CHAPTER 3: UPPER RUM RIVER WATERSHED

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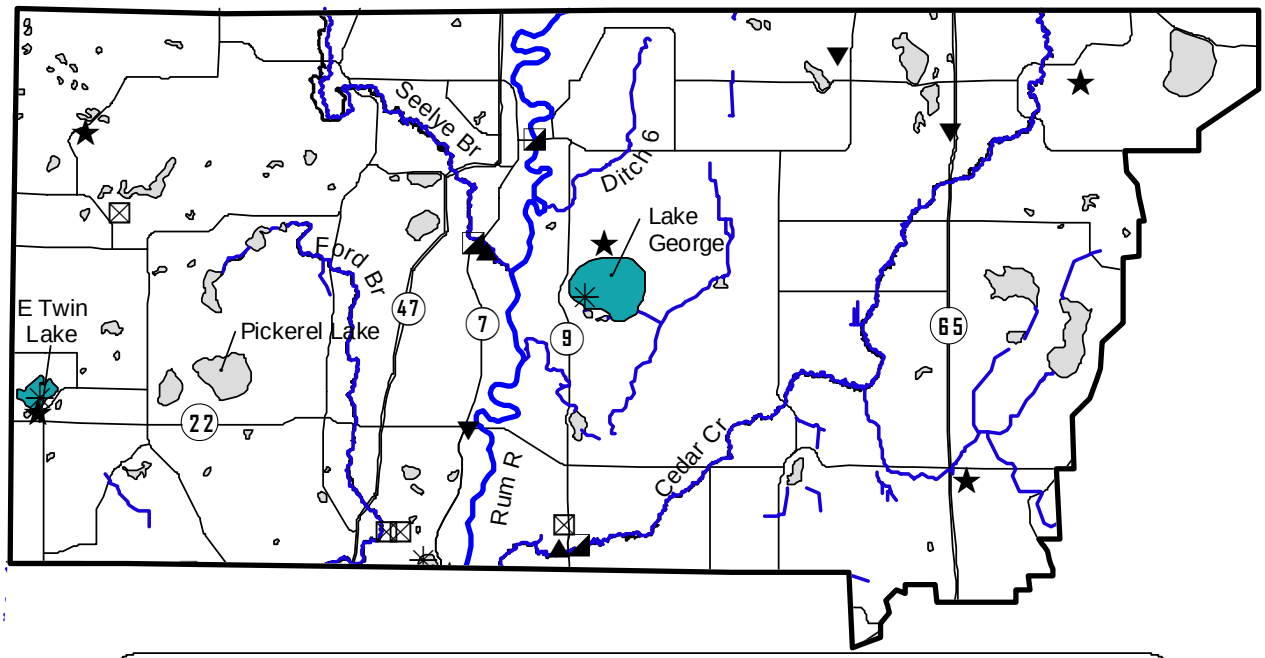
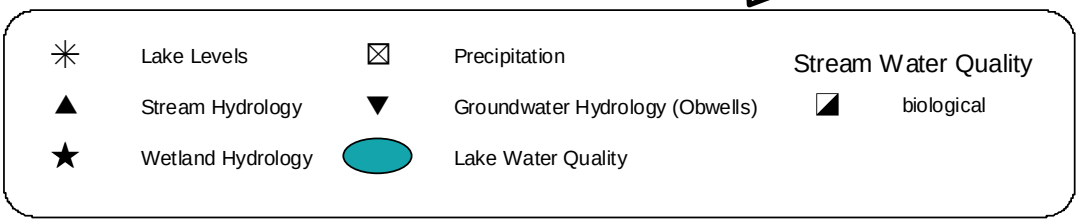
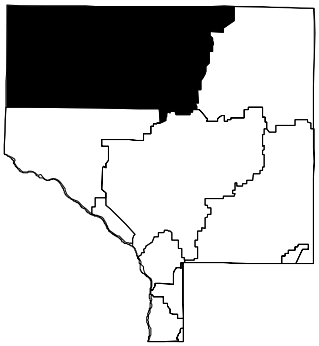
ACD = Anoka Conservation District, URRWMO = Upper Rum River Watershed Mgmt Org,
MNDNR = Minnesota Dept. of Natural Resources







Lake Levels

Description: Weekly water level monitoring in lakes. These data, as well as all additional historic data are available on the Minnesota DNR website using the "LakeFinder" feature (www.dnr.mn.us.state\lakefind\index.html).

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

Locations: East Twin Lake, Lake George, Rogers Lake

Results: Lake levels recovered from lower levels the preceding fall. Throughout summer 2002 water levels rose on all four of these lakes due to record rainfalls throughout the summer and fall.

Figure 3-1: East Twin Lake levels '98-2002

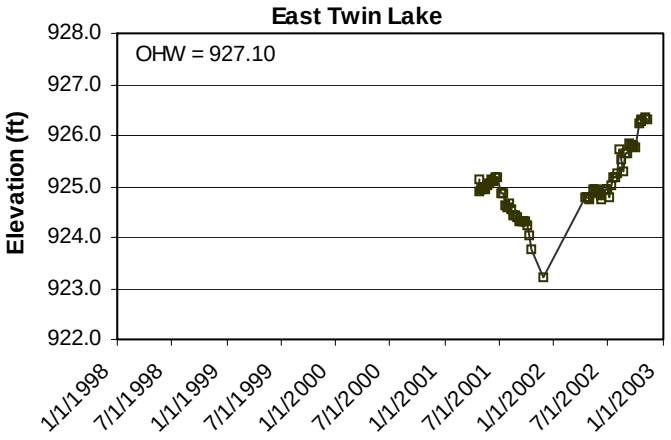


Figure 3-2: Lake George levels '98-2002

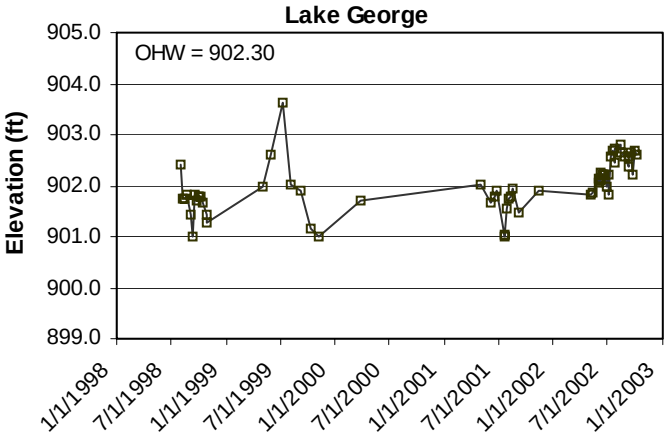
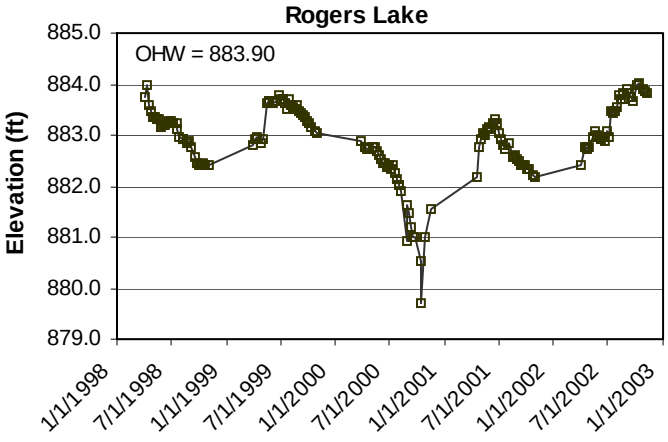


Figure 3-3: Rogers Lake levels '98-2002



Lake	Year	Average	Min	Max
East Twin	2001	924.62	923.2	925.16
	2002	925.36	924.75	926.34
George	1998	901.66	901.01	902.40
	1999	902.04	901.00	903.62
	2000	na	na	na
	2001	901.66	901.00	902.02
	2002	902.34	901.82	902.80
Rogers	1998	883.05	882.41	884.00
	1999	883.40	882.80	883.80
	2000	881.97	879.71	882.87
	2001	882.74	882.17	883.33
	2002	883.36	882.43	884.03

Table 3-1: Upper Rum River Watershed lake levels summary

Stream Hydrology

Description: Continuous water level monitoring in streams.

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

Locations: Seelye Brook at Highway 7, Oak Grove
Cedar Creek at Highway 9, Andover

Results: Both streams responded similarly to heavy rains throughout the summer by maintaining higher flows. The average stage in 2002 was 0.66 and 0.90 ft higher than 2001 for Cedar and Seelye, respectively. Neither stream recessed to the lowest stages seen the previous year. Despite the greater frequency of large rains in 2002 over 2001, maximum stages were 1.6 feet higher in 2001 than 2002. The difference between hydrograph peaks and valleys was greatest for Seelye Brook.

Figure 3-4: Seelye Brook hydrograph.

