2004 Water Quality Monitoring Report

CRWD

Wenck File #0002-66

Prepared for:

CLEARWATER RIVER WATERSHED DISTRICT Box 481 Annandale, Minnesota 55389

January 2005

Prepared by:

WENCK ASSOCIATES, INC. 1800 Pioneer Creek Center P.O. Box 249 Maple Plain, Minnesota 55359-0249 (763) 479-4200



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1.0 Introduction

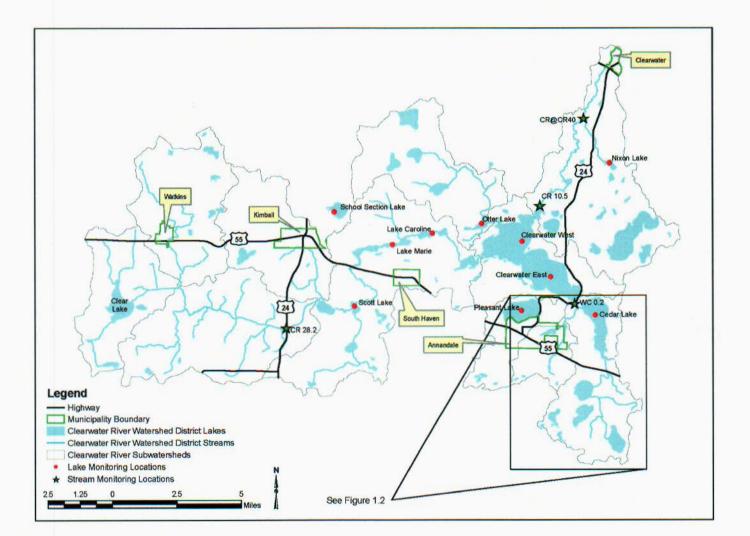
The Clearwater River Watershed District has conducted a stream, precipitation, and lake monitoring program since 1980. The monitoring program has focused on collecting baseline data to assess long-term water quality trends within the District. In the past few years the monitoring plan was expanded to add more fecal coliform and phosphorus monitoring in the watershed. Beginning in 2003, the District returned to baseline monitoring. A Total Maximum Daily Load (TMDL) study is under way for the Clearwater River between Clear Lake and Lake Betsy for dissolved oxygen and bacteria, and for nutrients in Lake Louisa. The potential for additional funding through the Minnesota Pollution Control Agency to address these issues has allowed the District to focus on baseline water quality, preparing for the TMDL.

In 2004, the Clearwater River was monitored at two long-term stations (CR-28.2 and CR-10.5). Warner Creek was monitored near its inflow to Clearwater Lake at WR-0.2. CR-10.5 and the Clearwater River at County Road 40 were also monitored for fecal coliform bacteria.

The nine lakes monitored were Clearwater (East and West basins), Caroline, Cedar, Marie, Nixon, Otter, Pleasant, School Section, and Scott. Cedar Lake, its tributaries, and outflow were monitored more frequently during 2004 in response to high total phosphorus concentrations observed in 2003. Citizen precipitation recorders collecting data in Kimball, Watkins, and Annandale comprise the precipitation records. Citizen volunteers also collect Secchi depths for numerous lakes.

An increased total phosphorus reading in Cedar Lake during 2003 combined with citizen concerns over nuisance algal blooms prompted the District to look more closely at the nutrient balance for Cedar Lake. As such, inflows and outflows to that lake were sampled during 2004. Figure 1.1 shows the monitoring locations for 2004, Appendix A gives the monitoring plan.





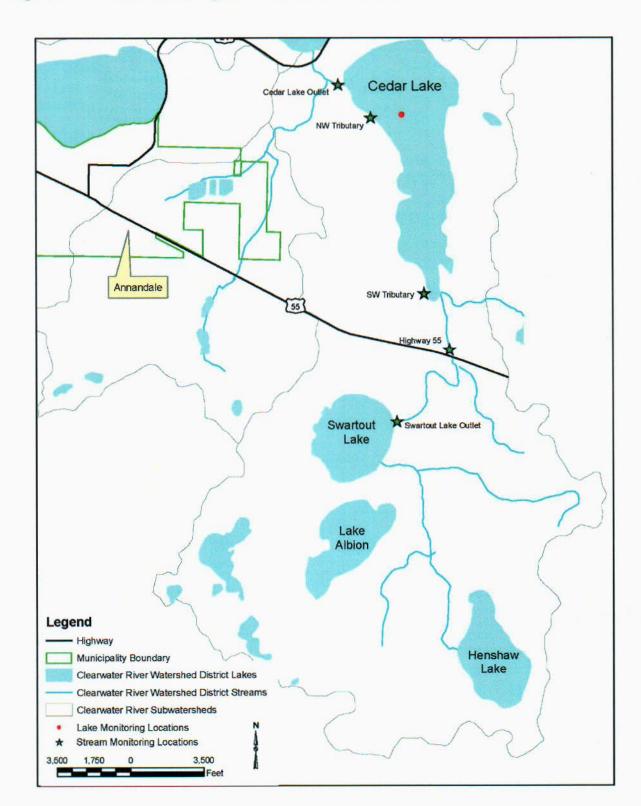


Figure 1.2 2004 Monitoring Locations, Cedar Lake Area

2.0 Precipitation

Precipitation during 2004 was above normal. The Annandale station recorded 31.67 inches for the year (2.61 inches above normal), the Watkins station recorded 33.58 inches (5.02 inches above normal), and the Kimball station recorded 29.94 inches (2.81 inches above normal). Table 2.1 and Figures 2.1, 2.2 and 2.3 show the volunteer precipitation records for the CRWD (Appendix B).

Table 2.1	Clearwater River Watershed 2004 Volunteer Precipitation Records and Normal	S
	(inches)	

	Kimball (Stearns)	St. Cloud (Stearns)	1971-2000 Normal (St. Cloud)	Watkins (Meeker)	1971-2000 Normal (Litchfield)	Annandale/ Corinna (Wright)	1971-2000 Normal (Cokato)
January	1.18	0.72	0.76	0.60	0.79	0.60	0.93
February	1.48	1.24	0.59	1.01	0.67	1.52	0.70
March	0.40	1.42	1.50	1.43	1.55	1.62	1.69
April	1.22	1.00	2.13	1.51	2.35	1.33	2.33
May	6.98	7.42	2.97	7.30	3.37	6.46	3.30
June	3.01	3.66	4.51	2.95	4.89	4.59	4.62
July	3.77	4.30	3.34	4.04	4.02	3.15	4.04
August	2.22	1.47	3.93	2.52	3.67	2.46	4.00
September	4.79	6.52	2.93	7.86	2.92	5.08	2.78
October	4.05	3.21	2.24	3.62	2.15	4.05	2.23
November	0.73	0.71	1.54	0.52	1.50	0.75	1.73
December	0.12		0.69	0.22	0.68	0.06	0.71
Total	29.94		27.13	33.58	28.56	31.67	29.06

Figure 2.1 2004 Kimball Citizen Precipitation Record, St. Cloud Precipitation Record, and Normal Precipitation Record (inches)

