERENCE WETLAND

Viking Meadows Golf Course, East Bethel

Site Information



Monitored Since: 1999

Wetland Type: 2

Wetland Size: ~0.7 acres

Isolated Basin? No

Connected to a Ditch? Yes, highway ditch is tangent to wetland

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

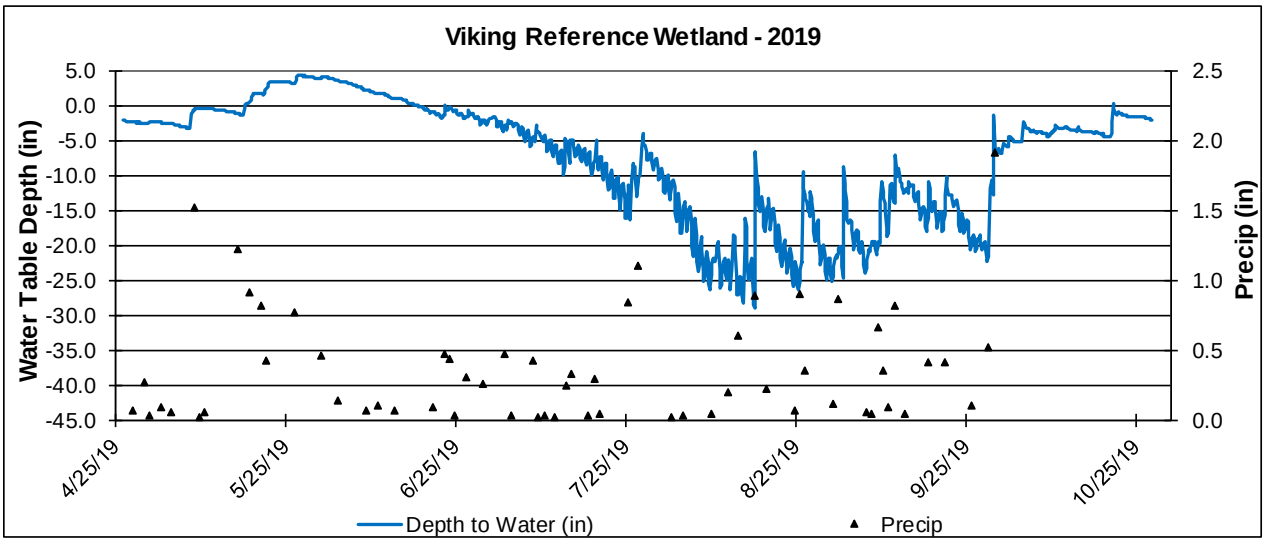
Surrounding Soils: Zimmerman fine sand

Vegetation at Well Location:

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 adjacent to Viking Boulevard (Hwy 22).

2019 Hydrograph



Rum River Bank Stabilization

Partners: LRRWMO, URRWMO, ACD, MN DNR Conservation Partners Legacy Grant, Lessard-Sams Outdoor Heritage Council grant, landowners