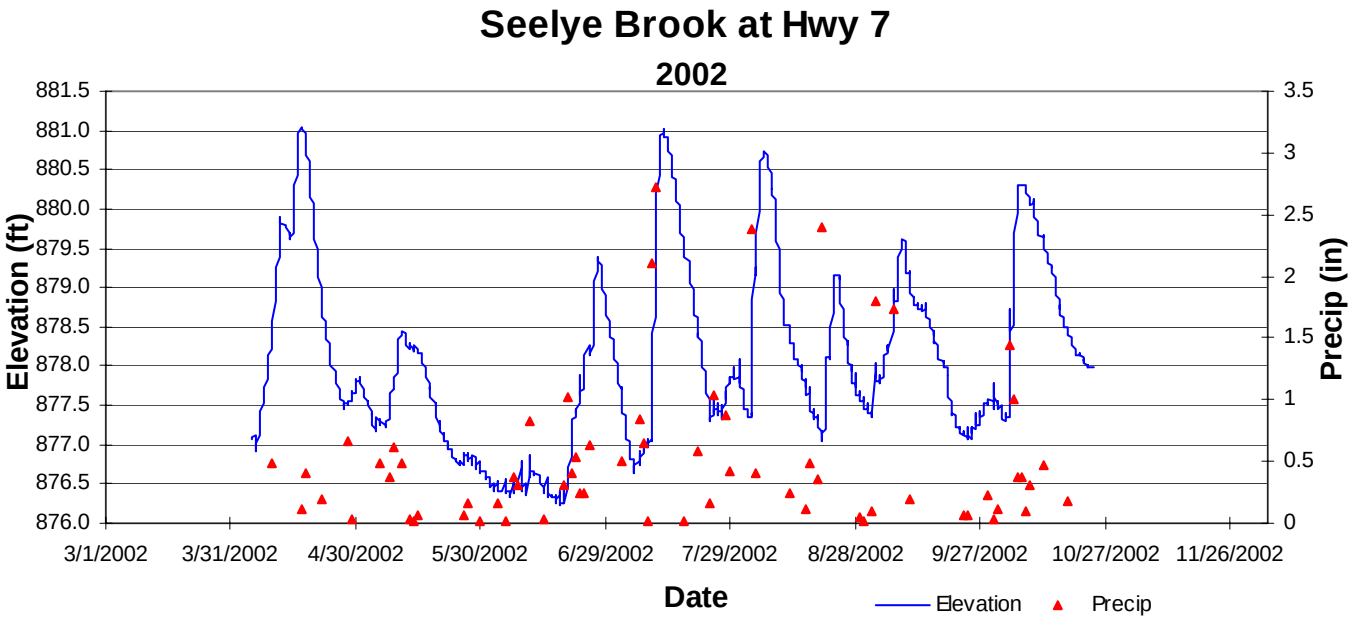
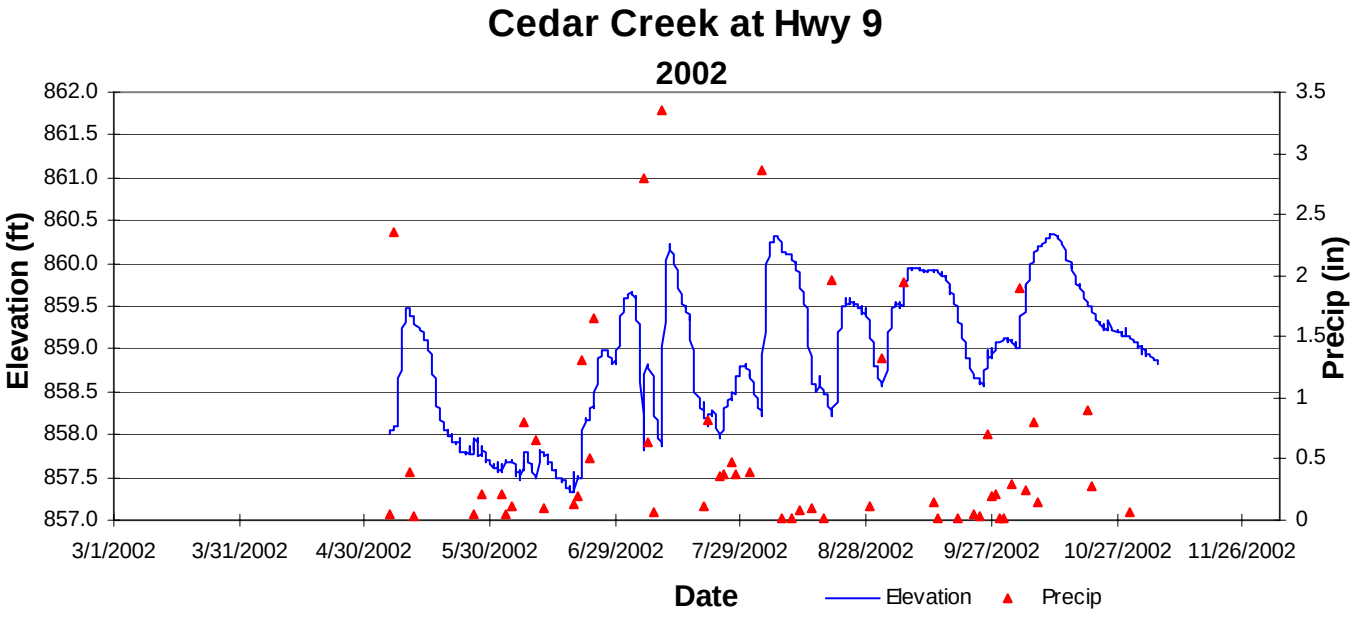


Figure 3-5: Cedar Creek hydrograph.



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 14 wetland hydrology monitoring stations.

Purpose: To provide understanding of wetland hydrology, including the impact of climate and landuse. 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 TechSystems property, Burns
Cedar Creek, Cedar Creek Natural History Area, East Bethel
East Twin Reference Wetland, East Twin County Park, Burns
Lake George Reference Wetland, Lake George County Park, Oak Grove
Viking Meadows Reference Wetland, Viking Meadows Golf Course property, East Bethel

Results: Hydrographs for 2002 were dramatically different from the previous couple of years. Water levels were maintained nearer the surface than seen in previous years. At several sites water levels increased throughout summer as the result of multiple heavy rainfalls, the opposite of the typical seasonal trend. The landscape around these wetlands is relatively undeveloped, especially immediately adjacent to the wetlands.

Between two and six years of data are available for each of these wetlands. To access digital copies of data, call the Anoka Conservation District.

In the graphs below, note that well depths were 40 inches, so when a graph stabilizes at a reading of–40, water levels were at or deeper than the graphed depth.

