



2008 CAMP MONITORING

Henry Lake:

Henry Lake is a 77-acre lake located within Hassan Township. Because the maximum depth of the lake is only 1.5 m (5 feet), the entire lake area is considered littoral zone (the 0-15 foot depth area of the lake dominated by aquatic vegetation). Additionally, because of the lake’s shallowness it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake’s water column).

This marks the fifth year that Henry Lake has been involved in CAMP. Other than for the 1995 and 2005-2008 CAMP data, a search through the STORET nationwide water quality database for historic data on the lake came up empty. Therefore, they are the only known years for which data is available.

The lake was monitored seven times between late May and early September. On sampling days the lake was monitored for total phosphorus (TP), chlorophyll-a (CLA), total Kjeldahl nitrogen (TKN), and secchi transparency, as well as the lake’s perceived physical condition and recreational suitability. (The resulting data are summarized in tables and figures in the following pages.)

2008 summer (May-September) data summary

<i>Parameter</i>	<i>Mean</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Grade</i>
TP (µg/l)	154.3	103.0	300.0	F
CLA (µg/l)	45.6	3.8	180.0	C
Secchi (m)	0.8	0.5	1.1	D
TKN (mg/l)	1.56	1.10	1.90	
			Lake Grade	D

The lake received a lake grade of D for 2008 which is similar to the D lake grades received in 1995, 2005, and 2007. Additional years of data are needed to determine trends in water quality.

Throughout the monitoring period, volunteers ranked their opinions of the lake’s physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 3.3 for physical condition (between 3- definite algal color and 4- high algal color), and 4.7 for recreational suitability (between 4- no swimming – boating ok and 5- no aesthetics possible).

Rice Lake:

Rice Lake lies within the City of Maple Grove. The lake has a surface area of 252 acres, an average depth of 1.9 m (6.2 ft), and a volume of 1570 acre-feet. The maximum depth is 3.4 m (11 ft). Because of the shallowness of the lake, the entire area is considered littoral zone, and it does not maintain a thermocline (a density gradient owed to changing water temperatures throughout the lake’s water column). Eurasian watermilfoil was documented to be present in the lake in 1996. There is a carry-in public access to the lake.



Elm Creek Watershed Management Commission

This was the second year that Rice Lake has been involved in the CAMP. A search through the STORET nationwide water quality database for historic data showed that secchi transparency measurements were collected along with user perception rankings for the years 1991, 1993, and 2002-2007. Dissolved oxygen measurements were collected in 1993. However, the CAMP 2007 and 2008 data are the only years of known data collected for nutrients and chlorophyll-a.

The lake was monitored ten times between early May and mid-October 2008. On sampling days the lake was monitored for TP, chlorophyll-a CLA, TKN, and secchi transparency, as well as the lake's perceived physical condition and recreational suitability. (The resulting data are summarized in tables and figures in the following pages.)

2008 summer (May-September) data summary

<i>Parameter</i>	<i>Mean</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Grade</i>
TP (µg/l)	282.0	45.0	749.0	F
CLA (µg/l)	49.9	15.0	140.0	D
Secchi (m)	1.3	0.4	2.9	C
TKN (mg/l)	2.08	1.60	2.80	
			Lake Grade	D

The lake received a lake grade of D for 2008 compared to last year's lake grade of F, which gives the appearance of an improvement in water quality. However, the 2008 lake grade was calculated on the basis of data collected from early May through mid-October, whereas the available 2007 data spans the period mid-June through mid-October. The 2008 data shows that the lake experienced relatively lower concentrations of TP and CLA, and greater water clarity during April, May, and early June. The 2007 data is lacking in this same time period. If the lake typically experiences better water quality during this time period every year, then the 2007 mean values would be skewed towards worse water quality because of the missing data from the earlier portion of the monitoring season. Therefore, it is difficult to compare the overall 2008 lake water quality to that of 2007. To better understand the lake's water quality and where it may be heading, additional years of data collection are needed.

The average user perception rankings were 3.9 for physical condition (approximately 4- high algal color), and 4.0 for recreational suitability (4- no swimming – boating ok).

Sylvan Lake:

Sylvan Lake is located in Hassan Township. The lake has a surface area of approximately 114 acres. It has a maximum depth of approximately 4 m (13 feet). Because of the shallowness of the lake, its entire surface area is considered littoral zone. The littoral zone is the shallow 0-15 feet depth zone dominated by aquatic vegetation).

