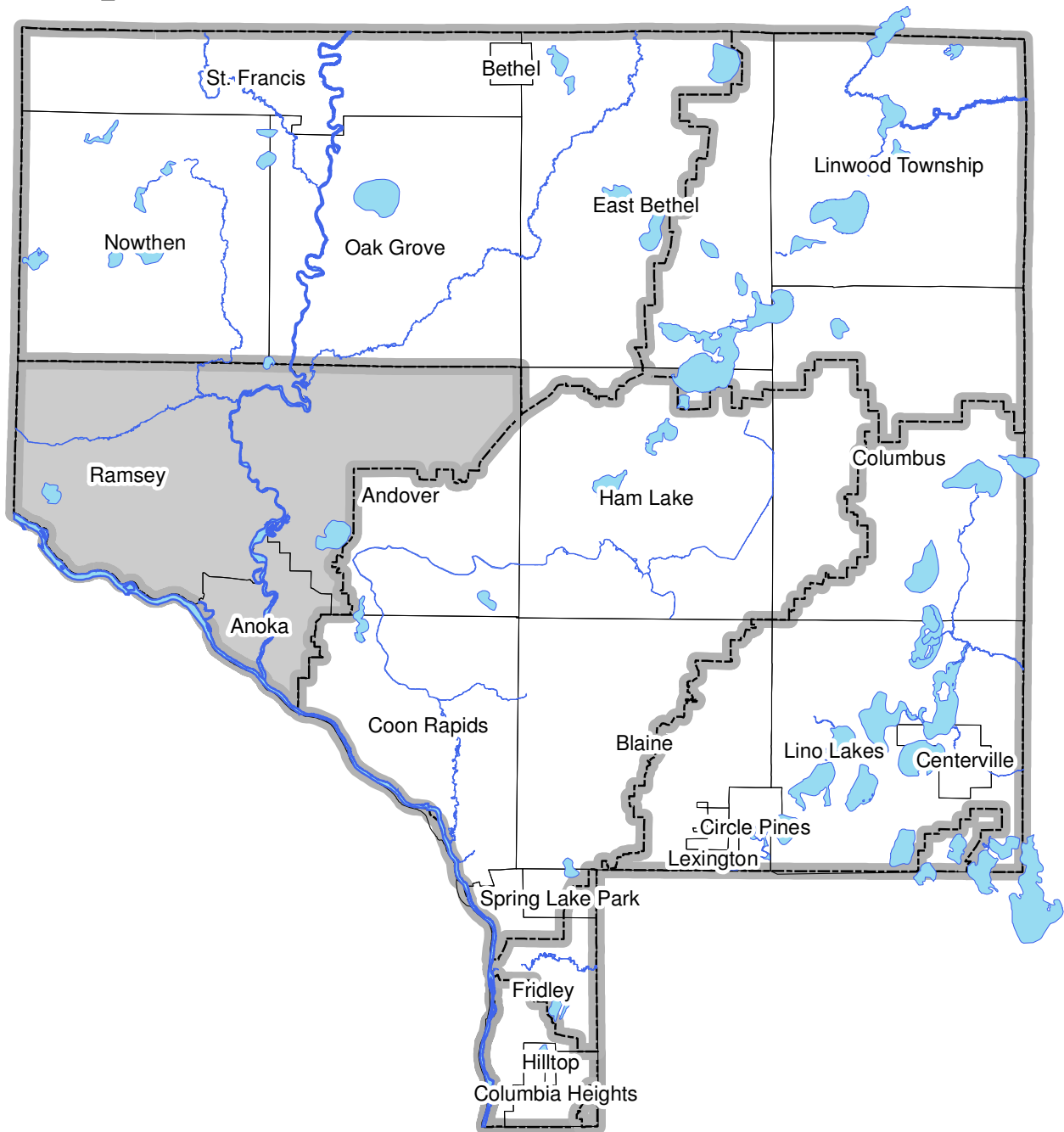


Excerpt from the 2014 Anoka Water Almanac

Chapter 4: Lower Rum River Watershed

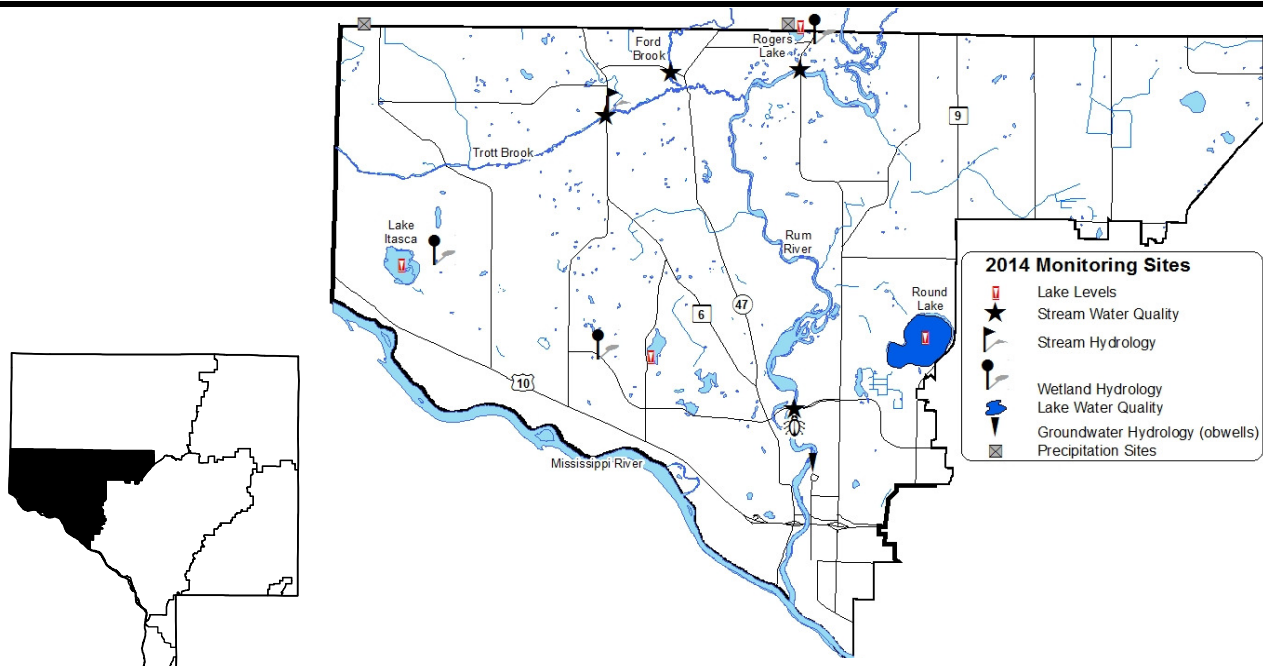


Prepared by the Anoka Conservation District

CHAPTER 4: LOWER RUM RIVER WATERSHED

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		Chapter 1

ACAP = Anoka County Ag Preserves, ACD = Anoka Conservation District, LRRWMO = Lower Rum River Watershed Mgmt Org, MC = Metropolitan Council, MNDNR = MN Dept. of Natural Resources



Lake Level Monitoring

Description: Weekly water level monitoring in lakes. The past five years are shown below, and all historic data are available on the Minnesota DNR website using the “LakeFinder” feature (www.dnr.mn.us.state/lakefind/index.html).

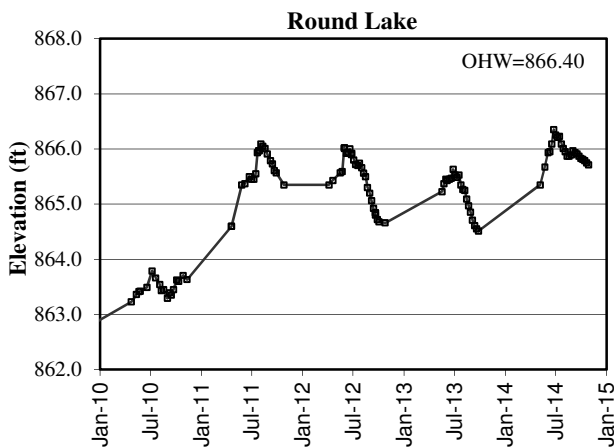
Purpose: To understand lake hydrology, including the impact of climate or other water budget changes. These data are useful for regulatory, building/development, and lake management decisions.

Locations: Itasca, Round, Rogers, and Sunfish/Grass Lakes

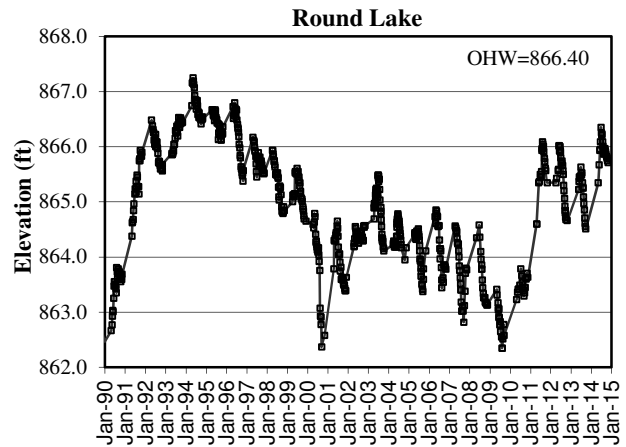
Results: Lake levels were measured by volunteers throughout the 2014 open water season. Lake gauges were installed and surveyed by the Anoka Conservation District and MN DNR. Lakes had sharply increasing water levels in spring and early summer 2014 when very heavy rainfall totals occurred. Rainfall tapered off later in the year and lake levels fell accordingly.

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.