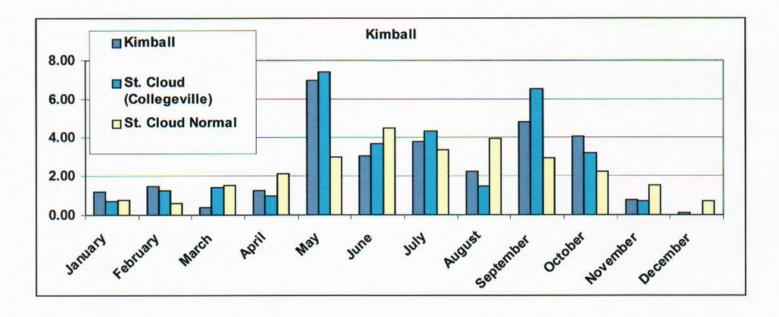


Figure 2.2 2004 Watkins Citizen Precipitation Record and Normal Precipitation Record (inches)

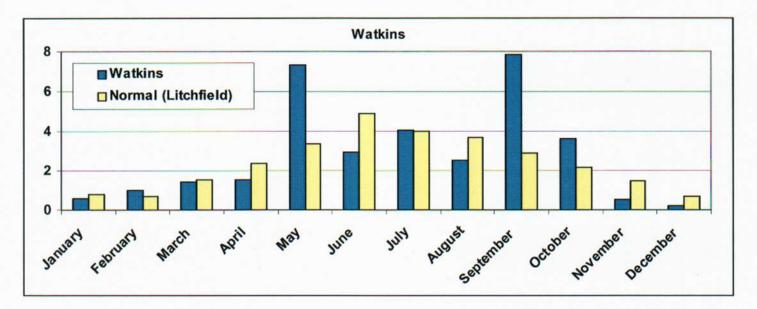
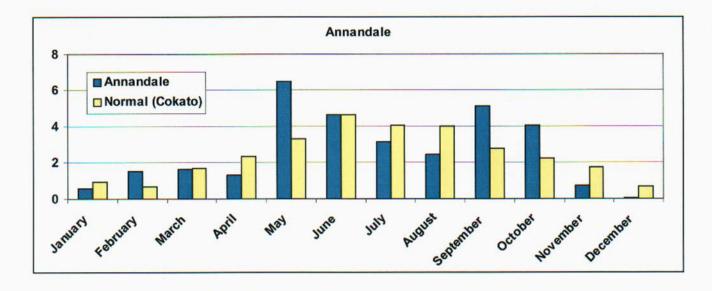


Figure 2.3 2004 Annandale Citizen Precipitation Record and Normal Precipitation Record (inches)



Appendix B contains citizen precipitation records.

3.0 Streams

3.1 RUNOFF AND DISCHARGE

Average stream flow at the outlet of Clearwater Lake (station CR 10.5) was about 32.2 cubic feet per second in 2004, or 2.8 inches of runoff over the 155-square mile watershed. Table 3.1 shows historic annual precipitation and runoff in the District.

Table 3.1	Annual Precipitation and Runoff	
-----------	---------------------------------	--

YEAR	Watkins	Kingston		Maine Prairie		Corinna		Area-Weighted Precipitation Average		Runoff (inches)
1981	w atkins	Kingston		Flame			-	19.76	(1)	3.6
1981	(222)							24.58	(1)	6.8
1982	46.54			42.32		35.02		41.78		17.4
1985	32.23	30.13		32.37		36.07		32.95		13.3
1985	40.72	39.49		45.28				42.22		12.0
1985	40.72	35.63		39.68		33.40		37.26		16.0
1980	18.97	15.40		19.41		16.16		17.52		1.4
1988	16.57	18.98		15.96		15.01		16.48		0.7
1989	22.13	22.68		21.80		16.96		20.68		3.0
1990	40.35	39.18		41.36		32.18		37.94		11.7
1991	41.30	45.11		43.41		36.28		41.01		20.7
1992	23.06	18.41		20.47		24.35		22.01		12.9
1993	40.17		(2)	37.54	(2)	33.33		36.71		15.5
1994	34.77		(2)	30.13	(-)	30.26		31.98		9.0
1995	33.80			33.65		28.66		32.21		8.8
1996	31.31			24.32	(2)	26.13	(2)	27.59		4.8
1997	24.18			21.90		27.37	. /	24.43		6.3
1998	30.03	· · · ·		29.39		27.43	(2)	29.05		5.5
1999	22.08			22.31	(2)	27.71	2.6	23.84		3.9
2000	23.83			20.56		19.91		21.22		1.0
2001	31.00	- <u>-</u>		33.56		29.57		31.28		2.8
2002	37.50			40.27		44.72		40.57		7.6
2003	22.63			21.34		26.77	(2)	23.02		6.5
2004	33.58			33.58		31.67	3.0	33.10		2.8
						N	Mean	29.55		8.1
						Std.	Dev.	8.3		5.7

Table 3.1 Notes: Whole watershed runoff is based on time-weighted average flow at Clearwater Lake outlet (station CR 10.5), and total drainage area of 155 square miles.

1. Data for single gauge in east-central part of watershed (Camp Heritage on Lake Caroline).

2. Average values of other stations in District were used to fill in missing data.

3.2 TOTAL PHOSPHORUS

Baseline Monitoring:

Baseline phosphorus levels in the Clearwater River remain low, especially as compared with conditions monitored in the early 1980s. The upstream station, CR 28.2, had a flow-weighted mean total phosphorus (TP) concentration of 166 μ g/l (micrograms per liter, or parts per billion). Historically this has ranged from 740 to 1,400 μ g/l in the early 1980s. Sites WR-0.2 and CR-10.5 had very low flow-weighted mean concentrations of 63 μ g/l and 22 μ g/l, respectively. The phosphorus loadings were 2,751 pounds at CR-28.2, and 172 and 1,409 pounds, respectively, at WR-0.2 and CR-10.5.

Soluble reactive phosphorus (SRP) (dissolved form of phosphorus easily utilized by algae) was also monitored. It represents 60%, 45%, and 24 % of the total phosphorus value at the three stations CR-28.2, WR-0.2 and CR-10.5 respectively (based on flow-weighted mean averages). The higher value at CR-28.2 may be indicative of agricultural sources. The SRP/TP rations were lower (22%) at WR-0.2 during 2002, and 2003. The increased ratio during 2004 may be an indicator that the phosphorus assimilation capacity of the upstream wetlands is reduced. Figures 3.1 to 3.3 shows historical phosphorus loadings, the values are tabulated in Appendix C.

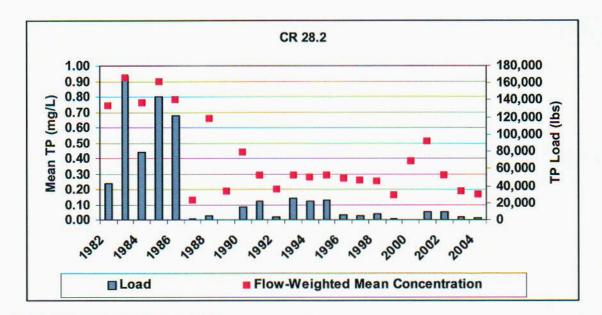


Figure 3.1 Historical Total Phosphorus Loading and Mean Concentration at CR 28.2

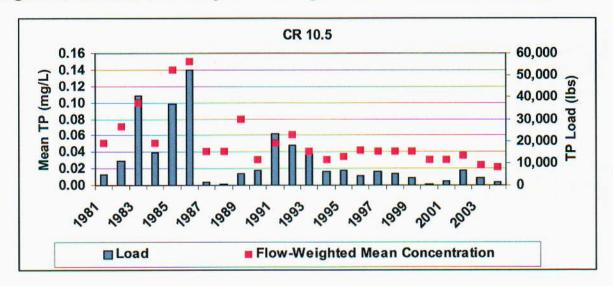
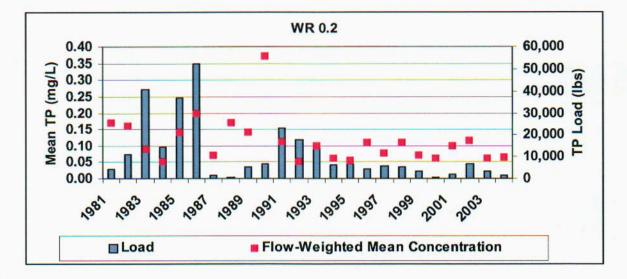