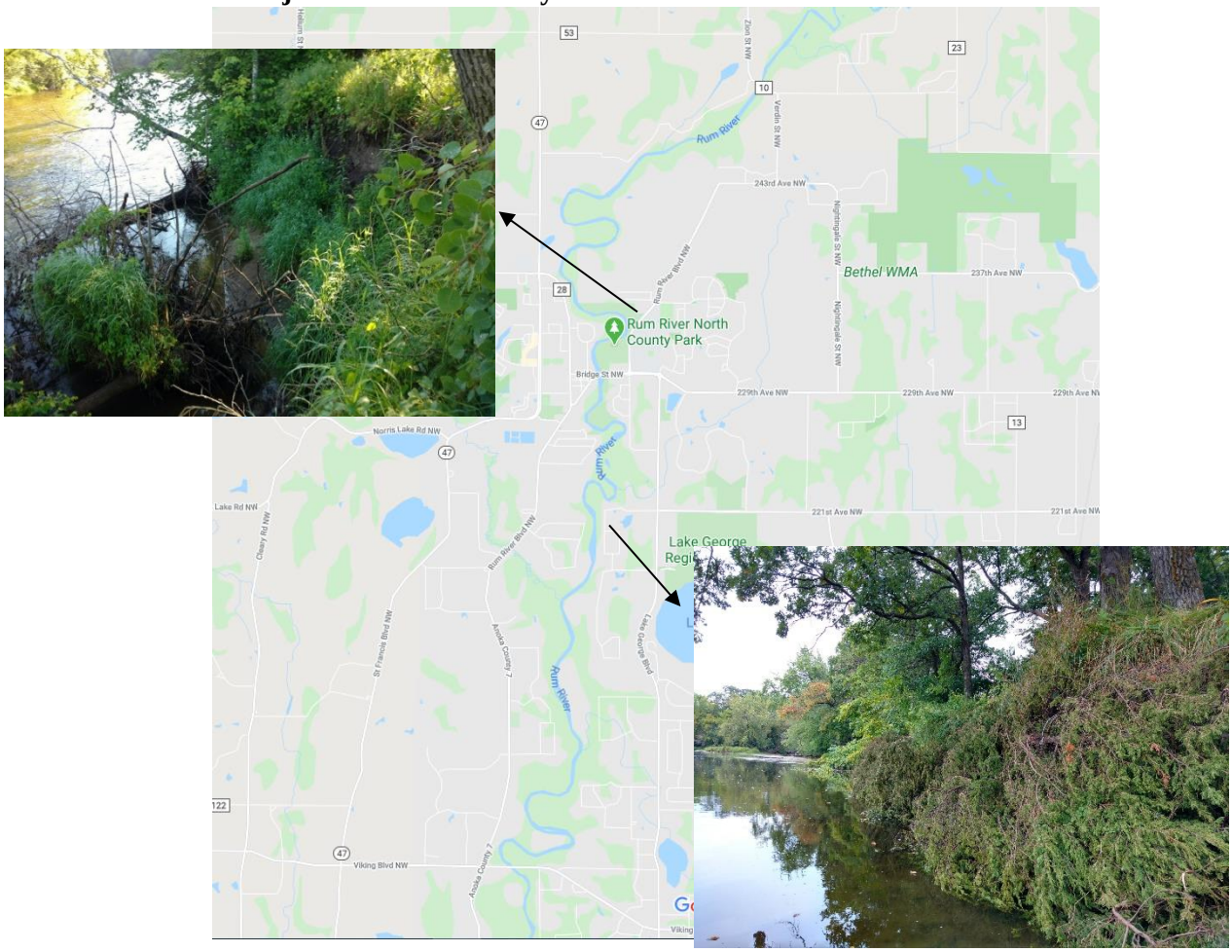
Description: 6 riverbank stabilization projects were installed on the Rum River in Anoka and Isanti Counties in 2019. At these sites, cedar tree revetments and willow stakes were used to stabilize eroding banks. The projects were installed with labor from Conservation Corps Minnesota (CCM) work crews. Funding for the 5 revetments installed in Anoka County came from the Conservation Partners Legacy Grant Program from the Outdoor Heritage Fund, a Clean Water Fund CCM crew labor grant, the URRWMO and LRRWMO, and landowner contributions. Funding for 1 additional revetment in Isanti County came from the Lessard-Sams Outdoor Heritage Council, a Clean Water Fund CCM crew labor grant and landowner contribution.

Purpose: To stabilize areas of riverbank with mild to moderate erosion to reduce sediment loading in the Rum River, as well as to reduce the likelihood of much larger and more expensive corrective projects in the future.

Location: Rum River Central Regional Park, Rum River North County Park, 3 residential properties in Anoka County, and the River Bluff Preserve in Isanti County

Results: Stabilized 650 linear feet of riverbank on the Rum River in Anoka and Isanti Counties.