Figure 3-6: Alliant Tech Reference Wetland 2002

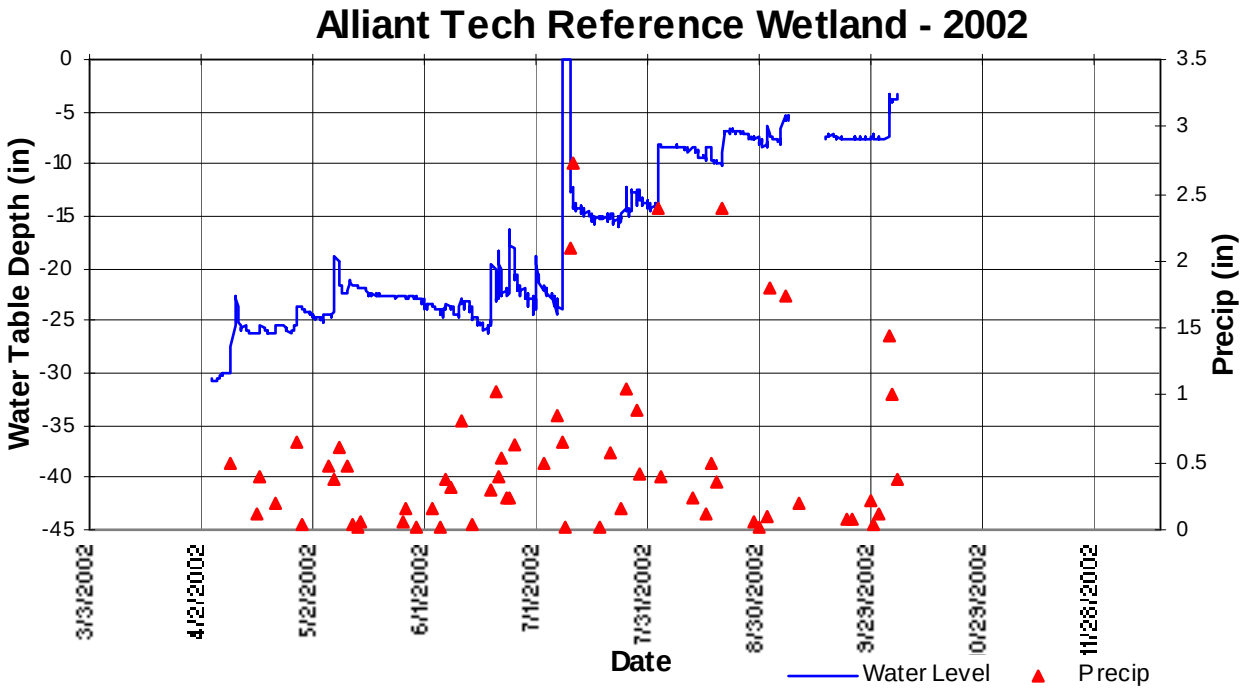


Figure 3-7: Cedar Creek Reference Wetland 2002

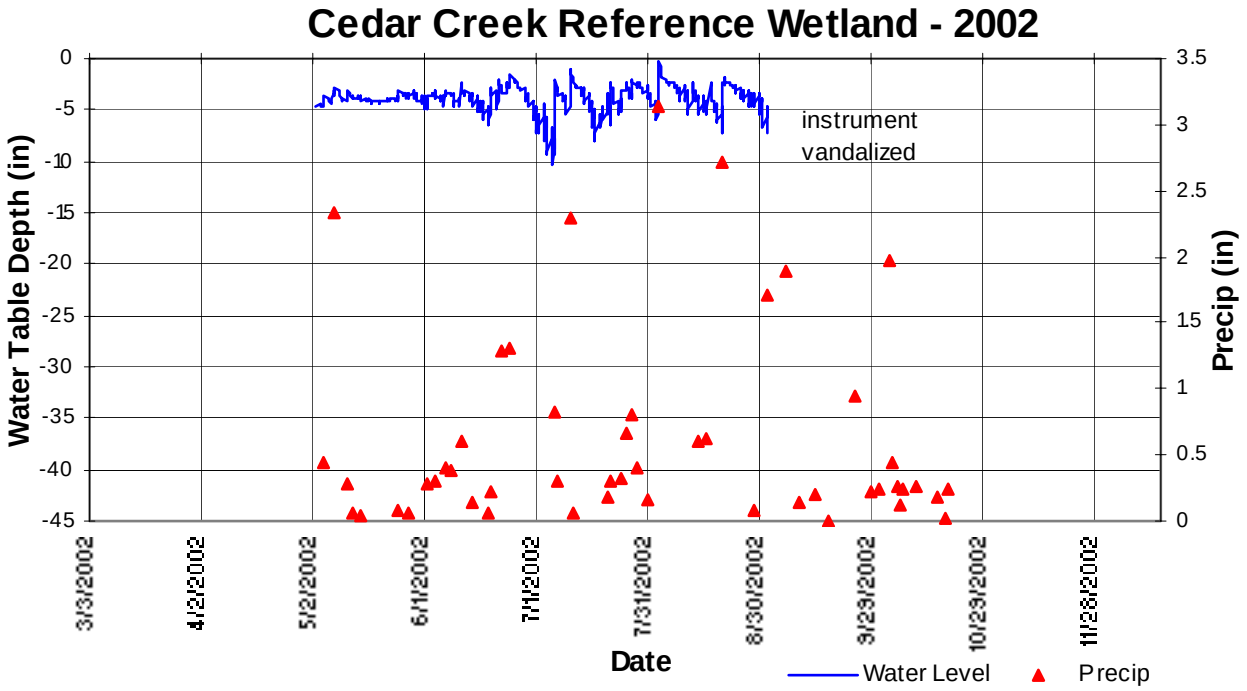


Figure 3-8: East Twin Reference Wetland 2002

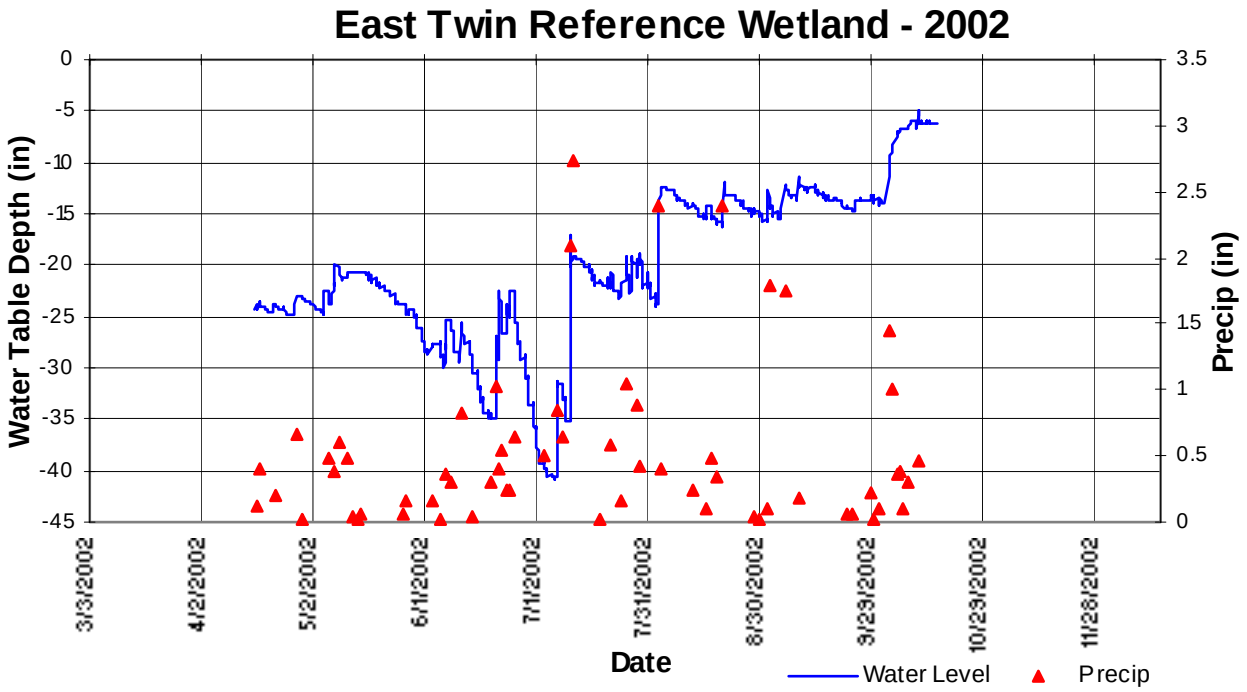


Figure 3-9: Lake George Reference Wetland 2002

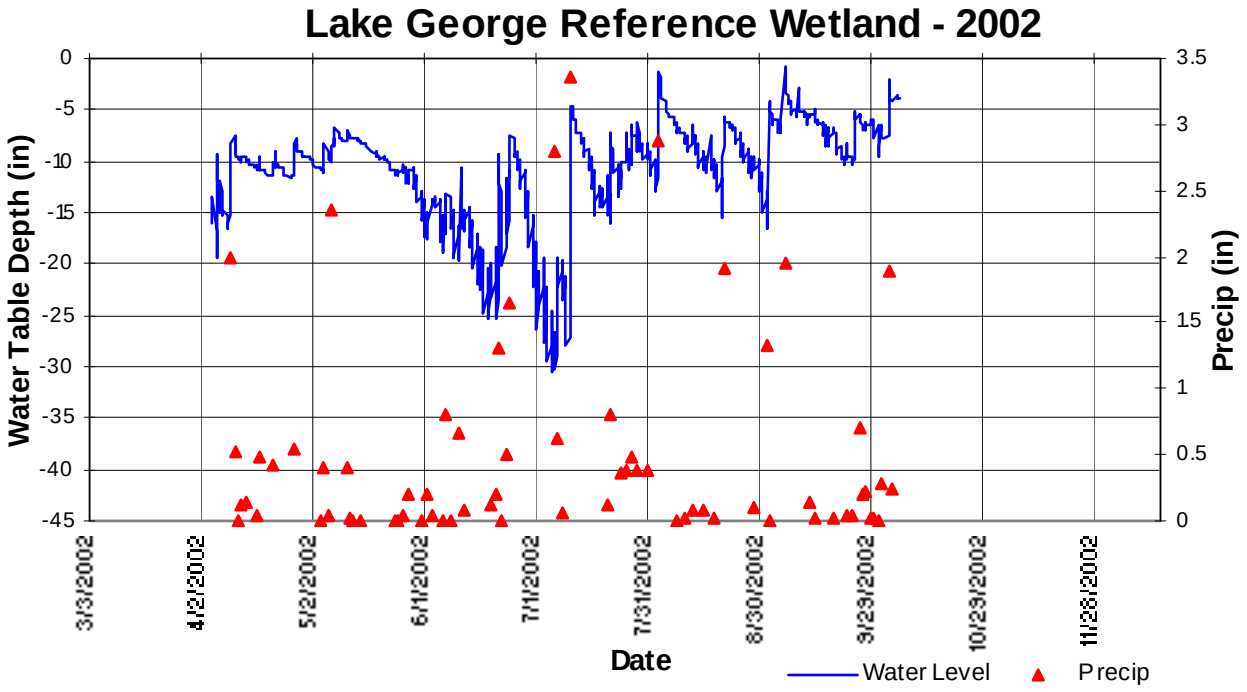
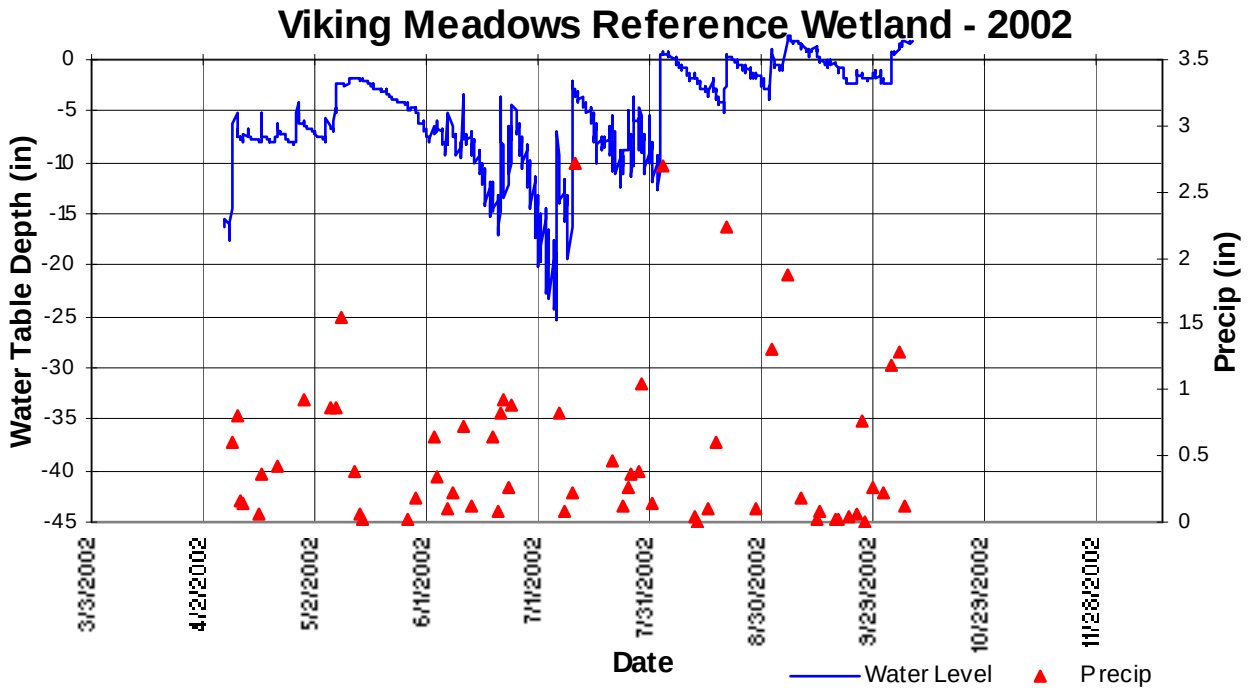


Figure 3-10: Viking Meadows Reference Wetland 2002



Lake Water Quality

Description: May through September twice-monthly 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: East Twin Lake

Lake George

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

East Twin Lake

BURNS TOWNSHIP, LAKE ID # 02-0133

Background

East Twin Lake is located on Anoka County's western boarder in Burns Township. The lake has a surface area of 116 acres with a maximum depth of 66 feet (20.1 m), making it Anoka County's deepest lake. Public access is from East Twin Lake County Park, where there is both a swimming beach and boat launch. The lakeshore is only moderately developed, with residences being mostly of low density and encompassing about half of the lake. The watershed is >75% undeveloped, with low-density residential areas. This lake is one of the clearest in the county.