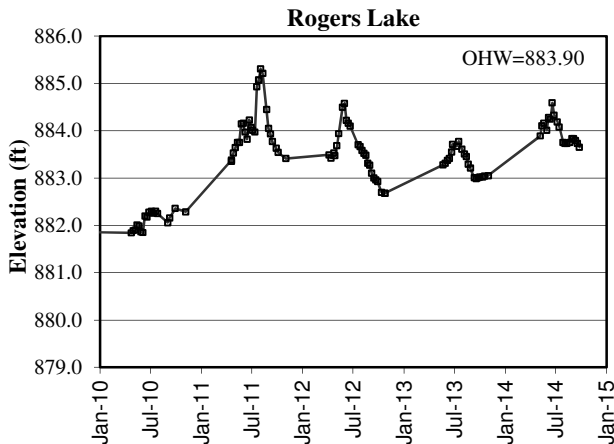
Round Lake Levels – last 5 years



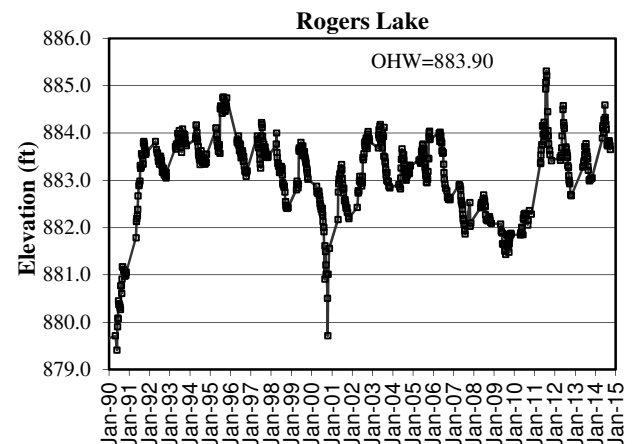
Round Lake Levels – last 25 years



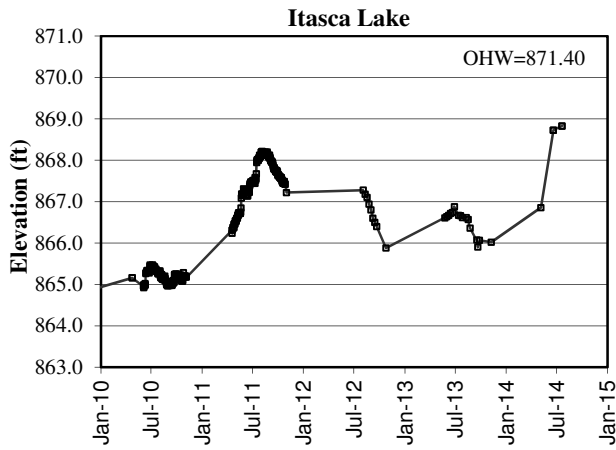
Rogers Lake Levels – last 5 years



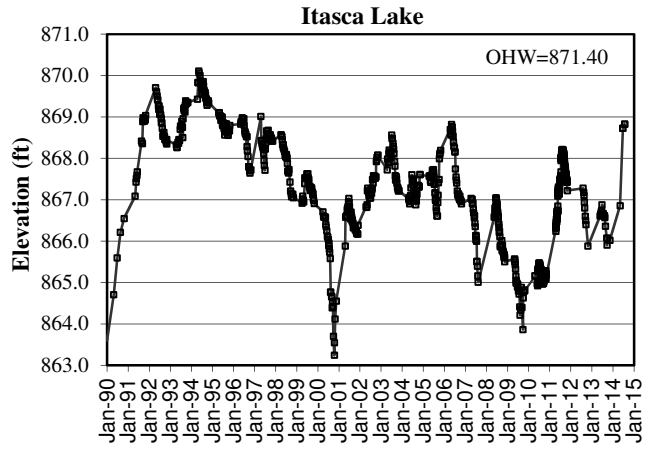
Rogers Lake Levels – last 25 years



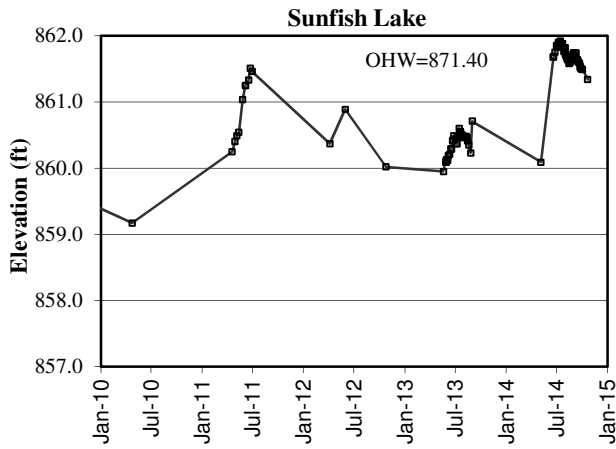
Itasca Lake Levels – last 5 years



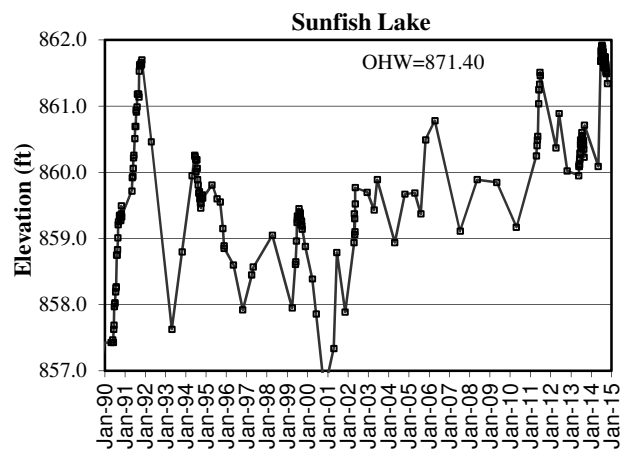
Itasca Lake Levels – last 25 years



Sunfish/Grass Lake Levels – last 5 years



Sunfish/Grass Lake Levels – last 25 years



Lake Water Quality

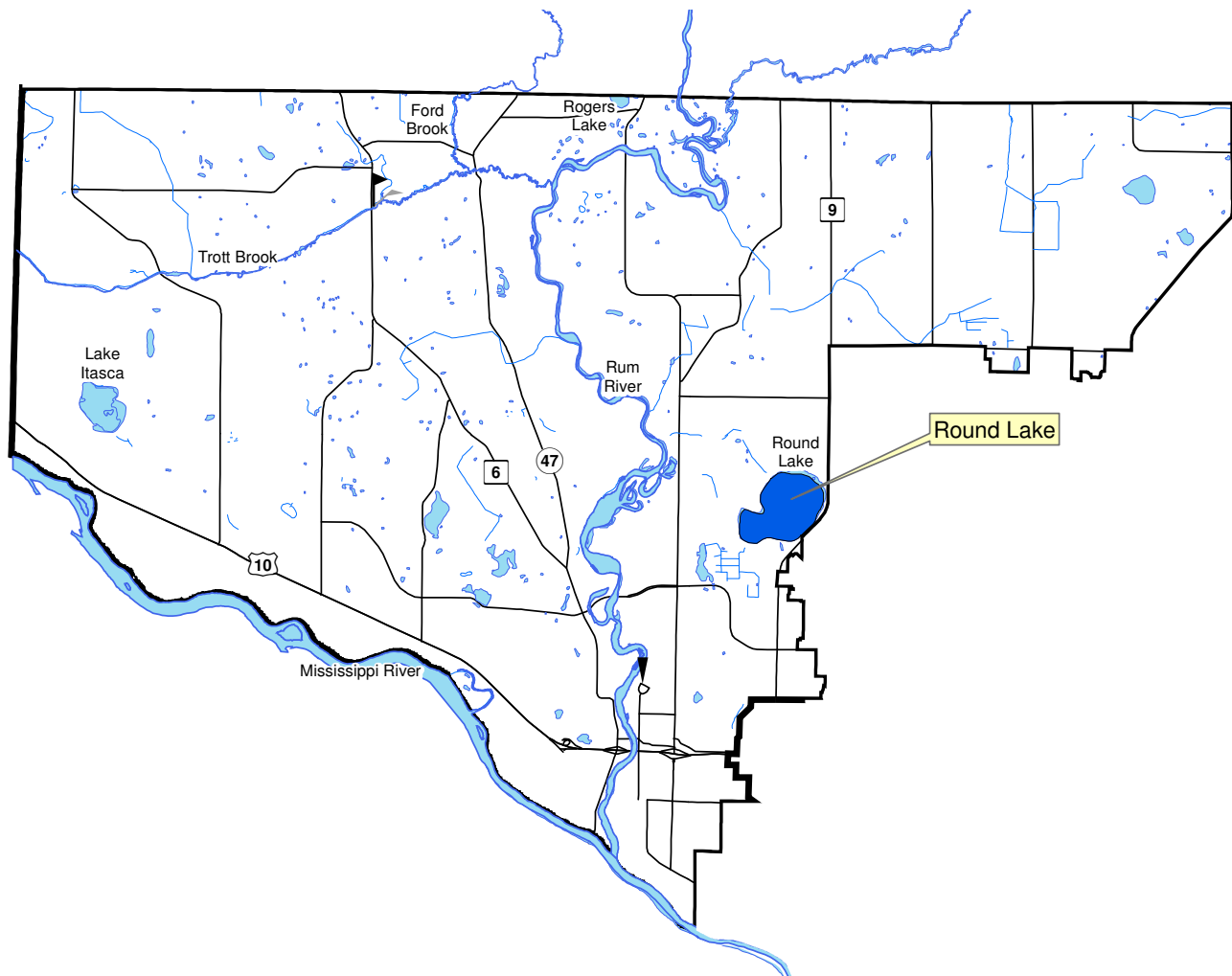
Description: May through September every-other-week monitoring of the following parameters: total phosphorus, chlorophyll-a, secchi transparency, dissolved oxygen, turbidity, temperature, conductivity, pH, and salinity.

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

Locations: Round Lake

Results: Detailed data for each lake are provided on the following pages, including summaries of historical conditions and trend analysis. Previous years' data are available from the ACD. Refer to Chapter 1 for additional information on interpreting the data and on lake dynamics.

Lower Rum River Watershed Lake Water Quality Monitoring Sites



Round Lake

City of Andover, Lake ID # 03-0089

Background

Round Lake is located in southwest Anoka County. It has a surface area of 220 acres and maximum depth of 19 feet, though the majority of the lake is less than 4 feet deep. The lake is surrounded by cattails and has submerged vegetation interspersed throughout the basin. This lake has a small watershed, with a watershed to surface area ratio of less than 10:1. Public access is from a dirt ramp on the lake's southeast side. Almost no boating and mostly wintertime fishing occurs. Wildlife, especially waterfowl, usage of the lake is relatively high.

2014 Results

In 2014 Round Lake's water quality was very good compared with other lakes in this region (NCHF Ecoregion) receiving an overall A letter grade. The average of total phosphorus (15.0 ug/L) and chlorophyll *a* (1.8 ug/L) were the lowest on record. Secchi transparency was 10.2 feet, which is the second best ever observed. It's important to note that the true Secchi transparency average was deeper than 10.2 feet, one reading was not used in this average since clarity exceeded the maximum depth of the lake.

Phosphorus and algae were fairly consistent without indication of any seasonal fluctuation. Additionally, results were very low. This could be the product of abnormally high rainfall early in the season, which resulted in higher than average lake water levels throughout the entire season.

Trend Analysis

Ten years of water quality monitoring have been conducted by the Anoka Conservation District (1998-2000, 2003, 2005, 2007, and 2009-2010, 2012, 2014), which is a marginal number of years for a powerful statistical test of trend analysis. In 2010, the results of the analysis indicated a significant trend of declining water quality across the years studied (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,5} = 9.6065$, $p = 0.0194$). When the analysis is run to include the exceptional water quality observed in 2012 and 2014 no significant water quality changes are apparent ($F_{2,7} = 0.41$, $p = 0.68$).

Discussion

2014 was the second consecutive monitoring year which observed good water quality for Round Lake. There was growing concern about a trend toward poorer water quality. Phosphorus and chlorophyll-a had increased substantially in each of four monitored years from 2005-2009, and 2010 was similar to 2009. These were years of low lake levels. There was speculation that in-lake sources of nutrients, driven by sediment mixing, were a source of phosphorus. During low water there is more wind mixing because of shallow water depths, and in these years there was also a conspicuous reduction of chara (a plant-like algae) carpeting the bottom. In both 2012 and 2014 water levels recovered substantially and water quality was dramatically improved. It does seem that low water levels in Round Lake lead to poorer water quality. Additional monitoring in the future can help verify.

Since at least the 1980's there have been complaints about low water in Round Lake. The lake has few surface water in-flows, so groundwater is important to lake hydrology. There have been concerns that local surficial groundwater levels, and hence the lake, are negatively impacted by a variety of causes including irrigation, residential groundwater use, stormwater management, road embankments, and others. Each has been studied by groups including the MN DNR, Anoka Conservation District, Watershed Organizations, and City. None have been found to cause lower-than-expected lake levels. But there is evidence that Round Lake levels do behave differently from other nearby lakes. Moreover, studies by the Metropolitan Council and others have found regional surficial water tables are being drawn down by groundwater pumping throughout the metro. Several lakes, including Round and Bunker Lakes are believed to be victims of this groundwater overuse.

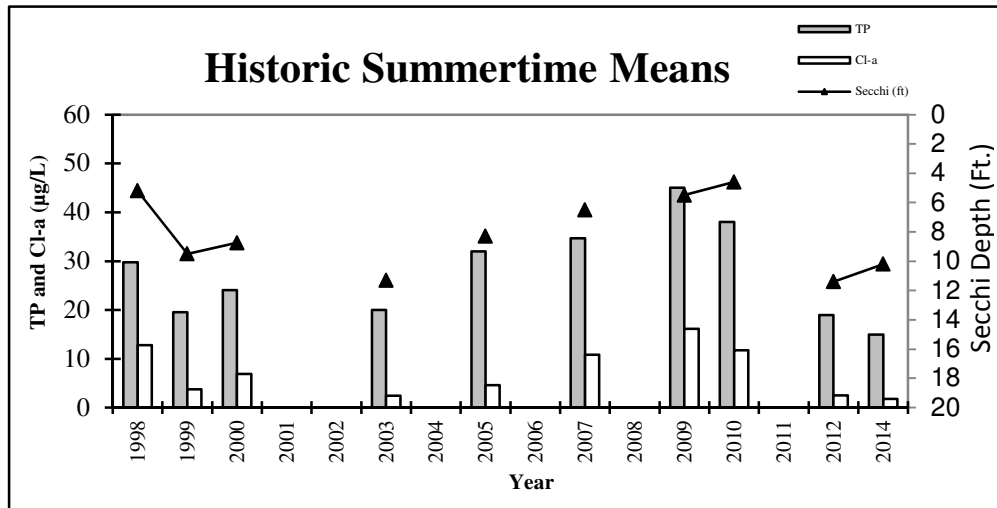
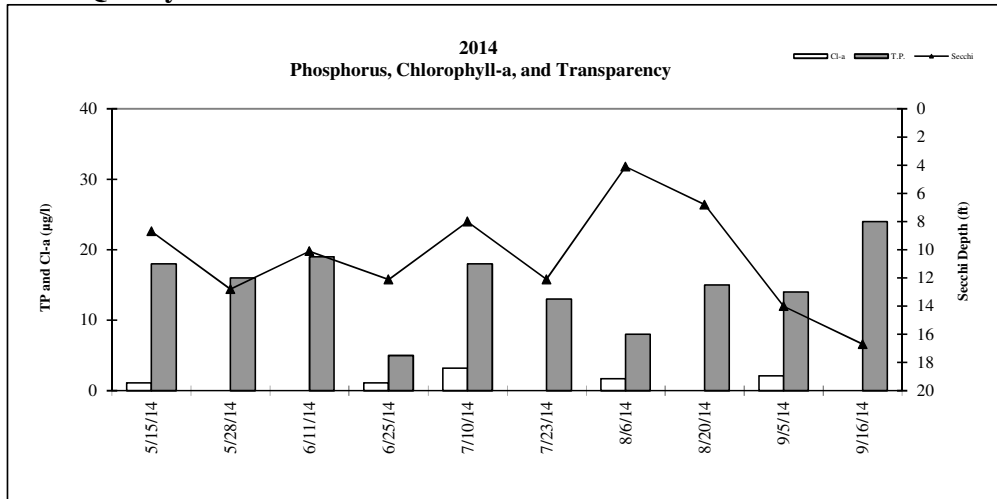
Conservation of groundwater must become a regional and local priority, least there will be negative impacts on lakes. In fact many negative impacts are already being documented. At Round Lake, where water quality appears linked to water levels, this issue is very important.