Figure 3.2 Historical Total Phosphorus Loading and Mean Concentration at CR 10.5

Figure 3.3 Historical Total Phosphorus Loading and Mean Concentration at WR 0.2



4.0 Water Quality of Lakes Sampled in Year 2004

Ten lake sites were sampled four times in 2004. The sites included the east and west bays of Clearwater Lake, as well as Nixon, Otter, Pleasant, School Section, Cedar, Caroline, Marie, and Scott Lakes. Parameters analyzed include total phosphorus, soluble reactive phosphorus, chlorophyll-a and a field reading of secchi depth.

Lake water quality in 2004 was generally good. Compared with the MCPA has guidelines on lake impairment based on ecoregion[•], Nixon, Otter, Pleasant, School Section, Clearwater, and Cedar lakes are all considered "full use" because the average TP concentrations are below 40 ug/L. Lake Caroline is considered partial use, and Lakes Marie, and Scott are considered impaired (Figure 4.1).

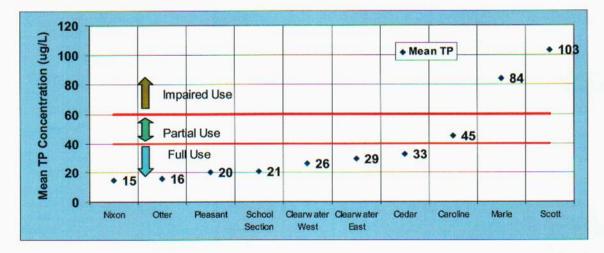


Figure 4.1 2004 Average Total In-Lake Phosphorus

The Carlson Tropic Status Index for lakes monitored in 2004 is generally mesotrophic, except for Lakes Caroline, Marie and Scott which are eutrophic (Figure 4.2).

[•] The MPCA uses total phosphorus as the criteria for swimability. This is called the "Swimable Use Support Classification". The TP values are different Ecoregions for different regions. For the North Central Hardwood Forest Ecoregion (where CRWD is located), TP concentrations below 40 ug/L are considered "full use"

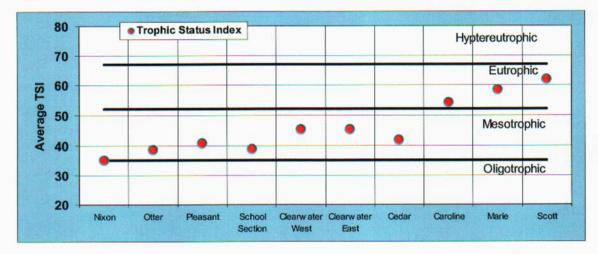
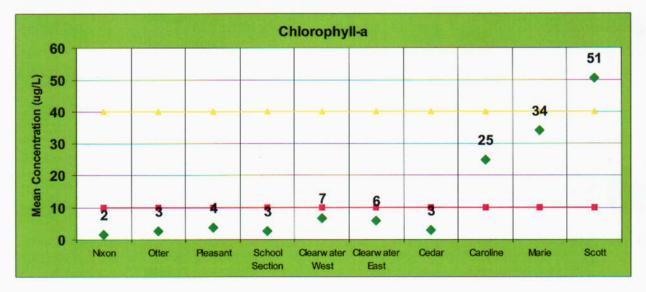


Figure 4.2 2004 Mean Trophic Status Index

Figures 4.3 and 4.4 show summer mean chlorophyll-*a* concentration, and Secchi depth (water clarity, or transparency) for these lakes. Table 4.1 below shows a comparison for the three parameters and the historical range of values.







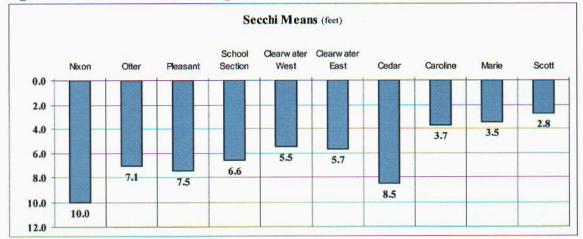


Table 4.1 2004 Mean In-Lake Total Phosphorus, Chlorophyll-a, and Secchi Depth, and Historical Ranges

0	Total Phosphorus µg/l				Secchi Depth (feet)		
Lake	2004 Mean	Historical Range Mean	2004 Mean	Historical Range Mean	2004 Mean (Citizen Reading)	Historical Range Mean	
Caroline	45	40-300	25	3-55	3.7	2.6-5.9	
Cedar	33	26-52	3	5.9-13.3	8.5 (8.5)	3.6-9.8	
Clearwater East	29	22-130	6	3-85	5.7 (3.2)	3.9-9.7	
Clearwater West	26	26-160	7	4-77	5.5 (2.4)	4.5-8.6	
Marie	84	70-360	34	4-153	3.5	1.4-7.6	
Scott	103	103-660	51	3-223	2.8	1.6-6.2	
School Section	21	21-50	3	3-14	6.6	1.0-2.2	
Nixon	15	15-39	2	2-7	10.0 (11.6)	1.8-3.3	
Otter	16	13-34	3	3-8	7.1	1.9-3.0	
Pleasant	20	15-51	4	4-12	7.5 (8.8)	2.0-3.0	

Figures showing historical lake data and trends are shown in Appendix D. Citizen Secchi depths are shown in Appendix E. Water quality lab reports are in Appendix F, and field notes are in Appendix G.

4.1 CEDAR LAKE SPECIAL MONITORING

In addition to regular monitoring on Cedar Lake, a special synoptic survey was conducted in and around Cedar Lake during 2004 to ascertain the reason for relatively high TP concentrations observed in Cedar Lake during 2003. Inflows to and outflow from Cedar Lake were monitored along with regular stream monitoring stations. Results of the special monitoring are discussed in this section.

First, total phosphorus concentrations in the lake were within normal ranges (about 0.30 mg/L), except one reading of 0.55 mg/L in June. This high reading coincided with an algal bloom, which was observed by citizens, District, and Wenck staff.

Table 4.2 shows that singular high TP readings in 2003, and 2004 skewed the average value. The rest of the measured TP values were closer to the historical average of around 0.30 mg/L. This indicates that the water quality problem in Cedar Lake is episodic in nature.