2002 Results

In 2002 East Twin Lake had excellent water quality for this region of the state (NCHF Ecoregion), receiving an overall A grade; the same as in eight of the previous nine years monitored. The lake is mesotrophic. Of particular notability is the 20 ft secchi reading in spring 2002 – the deepest at any Anoka County lake since at least 1996. TP and chlorophyll-a increased slightly in late summer, and secchi transparency was reduced by up to 50%, but conditions were still excellent. Subjective observation by ACD staff ranked physical and recreational conditions optimal. Raw 2002 data can be found in Table 3-2 below and are summarized in figures on the following page.

Trend Analysis

Ten years of water quality data have been collected by the Metropolitan Council (1980, '81,'83, '95, and '98), the Minnesota Pollution Control Agency (1989), and the Anoka Conservation District (1997, '99, 2000, and 2002). Water quality significantly increased from 1980 to 2002 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,7}$= 8.16, p=0.01). One-way ANOVAs revealed that TP and Cl-a, but not Secchi depth, are the factors contributing to this trend. The improvements have been small, slow and continuous, with no period of particularly dramatic improvement. Specific reasons for the improvement are unknown, but improved landuse practices, both throughout the watershed and by lakeshore homeowners are suspected.

Discussion

The lake's direct watershed is small, which contributes to good water quality because there is a small area from which polluted runoff might enter the lake. Additionally, this watershed is only lightly developed. Aquatic vegetation is also healthy, but not so prolific as to be a nuisance, further contributing to high water quality. One exotic invasive plant is present in the lake, curly leaf pondweed, though its growth is moderate and restricted in extent due to lake depth. Because the boat landing is small and shallow, few high-powered watercraft that could disturb sediments and nutrients are used on this small lake. Lastly, the ecology of this lake is different from that of many other Anoka County Lakes because it is deep. Sediment and dead algae sink to the bottom, mostly lost from the system. Resuspension by wind or rough fish is minimal. In shallower lakes, these factors can make the lake itself a major source of nutrients and sediment. Continued periodic monitoring is suggested to detect any lake degradation.

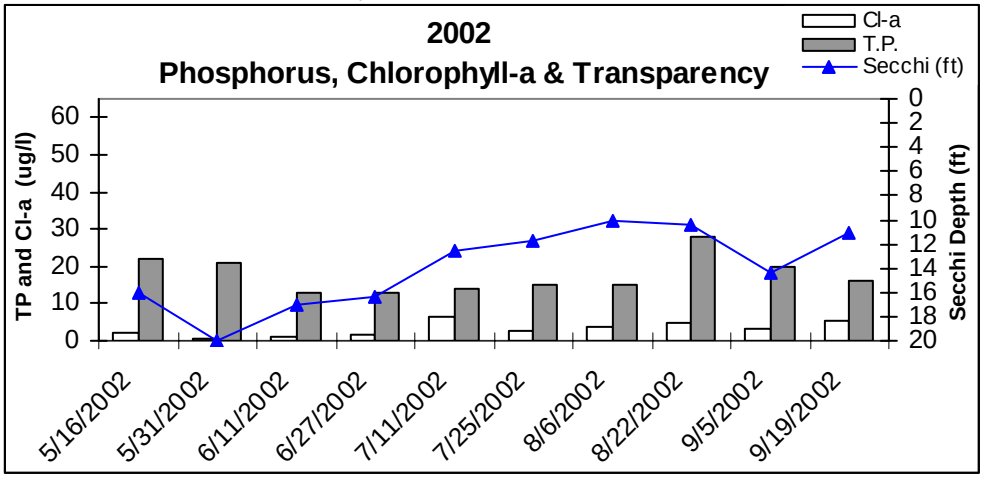
Table 3-2: 2002 East Twin Lake Water Quality Data

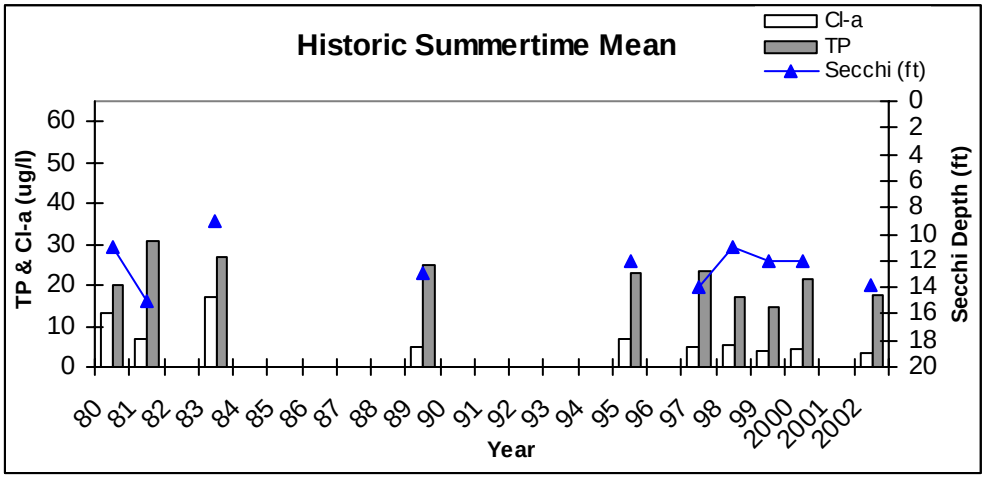
East Twin Lake

2002 Water Quality Data			5/16/2002	5/31/2002	6/11/2002	6/27/2002	7/11/2002	7/25/2002	8/6/2002	8/22/2002	9/5/2002	9/19/2002			
	Units	R.L.*	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Average	Min	Max
pH		0.1	8.20	9.04	8.92	9.06	8.67	8.72	8.70	8.65	8.79	8.28	8.70	8.20	9.06
Conductivity	mS/cm	0.01	0.237	0.237	0.235	0.223	0.211	0.207	0.202	0.202	0.204	0.207	0.217	0.202	0.237
Turbidity	NTU	1		2	0	1	1	1	2	1	1	1	1	0	2
D.O.	mg/l	0.01	11.81	9.66	9.04	7.68	6.51	6.55	6.40	6.76	6.39	5.19	7.44	5.19	11.81
Temp.	°C	0.1	14.0	21.6	22.1	25.8	25.1	24.5	23.6	22.2	24.0	21.9	22.48	14.00	25.80
Temp.	°F	0.1	57.2	70.9	71.8	78.4	77.2	76.1	74.5	72.0	75.2	71.4	72	57	78
Salinity	%	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cl-a	ug/l	0.5	2.2	0.6	1.2	1.7	6.4	2.9	4.0	4.6	3.4	5.2	3.2	0.6	6.4
T.P.	mg/l	0.01	0.022	0.021	0.013	0.013	0.014	0.015	0.015	0.028	0.020	0.016	0.018	0.013	0.028
T.P.	ug/l	10	22.0	21.0	13.0	13.0	14.0	15.0	15.0	28.0	20.0	16.0	17.7	13.0	28.0
Secchi	ft	0.1	16.0	20.0	17.0	16.4	12.6	11.7	10.0	10.4	14.3	11.0	13.9	10.0	20.0
Secchi	m	0.1	4.9	6.1	5.2	5.0	3.8	3.6	3.0	3.2	4.4	3.4	4.3	3.0	6.1
Field Observations															
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	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Trophic State Index															
TSIP			49	48	41	41	42	43	43	52	47	44	45	41	52
TSIC			38	26	32	36	49	41	44	46	43	47	40	26	49
TSIS			37	34	36	37	41	42	44	43	39	43	40	34	44
Mean TSI			41	36	37	38	44	42	44	47	43	45	42	36	47

*reporting limit

Figure 3-11: East Twin Lake Water Quality





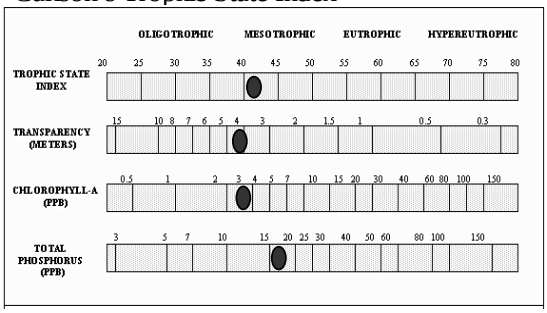
East Twin Lake Historic Summertime Mean Values

Agency	MC	MC	MC	MPCA	MC	ACD	MC	ACD	ACD	ACD
Year	80	81	83	89	95	97	98	99	2000	2002
TP	20.00	31.00	27.00	25.00	23.00	23.50	17.00	14.80	21.60	17.7
Cl-a	13.00	7.00	17.00	5.00	7.05	5.10	5.55	4.06	4.18	3.2
Secchi (m)	3.3	4.7	2.7	4.1	3.5	4.2	3.4	3.6	3.7	4.3
Secchi (ft)	11.0	15.0	9.0	13.0	12.0	14.0	11.0	12.0	12.0	13.9
TSIP	47	54	52	51	49	50	45	43	48	45
TSIC	56	50	58	46	50	47	48	44	45	40
TSIS	43	38	46	40	42	39	42	42	41	40
TSI	49	47	52	46	47	45	45	43	45	42

East Twin Lake Water Quality Report Card

Year	80	81	83	89	95	97	98	99	2000	2002
TP	A	B	B	B	B	B	B	A	A	A
Cl-a	B	A	B	A	A	A	A	A	A	A
Secchi	A	A	B	A	A	A	A	A	A	A
Overall	**A**	**A**	**B**	**A**	**A**	**A**	**A**	**A**	**A**	**A**

Carlson's Trophic State Index



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. The about 70% of the lake is circumscribed by residences, the remainder is county parkland and a currently undeveloped area on the lake's south side. The watershed is mostly undeveloped or vacant, with some residential areas, particularly on the lakeshore and in the southern half of the watershed. One invasive exotic aquatic plant is established in this lake, curly leaf pondweed.