2014 Round Lake Water Quality Data

	Units	R.L.*	5/15/2014	5/28/2014	6/11/2014	6/25/2014	7/10/2014	7/23/2014	8/6/2014	8/20/2014	9/5/2014	9/16/2014	Average	Min	Max	
			14:15	13:58	14:10	13:30	15:00	13:15	14:15	15:55	15:10	14:15				
pH			0.1	8.32	8.02	8.4	8.63	8.7	8.86	9.34	8.46	8.34	8.99	8.61	8.02	9.34
Conductivity	mS/cm		0.01	0.327	0.331	0.324	0.289	0.299	0.311	0.305	0.350	0.376	0.334	0.325	0.289	0.376
Turbidity	NTU		1	1.4	0	0.2	3.1	0.9	7.7	0	0	0.8	1	0	8	
D.O.	mg/L		0.01	12.19	8.44	10.31	9.24	8.87	8.33	10.07	8.36	8.74	11.65	9.62	8.33	12.19
D.O.	%		1	114%	95%	123%	113%	102%	106%	129%	108%	102%	121%	111%	95%	129%
Temp.	°C		0.1	13	23	23	25	26	26	26.0	26.4	21.2	16	22.5	12.5	26.5
Temp.	°F		0.1	54.5	72.8	74.1	76.1	78.0	79.7	78.8	79.4	70.1	61.0	72.4	54.5	79.7
Salinity	‰		0.01	0.16	0.16	0.16	0.14	0.15	0.15	0.15	0.17	0.18	0.16	0.16	0.14	0.18
Cl-a	ug/L		0.5	1.1	<1	<1	1.1	3.2	<1	1.7	<1	2.1	<1	1.8	1.1	3.2
T.P.	mg/L		0.010	0.018	0.016	0.019	0.005	0.018	0.013	0.008	0.015	0.014	0.024	0.015	0.005	0.024
T.P.	ug/L		10	18	16	19	5	18	13	8.0	15.0	14.0	24	15.0	5.0	24.0
Secchi	ft		0.1	8.7	12.8	10.1	12.11	8	12.1	4.1	6.8	>14"	16.7	10.2	4.1	16.7
Secchi	m		0.1	2.65	3.90	3.08	3.69	2.44	3.69	1.2	2.1	>4.3	5.09	3.1	1.2	5.1
Physical				1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Recreational				1.0	1.0	1.0	1.0	1.0	1.0	3.0	1.0	1.0	1.0	1.0	1.0	3.0

*reporting limit

Round Lake Water Quality Results



Round Lake Historic Summertime Mean Values

Agency	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD
Year	1998	1999	2000	2003	2005	2007	2009	2010	2012	2014
TP	29.8	19.6	24.1	20.0	32.0	34.7	45.0	38.0	19.0	15.0
Cl-a	12.8	3.7	6.9	2.4	4.6	10.9	16.2	11.8	2.5	1.8
Secchi (m)	1.60	2.90	2.67	3.40	2.50	2.00	1.70	1.40	3.50	3.10
Secchi (ft)	5.2	9.5	8.8	11.3	8.3	6.5	5.5	4.6	11.4	10.2

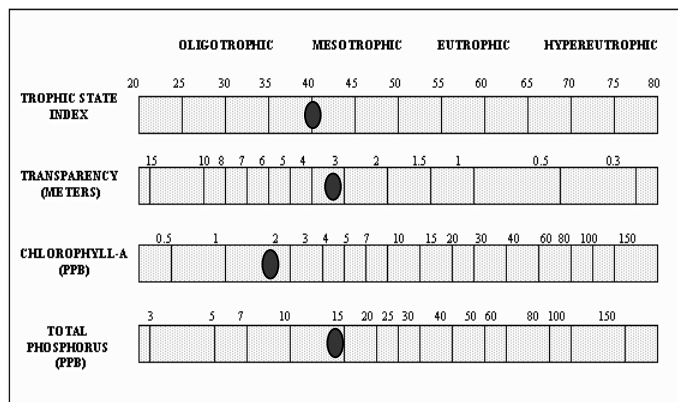
Carlsons trophic state indices

TSIP	53	47	50	47	54	55	59	57	47	43
TSIC	56	44	49	39	46	54	58	55	40	36
TSIS	53	45	46	42	47	50	52	55	42	44
TSI	54	45	48	43	49	53	56	56	43	41

Round Lake Water Quality Report Card

Year	1998	1999	2000	2003	2005	2007	2009	2010	2012	2014
TP	B	A	B	A	B	C	C	C	A	A
Cl-a	B	A	A	A	A	B+	B	B	A	A
Secchi	C	B	B	A	B	C	C	C	A-	A
Overall	B	A	B	A	B	C	C	C	A	A

Carlson's Trophic State Index



Stream Water Quality - Chemical Monitoring

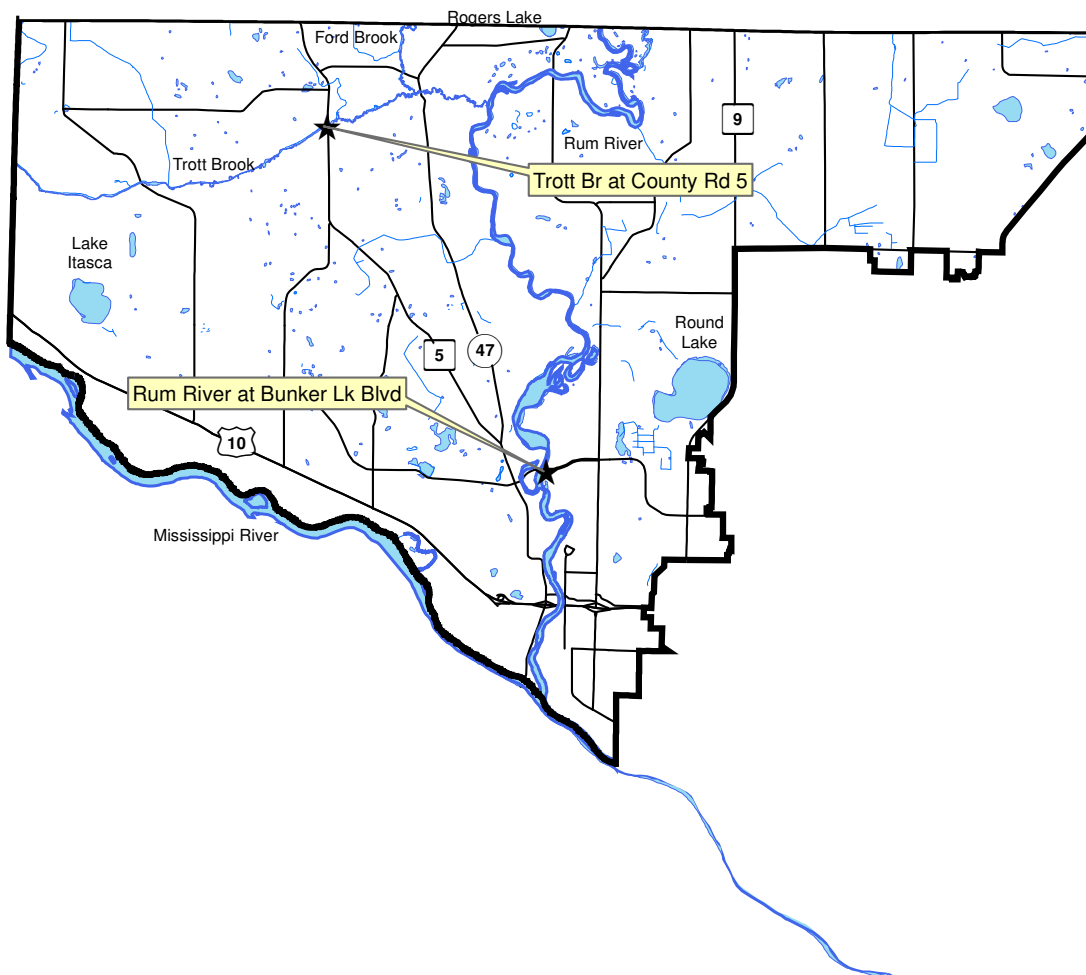
Description: The Anoka Conservation District (ACD) is conducting Surface Water Assessment Grant (SWAG) monitoring for the MPCA in 2013 and 2014. Monitoring events are scheduled May through September for of the following parameters: total suspended solids, chlorides, sulfate, hardness, calcium, magnesium, nitrogen-ammonia, total kjeldahl nitrogen, nitrate & nitrite, volatile suspended solids, e. coli, total phosphorus, Secchi tube transparency, dissolved oxygen, turbidity, temperature, conductivity, pH, and salinity.

Purpose: To provide an initial assessment of water quality to be used in the completion of the Rum River Watershed Restoration and Protection Plan (WRAPP).

Locations: Trott Brook at County Road 5
Rum River at Bunker Lake Blvd

Results: Results are presented on the following pages.

2014 Lower Rum River Monitoring Sites



Stream Water Quality Monitoring

TROTT BROOK

Trott Brook at Co. Rd. 5, Ramsey

STORET SiteID = S003-176

Years Monitored

Trott at Co. Rd. 5 1998, 2003, 2006, 2012, 2013, 2014

Background

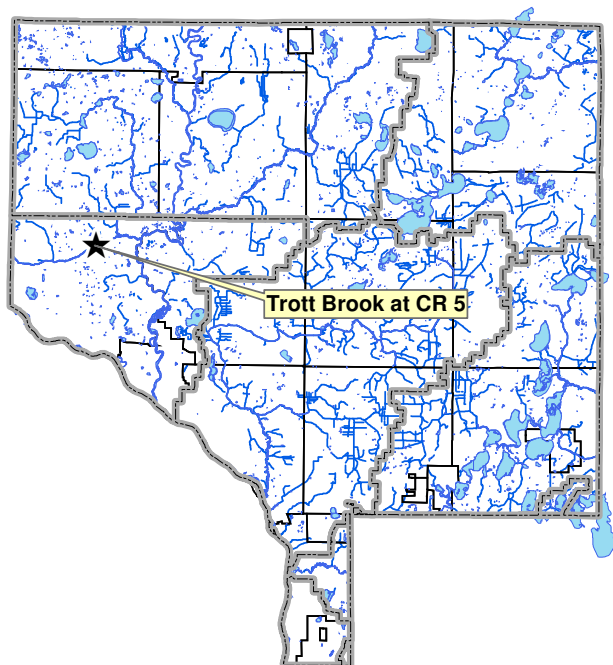
Trott Brook is a medium-sized creek that flows south through Sherburne County, paralleling the Anoka-Sherburne County boundary before turning east through the City of Ramsey where outlets to the Rum River. Overall, the watershed is rural or suburban residential, and areas within the watershed are undergoing rapid development. The creek is about 25 feet wide and 2.5 feet deep at the monitoring site during baseflow. The monitoring site is approximately one mile upstream of Trott Brook's confluence with Ford Brook.

Results and Discussion

This report includes data from 2014. A reason this monitoring is being performed is to gain additional historical data for the state to determine if the creek is meeting state water quality standards. That assessment process is part of the Rum River Watershed Restoration and Protection Project (WRAPP). The following is a summary of results.