Date	<u>Total</u> <u>Phosphorus</u> (mg/L)	<u>Soluble</u> <u>Reactive</u> <u>Phosphorus</u> <u>(mg/L)</u>	<u>Chlorophyll-a</u> (µg/L)	<u>Secchi Depth</u> (ft)
6/17/2003	0.033	< 0.005	7	10.5
7/9/2003	0.028	< 0.005	12	4.5
8/20/2003	0.033	< 0.005	6	
9/17/2003	0.112	< 0.005	18	
2003 Average	0.0515	< 0.005	11	7.5
6/22/2004	0.055	< 0.005	5.87	
7/20/2004	0.031	< 0.005	1.07	
8/11/2004	0.025	< 0.005	< 0.200	8.5
9/16/2004	0.021	< 0.005	2.14	
2004 Average:	0.033	< 0.005	3	NA

Table 4.2 2003 and 2004 Total Phosphorus in Cedar Lake

The episodic nature of the high phosphorus readings, in combination with the low watershed loads observed during 2004 due to dry conditions might indicate internal loading. However, we would expect to see also high soluble reactive phosphorus (SRP) in these samples. SRP is below detection limits and thereby a small fraction of the TP (below 4 to 10%) for all measurements. Low SRP coupled with low chlorophyll-*a* indicates that the phosphorus in the sample is particulate, which may indicate a non-representative sample, or some other, yet unidentified mechanism.

Large precipitation events occurred one to two weeks prior to the two sampling events during which the high TP was observed. If these events caused discharge from Swartout Lake, the discharge would have been high in TP concentration. The water may also have been warm enough, due to the shallow nature of Swartout Lake, to spread across the top of Cedar Lake, causing a briefly stratified layer of high TP concentration water at the top. These conditions may be suitable to cause algal blooms such as those observed in Cedar Lake. However, high SRP and chlorophyll-a concentrations would be expected in this case as well.

The synoptic surveys during 2004 showed high total phosphorus concentrations in discharge from Swartout Lake (0.307 mg/L). This was higher than observed at any other location during the synoptic survey. Total phosphorus in outflow from Henshaw Lake was also high, 0.213 mg/L. Total phosphorus concentrations in other tributaries to Cedar Lake were comparatively small. Loads were small due that fact, coupled with low flow during 2004. Many of the tributaries were not flowing for the majority of the year. Figure 4.5 shows the results of the synoptic survey. Results of Cedar Lake tributary monitoring are included as Appendix H.

The potential causes of algal blooms in Cedar Lake may include:

- Storm event loadings from Swartout Lake causing warm water to wash into Cedar Lake and float over the top of the lake.
- Internal loading.
- Wind effects causing thermocline tip.
- Watershed loading.

The data available does not support one cause.

4-5

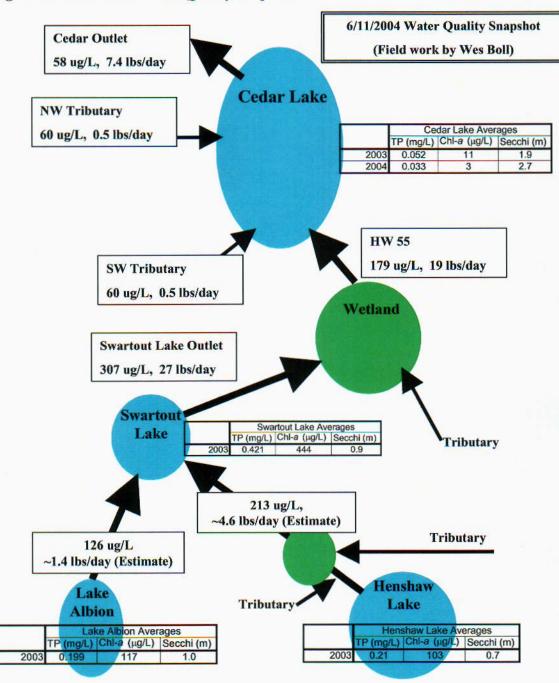


Figure 4.5 Cedar Lake Water Quality Snapshot

5.0 Conclusions

- Annual precipitation for 2004 was above normal. Annandale and Kimball stations were 2.6 and 2.8 inches, respectively above normal for the year, while Annandale was 5.02 inches above normal for the year.
- Dry conditions late in 2003 contributed to lower runoff in 2004: 2.8 inches. This is over 5 inches below the 20-year average.
- The Clearwater River phosphorus load was about 2,751 pounds at CR-28.2, significantly lower than previous years due primarily to lower flow conditions.
- The water quality of Nixon, Otter, Pleasant, School Section, Clearwater, and Cedar Lakes was good, water quality in Lake Caroline was fair. Water quality in Lakes Marie, and Scott were poor.
- 5. Potential causes of episodic nuisance algal blooms in Cedar Lake include:
 - Storm event driven discharge from Swartout Lake discharging warm water that floats on the surface of Cedar Lake causing an algal bloom.
 - b. Wind effects that tip the thermocline and push water from the hypolimnion closer to the water surface.
 - c. In-lake loading.
 - d. Watershed runoff.

5-1

Appendix A

2004 Monitoring Plan

Wenck Associates, Inc. 1800 Pioneer Creek Ctr. P.O. Box 249 Maple Plain, MN 55359-0249



(763) 479-4200 Fax (763) 479-4242 E-mail: wenckmp@wenck.com

MEMORANDUM

TO:	Clearwater River Watershed District Board of Managers
FROM:	Norman C. Wenck Engineer for the District
DATE:	February 18, 2004

RE: Proposed 2004 Water Quality Monitoring Program

Introduction

The Clearwater River Watershed District conducts annual water quality monitoring at selected lakes and selected locations on streams. The District is working with the MPCA on a Phase I TMDL program which will move into Phase II (data collection) in 2004. The District's proposed 2004 program is intended to provide data throughout the District while the TMDL is focused on the impaired reaches.

Lake monitoring follows the long-term plan shown in Table 1, and stream monitoring sites together with laboratory and field parameters are shown in Table 2.

Lake Monitoring

The schedule for 2004 has Clearwater East and West being monitored and the additional main stem lakes of Caroline and Scott. Pleasant, School Section, Nixon and Otter Lakes will also be monitored. Cedar Lake is proposed to be monitored again in 2004 to assess the increased phosphorus levels that were apparent in 2003. The total number of lakes is 8 but 9 stations are monitored since Clearwater Lake has two stations and the parameters to be monitored are shown on Table 2. Citizens monitor approximately 14 lakes for secchi depth also.

Stream Monitoring

The Clearwater River will be monitored at station CR10.5, Warner Creek will be monitored at WR 0.2 and three Cedar Lake tributaries will be monitored. These stations will be monitored six times for water quality and flow. Parameters are total phosphorus and soluble reactive phosphorus.

Cost

This proposed basic program is estimated to cost \$12,600.

Summary

The proposed monitoring program continues the program in place since 1981. The remaining options are progressive and additive and can be modified as desired after you have an opportunity to review this proposal. It is requested that a decision on the scope of the program be made at the March 10, 2004 meeting. Please feel free to call me with any questions or comments that you may have before the meeting.