2008 was the first year that the lake has been monitored via the CAMP. A search through the EPA's STORET database provided secchi water clarity data for the year 1997. Therefore, the 2008 CAMP data are the only nutrient data available for the lake.

The lake was monitored ten times between mid May and mid October 2008. On sampling days the lake was monitored for TP, CLA, TKN, and secchi transparency, as well as the lake’s perceived physical condition and recreational suitability. (The resulting data are summarized in tables and figures in the following pages.)

The lake received a lake grade of D for 2008. The TP concentrations were very high as indicated by the summer-time mean of 425 ug/L which yields a parameter grade of F. The CLA concentrations and water clarity both received C parameter grades. The CLA and water clarity grades are consistent with respect to each other not only in magnitude of the mean, but also consistent with respect to patterns in peaks and lows of the seasonal data. Therefore the water quality with respect to water clarity and algal abundance was not affected as greatly by TP as would be suggested by the higher TP concentrations. Further monitoring is suggested to determine if this interesting pattern is a characteristic of this lake.

2008 summer (May-September) data summary

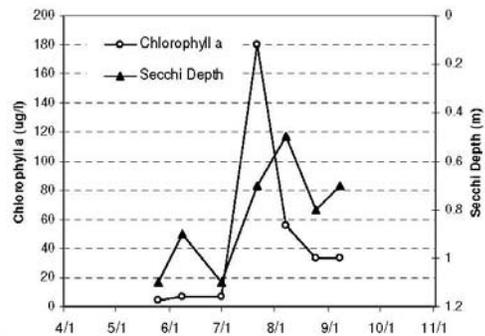
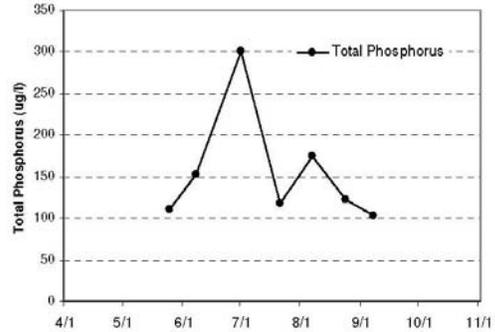
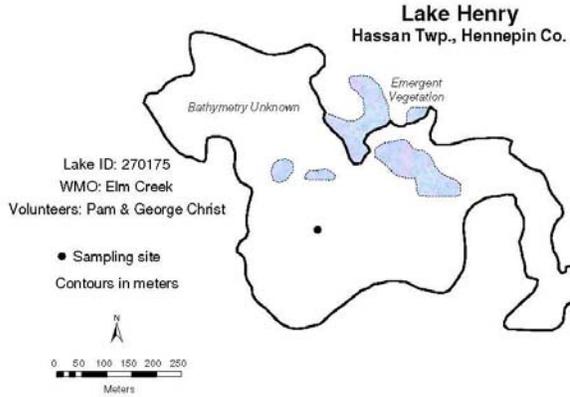
<i>Parameter</i>	<i>Mean</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Grade</i>
TP (µg/l)	425.3	274.0	514.0	F
CLA (µg/l)	26.7	1.7	66.0	C
Secchi (m)	2.0	1.0	4.0	C
TKN (mg/l)	1.46	0.78	2.40	
			Lake Grade	D

Throughout the monitoring period, the volunteer(s) ranked their opinions of the lake’s physical and recreational conditions on a 1-to-5 scale. The average user perception rankings were 2.8 for physical condition (between 2- some algae present and 3- definite algae present), and 3.1 for recreational suitability (between 3- swimming slightly impaired and 4- no swimming - boating ok).

If you notice any errors in these lake’s data or physical information, or are aware of any additional or missing information, please contact Brian Johnson of the Metropolitan Council at (651)602-8743 or brian.johnson@metc.state.mn.us.