- Dissolved constituents, as measured by conductivity, in Trott Brook was similar to other Anoka County streams. Conductivity averaged 0.482 mS/cm Maximum of 0.595 mS/cm and a minimum of 0.320 mS/cm).
- Phosphorous averaged higher the proposed MPCA water quality standard of 100 ug/l. If the proposed standard is approved Trott Brook often exceeds the limit, even during baseflow periods. Phosphorous in Trott Brook averaged 111 ug/l (maximum of 150 ug/l and a minimum of 78 ug/l).
- Turbidity stayed below the state standards each sampling event. Turbidity averaged 4.2 NTU (maximum of 10.2 NTU and a minimum of 0.00 NTU).
- pH was within the range considered normal and healthy for streams in this area. pH averaged 7.61 (maximum of 7.88 and a minimum of 7.35).
- Dissolved oxygen was periodically below the state water quality standard of 5 mg/L of dissolved oxygen (DO). Low DO in this creek was a known concern based on past monitoring. In 2014 Trott Brook 1 of the 6 DO measurements was below 5 mg/L and all measurements averaged 5.29 mg/l (maximum of 6.38 mg/l and a minimum of 3.69 mg/l). Measurements were not taken in early morning when DO is typically lowest.

For a significant number of the results below there are no current state standards. However, this data will be used as a baseline for future assessments of the watershed.



Trott Brook Water Quality Monitoring Results for 2014.

Grey column indicates date with E.coli duplicate.

Trott Brook at CR 5		6/2/2014	6/16/2014	7/2/2014	7/2/2014	7/21/2014	8/5/2014	8/26/2014	Average	Min	Max
Units	R.L.*	Results	Results	Results	Results	Results	Results	Results			
pH		7.35	7.41	7.58		7.81	7.63	7.88	7.61	7.35	7.88
Conductivity	mS/cm	0.357	0.32	0.512		0.531	0.576	0.595	0.482	0.320	0.595
Turbidity	NTU	10.2	5.4	7.0		1.8	0.0	0.6	4.2	0.0	10.2
D.O.	mg/L	4.21	3.69	6.19		6.01	6.38	5.27	5.29	3.69	6.38
D.O.	%	36.2	35.4	69.8		70.9	69.3	56.4	56.3	35.4	70.9
Temp.	°C	20.0	18.3	19.8		22.0	18.7	17.6	19.4	17.6	22.0
Salinity	%	0.17	0.15	0.19		0.26	0.27	0.29	0.22	0.15	0.29
T.P.	ug/L	150	112	114		99		78	111	78	150
Chl-a	ug/L	3.2	1.1	<1		<1		2.6	2.3	<1	3.2
Ortho-P	mg/L	0.036	0.034	0.033		0.032		0.033	0.034	0.032	0.036
Sacchi-tube	cm	>100	>100	92		>100	>100	>100	>100	92	>100
Nitrogen, Ammonia	mg/L	<0.16	<0.16	<0.16		<0.16		<0.16	<0.16	0.00	0.15
TKN	mg/L	2.1	1.5	1.2		1.4		1.2	1.48	1.20	2.10
Nitrate plus Nitrite	mg/L	<0.2	<0.2	0.38		0.26		0.36	0.33	0.26	0.38
BOD	mg/L	<2	<2	<2		<2		<2	<2.00	0.00	1.99
E coli	MPN	135	186	35.0	31.0	51.0	36.0	58.0	76.0	31.0	186.0
Appearance		3	3	1A		1A	1A	1A			
Recreational		2	2	2		2	2	3	2	2	3

Stream Water Quality Monitoring

RUM RIVER

Rum River at Bunker Lake Boulevard, Anoka

STORET SiteID = S007-555

Years Monitored

Rum River at Bunker L Blvd 2013, 2014

Background

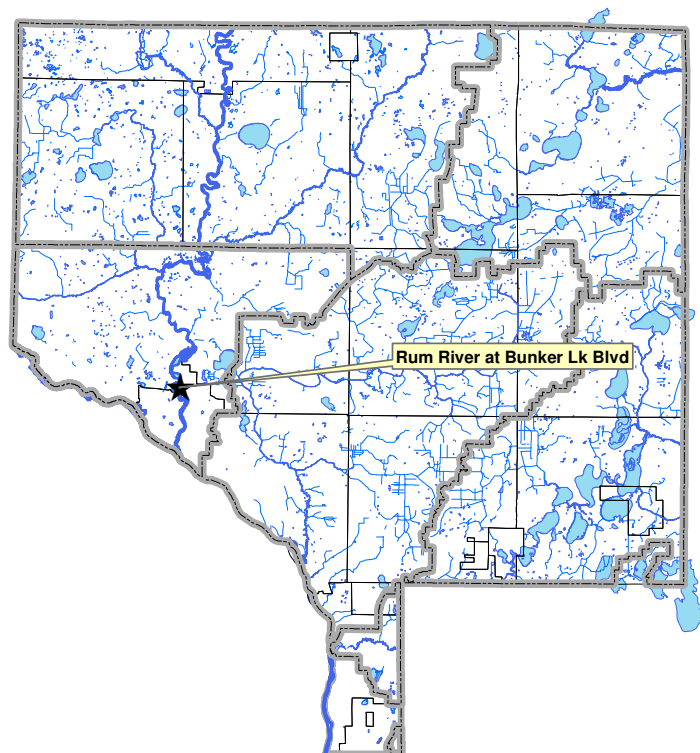
The Rum River originates from Lake Mille Lacs, and flows south through western Anoka County where it joins the Mississippi River in the City of Anoka. In Anoka County the river has both rocky riffles (northern part of county) as well as pools and runs with sandy bottoms. The river's condition is generally regarded as excellent. Most of the Rum River in Anoka County has a state "scenic and recreational" designation. The sampling site is at the pier located in River Bend Park, southwest of the Bunker Lake Boulevard bridge.

Results and Discussion

This report includes data from 2014. A reason this monitoring is being performed is to gain additional historical data for the state to determine if the river is meeting state water quality standards. That assessment process is part of the Rum River Watershed Restoration and Protection Project (WRAPP). The following is a summary of results.

- Dissolved constituents, as measured by conductivity, in the Rum River were low when compared to Anoka County streams. Conductivity averaged 0.293 mS/cm Maximum of 0.338 mS/cm and a minimum of 0.240 mS/cm).
- Phosphorous was typically higher than the proposed MPCA water quality standard of 100 ug/l, even during baseflow periods. Phosphorous results in the Rum River averaged 139 ug/l (maximum of 188 ug/l and a minimum of 73 ug/l).
- Turbidity was below the state standards each sampling event and averaged well below the standards. Turbidity averaged 8.35 NTU (maximum of 11.30 NTU and a minimum of 5.90 NTU).
- pH and dissolved oxygen were with the range considered normal and healthy for streams in this area. pH averaged 7.98 (maximum of 8.40 and a minimum of 7.63). DO averaged 9.03 mg/l (maximum of 15.50 mg/l and a minimum of 7.36 mg/l).

For a significant number of the results below there are no current state standards. However, this data will be used as a baseline for future assessments of the watershed.



Rum River Water Quality Monitoring Results for 2014.

Grey column indicates date with QA/QC duplicates.

Rum River at Bunker Lk Boulevard		6/2/2014	6/16/2014	7/2/2014	7/2/2014	7/21/2014	8/5/2014	8/26/2014	Average	Min	Max
Units	R.L.*	Results	Results	Results	Results	Results	Results	Results			
pH	0.1	7.63	7.63	7.77		8.11	8.4	8.33	7.98	7.63	8.40
Conductivity	mS/cm	0.240	0.247	0.296		0.306	0.331	0.338	0.293	0.240	0.338
Turbidity	NTU	8.4	5.9	9.8		11.3	6.3	8.4	8.35	5.90	11.30
D.O.	mg/L	15.5	7.36	7.50		7.44	8.07	8.30	9.03	7.36	15.50
D.O.	%	80.7	73.6	86.5		90.2	93.5	96.6	86.9	73.6	96.6
Temp.	°C	21.2	18.8	21.1		23.8	22.8	21.7	21.6	18.8	23.8
Salinity	%	0.11	0.12	0.14		0.15	0.16	0.16	0.14	0.11	0.16
T.P.	ug/L	162	165	183	188	113	73	90	139	73	188
Chl-a	ug/L	2.1	<1	2	1.1	1.7	3.4	2.6	2.2	1.1	3.4
Secchi-tube	cm	81	>100	83		91	>100	>100		81	>100
TKN	mg/L	1.2	1.1	1.2	1.4	1.5	0.8	1.2	1.20	0.80	1.50
Nitrate plus Nitrite	mg/L	0.2	0.22	0.23	0.25	0.3	0.24	0.39	0.26	0.20	0.39
E coli	MPN	172	46	28.0	31.0	50.0	50.0	77.0	64.9	28.0	172.0
Appearance		1	1	1		1	1	1	1	1	1
Recreational		3	3	3		2	3	2	3	2	3

Stream Water Quality Monitoring

FORD BROOK

At CR 63, Oak Grove

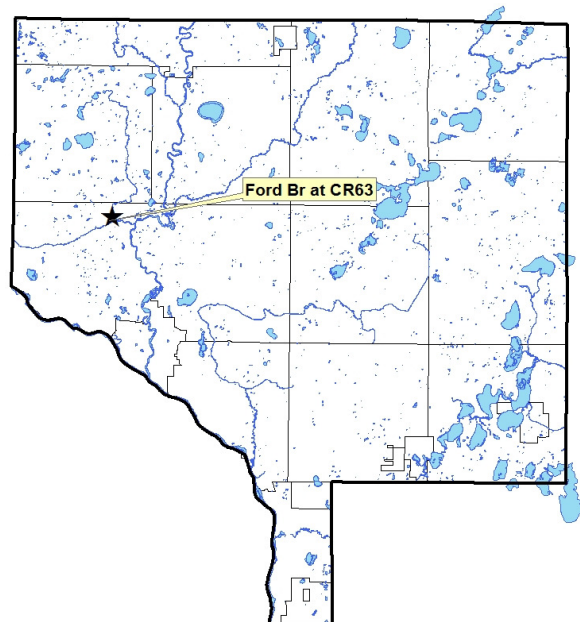
Background

Ford Brook originates at Goose Lake in north-western Anoka County and flows south. Ford Brook is a tributary to the Rum River. In north-western Anoka County it flows through the relatively undisturbed community of Nowthen before joining Trott Brook just prior to the Rum River.

Ford Brook is one of the smaller streams in Anoka County. The watershed is moderately developed with scattered single family homes, but continues to grow.

Results and Discussion

This report includes data from 2014. A reason this monitoring is being performed is due to the lack of historical data for the state to determine if the creek is meeting state water quality standards. That assessment process is part of the Rum River Watershed Restoration and Protection Project (WRAPP). The following is a summary of results.



- Dissolved constituents, as measured by conductivity, in Ford Brook was average when compared to similar Anoka County streams. Conductivity averaged 0.299 mS/cm (maximum of 0.394 mS/cm and a minimum of 0.128 mS/cm).
- Phosphorous averaged over the proposed MPCA water quality standard of 100 ug/l. If the proposed standard is approved, Ford Brook often exceeds the limit, even during baseflow periods. Phosphorous results in Ford Brook averaged 120.2 ug/l (maximum of 176 ug/l and a minimum of 54 ug/l).
- Suspended solids and turbidity both stayed below the state standards each sampling event and averaged well below the standards. Total suspended solids averaged 8.80 mg/l (maximum of 19 mg/l and a minimum of 3 mg/l). Turbidity averaged 15.86 NTU (maximum of 50.0 NTU and a minimum of 4.1 NTU). Water flow during the 50.0 NTU reading was extremely fast and turbulent due to abnormal rainfall.
- pH and dissolved oxygen were with the range considered normal and healthy for streams in this area. pH averaged 7.64 (maximum of 7.71 and a minimum of 7.58). DO averaged 9.58 mg/l (maximum of 14.73 mg/l and a minimum of 6.19 mg/l).

For a significant number of the results below there are no current state standards. However, this data will be used as a baseline for future assessments of the watershed.