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TABLE 1

PROPOSED LONG-TERM WATER QUALITY MONITORING PLAN FOR CRWD LAKES

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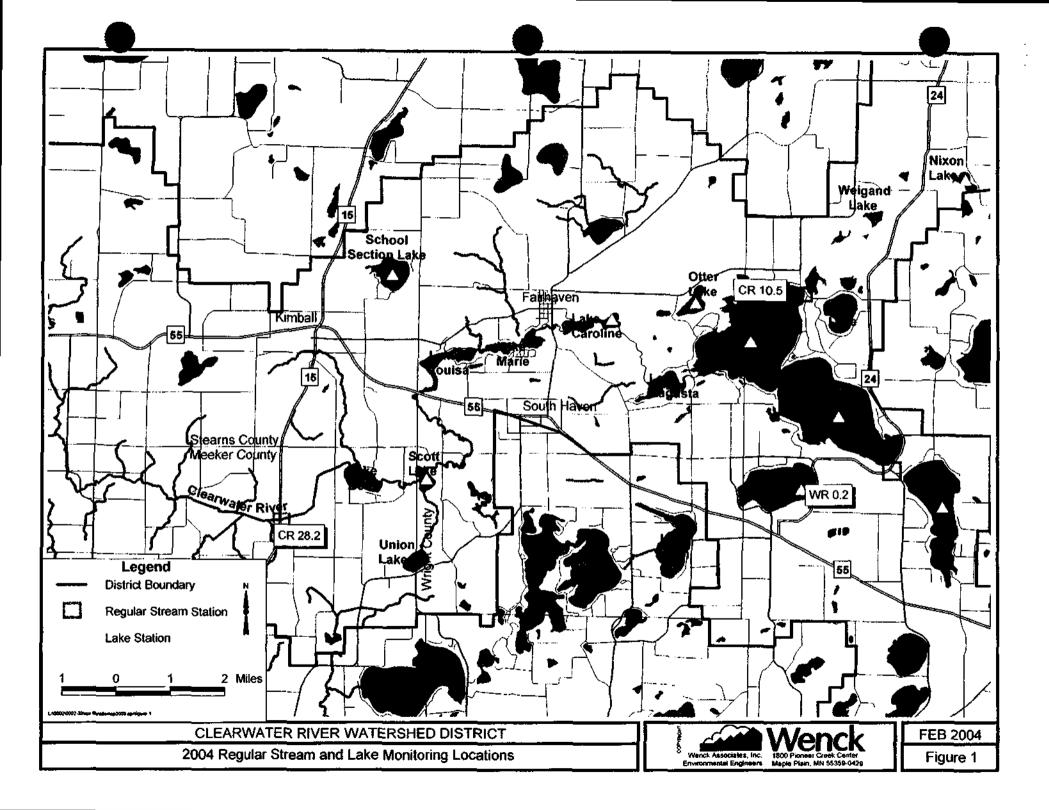
 (γ_i)

LAKE STATIONS ⁽¹⁾	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>
Clearwater Lake:								
Clearwater East	X	Х	Х	X	Х	X	Х	X
Clearwater West	Х	x	х	х	Х	х	х	х
Main Stem Lakes:								
Augusta	х		Х		Х		X	·
Louisa	х		х		X		Х	
Caroline		Х				Х		х
Scott		Х	х			Х		х
Marie		Х		Х		Х		x
Betsy	х		х		Х		х	
Other Lakes:								
Cedar		· · · · · · · · · · · · · · · · · · ·	X		X	····	Х	
Pleasant	х		Х	Х				х
School Section	х		х	Х				х
Nixon	х		х		х			х
Otter	х		х		Х			х
Bass		Х	х		Х			
Clear		х	Х	Х			Х	
Union		Х	х			Х		
Henshaw		Х	х			х		
Little Mud			х			Х		
Wiegand			Х			Х		
Swart Watts			х				Х	
Albion			х				x	
Grass			Х				х	
Note:	⁽¹⁾ Lake selectio	n based on t	otal lake siz	e ranking sco	ores (Lake Pr	riority Ranki	ng, 1990)	

egory	Schedule	Station	Parameters
Lakes:	May 15 - June 5 June 24 - July 5 Jul 25 - Aug 4	Clearwater-East Clearwater-West	Field: Secchi, DO and temperature profiles
	Aug 26 - Sep 11		Lab: Total phosphorus, soluble reactive phosphorus an Chlorophyll-a
		Caroline	
		Scott	
		Cedar	
		Pleasant	
		School Section	
		Nixon	
		Otter	
			Citizen Secchi: Fourteen Sites
Streams:	April		Field: Flows, DO and temperature
	May	WRO.2	
	June	CR10.5	Lab: Total phosphorus, soluble reactive phosphorus
	July	3 Cedar Lake Tributaries	
	August		
	September		
	Weekly	River Stage at CR10.5	

TABLE 2 Proposed 2004 CRWD Monitoring Plan Summary

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Appendix B

Citizen Precipitation Records

TOTALS	



MINNESOTA	CLIMATOLOGICAL	NETWORK
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8 6

am L pm Month Ob Time

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D

Year

County Township

1

2 1

Range Section

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Address 9214 Kilbury Avenue NW, Annandale, MN 55302 Telephone No. 24-HOUR AMOUNTS At the end of each month, forward forms to: REMARKS: (320) 274-5179 24-HOUR AMOUNTS At the end of each month, forward forms to: REMARKS: Type of Gauge: (Check One Show on University of Minnesota, 279 Nørth Hall RAIN MELTED SNOW SNOW, SNOW SNOW: University of Minnesota, 279 Nørth Hall Give times and comments about events, University of Minnesota, 5108 Type of Gauge: (Check One Other International Provide Action of Cyl.	ame	Vi	ola N	ovotr	ne	County Name Wright	To	wnship Na Corin	me na			
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MINNESOTA CLIMATOLOGICAL NETWORK

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Name				County Name		wnship Na	me		
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Address	5					lephone N		-0	
			venue NW, Annandale, MN 553		1(	320) 274			
24-HOUR AMOUNTS		SNOW	At the end of each month, forward forms to. Office of State Climatology	Give times and comments				e: (Check C	-
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Department of Natural Resources

MINNESOTA CLIMATOLOGICAL NETWORK

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27 17 Range Section

Name					County Name Township Name				
1	/iola N	lovotne		Wright	Corinna				
Address					Telephone No.				
			venue NW, Annandale, M	N 55302	(320) 274-5179				
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RAIN MELTED SNOW	SNOW	SNOW	Department of Natural Resource	ces about events.	Cyl. X Test Tube				
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Name	lame Viola Novotne				County Name Wright	Township Name Corinna					
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Address	214 Ki	ilbury A	venue NW, Ann	andale, MN 5530	)2 ~	(320)	274-51				
24-HO	UR AM	DUNTS	At the end of each mor	nth. forward forms to:	REMARKS:	Type of Gauge: (Check One)					
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Name Viola Novotne				Wright	Corinna				
Address	3		venue NW, Annandale, MN		Telephone No. (320) 274-5179				
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### MINNESOTA CLIMATOLOGICAL NETWORK

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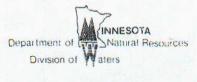
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	Viola N	ovotne			Wright Corinna						
Address			-			Telephone No.					
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Department of Waters

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Address		th Char	at V	imball MN			Telephone No. (320) 398-7455				
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Richard Eckman     Stearns       Address     Telephone No. (320) 398-7455       7905 - 137 th Street, Kimball, MN     (320) 398-7455 <b>24-HOUR AMOUNTS</b> At the end of each month, forward forms to. Office of State Climatology Department of Natural Resources     REMARKS: Give times and comments about events.       SNOW SNOW     SNOW ON Department of Natural Resources     Give times and comments about events.     Type of Gauge (Check One)       Cyl.     X Test Tube       Wedge     Other					Year Month	ObTime	County Town		
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Address		Watkins	, MN	55389 (32) 764-7
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Name Addre	417 L	<b>ce and</b> uella Str kins, MN	eet, Un	8	Forest Prairie • Telephone No. §20) 764-7395
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		la Stree	t, Unit 8, Watkins, MN 553	89	(320) 764		95	
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## Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation network The data presented are monthly totals and the data are grouped by county. Observer locations are described usin section numbers.