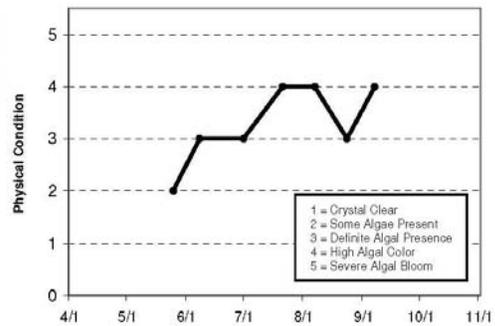


Elm Creek Watershed Management Commission



2008 Data

DATE	Surf Temp (°C)	Bot Temp (°C)	Surf DO (mg/L)	Bot DO (mg/L)	CLA (µg/L)	Surf TP (µg/L)	Bot TP (µg/L)	Secchi (m)	PC	RS
5/25	18.6				3.8	111		1.1	2	3
6/8	22.1				6.7	153		0.9	3	5
7/1	23.3				6.6	300		1.1	3	5
7/21	26				180	117		0.7	4	5
8/7	25.5				56	174		0.5	4	5
8/24	24.1				33	122		0.8	3	5
9/7	17.8				33	103		0.7	4	5



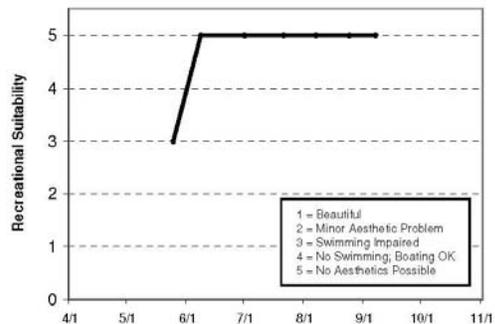
Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Phosphorus												
Chlorophyll a												
Secchi Depth												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total Phosphorus				D								
Chlorophyll a				C								
Secchi Depth				D								
Lake Grade				D								

Year	2004	2005	2006	2007	2008
Total Phosphorus	D	F	C	F	
Chlorophyll a	C	B	D	C	
Secchi Depth	D	C	D	D	
Lake Grade	D	C	D	D	

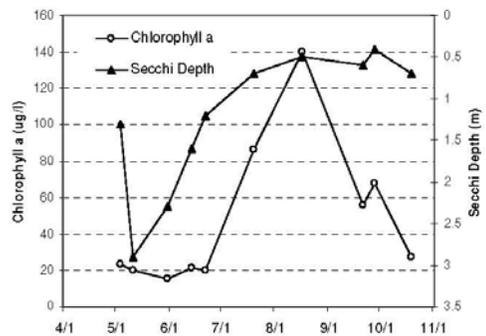
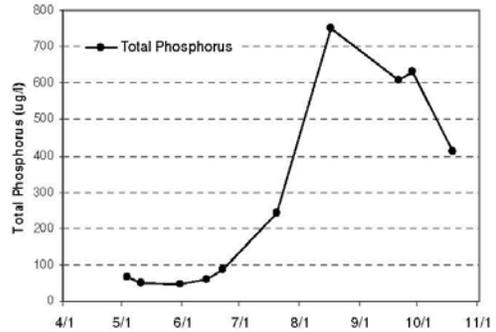
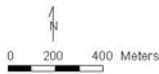
Source: Metropolitan Council and STORET data



Rice Lake
Maple Grove, Hennepin Co.

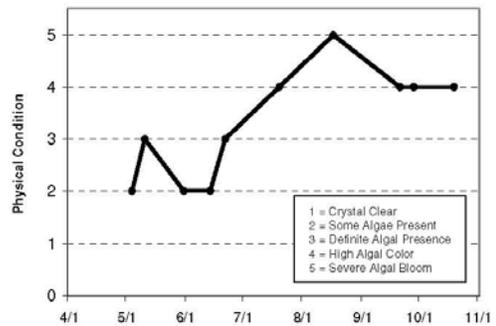
Lake ID: 270116
WMO: Elm Creek
Volunteer: George Schneider

● Sampling site
Contours in meters



2008 Data

DATE	Surf Temp (°C)	Bot Temp (°C)	Surf DO (mg/L)	Bot DO (mg/L)	CLA (µg/L)	Surf TP (µg/L)	Bot TP (µg/L)	Secchi (m)	PC	RS
5/4	12				23	68		1.3	2	3
5/11	14				20	49		2.9	3	3
5/31	20				15	45		2.3	2	2
6/14	21				21	60		1.6	2	2
6/22	24				20	87		1.2	3	3
7/20	27				86	243		0.7	4	4
8/17	26				140	749		0.5	5	4
9/21	22				56	607		0.6	4	4
9/28	18				68	630		0.4	4	3
10/19	12				27	411		0.7	4	3