FordBrook at CR63

			4/28/2014	5/9/2014	6/2/2014	6/16/2014	7/2/2014			
	Units	R.L.*	Results	Results	Results	Results	Results	Average	Min	Max
pH		0.1	7.7	7.71	7.58	7.6	7.6	7.64	7.58	7.71
Conductivity	mS/cm	0.01	0.314	0.128	0.344	0.316	0.394	0.299	0.128	0.394
Turbidity	NTU	1	50.0	4.1	10.4	8.0	7.0	15.90	4.10	50.00
D.O.	mg/L	0.01	12.29	7.35	14.73	7.33	6.19	9.58	6.19	14.73
D.O.	%	1	97.7	70.8	75	71	69.8	76.9	69.8	97.7
Temp.	°C	0.1	4.7	11.6	20.5	18.5	19.8	15.0	4.7	20.5
Salinity	%	0.01	0.14	0.03	0.16	0.15	0.19	0.13	0.03	0.19
T.P.	ug/L	10	98	54	176	121	152	120	54	176
TSS	mg/L	2	19	4	10.0	3	8	8.8	3.0	19.0
Secchi-tube	cm		43	>100	83	97	92	>100	43	97
E coli	MPN				93.0	161.6	224.7	159.8	93.0	224.7
Appearance					1B	2	3			
Recreational					2	2	2	2	2	2

*reporting limit

Stream Water Quality – Biological Monitoring

- Description:** This program combines environmental education and stream monitoring. Under the supervision of 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 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.
- Locations:** Rum River behind Anoka High School, south side of Bunker Lake Blvd, Anoka
- 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

- % Dominant Family High numbers indicates an uneven community, and likely poorer stream health.
-

Biomonitoring

RUM RIVER

behind Anoka High School, Anoka
 STORET SiteID = S003-189

Last Monitored

By Anoka High School in 2014

Monitored Since

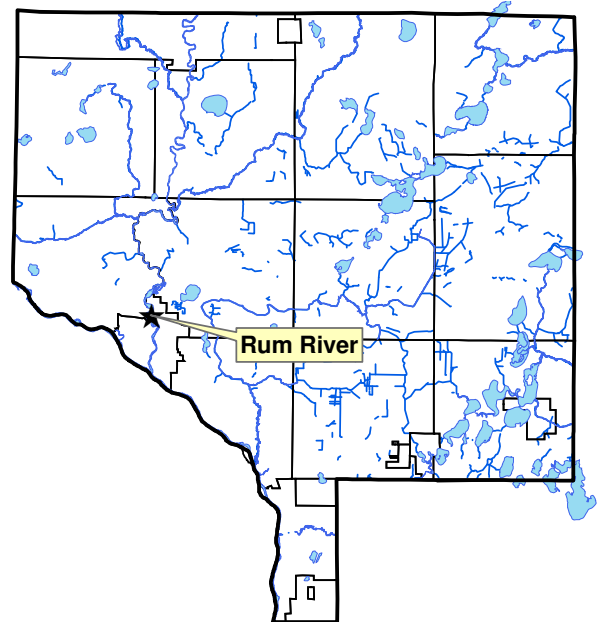
2001

Student Involvement

128 students in 2014, approximately 738 since 2001

Background

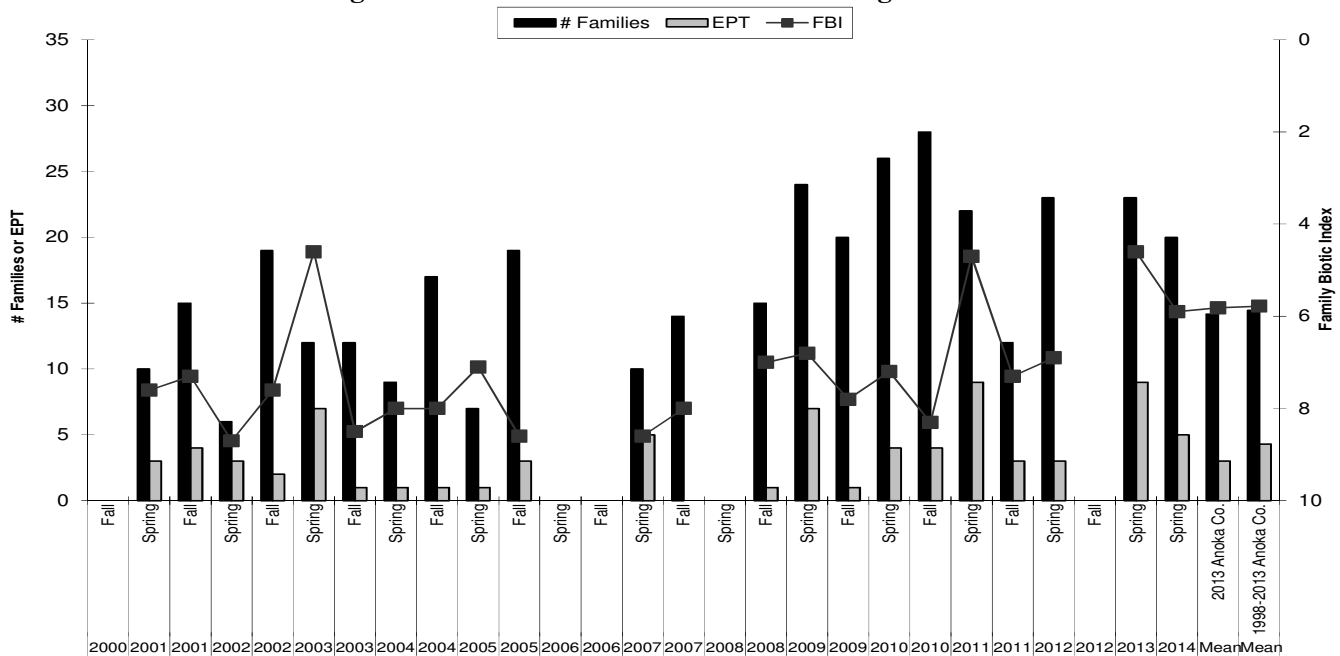
The Rum River originates from Lake Mille Lacs, and flows south through western Anoka County where it joins the Mississippi River in the City of Anoka. In Anoka County the river has both rocky riffles (northern part of county) as well as pools and runs with sandy bottoms. The river's condition is generally regarded as excellent. Most of the Rum River in Anoka County has a state "scenic and recreational" designation. The sampling site is near the Bunker Lake Boulevard bridge behind Anoka High School. Most sampling has been conducted in a backwater rather than the main channel.



Results

Anoka High school classes monitored the Rum River in spring of 2014 with Anoka Conservation District (ACD) oversight. The results for spring 2014 were similar to previous years. More families, 20 in total, were found here than in any other Anoka County stream. This should be expected as most other sites are small streams and this is a larger river. The number of sensitive EPT families (5) and the FBI score (5.9) were the best in Anoka County and above the county averages.

Summarized Biomonitoring Results for Rum River behind Anoka High School



Biomonitoring Data for the Rum River behind Anoka High School

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

Year	2009	2009	2010	2010	2011	2011	2012	2013	2014	Mean	Mean
Season	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Spring	Spring	2014 Anoka Co.	1998-2014 Anoka Co.
FBI	6.80	7.80	7.20	8.30	4.70	7.30	6.90	4.60	5.90	5.8	5.8
# Families	24	20	26	28	22	12	23	23	20	13.2	14.6
EPT	7	1	4	4	9	3	3	9	5	3.0	4.3
Date	8-May	28-Sep	18-May	7-Oct	10-Jun	5-Oct	8-May	14-May	20-May		
sampling by	AHS	AHS	AHS	AHS	ACD	ACD	AHS	AHS	AHS		
sampling method	MH	MH	MH	MH	MH	MH	MH	MH	MH		
Mean # individuals	880	585	443	816	604	188	502	357	350		
# replicates	1	2	1	1	1	1	2	4	4		
Dominant Family	Siphonuridae	Hyaellidae	Gastropoda	Hyaellidae	baetidae	hyaellidae	siphonuridae	Perlodidae	Siphonuridae		
% Dominant Family	40.7	39.1	31.8	34.1	57.5	63.3	37.8	42.1	33.4		
% Ephemeroptera	48.2	0.9	8.1	0.9	59.3	11.2	44.9	19.4	57.8		
% Trichoptera	0.1	0	0	0.2	1	0	1.2	0.2	0.1		
% Plecoptera	2.6	0	0.5	0	3.8	0.5	0	42.6	0.5		

Supplemental Stream Chemistry Readings

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

Parameter	5/18/2010	10/7/2010	6/10/2011	10/5/2011	5/8/2012	5/13/2013	5/20/2014
pH	7.24	7.22	7.84	7.98	8.10	7.69	8
Conductivity (mS/cm)	0.207	0.399	0.296	0.296	0.205	0.181	0.237
Turbidity (NTU)	7	7	18	10	7	5	14.2
Dissolved Oxygen (mg/L)	6.93	na	6.85	7.91	7.87	10.00	13.05
Salinity (%)	0	0.01	0.01	0.01	0.00	0.00	0.11
Temperature (°C)	14.8	12.2	20.7	15.3	15.7	13.0	13.5

Discussion

Both chemical and biological monitoring indicate the good quality of this river. Habitat is ideal for a variety of stream life, and includes a variety of substrates, plenty of woody snags, riffles, and pools. Water chemistry monitoring done at various locations on the Rum River throughout Anoka County found that water quality is also good. Both habitat and water quality decline, but are still good, in the downstream reaches of the Rum River where development is more intense and the Anoka Dam creates a slow moving pool.

Historically, biomonitoring near Anoka was conducted mostly in a backwater area that has a mucky bottom and does not receive good flow. This area is unlikely to be occupied by families which are pollution intolerant. In recent years more sampling occurred in the main channel which has more diverse habitat. This change in sampling explains the apparent improvement in the invertebrate community in recent years. In 2014 sampling returned to the backwater area, however extreme water levels likely altered its normal functions.



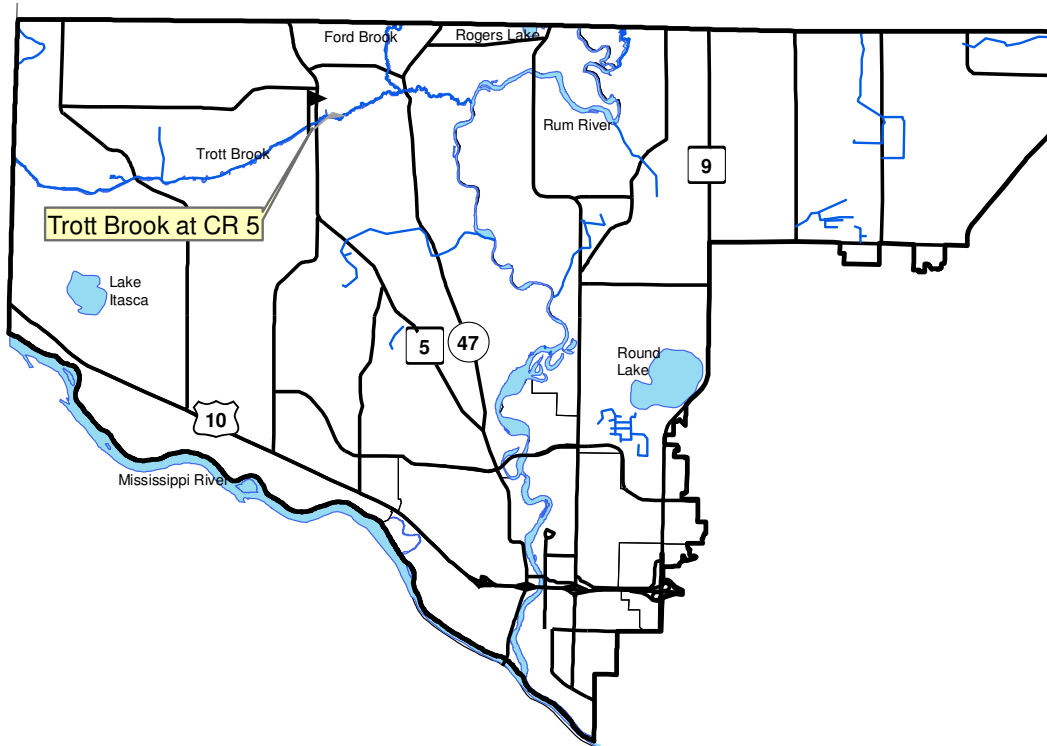
Stream Hydrology

Description: Continuous water level monitoring in streams.

Purpose: To provide understanding of stream hydrology, including the impact of climate, land use or discharge changes. These data are also needed for calculation of pollutant loads and use of computer models for developing management strategies.