Choose a county and year, then click on "Annual report".

Annual report

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2004 STEARNS Monthly Precipitation, Totals

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- Data as received and digitized on or before 1/11/2005. All values are in inches.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'n
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2003, Oct 2003, and Jan 2004, res growing season (May 2004 thru Sep 2004) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactiv precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes



Return to Minnesota Climatology Working Group Main Page

Comments/Questions URL: http://climate.umn.edu/HIDENannual

http://climate.umn.edu/HIDENannual/HIDENannual.asp

## Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation network The data presented are monthly totals and the data are grouped by county. Observer locations are described usin section numbers.

Choose a county and year, then click on "Annual report".

Annual report MEEKER 

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2004 MEEKER Monthly Precipitation, Totals

47 118N 30W 31	00000000 nnnn SWCD	JAN . 67	FEB .97	MAR 1.56	1.26	6.23	JUN 4.73	4.24	2.06	SEP 5.15	3.29	NOV .75	DEC 28
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Obtaining Data for Legal Purposes



Comments/Questions URL: http://climate.umn.edu/HIDENannual Last modified: August 21, 2003

## **Annual Reports of Monthly Precipitation Totals**

This application creates annual summaries of precipitation data gathered by volunteer-based observation network The data presented are monthly totals and the data are grouped by county. Observer locations are described usin section numbers.

Choose a county and year, then click on "Annual report".

Annual report WRIGHT 2004 -

### 2004 WRIGHT Monthly Precipitation, Totals

	ttt 118N	rr 25w		00000000 DELANO	nnnn NWS	JAN *	FEB 1.36	MAR .83	APR 2.14		JUN		AUG 1.39		OCT	NOV	DEC
86	118N	27W	14		SWCD	.40	.99	1.78	1.89	6.63	4.21	2.58	2.16	5.54	3.06		25
	118N				SWCD	2.20	2.02	2.42	1.70	7.31	4.14	1.99	3.95	6.15	1.92	.54	31
			29	ROCKFORD	NWS	.45	1.07	1.38	2.10	5.78	7.62	2.82	1.68	6.58	3.07	. 59	28
	119N		7		BYRG	.52	1.29	1.96	2.51	7.32	4.44	2.42	2.34	6.86	3.66	1.03	.41 28
	119N		1000		SWCD	1.00	1.70	1.63	2.15	6.29	3.07	2.51	4.12	6.41	3.29	.88	27
	120N			BUFFALO	NWS	.60	1.13	1.31	1.92	4.26	4.08	2.46	.64	4.41	3.23	.65	22
	120N				SWCD				2.53	7.46	3.73	2.31	1.73	6.07	2.83		
	121N				SWCD	.91	2.58	1.91	1.66	7.29	3.62	2.91	2.61	6.86	5.46	1.05	3(
				IDZIOREK	MOSQ								1.67				
	121N		6		BYRG		-		1.84	6.83	4.84	3.42	2.48	5.76	4.80		
	121N				SWCD			1.33	1.09	5.69	3.76	2.49	2.05	5.59	3.46	.23	25
86	122N	27W	32		SWCD	.72	1.13	. 89	1.62	7.05	5.34	4.04	1.70	4.14	2.99	.78	28
	ity av	verag	les			.84	1.53	1.54	1.91	6.37	4.27	2.84	2.19	5.92	3.50	.67	.41 27
# of	obs					9	10	10	13	13	12	13	13	13	13	9	1

- Data as received and digitized on or before 1/11/2005. All values are in inches.
- · 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'n
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2003, Oct 2003, and Jan 2004, res growing season (May 2004 thru Sep 2004) precipitation total.
- "*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactiv precipitation data from the site nearest to a target.

### Obtaining Data for Legal Purposes



Return to Minnesota Climatology Working Group Main Page

Comments/Questions URL: http://climate.umn.edu/HIDENannual Last modified: August 21, 2003

## Appendix C

## Historical Mean Flow, Mean Phosphorus, and Phosphorus Loading

#### TABLE 1

### HISTORICAL SUMMARY OF STREAM FLOWS, PHOSPHORUS CONCENTRATIONS, AND LOADINGS

### **Clearwater River Watershed District**

				Average Total Phosphorus		
		Average Stream		Concentration	Total Phospho	
Station	Year	(cu m/sec)	(cfs)	(mg/l)	(kg)	(lb)
Main Stem:						
CR 28.2	1981 (1)			1.40		12 500
	1982 (1)	0.93	32.8	0.74	19,700	43,500
	1983	2.62	92.6	0.92	76,000	168,000
	1984	1.49	52.6	0.76	35,700	78,800
	1985	2.32	81.9	0.90	65,500	144,000
	1986	3.20	113	0.78	55,200	122,000
	1987	0.11	3.90	0.13	460	1,020
	1988	0.09	3.12	0.66	1,850	4,080
	1989	0.02	0.72	0.19	120	260
	1990	0.51	18.0	0.44	7,040	15,500
	1991	1.11	39.1	0.29	10,200	22,500
	1992	0.26	9.30	0.20	1,660	3,650
	1993	1.28	45.2	0.29	11,600	25,600
	1994	1.17	41.2	0.28	10,100	22,300
	1995	1.15	40.4	0.29	10,400	22,900
	1996	0.33	11.7	0.27	2,860	6,300
	1997	0.27	9.36	0.26	2,170	4,790
	1998	0.41	14.4	0.25	3,190	7,020
	1999	0.08	2.78	0.16	400	870
	2000	0.02	0.72	0.38	240	530
	2001 (4),(5)	0.27	9.46	0.51	4,309	9,500
	2002	0.47	16.50	0.29	4,290	9,460
	2003	0.28	9.92	0.19	1,710	3,770
	2004	0.48	17.04	0.17	1,248	2,751
CR 10.5	1981 (1)	1.15	40.6	0.05	2,060	4,550
	1982 (1)	2.20	77.8	0.07	4,990	11,000
	1983	5.64	199	0.10	18,500	40,800
	1984	4.28	151	0.05	6,620	14,600
	1985	3.88	137	0.14	16,700	36,800
	1986	5.52	195	0.15	23,700	52,300
	1987	0.46	16.2	0.04	600	1,320
	1988	0.23	7.95	0.04	260	580
	1989	0.97	34.2	0.08	2,340	5,150
	1990	3.77	133	0.03	3,060	6,750
	1991	6.68	236	0.05	10,500	23,200
	1992	4.16	147	0.06	8,090	17,800
	1993	5.01	177	0.04	6,330	14,000
	1994	2.92	103	0.03	2,850	6,290
	1995	2.83	100	0.03	3,040	6,710
	1996	1.53	54.2	0.04	1,970	4,350
	1997	2.06	72.8	0.04	2,690	5,940
	1998	1.78	63.0	0.04	2,330	5,120
	1999	1.25	44.1	0.04	1,520	3,350
	2000	0.31	10.8	0.03	280	610
	2001 (4),(5)	0.90	31.7	0.03	850	1,873
	2002	2.46	87.0	0.04	2,950	6,500
	2002	2.11	74.6	0.024	1,590	3,500
	2004	1.66	58.8	0.022	639	1,409