Bank Stabilization Projects in Anoka County in 2019



Rum River Bank Erosion Grants

Partners: ACD, Anoka County Parks, LRRWMO, URRWMO

Description: The Anoka Conservation District (ACD) prepared an inventory of Rum River bank erosion using 360° photos of the riverbanks of the Rum throughout Anoka County. The photos are available through Google Maps using the Street View feature. An inventory report identifying 80 stretches of riverbank with moderate to very severe erosion is available on ACD's website. Estimated project cost and annual sediment load reduction to the river were calculated. ACD used this inventory to apply for grant funding for stabilization projects to correct some of these eroding banks. These applications, and matching money from Anoka County and the Rum River WMOs resulted in $1.4 Million to be used over the next three years for stabilization projects.

Purpose: To identify and prioritize riverbank stabilization sites and be used by ACD and other entities to pursue grant funds to restore or stabilize eroding stretches of Rum Riverbank.

Location: Rum River conveyance throughout Anoka County

Results: Inventory of 80 stretches of moderate to very severe erosion on banks of the Rum River. $1.4 Million has been secured so far in grant and matching funds to implement stabilization projects.

Application illustration for the Lessard-Sams Outdoor Heritage Council to do Rum River stabilization projects utilizing bioengineering approaches. The LSOHC reccomended funding these projects at $952,000 over the next three years, which will be matched with $236,000 in local funds from Anoka County and the Upper and Lower Rum River WMOs.

URRWMO Website

Partners: URRWMO, ACD

Description: The Upper Rum River Watershed Management Organization (URRWMO) contracted the Anoka Conservation District (ACD) to design and maintain a website about the URRWMO and the Upper Rum River watershed.

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

Location: www.URRWMO.org

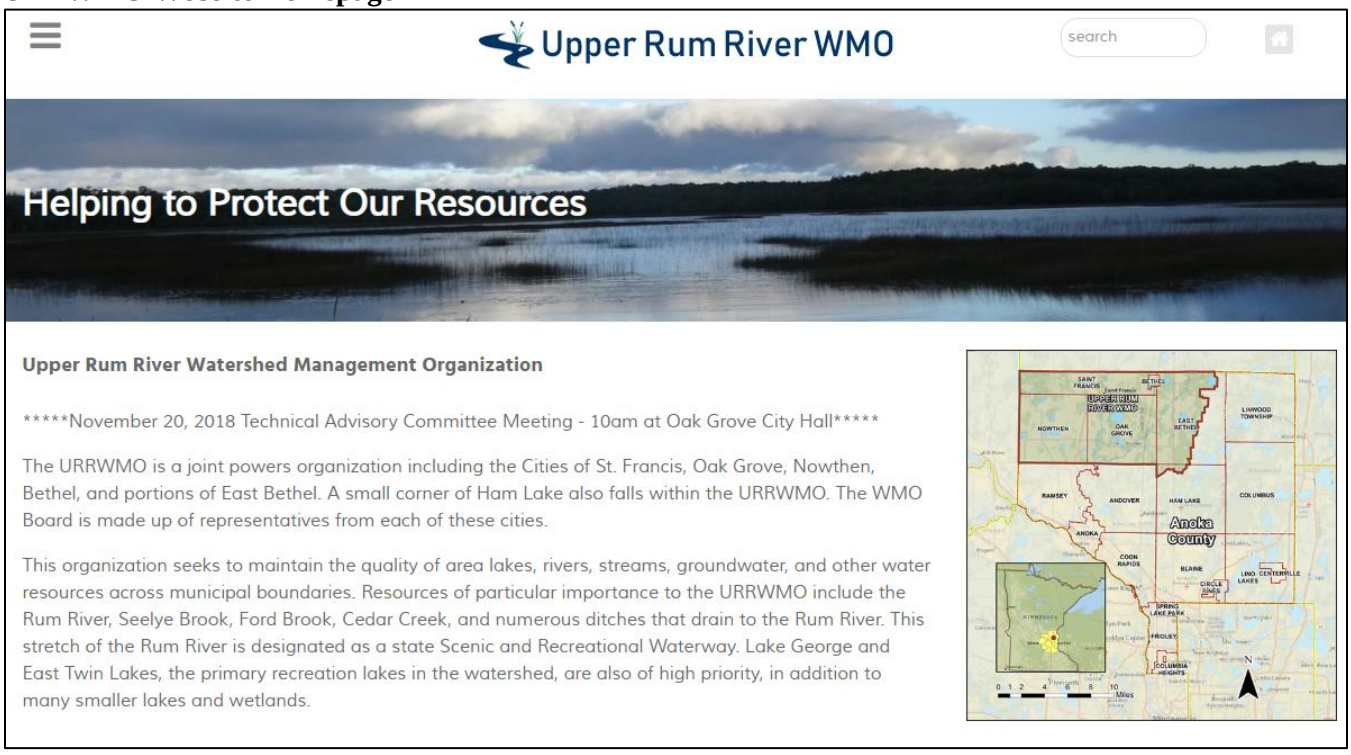
Results:

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.

URRWMO Website Homepage



URRWMO Annual Newsletter

Partners: URRWMO, ACD

Description: The URRWMO Watershed Management Plan and state rules call for an annual URRWMO newsletter in addition to the WMO website. The URRWMO produces a newsletter article including information about the URRWMO, its programs, related educational information, and the URRWMO website address. This article is provided to each member city, and they are asked to include it in their city newsletters.

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

Locations: Watershed-wide.

Results: The Anoka Conservation District (ACD) assisted the URRWMO by drafting the annual newsletter article about the new management plan for area streams and lakes. The URRWMO Board reviewed and edited the draft article. The finalized article was posted to the URRWMO website, sent to each member community for publication in their newsletters and provided to the Independent School District 15 publication, "The Courier."

2019 URRWMO Newsletter Article

Upper Rum River
Watershed Management Organization

MEDIA RELEASE

Contact person: Jamie Schurbon 763-434-2030 ext. 21
Date: October 11, 2019

Local Watershed Organization Tackles Riverbank Erosion

Riverbank erosion causes problems for both property owners and the river's health. A recent inventory of river conditions found 80 stretches of eroding Rum Riverbank in Anoka County. The Upper Rum River Watershed Management Organization (URRWMO) and its partners will soon begin work to correct a number of those eroding riverbanks.

Riverbank erosion varies in size and type of solution. Amongst locally eroding riverbanks, some are 30-foot tall banks of bare, collapsing sand. These, often on the outside bends of the river, may require re-grading, rock or other robust engineering to fix. Other eroding riverbanks are just a few feet tall. These can be corrected with "softer" materials such as armoring with cut cedar trees and planting for long-term stability. In either case, work is done with an eye toward improving habitat.

Three grants are being pursued, each for a different approach to fixing erosion. The grants are from the MN DNR, the MN Board of Water and Soil Resources and the Lessard-Sams Outdoor Heritage Council. The first two of these grant sources will make funding decisions in winter 2019-2020. The latter has already favorably reviewed the project and is recommending that the State legislature fund it at $822,000. All of these funding sources get money from the Clean Land, Water and Legacy Amendment passed by voters in 2008.

The projects will be done through a partnership of organizations interested in the Rum River's health. Each of the following are providing matching funds for the grants: the Upper Rum River WMO, Lower Rum River WMO, The Nature Conservancy and Anoka County Parks. The Anoka Conservation District is providing staff time to coordinate the grant applications and river work.

Stabilizing even just 10 eroding riverbanks will decrease sediment entering the river by over 750 tons. That sediment makes the water brown, carries nutrients and other pollutants, and smothers fish spawning habitat. Every project will include habitat improvements in and next to the water. Work will begin in 2020.

The Upper Rum River Watershed Management Organization is a special purpose unit of government made up of six cities: Bethel, East Bethel, Ham Lake, Nowthen, Oak Grove, and St. Francis. Its purpose is to manage the area's waters, particularly those that flow across city boundaries. More information is at www.URRWMO.org.

URRWMO 2018 Annual Reports to the State

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). This report consists of an up-to-date listing of URRWMO Board members, activities related to implementing the URRWMO Watershed Management Plan, the 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).

Additionally, the URRWMO is required to perform annual financial reporting to the State Auditor. This includes submitting a financial report and filling out a multi-worksheet form.