Locations: Trott Brook at County Road 5

Lower Rum River Watershed Stream Hydrology Monitoring Sites



Stream Hydrology Monitoring

TROTT BROOK

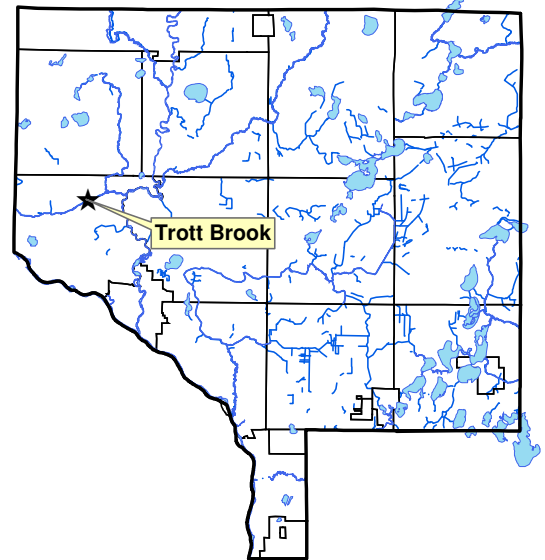
at County Road 5 (Nowthen Blvd NW), Ramsey
 STORET SiteID = S003-176

Notes

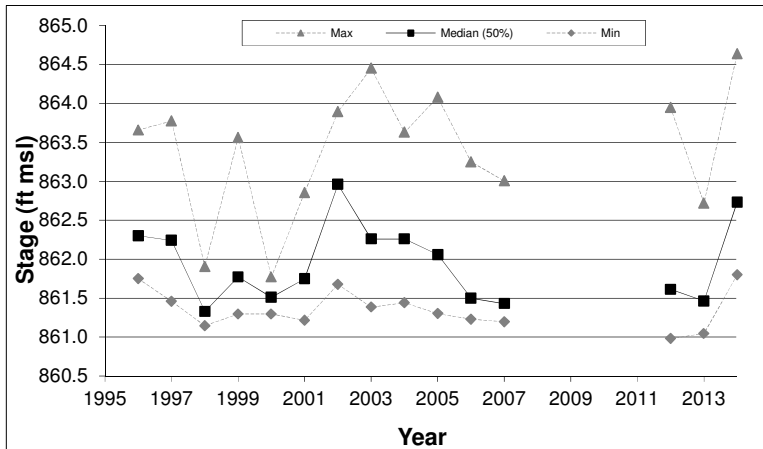
Trott Brook is a medium-sized creek that flows south through Sherburne County, paralleling the Anoka-Sherburne County boundary before turning east through the City of Ramsey where outlets to the Rum River. Overall, the watershed is rural or suburban residential, and areas within the watershed are undergoing rapid development. The creek is about 25 feet wide and 2.5 feet deep at the monitoring site during baseflow.

A rating curve for this site was developed in 2013:

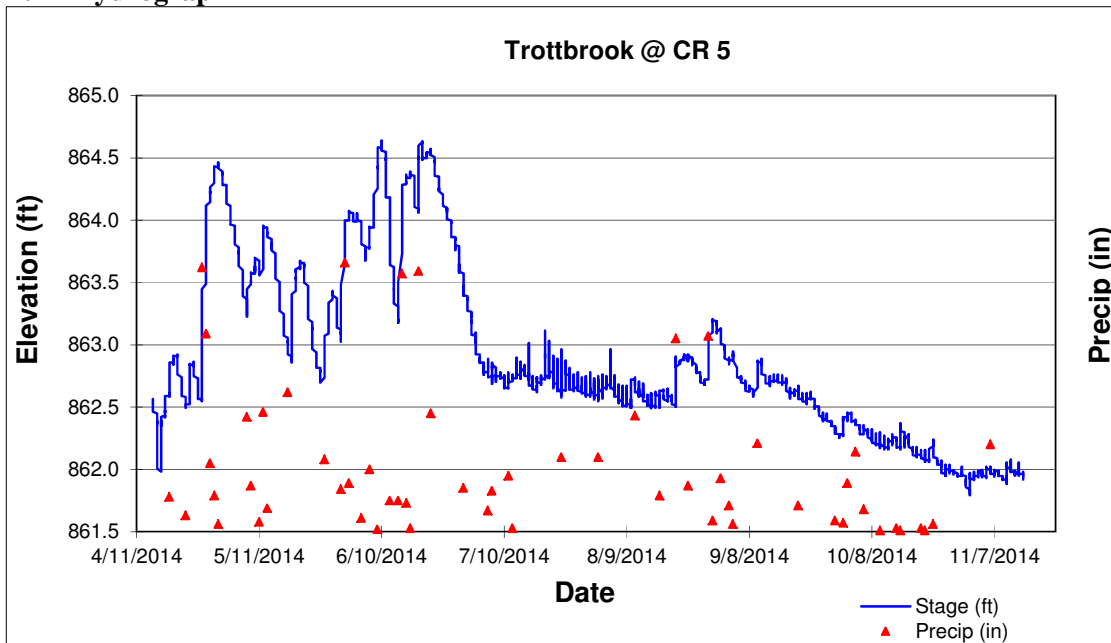
$$\text{Flow (cfs)} = 16.39(\text{stage}-859)^2 - 63.716(\text{stage}-859) + 65.908$$



Summary of All Monitored Years



2014 Hydrograph



Wetland Hydrology

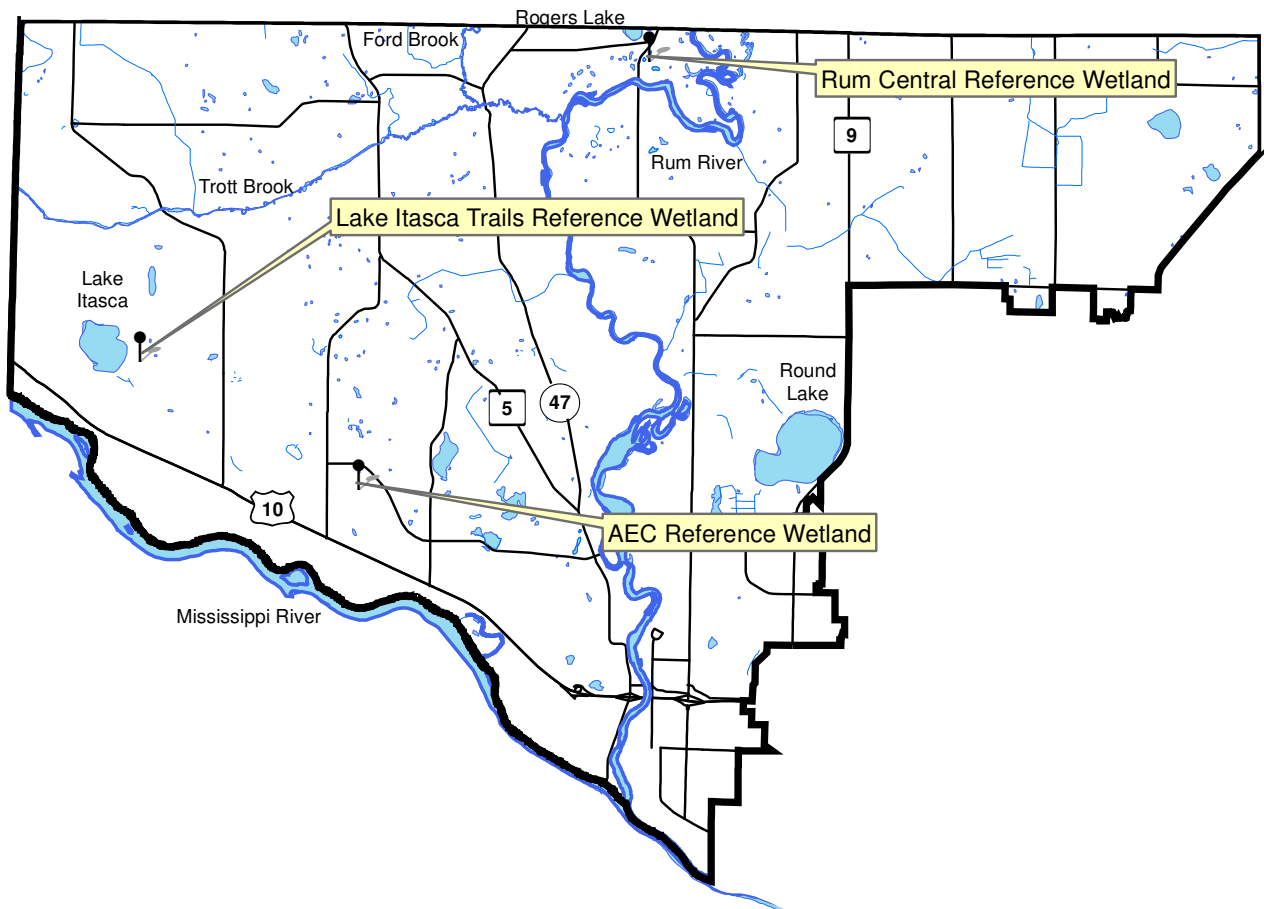
Description: Continuous groundwater level monitoring at a wetland boundary to a depth of 40 inches. County-wide, the ACD maintains a network of 23 wetland hydrology monitoring stations.

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

Locations: AEC Reference Wetland, Connexus Energy Property on Bunker Lake Blvd, Ramsey
Rum River Central Reference Wetland, Rum River Central Park, Ramsey
Lake Itasca Trail Reference Wetland, Lake Itasca Park, Ramsey

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

Lower Rum River Watershed Wetland Hydrology Monitoring Sites



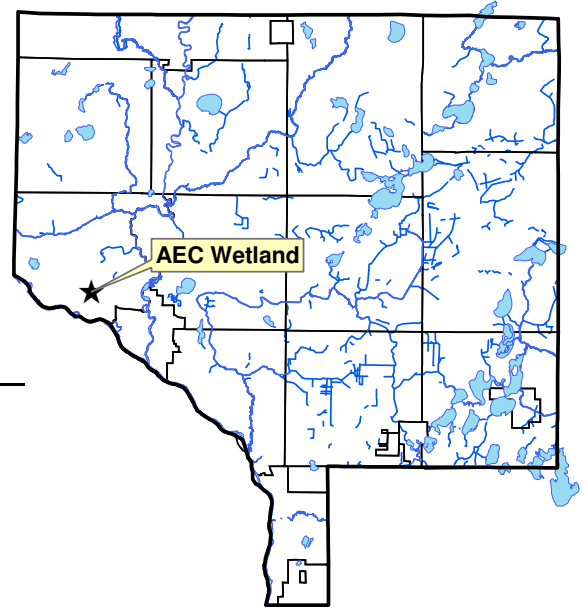
Wetland Hydrology Monitoring

AEC REFERENCE WETLAND

Cottonwood Park, adjacent to Connexus Energy Offices (formerly Anoka Electric Coop), Ramsey

Site Information

Monitored Since: 1999
Wetland Type: 3
Wetland Size: ~18 acres
Isolated Basin? No, probably receives storm water
Connected to a Ditch? No



Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
A	0-15	10yr2/1	Sandy Loam	-
Bw	15-40	10yr3/2	Gravelly Sandy loam	-

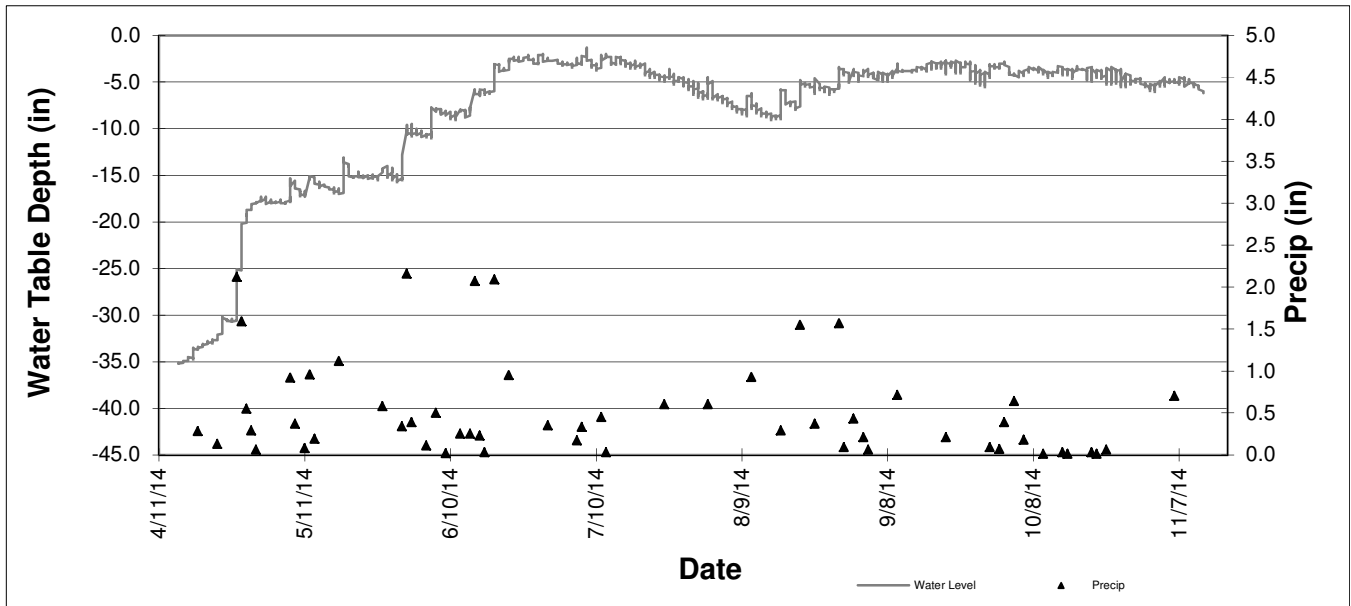
Surrounding Soils: Hubbard coarse sand

Vegetation at Well Location:

Scientific	Common	% Coverage
Populus tremuloides	Quaking Aspen	30
Salix bebbiana	Bebb Willow	30
Carex Spp	Sedge undiff.	30
Solidago canadensis	Canada Goldenrod	20

Other Notes: Well is located at the wetland boundary.