100 100

1/12/2005

#### TABLE 1

### HISTORICAL SUMMARY OF STREAM FLOWS, PHOSPHORUS CONCENTRATIONS, AND LOADINGS

### **Clearwater River Watershed District**

		Average Strea	m Flow	Average Total Phosphorus Concentration	Total Phospho	tus Load
Station	Year	(cu m/sec)	(cfs)	(mg/l)	(kg)	(lb)
Tributaries:	0.500	(	(0.0)	(iig/i)	(Kg)	(10)
WR 0.2 (2)	1981 (1)	0.07	2.60	0.17	390	860
	1982 (1)	0.23	8.20	0.16	780	1,720
	1983	0.47	16.50	0.09	1,270	2,800
	1984	0.60	21.20	0.05	950	2,100
	1985	0.48	17.10	0.14	2,130	4,700
	1986	0.86	30.40	0.20	4,630	10,200
	1987	0.04	1.50	0.07	100	230
	1988	0.01	0.40	0.17	60	130
	1989	0.03	1.19	0.14	80	180
	1990	0.06	2.28	0.37	750	1,660
	1991	0.26	9.22	0.11	860	1,900
	1992	0.11	4.02	0.05	170	370
	1993	0.24	8.59	0.10	760	1,670
	1994	0.18	6.34	0.06	320	700
	1995	0.12	4.27	0.05	210	460
	1996	0.05	1.78	0.11	180	380
	1997	0.09	3.15	0.08	220	480
	1998	0.09	3.11	0.11	290	650
	1999	0.06	2.03	0.07	130	280
	2000 (3)	0.01	0.44	0.06	25	56
	2001 (4),(5)	0.08	2.88	0.10	257	567
	2002	0.26	9.17	0.11	930	2,060
	2003	0.16	5.79	0.062	320	710
	2004	0.07	2.6	0.06	78	172

### NOTES:

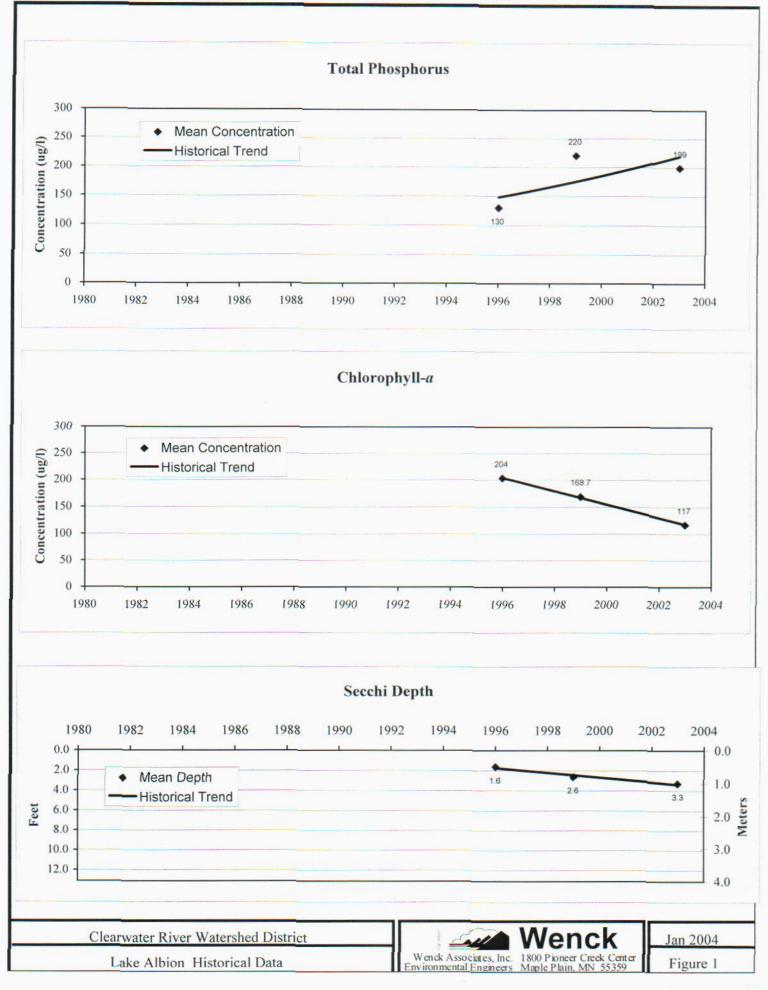
Flow values are time-weighted averages unless otherwise noted.

Total phosphorus values are flow- and time-weighted averages unless otherwise noted.

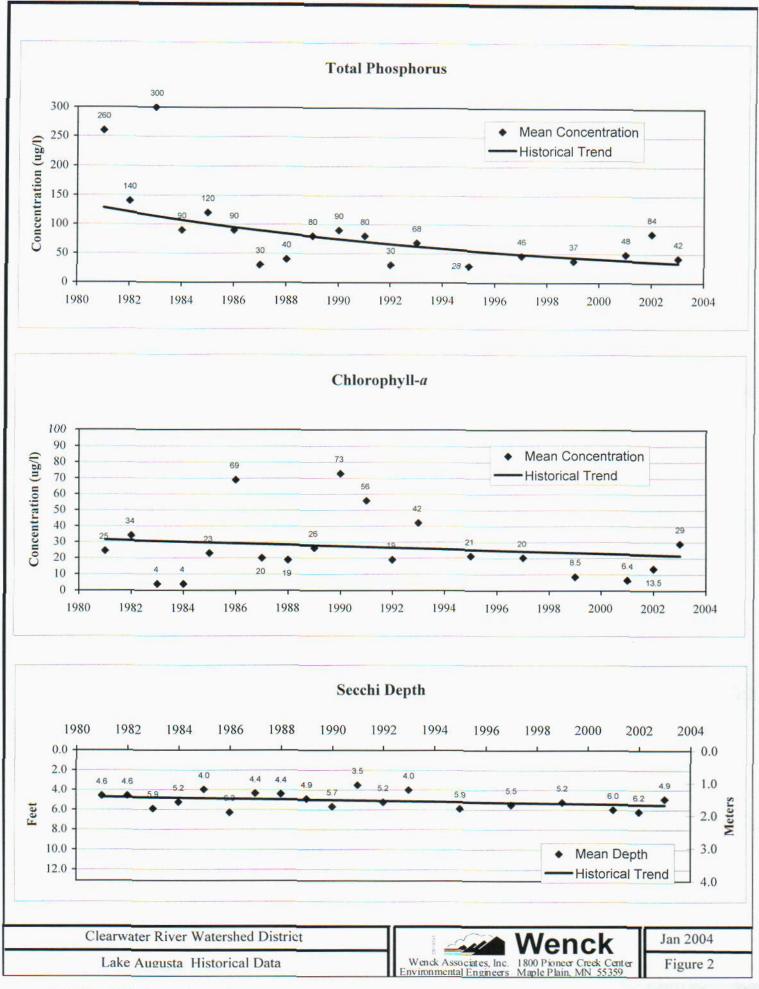
- (1) Values in 1981 and 1982 are arithmetic means
- (2) Station WR 0.2 was designated Station WC 0.2 in 1981-1983
- (3) Phosphorus values in 2000 are flow-weighted and adjusted per log-log regression on flow so as to correspond to annual mean flows.
- (4) 2001 Flow and total phosphorus values are arithmetic averages.
- (5) 2001 total phosphorus loads estimated from arithmetic averages of flow and total phosphorus values.