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

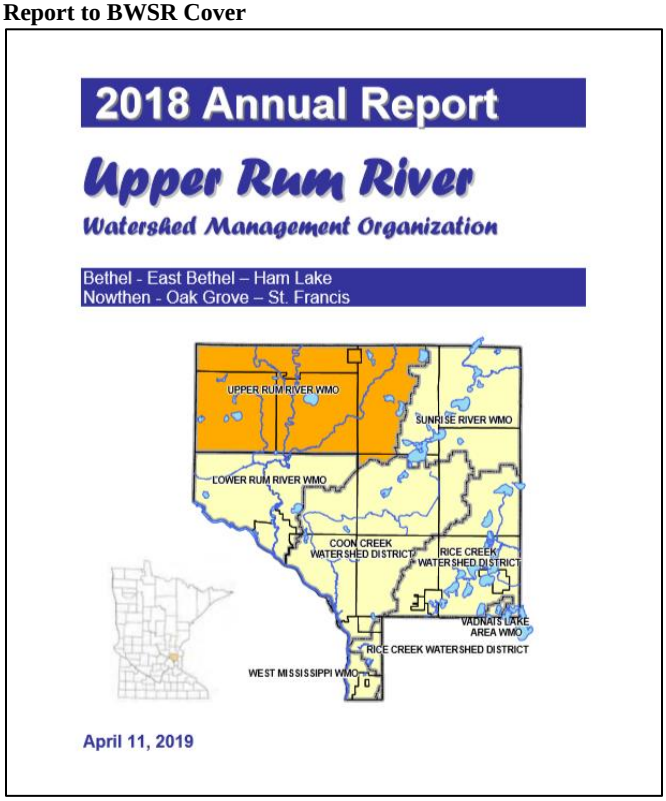
Locations: Watershed-wide

Results: The Anoka Conservation District assisted the URRWMO with preparation of a 2018 Upper Rum River WMO Annual Report to BWSR and reporting to the State Auditor. This included:

- Preparation of an unaudited financial report,
- A report to BWSR meeting MN statutes,
- State Auditor's reporting forms through the State's SAFES website.

All were completed by the end of April 2019. The report to BWSR and financial report are available on the URRWMO website.

Report to BWSR Cover



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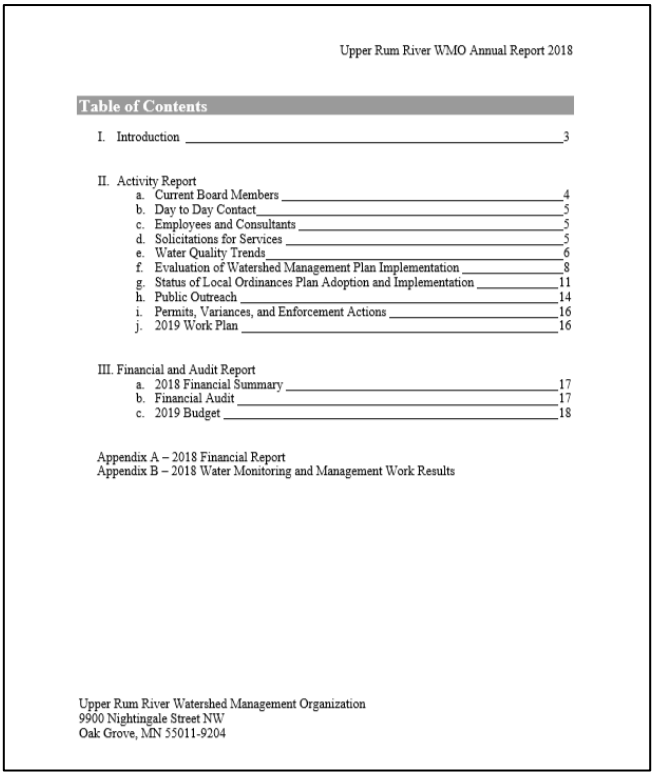

Upper Rum River WMO Annual Report 2018

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Appendix A – 2018 Financial Report
Appendix B – 2018 Water Monitoring and Management Work Results

Upper Rum River Watershed Management Organization
9900 Nightingale Street NW
Oak Grove, MN 55011-9204

Financial Summary

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.