2014 Hydrograph



Well depth was 42 inches, so a reading of -42 indicates water levels were at an unknown depth greater than or equal to 42 inches.

Wetland Hydrology Monitoring

RUM RIVER CENTRAL REFERENCE WETLAND

Rum River Central Regional Park, Ramsey

Site Information

Monitored Since: 1997
Wetland Type: 6
Wetland Size: ~0.8 acres
Isolated Basin? Yes
Connected to a Ditch? No

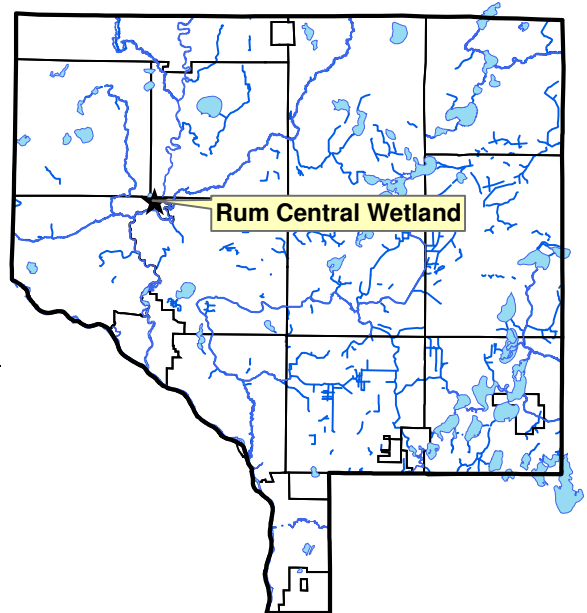
Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
A	0-12	10yr2/1	Sandy Loam	-
Bg1	12-26	10ry5/6	Sandy Loam	-
Bg2	26-40	10yr5/2	Loamy Sand	-

Surrounding Soils: Zimmerman fine sand

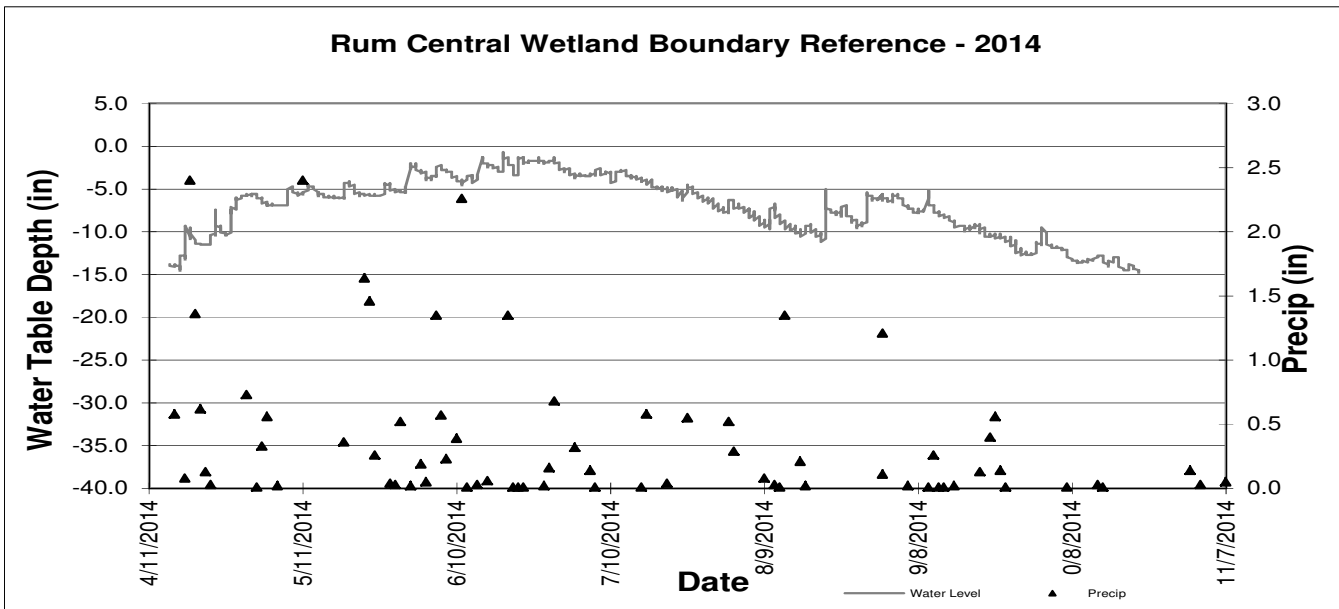
Vegetation at Well Location:

Scientific	Common	% Coverage
Phalaris arundinacea	Reed Canary Grass	40
Corylus americanum	American Hazelnut	40
Onoclea sensibilis	Sensitive Fern	30
Rubus strigosus	Raspberry	30
Quercus rubra	Red Oak	20



Other Notes: Well is located at the wetland boundary.

2013 Hydrograph



Well depth was 40 inches, so a reading of -40 indicates water levels were at an unknown depth greater than or equal to 40 inches.

Wetland Hydrology Monitoring

LAKE ITASCA TRAILS REFERENCE WETLAND

Lake Itasca Trails Park, Ramsey

Site Information

Monitored Since: 2013
Wetland Type: 2/6
Wetland Size: ~10 acres
Isolated Basin?: Yes
Connected to a Ditch?: No

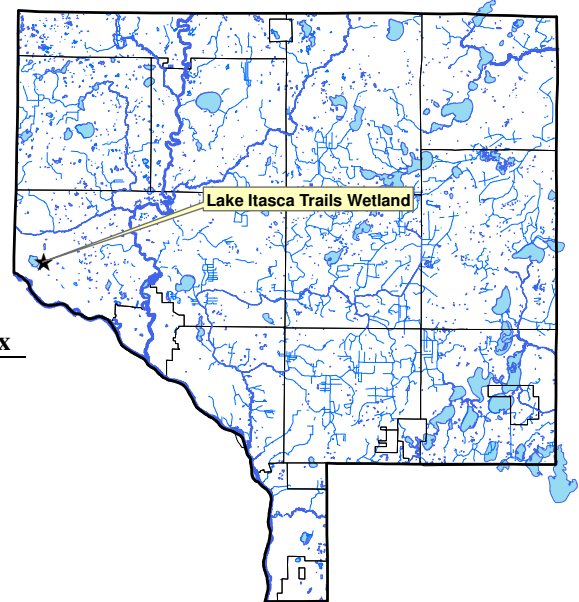
Soils at Well Location:

Horizon	Depth	Color	Texture	Redox
A1	0-12	10yr2/0	Mucky sand	-
A2	12-20	10ry2/1	Sand	-
B1	20-36	10yr4/1	Sand and fine gravel	-
B2	36-48	10yr6/1	Sand and fine gravel	-

Surrounding Soils: Hubbard coarse sand

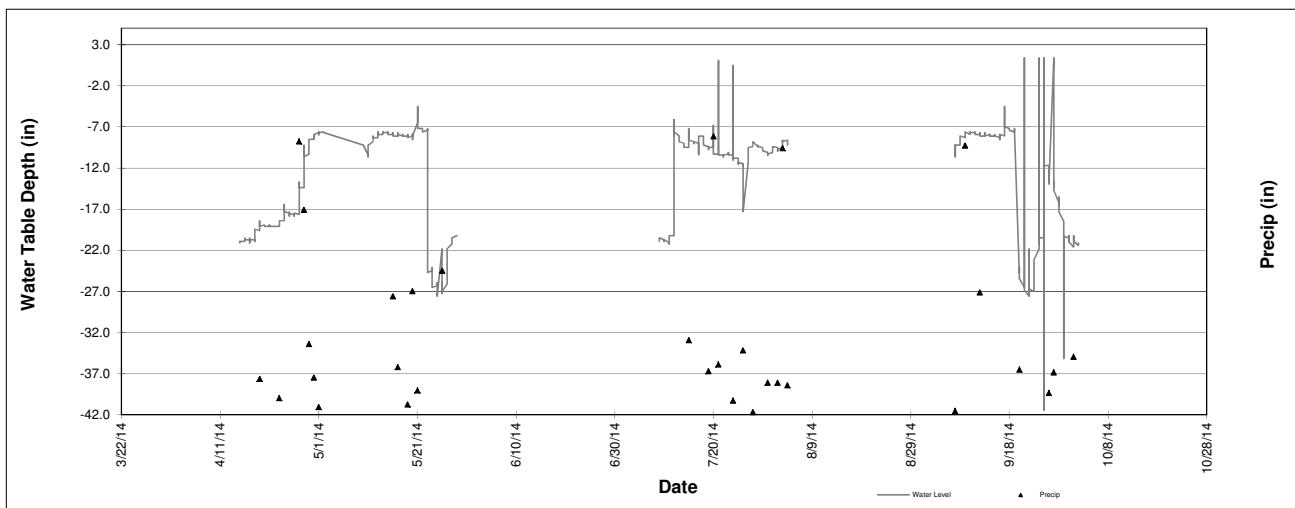
Vegetation at Well Location:

Scientific	Common	% Coverage
Carex stricta	Hummock Sedge	80
Phalaris arundinacea	Reed Canary Grass	20
Salix sp.	Willow	20
Rubus sp.	Bristle-berry	5



Other Notes: Well is located about 10 feet east and about 6 inches downslope of the wetland boundary. DNR Public Water Wetland 2-339.

2014 Hydrograph



Well depth was 40 inches, so a reading of -40 indicates water levels were at an unknown depth greater than or equal to 40 inches. Equipment deployed at this site experienced a multitude of malfunctions. Data should be interpreted accordingly.

Water Quality Grant Fund

Description: The LRRWMO provided cost share for projects on either public or private property that will improve water quality, such as repairing streambank erosion, restoring native shoreline vegetation, or rain gardens. This funding was administered by the Anoka Conservation District, which works with landowners on conservation projects. Projects affecting the Rum River were given the highest priority because it is viewed as an especially valuable resource.

Purpose: To improve water quality in lakes streams and rivers by correcting erosion problems and providing buffers or other structures that filter runoff before it reaches the water bodies.

Results: Projects reported in the year they are installed. No projects were installed in 2014.

LRRWMO Cost Share Fund Summary

2006 LRRWMO Contribution	+	\$1,000.00
2008 Expense – Herrala Rum Riverbank stabilization	-	\$ 150.91
2008 Expense – Rusin Rum Riverbank stabilization	-	\$ 225.46
2009 LRRWMO Contribution	+	\$1,000.00
2009 Expense – Rusin Rum Riverbank bluff stabilization	-	\$ 52.05
2010 LRRWMO Contribution	+	\$ 0
2010 LRRWMO Expenses	-	\$ 0
2011 LRRWMO Contribution	+	\$ 0
2011 Expense - Blackburn Rum riverbank	-	\$ 543.46
2012 LRRWMO Contribution	+	\$1,000.00
2012 Expense – Smith Rum Riverbank	-	\$1,596.92
2013 LRRWMO Contribution	+	\$1,000.00
2013 Expense – Geldacker Mississippi Riverbank	-	\$1,431.20
<u>2014 LRRWMO Contribution</u>	<u>+</u>	<u>\$2,050.00</u>
Fund Balance		\$2,050.00

Newsletters

Description: The Lower Rum River Watershed Management Organization (LRRWMO) contracted the Anoka Conservation District (ACD) to create a series of public education newsletter articles.

Purpose: To improve public understanding of the LRRWMO, its functions, and accomplishments.

Location: Watershed-wide

Results: The Anoka Conservation District (ACD) drafted two newsletters and sent each to local community leaders as well as local newspapers. Each was printed in several city newspapers.

Both newsletters focused on public education regarding wetlands. The articles included information on recognizing wetlands as well as their values and benefits. Brief explanations of wetland regulations and penalties for rule violations were included in both articles. Directives on how to acquire additional information regarding wetlands were also provided.