2002 Results

In 2002 Lake George had excellent water quality for this region of the state (NCHF Ecoregion), receiving an overall A grade; the same as in eight of the previous ten years monitored. The lake is mesotrophic. Conditions did not deteriorate dramatically in late summer, as occurs on many lakes. Total phosphorus and chlorophyll-a increased and secchi depth decreased only mildly and conditions remained excellent. Subjective observation by ACD staff ranked physical and recreational conditions very good, with occasionally some algae present and only minimal impairment of recreation. Raw 2002 data can be found in Table 3-3 below and are summarized in figures on the following page.

Trend Analysis

Eleven years of water quality data have been collected by the Metropolitan Council (between 1981 and '94, and 1998) and the Anoka Conservation District (1997,'99, 2000, and 2002). Water quality has not significantly changed from 1980 to 2002 (repeated measures MANOVA with response variables TP, Cl-a, and Secchi depth, $F_{2,7}= 0.60$, $p>0.05$).

Discussion

Lake George remains one of the clearest of Anoka County Lakes. It, along with East Twin Lake, are especially valuable resources because of their condition, size, suitability for many types of recreation, and ample public access. Continued efforts are needed to maintain the resource including monitoring, education, and lakeshore and nutrient best management practices. One example is residential lakeshore restorations which have occurred on several properties. Because of the number of shoreland homes, failing septic systems may be a threat to the lake and a cooperative effort with the lake association to conduct a shoreland septic survey is advised.
While the exotic invasive aquatic plant curly leaf pondweed is present in the lake, it causes only a brief impairment in the spring. Other aspects of the aquatic vegetation seem to be diverse and healthy, but not so prolific as to be a nuisance.

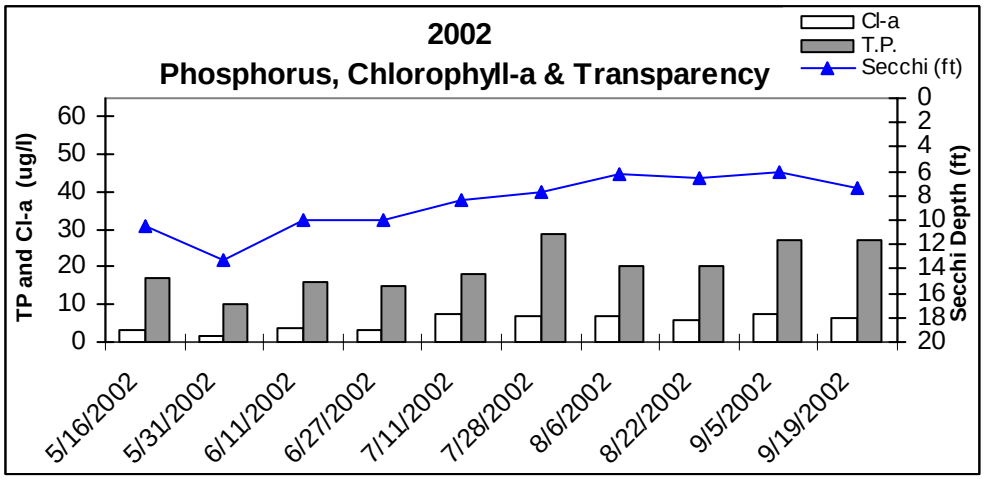
Table 3-3: 2002 Lake George Water Quality Data

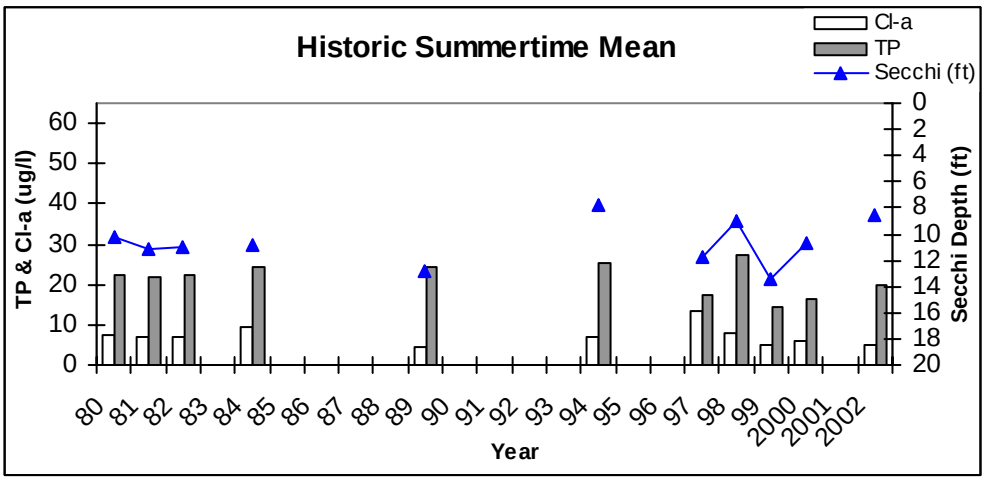
Lake George

2002 Water Quality Data			5/16/2002	5/31/2002	6/11/2002	6/27/2002	7/11/2002	7/28/2002	8/6/2002	8/22/2002	9/5/2002	9/19/2002			
	Units	R.L.*	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Average	Min	Max
pH		0.1	8.08	9.10	8.30	9.13	8.69	8.68	8.53	8.18	8.73	8.38	8.58	8.08	9.13
Conductivity	mS/cm	0.01	0.205	0.206	0.201	0.191	0.179	0.174	0.169	0.173	0.171	0.176	0.185	0.169	0.206
Turbidity	NTU	1		2	1	2	3	3	3	2	3	2	2	1	3
D.O.	mg/l	0.01	11.73	10.08	9.28	7.88	6.15	6.43	6.20	6.43	6.53	5.82	7.47	5.82	11.73
Temp.	°C	0.1	12.8	20.5	21.3	25.2	25.0	24.2	23.4	21.9	23.8	22.7	22.08	12.80	25.20
Temp.	°F	0.1	55.0	68.9	70.3	77.4	77.0	75.6	74.1	71.4	74.8	72.9	72	55	77
Salinity	%	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cl-a	ug/l	0.5	3.1	1.7	3.5	3.4	7.5	6.8	6.8	5.7	7.4	6.4	5.2	1.7	7.5
T.P.	mg/l	0.01	0.017	0.010	0.016	0.015	0.018	0.029	0.020	0.020	0.027	0.027	0.020	0.010	0.029
T.P.	ug/l	10	17.0	10.0	16.0	15.0	18.0	29.0	20.0	20.0	27.0	27.0	19.9	10.0	29.0
Secchi	ft	0.1	10.5	13.3	10.0	10.0	8.4	7.7	6.3	6.6	6.1	7.3	8.6	6.1	13.3
Secchi	m	0.1	3.2	4.1	3.0	3.0	2.6	2.3	1.9	2.0	1.9	2.2	2.6	1.9	4.1
Field Observations															
Physical			1.5	2.0	2.0	1.5	1.5	1.5	1.5	2.0	2.0	1.5	1.7	1.5	2.0
Recreational			1.5	1.5	1.5	1.0	1.5	1.5	1.5	2.0	2.0	1.5	1.6	1.0	2.0
Trophic State Index															
TSIP			45	37	44	43	46	53	47	47	52	52	47	37	53
TSIC			42	36	43	43	50	50	50	48	50	49	46	36	50
TSIS			43	40	44	44	46	48	51	50	51	48	47	40	51
Mean TSI			43	38	44	43	48	50	49	48	51	50	46	38	51

*reporting limit

Figure 3-12: Lake George Water Quality





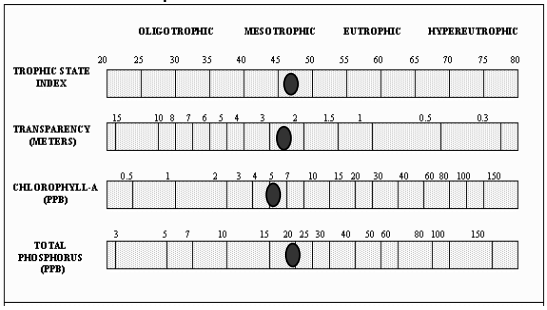
Lake George Historic Summertime Mean Values

Agency	MC	MC	MC	MC	MC	MC	ACD	MC	ACD	ACD	ACD
Year	80	81	82	84	89	94	97	98	99	2000	2002
TP	22.50	22.00	22.34	24.44	24.30	25.38	17.40	27.50	14.20	16.30	19.9
Cl-a	7.28	7.10	6.98	9.48	4.51	6.87	13.20	7.76	4.76	5.80	5.2
Secchi (m)	3.10	3.40	3.36	3.28	3.92	2.38	3.57	2.74	4.13	2.80	2.6
Secchi (ft)	10.2	11.2	11.0	10.8	12.9	7.8	11.7	9.0	13.5	10.7	8.6
TSIP	49	49	49	50	50	51	45	52	42	44	47
TSIC	50	50	50	53	45	50	56	51	46	48	47
TSIS	44	42	43	43	40	48	42	45	40	45	46
TSI	48	47	47	49	45	49	48	49	43	46	47

Lake George Water Quality Report Card

Year	80	81	82	84	89	94	97	98	99	2000	2002
TP	A	A	A	B	B	B	A	B	A	A	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**

Carlson's Trophic State Index



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 in mathematical equations that summarize water and habitat quality. These methods are based upon the knowledge that different families of insects 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 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: Cedar Creek at Hwy 9, Oak Grove

Ford Brook at Hwy 63, Ramsey

Rum Rum at Hwy 24, Rum River North County Park, St. Francis

Seelye Brook at Hwy 7, Oak Grove

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

Tips for Data Interpretation

Consider biological indices of water quality in concert rather than alone, as 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), and 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; likely a poorer conditon.