2019 Upper Rum River Watershed Financial Summary

Upper Rum River Watershed	Volunteer Precip	DNR Groundwater Wells	Wetland Levels	Lake Levels	Lake Water Quality	Biomonitoring	AIS Lake George Mapping	Rum River Small Watersheds Grant	1W1P Rum River Planning	URRWMO Admin/Reporting/Grants	Beach Property Enhancement	Kern Property Enhancement	Burman WMA Restoration	Rum River Revetments	URRWMO Website	URRWMO Educ/Newsletter	Outreach Collaborative	Total
Revenues																		
URRWMO			1950	1240	1825					11360					665	1000		18040
State - Other		344															5767	6111
DNR OHF											3516		9285	935				13736
BWSR Local Water Planning					223													223
Regional/Local							1200		884					8754			364	11201
Anoka Co. General Services	571	597	132		43		56	160	4420		2149				1008		989	10125
County Ag Preserves/Projects					367	475								1862				2704
Service Fees						250						1868	5313	1149			31	8612
TOTAL	571	941	2082	1240	2459	725	1256	160	5304	11360	5665	1868	14599	12699	1673	1000	7151	70752
Expenses-																		
Capital Outlay/Equip	1	2	4	1	4	0			9	19	2	2	8	42	1		7	103
Personnel Salaries/Benefits	545	868	2898	1231	1656	1102	1228	146	4899	9634	3007	1696	11952	9591	1076	873	4465	56868
Overhead	31	47	141	67	84	68	53	12	271	481	244	105	580	404	69	44	252	2952
Employee Training	2	3	11	5	4	4	2	1	16	37	8	5	77	32	3	6	17	233
Vehicle/Mileage	7	11	40	16	24	13	20	1	64	131	27	21	144	146	13	10	56	743
Rent	23	44	124	53	87	47	56	7	238	435	165	85	337	511	55	22	202	2491
Program Participants														699				699
Program Supplies	13		209		585	80			64	122	2178	20	3858	566	484		631	8810
TOTAL	621	976	3426	1374	2444	1314	1360	167	5561	10859	5631	1933	16956	11991	1701	955	5630	72899
NET	-50	-35	-1345	-134	15	-589	-104	-7	-257	501	34	-65	-2358	708	-28	45	1522	-2146

Recommendations

- **Participate in the Rum River One Watershed One Plan** process, resulting in prioritized management across the entire Rum River watershed.
- **Pursue projects that are in the URRWMO Watershed Management Plan**. This prioritized list was created by the URRWMO Technical Advisory Committee (TAC):
    1. Rum Riverbank stabilizations
    2. Anoka County Water Resources Outreach Collaborative
    3. (Tied) Stormwater retrofits for the Rum River and subwatershed assessments. Prioritized subwatershed assessment areas are: a) Pickerel Lake b) East Twin Lake c) Rum River direct drainage and d) City of Bethel periphery
    4. Lake George shoreline stabilizations
    5. Lake George iron-enhanced sand filter feasibility study
    6. Ditch 19 connector dredging
- **Bring projects to a construction-ready status** so they are positioned for State Watershed Based Implementation Funds. 10% match is needed for these grants.
- **Ensure stormwater treatment standards for new development result in no increase, and preferably a decrease, in phosphorus.** The Rum River is just below State standards for impairment and several tributaries exceed State nutrient standards. State MS4 stormwater treatment standards are aimed at maintaining water quality only, and it may be favorable to consider Minimum Impact Development Standards (MIDS) that are aimed at pollutant reductions.
- **Monitor Lake George water quality at least every other year.** The lake has a declining trend. The Lake Improvement District has taken up monitoring every other year when the URRWMO has not funded that work, but would prefer to put their dollars into projects.
- **Promote practices that limit road deicing salt applications** while keeping roads safe. Streams throughout the URRWMO have increasing specific conductivity. 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.
- **Promote groundwater conservation.** Metropolitan Council models predict 3+ ft. drawdown of surface waters in parts of the URRWMO by 2030, and 5+ ft. by 2050.