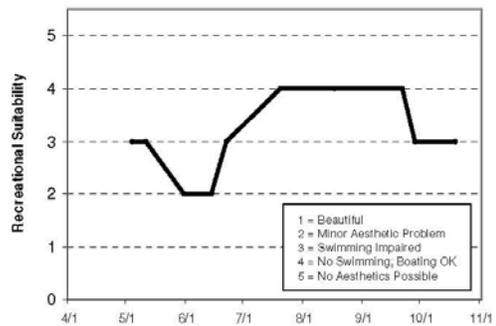
Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Phosphorus												
Chlorophyll a												
Secchi Depth												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total Phosphorus												
Chlorophyll a												
Secchi Depth												
Lake Grade												

Year	2004	2005	2006	2007	2008
Total Phosphorus				F	F
Chlorophyll a				F	D
Secchi Depth				F	C
Lake Grade				F	D

Source: Metropolitan Council and STORET data





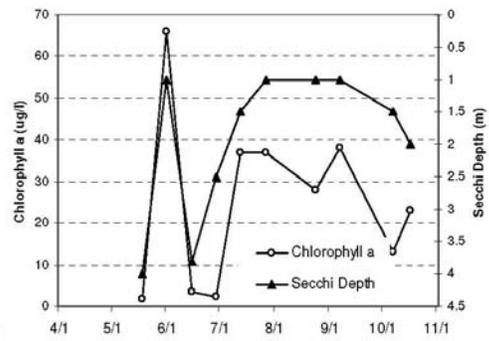
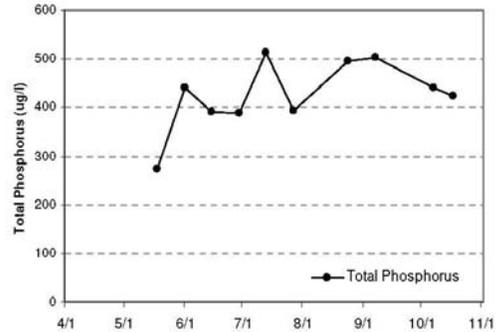
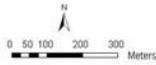
Elm Creek Watershed Management Commission

Sylvan Lake Hassan Twp., Hennepin Co.

LAKE ID: 270171
WMO: Elm Creek
Volunteer: Dirk Colby

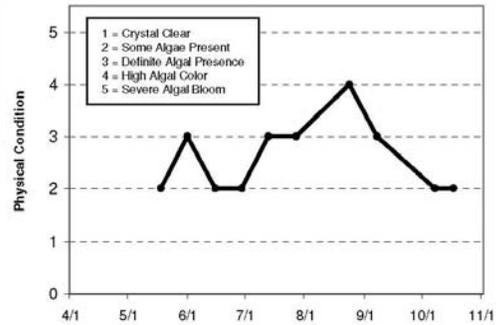
● Sampling station

Contours in meters



2008 Data

DATE	Surf Temp (°C)	Bot Temp (°C)	Surf DO (mg/L)	Bot DO (mg/L)	CLA (µg/L)	Surf TP (µg/L)	Bot TP (µg/L)	Secchi (m)	PC	RS
5/18	16				1.7	274		4	2	1
6/1	19				66	441		1	3	4
6/15	19.5				3.5	391		3.8	2	3
6/29	21.5				2.2	389		2.5	2	3
7/13					37	514		1.5	3	
7/27	25.2				37	394		1	3	4
8/24	22.8				28	496		1	4	4
9/7	19				38	503		1	3	3
10/7	15				13	441		1.5	2	4
10/17	11.9				23	422		2	2	3



Lake Water Quality Grades Based on Summertime Averages

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Phosphorus												
Chlorophyll a												
Secchi Depth												
Lake Grade												

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total Phosphorus												
Chlorophyll a												
Secchi Depth												
Lake Grade												

Year	2004	2005	2006	2007	2008
Total Phosphorus					F
Chlorophyll a					C
Secchi Depth					C
Lake Grade					D

Source: Metropolitan Council and STORET data