CEDAR CREEK

at Hwy 9, Oak Grove

Monitored by

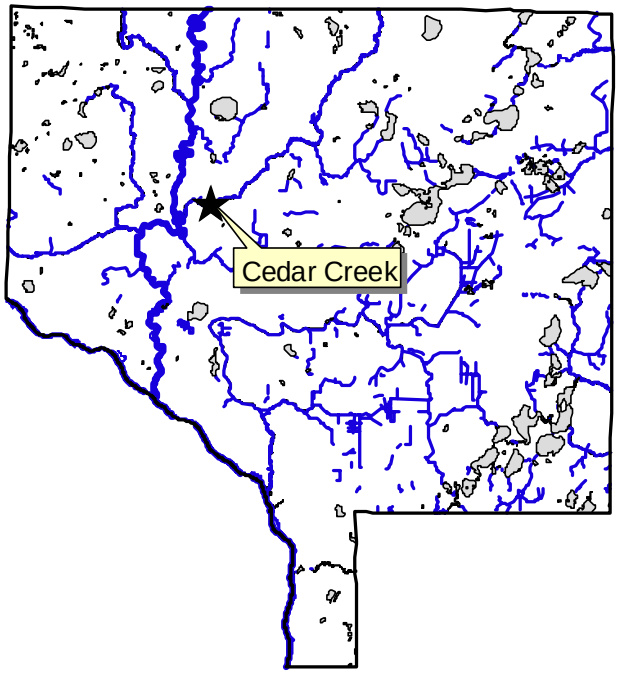
Anoka Conservation District staff

Number Years Monitored

4

Background

Cedar Creek originates in south-central Isanti County and flows south. In north-central Anoka County it flows through some areas of high quality natural communities, including the Cedar Creek Natural History Area. Habitat surrounding the stream in other areas is of moderate quality overall. Cedar Creek enters the Rum River about 2 miles west of the sampling site.



Cedar Creek is one of the larger streams in Anoka County. Stream widths of 25 feet and depths greater than 2 feet are common at baseflow. The stream bottom is primarily silt. Watershed landuse is moderately developed with scattered single family homes, and continues to develop rapidly.

Results

Biological data indicated a slightly below average condition for Anoka County, and 2002 results were consistent with those seen in the past (Fig. 3-13, Table 3-2). The number of families (13) was not unusual, but most captures (73%) were of two pollution insensitive families, the clams (pelycapoda) and scuds (taltridae). None of the families present were very sensitive to pollution.

Figure 3-13: Summarized biomonitoring results for Cedar Creek at Hwy 9, Oak Grove.

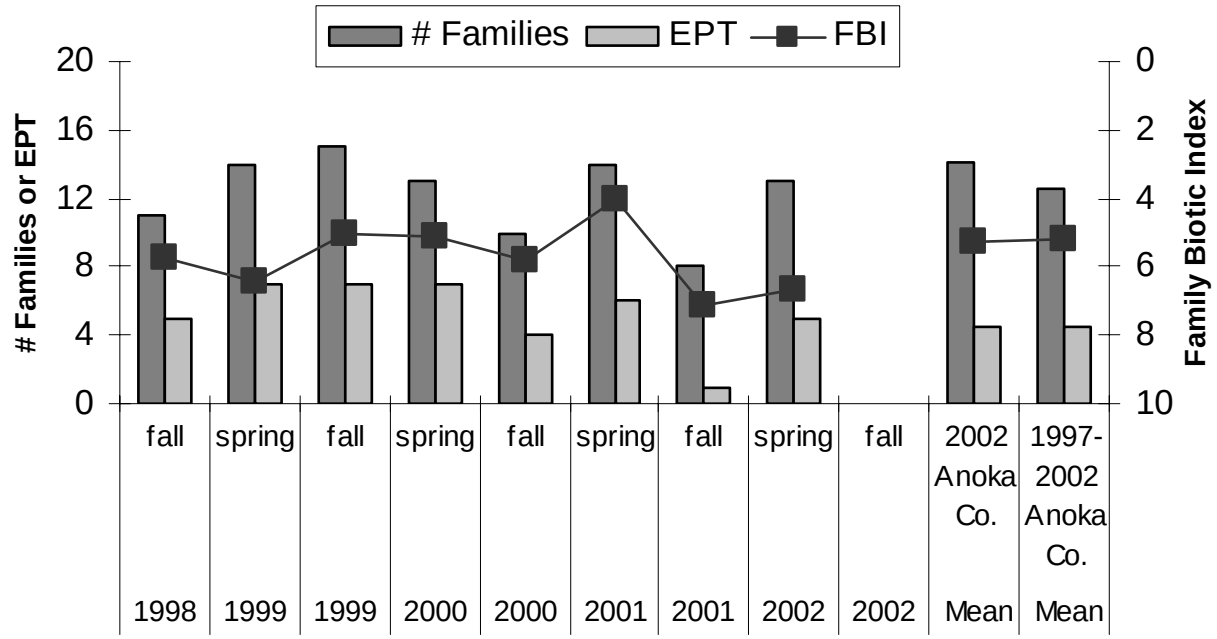


Table 3-2: Biomonitoring data for Cedar Creek at Hwy 9, Oak Grove.

Cedar @ 9												
Year	**1998**	**1998**	**1999**	**1999**	**2000**	**2000**	**2001**	**2001**	**2002**	**2002**	**Mean**	**Mean**
Season	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**2002 Anoka Co.**	**1997-2002 Anoka Co.**
FBI	not sampled	5.77	6.42	5.02	5.10	5.80	4.00	7.10	6.70	not sampled	5.3	5.2
# Families		11	14	15	13	10	14	8	13		14.1	12.5
EPT		5	7	7	7	4	6	1	5		4.5	4.5
Date		9/23	6/8	10/21	5/1	?	5/30	10/26	5/28			
sampling by		ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD			
sampling method		MH	MH	MH	MH	MH	MH	MH	MH			
# individuals		87	130	226	135	128	171	143	175			
# replicates		1	1	1	1	1	1	1	1			
Dominant Family		taltridae	taltridae	hydroptilidae	limnephilidae	chironomidae	baetidae	Pelycapoda	Pelycapoda			
% Dominant Family		29.9	56.4	32	27	52	68.4	65	52.6			
% Ephemeroptera		31	3.1	12.4	22.2	24.2	70.8	0	8			
% Trichoptera		3.4	6.2	51.3	27.4	0	2.3	0.7	5.7			
% Plecoptera		0	1.5	0	2.2	0	4.1	0	0			

Discussion

These biological data complement chemical water quality data. The last chemical monitoring was conducted in 1999, and showed about average conditions compared to other nearby streams. At that time it was noted that low dissolved oxygen levels were a chronic problem. Invertebrate life is especially sensitive to dissolved oxygen levels. Habitat degradation is also likely responsible for invertebrate community impairment. The heavily silted stream bottom and lack of overhanging snags and vegetation (except for reed canary grass) provide little of the habitat types required for a rich stream community.

FORD BROOK

at Highway 63, Ramsey

Monitored by

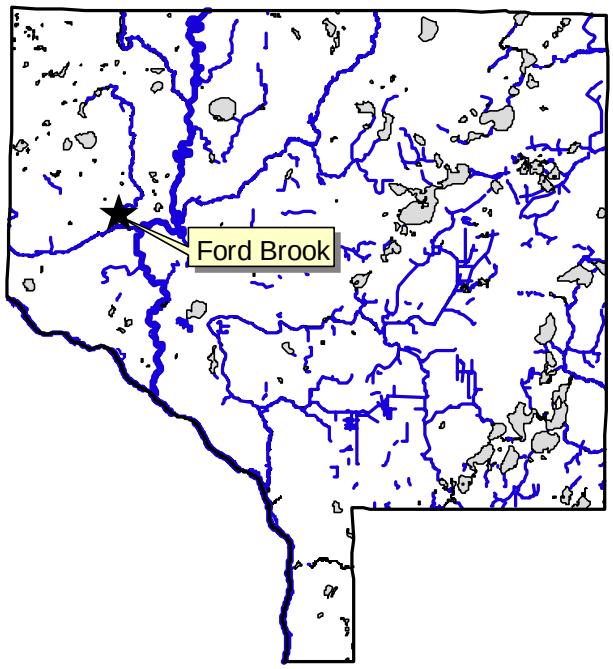
Anoka Conservation District staff

Number Years Monitored

4.5

Background

Ford Brook originates in northwestern Anoka County from Ekstrom Lake. It flows southward to northern Ramsey where it joins Trott Brook and eventually enters the Rum River. This stream has some riffles and pools but is still predominantly silty-bottom. The surrounding watershed is developing quickly but still contains large areas of undeveloped land, particularly near the stream. Many residential lots in this area are 5 acres, and many of these have horses.



The sampling site is in the road right of way on the south side of Highway 63. This site has a rocky bottom with both riffles and pools. Deadfalls and overhanging bank vegetation are also common at this site.