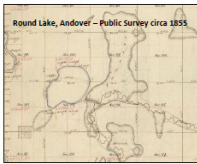
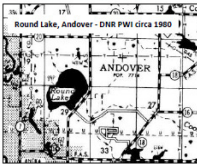
A BRIEF HISTORY OF WETLAND POLICY IN MINNESOTA

1850's survey maps show the general locations of expansive "pre-settlement" wetlands that may have covered as much as 40% of Anoka County. At the turn of the 20th Century, state policy treated these wetlands as undesirable wastelands. This resulted in large-scale ditching efforts that contributed to the drainage of as much as 50% of Anoka County's pre-settlement wetlands.

Following the droughts of the 1930s, however, large-scale drainage efforts were generally abandoned in Anoka County, and Minnesota policy began to shift toward the conservation of surface waters that were considered to have public value. In 1973, shortly after the passage of the federal Clean Water Act, Minnesota expanded its definition of public waters to include large, deep wetlands. These wetlands were mapped in the early-1980s as part of the Minnesota Public Water Inventory. PWI wetlands continue to be managed by the DNR today.


Since Minnesota public waters only protect large, deep wetlands, Minnesota passed the Wetland Conservation Act of 1991 (WCA) to establish protection for all of Minnesota's wetlands that were not included in the PWI. To ensure a "no net loss" of wetland values, WCA requires people to off-set approved unavoidable wetland impacts through wetland mitigation, or by purchasing credits from a local wetland mitigation bank.

WCA is administered through Local Government Units (LGUs), which includes the Lower Rum River Watershed Management Organization and Coon Creek Watershed District. If you have a project that may impact a wetland, contact your LGU to identify any necessary approvals.

Lower Rum River Watershed Management Organization
<http://www.lrrwmo.org>
 Phone: 763-767-5131

Coon Creek Watershed District
www.cooncreekwd.org
 Phone: 763-755-0975



An Ode to Anoka County Wetland Policy - The Dr. Seuss Version

Wetland, wasteland the surveyors said.
 It's 1858, Minnesota settlers are on their way.
 We need some land that's dry.

Ditch, ditch all wetlands, the state of Minnesota did say.
 It's 1900, swamps, bogs, and marshes? What a waste,
 We want progress today.

Dank, dank when the machines.
 Cutting deep channels in straight lines.
 It's the early 1900s, it's still too wet here!
 Drain and straighten everything,
 We're nearly halfway there!

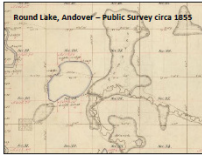
Stop, stop! Cease all the ditching, we have better things to do.
 It's the 1930s, we're out of money, and oh the land so dry.

Wetland, wasteland? Does surface water have value?
 Perhaps we shouldn't drain them all.
 It's the 1940s, we'll save the biggest and the deepest.
 We'll call them Minnesota public waters.


Wetlands, wetlands. We didn't realize.
 Habitat? Flood Storage? Water Quality? They have public value too.
 It's the 1970s, let's map them and protect the wet areas.
 We'll call them public water wetlands.

Wait, wait! We haven't protected them all?
 It's 1991, let's save all wetlands.
 We'll pass the Wetland Conservation Act because they provide us public service.

Drain, fill, excavate. We're still impacting wetlands.
 Will you help protect them too?
 It's 2014, your chance to make history.
 What are you going to do?




Wetland drainage circa 1900



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 Phone: 763-755-0975



WHAT IS THE WETLAND CONSERVATION ACT?

OR, WHAT IS A WMO?

METROPOLITAN SURFACE WATER ACT OF 1982

1973 WILD AND SCENIC RIVER ACT OF MN

[HTTP://BWSR.STATE.MN.US/PLANNING/WD-WMO_OVERVIEW.HTML](http://bwsr.state.mn.us/planning/wd-wmo_overview.html)

The Rum River was added to Minnesota's Wild & Scenic Rivers Program in 1978. The designated stretch extends along Mille Lacs, Sherburne, Isanti and Anoka counties.

In the Minnesota, more than 50 percent of streams have been ditched or straightened.

As warm weather comes so do questions about wetlands. Outdoor projects in and around wetlands can get the owner into "hot water" if proper permits are not obtained. The laws are complex. And "I didn't know" is not an acceptable excuse. But help does exist for free! Your local watershed organization and the Anoka Conservation District can be your guide.

Wetlands are areas in the landscape that naturally have saturated soils or standing water. Along with the presence of water, soils and vegetation are also used to define legal wetland boundaries. Professional wetland delineators determine the wetland boundary. The water edge is not necessarily the same as a wetland boundary.

Filling, draining, excavating, or building within a wetland boundary are all regulated. Unauthorized work within wetlands may result in a Restoration Order, a legal order to put the wetland back the way it was, often at substantial expense to the landowner/violator.

Recognizing the complexity of the wetland laws, local communities provide experts to guide landowners to help keep them out of "hot water." So, before starting any project around a wetland, contact your local watershed organization or the Anoka Conservation District, they will be happy to help you.

Some wetlands rarely have standing water. These seasonal wetlands have a high water table in the spring and then dry out later in the year.

Lower Rum River Watershed Management Organization
<http://www.anokanaturalresources.com/lrrwmo>
 Phone: 763-767-5131

Coon Creek Watershed District
www.cooncreekwd.org
 Phone: 763-755-0975

Anoka Conservation District
www.anokaswcd.org
 Phone: 763-434-2030

Review Member Communities' Local Water Plans

- Description:** Member cities must have local water plans and ordinances consistent with the LRRWMO 3rd Generation Watershed Management Plan (MN Rules 8410.0130 and 84100160). The LRRWMO has approval authority over the Local Water Management Plans. Once a community submits their updated Local Water Management Plan to the WMO for review, the WMO has 60 days to provide comments. The Metropolitan Council has a simultaneous 45 day review period, and the WMO's review of the Plan must include a review of Metropolitan Council's comments.
- The LRRWMO has requested that the ACD assist with their review of local water plans as they are completed.
- Purpose:** To ensure the policies and actions in the LRRWMO 3rd Generation Watershed Management Plan are implemented consistently across the watershed.
- Location:** Watershed-wide
- Results:** As of 2014 the review of Anoka's local water plan has been completed. No other plans have yet been received.

Web Video

- Description:** As part of the LRRWMO's public education plan web videos are being used to convey conservation messages. The ACD was asked to create web videos about water conservation, correcting riverbank erosion, as well as wetland regulation and post them on the LRRWMO website.
- Purpose:** To provide education to the public about aquifer sustainability and water use, streambank erosion problems and solutions, as well as wetland regulation and protection.
- Location:** Watershed-wide
- Results:** The web video about water conservation was completed in March of 2014 and can be viewed through the LRRWMO website. Scripts have been written and video footage has been collected for the assembly of the Riverbank Erosion and Wetland Regulation videos. The videos will be completed and posted to the LRRWMO (*LRRWMO.org*) website by March 31 of 2015.

LRRWMO Website

Description: The Lower Rum River Watershed Management Organization (LRRWMO) contracted the Anoka Conservation District (ACD) to design and maintain a website about the LRRWMO and the Lower Rum River watershed. The website has been in operation since 2003.

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

Location: LRRWMO.org

Results: In 2013 the ACD upgraded, redesigned, and re-launched the LRRWMO website. These updates were necessary because the old website platform was incompatible with certain tablet computers and smartphones. Additionally, the old website was hosted with in the ACD website, while the new website is completely independent, offering the WMO future management choices.

The LRRWMO website contains information about both the LRRWMO and about natural resources in the area. Information about the LRRWMO includes:

- a directory of board members,
- meeting minutes and agendas,
- watershed management plan and annual reports,
- descriptions of work that the organization is directing,
- highlighted projects.

LRRWMO Website Homepage

Lower Rum River Watershed Management Organization

Main Menu

- Home
- Board Members
- Minutes & Agendas
- Cost Share Grants
- Working
- Permits & Contacts
- Papers & Reports
- Projects
- Videos

Other Watershed Organizations

- Coon Creek Watershed District
- Lower Rum River WMO
- Rice Creek Watershed District
- Sunrise River WMO
- Upper Rum River WMO
- Vikstrom Lake Area Water Management WMO

Welcome

The Lower Rum River Watershed Management Organization (LRRWMO) is a joint powers special purpose unit of government including the cities of Ramsey, Anoka, and portions of Coon Rapids and Andover. The WMO Board is made up of representatives from each of these cities. This organization seeks to protect and improve lakes, rivers, streams, groundwater, and other water resources across municipal boundaries. These goals are pursued through:

- water quality and flow [monitoring](#)
- investigative studies of problems
- coordinating improvement projects
- education campaigns
- a permitting process
- others at the WMO's discretion

All of the WMO's activities are guided by their Watershed Management Plan.

Anoka County

Resources of particular importance to the LRRWMO include the Rum River, Troll Brook, numerous ditches that drain to the Rum River, Round Lake, Lake Itasca, and numerous wetlands. The Mississippi River is also notable, as it borders the southern edge of the WMO's jurisdictional area. Because little of the land area in the LRRWMO drains directly to the Mississippi, but rather to the Rum River, the Mississippi receives protection from the WMO primarily through management of the Rum.

Most projects that may directly or indirectly affect water resources are

Video About LRRWMO

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.

Lower Rum River Watershed Financial Summary

Lower Rum River Watershed	WMO Asst (no charge)	BNP Maintenance	Volunteer Precipitation	Reference Wetlands	DNR Observation Wells	Lake Levels	Lake Water Quality	Stream Levels	Stream Water Quality	Watershed Outlet Monitoring	Student Biomonitoring	LRRWMO Admin	LRRWMO Outreach/Promo	Website Management	Anoka Nat. Pres. Restoration	Rum River WRAPP	Cost Share - Local/State	Total
Revenues																		
LRRWMO	0	0	0	1725	0	800	1300	600	0	0	825	850	8440	440	0	0	1431	16411
State	0	0	0	0	120	0	0	0	4473	0	0	0	0	0	29066	16480	0	50138
Anoka Conservation District	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anoka Co. General Services	586	0	0	0	77	0	0	0	0	0	0	0	0	0	8071	0	384	9117
County Ag Preserves	0	0	0	0	0	0	461	0	0	0	39	0	0	0	0	0	5746	6246
Regional/Local	0	0	0	0	0	0	0	0	0	720	0	0	0	0	0	0	0	720
Other Service Fees	0	0	0	0	0	0	0	0	0	0	0	(0)	0	0	1336	0	0	1336
BWSR Cons Delivery	0	3302	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3302
BWSR Cost Share TA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Water Planning	0	0	99	241	0	0	0	0	0	287	0	471	0	14	0	0	0	1111
TOTAL	586	3302	99	1966	197	800	1761	600	4473	1007	864	1321	8440	454	38473	16480	7561	88383
Expenses-																		
Capital Outlay/Equip	13	70	2	42	4	19	29	13	90	22	18	29	101	9	393	118	0	972
Personnel Salaries/Benefits	505	2744	85	1633	170	765	1137	499	3542	867	708	1138	3957	337	15393	4642	0	38122
Overhead	34	184	6	110	11	51	76	34	238	58	48	76	266	23	1034	312	0	2562
Employee Training	4	20	1	12	1	6	8	4	26	6	5	8	29	2	112	34	0	277
Vehicle/Mileage	9	49	2	29	3	14	20	9	63	15	13	20	70	6	273	82	0	677
Rent	22	119	4	71	7	33	49	22	153	37	31	49	171	15	665	201	0	1647
Program Participants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7561	7561
Program Supplies	0	117	0	59	0	3	442	10	362	0	42	0	677	0	20602	11090	0	33404
McKay Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	586	3302	99	1956	197	891	1761	590	4473	1007	864	1321	5270	391	38473	16480	7561	85221

Recommendations

- **Actively participate in the MPCA Rum River WRAPP (Watershed Restoration and Protection Plan) which began in 2013.** This WRAPP is an assessment of the entire Rum River watershed. This is an opportunity for the LRRWMO to prioritize and coordinate efforts with upstream entities and state agencies. TMDL studies with regulatory implications will likely arise out of this project.
- **Diagnose low dissolved oxygen in Trott Brook.** Diagnostic monitoring is complete and will be reviewed by MPCA. Local review is advised.
- **Complete a stormwater retrofitting assessment for the City of Anoka.** The project will identify and rank projects that improve stormwater runoff before it is discharged to the Rum River. A grant is secured by ACD and will be used in communities providing 25% match.
- **Implement water conservation measures** throughout the watershed and promote it metro-wide. Depletion of surficial water is a concern.
- **Continue lake level monitoring, especially on Round Lake** where residents have expressed concerns with levels. Other nearby lakes should be monitored for comparison and problems.
- **Remind LRRWMO Cities that local water plans must be updated.**