Results

In 2002 this site was monitored only in the spring due to excessive water levels throughout summer and fall that made sampling unsafe. In 2002, as in the past, this site had slightly above average conditions for Anoka County (Fig. 3-14, Table 3-3). The dominant species was a pollution-sensitive mayfly (baetidae), and over 1/3 of all families present were EPT. Families were evenly represented in abundance.

Figure 3-14: Summarized biomonitoring results for Ford Brook at Highway 63.

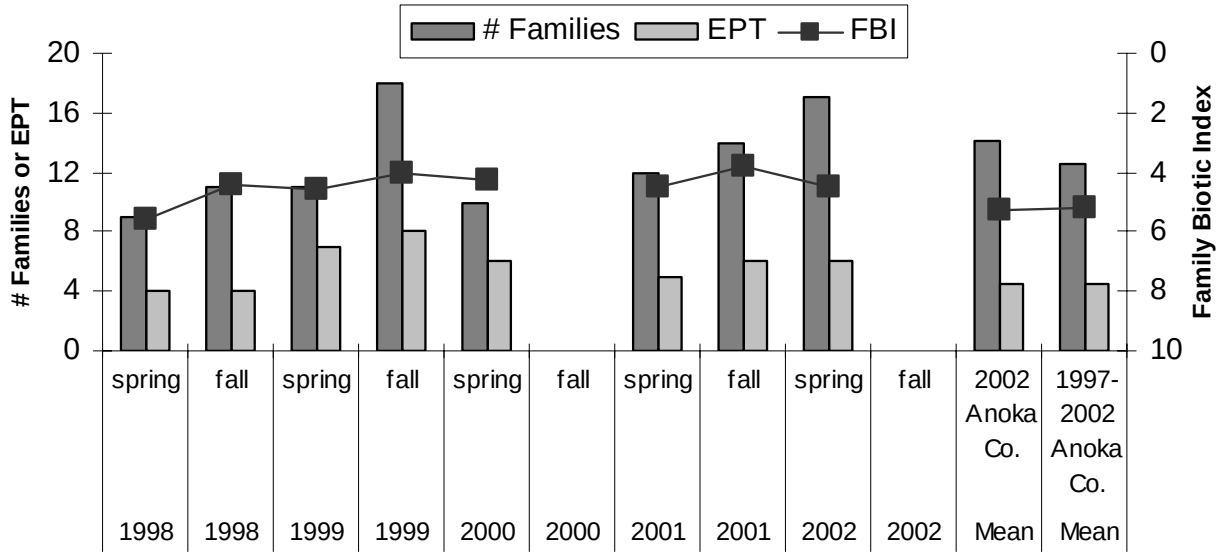


Table 3-3: Biomonitoring data for Ford Brook at Highway 63.

Ford @ 63												
Year	**1998**	**1998**	**1999**	**1999**	**2000**	**2000**	**2001**	**2001**	**2002**	**2002**	**Mean**	**Mean**
Season	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**2002 Anoka Co.**	**1997-2002 Anoka Co.**
FBI	5.6	4.40	4.59	4.04	4.24		4.50	4.50	3.80	not sampled	5.3	5.2
# Families	9	11	11	18	10		12	12	14		14.1	12.5
EPT	4	4	7	8	6		5	5	6		4.5	4.5
Date	6-May	9/22	6/10	10/21	6/8		1/5	10/26	5/28			
sampling by	ACD	ACD	ACD	ACD	ACD		ACD	ACD	ACD			
sampling method	kicknet	kicknet	MH	MH	MH		MH	MH	MH			
# individuals	72	169	79	205	153		125	93	93			
# replicates	1	1	1	1	1		1	1	1			
Dominant Family	Nematoda	Heptageniidae	Baetidae	Hydropsychidae	Hydropsychidae		Baetidae	Gammaridae	Baetidae			
% Dominant Family	22.2	36	29	26.8	28		62.4	25.8	20.8			
% Ephemeroptera	29.2	55	60	44.4	22.9		63.2	33.3	23.7			
% Trichoptera	19.4	13	15.2	29.8	45.1		4	25.8	26.9			
% Plecoptera	0	0	7.6	2.4	10.5		2.4	0	4.3			

Discussion

No trend toward improving or deteriorating conditions is apparent.

RUM RIVER

at Hwy 24, Rum River North County Park, St. Francis

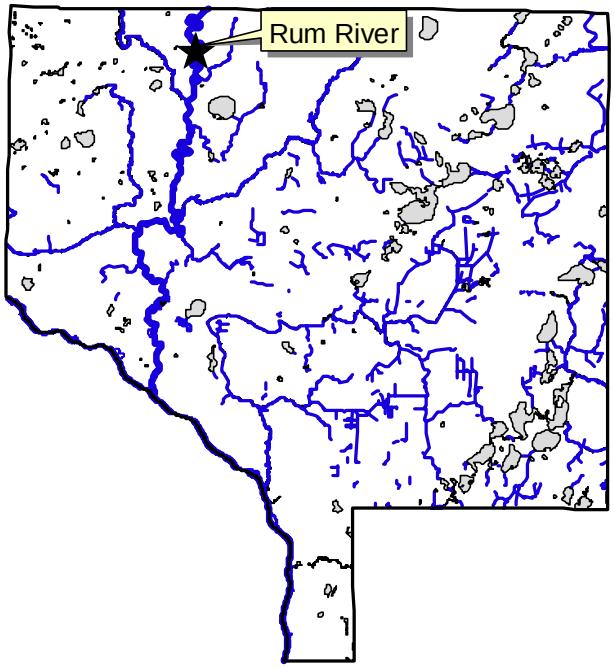
Monitored by

St. Francis High School

Crossroads School

Number Years Monitored

2.5



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 ripples 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 "wild and scenic" designation.

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

Results

Biological data for 2002, and historically, indicate the best conditions of all sites monitored (Fig. 3-15, Table 3-4). All biological indices were above the county averages. More pollution-intolerant invertebrate families were found at this site than anywhere else in Anoka County. Many of these were EPT families not found elsewhere.

Figure 3-15: Summarized biomonitoring results for Rum River at Hwy 24, St. Francis.

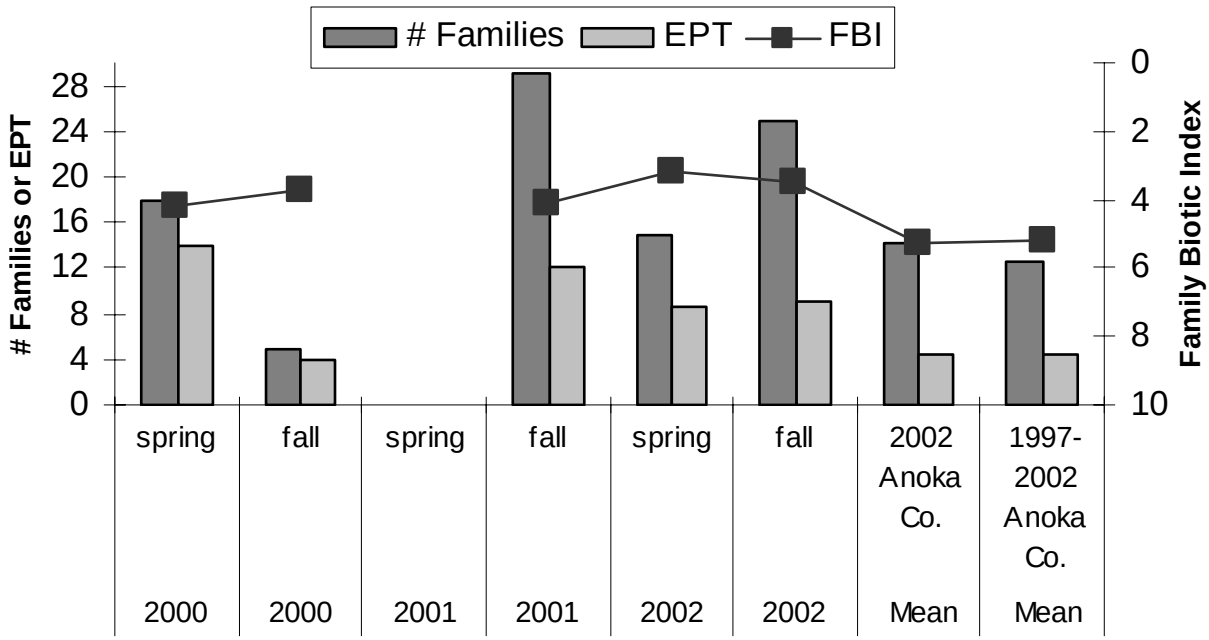


Table 3-4: Biomonitoring data for Rum River at Hwy 24, St. Francis.

Rum River @ Rum R North Co Park - Crossroads School and St. Francis HS									
Year	**2000**	**2000**	**2001**	**2001**	**2002**	**2002**	**2002**	**Mean**	**Mean**
Season	**spring**	**fall**	**spring**	**fall**	**spring**	**spring**	**fall**	**2002 Anoka Co.**	**1997-2002 Anoka Co.**
FBI	4.16	3.70	not sampled	4.10	3.50	2.90	3.50	5.3	5.2
# Families	18	5		29	10	20	25	14.1	12.5
EPT	14	4		12	7	10	9	4.5	4.5
Date	5/24	?		10/23	6/3	5/29	8-Oct		
sampling by	ACD	Xroads		SFHS	Xroads	SFHS	SFHS		
sampling method	MH	MH		MH	MH	MH	MH		
# individuals	125	233		152.5	164	112	133		
# replicates	1	1		2	1	2	2		
Dominant Family	heptageniidae	hydropyschidae		corixidae	hydropyschidae	perlodidae	hydropsychidae		
% Dominant Family	22	81.5		21	64	36.6	19.9		
% Ephemeroptera	46.4	1.7		18	6.1	11.2	20.3		
% Trichoptera	20.8	87.6		9.2	70.1	29	20.3		
% Plecoptera	7.2	9.4		3.9	15.2	45.1	13.2		

Discussion

Both chemical and biological monitoring have indicated the exceptional quality of this river. Habitat is also ideal for a variety of stream life. Conditions deteriorate downstream near Anoka. One cause of downstream deterioriation is probably higher-density development. The river is also lower-gradient downstream, providing fewer ripple and pool habitats and less oxygenation of the water from turbulence. Still, the condition of the river is regarded as very good throughout Anoka County. Water resource management should be focused upon protecting the Rum's quality.

SEELYE BROOK

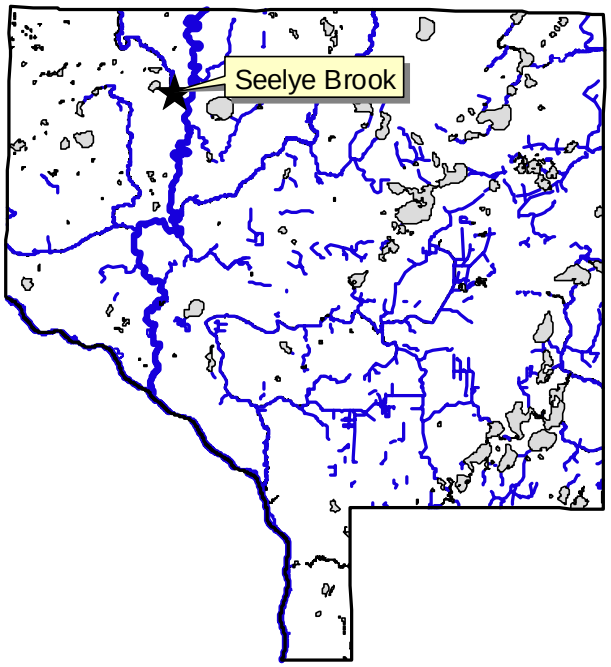
at Hwy 7, Oak Grove

Monitored by

Anoka Conservation District staff

Number Years Monitored

4



Background

Seelye Brook originates in southwestern Isanti County and flows south through northwest Anoka County, draining into the Rum River just east of the sampling site. This stream is low-gradient, like almost all other streams in the area. It has a silty or sandy bottom and lacks riffle-pool sequences. In many areas the stream has a good forest canopy overhead. It is a moderate to large stream for Anoka County, with a typical baseflow width of 20-25 feet.

The sampling site is in the road right of way of the Highway 7 crossing. The bridge footings and poured concrete are a feature of the sampling site. This site also experiences scour during high flow because the water is forced under the bridge. Banks are very steep and undercut. A few snags overhand the stream, but otherwise invertebrate habitat is sparse.

Results

Biological data indicated an average condition for Anoka County, and 2002 results were consistent with those seen in the past (Fig. 3-16, Table 3-5). No extremely pollution sensitive families were found, but some moderately sensitive families were present.

Figure 3-16: Summarized biomonitoring results for Seelye Brook at Hwy 7, Oak Grove.

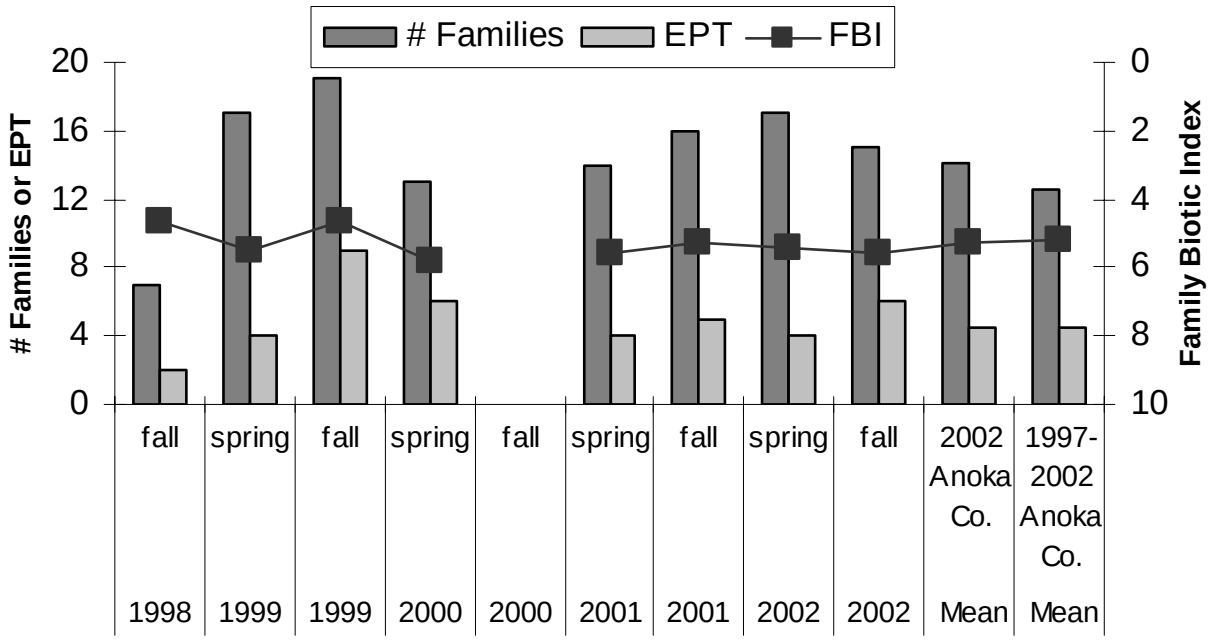


Table 3-5: Biomonitoring data for Seelye Brook at Hwy 7, Oak Grove.

Seelye @ 7												
Year	**1998**	**1998**	**1999**	**1999**	**2000**	**2000**	**2001**	**2001**	**2002**	**2002**	**Mean**	**Mean**
Season	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**spring**	**fall**	**2002 Anoka Co.**	**1997-2002 Anoka Co.**
FBI		4.65	5.50	4.68	5.80		5.60	5.30	5.40	5.60	5.3	5.2
# Families		7	17	19	13		14	16	17	15	14.1	12.5
EPT		2	4	9	6		4	5	4	6	4.5	4.5
Date		9/22	6/8	10/26	?		5/30	10/26	5/28	10/21		
sampling by		ACD	ACD	ACD	ACD		ACD	ACD	ACD	ACD		
sampling method		kicknet	MH	MH	MH		MH	MH	MH	MH		
# individuals		74	75	160	131		107	85	111	53		
# replicates		1	1	1	1		1	1	1	1		
Dominant Family		chironomidae	taltridae	heptageniidae	chironomidae		corixidae	corixidae	Limnephilidae	taltridae		
% Dominant Family		38	29	27	32.8		25.2	32.2	33.3	30.2		
% Ephemeroptera		8.1	12	38.8	21.4		18.7	16.5	6.3	15.1		
% Trichoptera		4.1	2.7	26.9	9.2		9.3	9.4	33.3	13.2		
% Plecoptera		0	0	2.5	0.8		0.9	0	0	0		

Discussion

Chemical monitoring from 1999 data showed relatively good water quality. Therefore, habitat degradation may be the prime reason for a mediocre biological community. Overall, average conditions are present and this stream contributes to the excellent water quality of the Rum River.

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 such as our lake water quality monitoring program. We do not, however, know specifically which expenses are attributed to monitoring which lakes. 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. The process also takes into account equipment that is purchased for monitoring a specific area.

Upper Rum River Watershed	Wetland Levels	Groundwater Observation Wells	Stream Levels	Lake Water Quality	Stream Biomonitoring	Website	Total
Revenues							
URRWMO	$0	$0	$0	$1,500	$0	$0	$1,500
County General Allocation	$0	$0	$0	$0	$0	$1,130	$1,130
County Ag Preserves	$1,473	$0	$0	$1,235	$3,140	$240	$6,088
Service Fees	$0	$354	$0	$0	$0	$0	$354
Interest	$0	$3	$13	$0	$0	$6	$22
BWSR General Services	$0	$0	$217	$213	$0	$75	$506
BWSR Local Water Planning	$0	$260	$562	$278	$334	$36	$1,470
City of Fridley	$0	$0	$0	$326	$0	$0	$326
Non-Profit/Lake Assoc.	$0	$0	$0	$0	$89	$0	$89
TOTAL	$1,473	$617	$792	$3,552	$3,563	$1,488	$11,484
Expenses-							
Capital Outlay/Equip	$102	$30	$242	$390	$227	$104	$1,097
Personnel Salaries/Benefits	$1,116	$442	$459	$2,026	$2,817	$1,254	$8,114
Office Supplies/Maintenance	$48	$17	$21	$705	$109	$36	$936
Employee Training	$15	$7	$6	$31	$35	$14	$108
Vehicle/Mileage	$60	$69	$13	$141	$77	$0	$360
Rent	$65	$29	$27	$143	$145	$50	$460
Monthly Bills	$25	$10	$10	$51	$57	$21	$174
Fees and Dues	$12	$7	$6	$35	$19	$3	$82
Promotion/Marketing	$12	$5	$5	$29	$23	$6	$79
Program Supplies	$18	$0	$3	$2	$52	$0	$74
TOTAL	$1,473	$617	$792	$3,552	$3,563	$1,488	$11,484
BALANCE	$0	$0	$0	$0	$0	$0	$0

Recommendations

- Continue routine, periodic monitoring. Lake level, and stream and wetland hydrology monitoring should be conducted every year. Stream and lake water quality can be conducted alternating year in a rotation to ensure all sites are monitored every three years.
- Develop rating curves for all stream hydrology monitoring sites.
- Recruit high schools or other volunteer groups to conduct stream biomonitoring at Seelye Brook, Cedar Creek, and Ford Brook.
- Secure local funding for biomonitoring of the Rum River by St. Francis High School and Crossroads School.
- Secure local funding for stream and wetland hydrology monitoring.

Intentionally Blank