# Appendix D

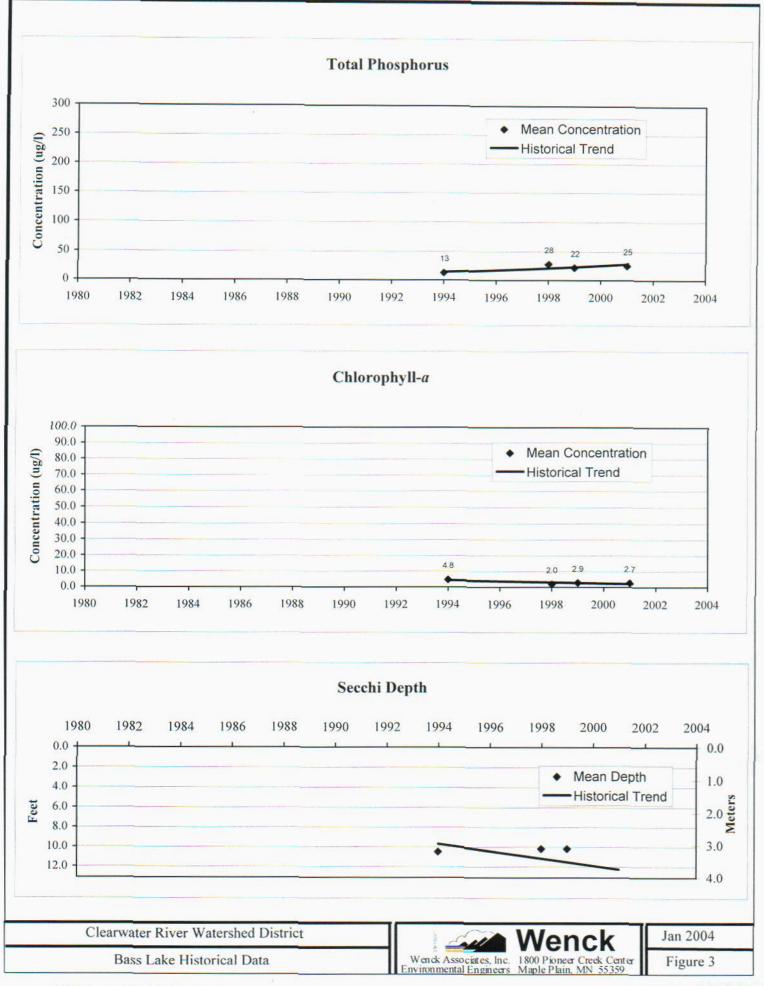
Lake Historical Data

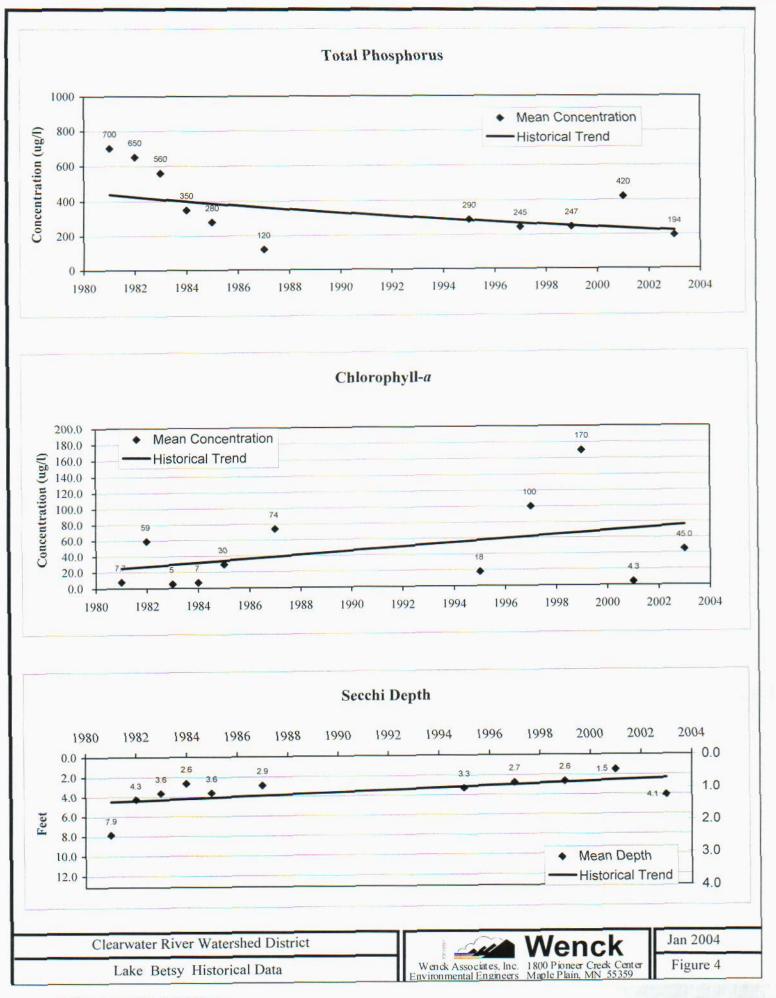


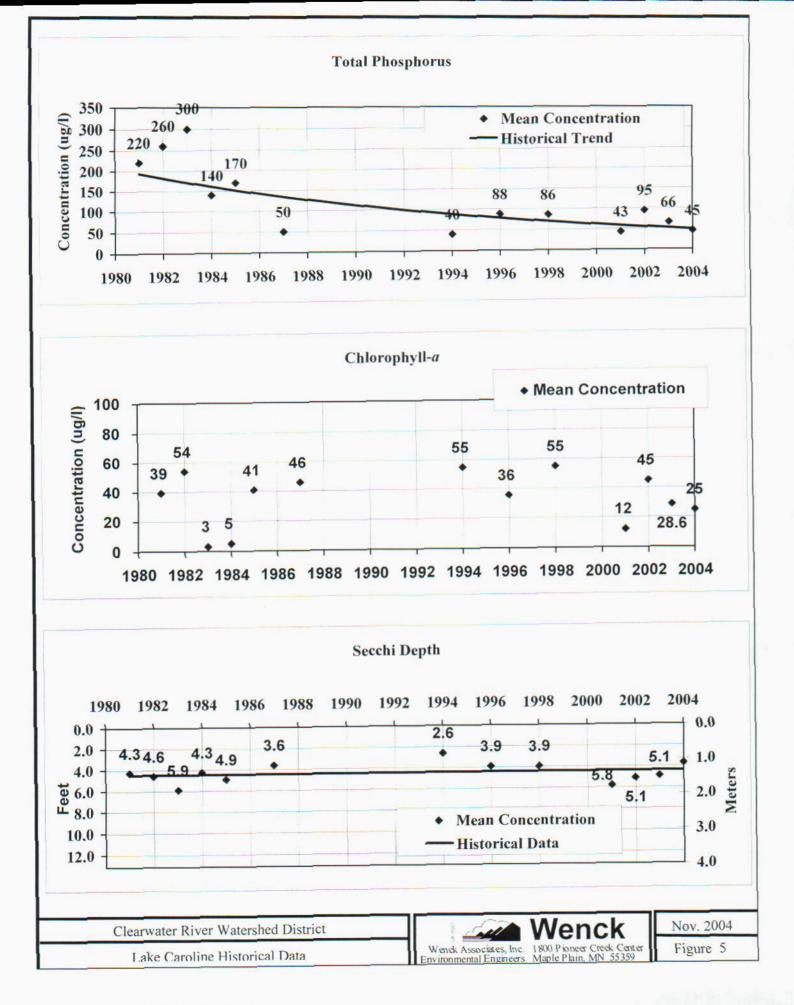
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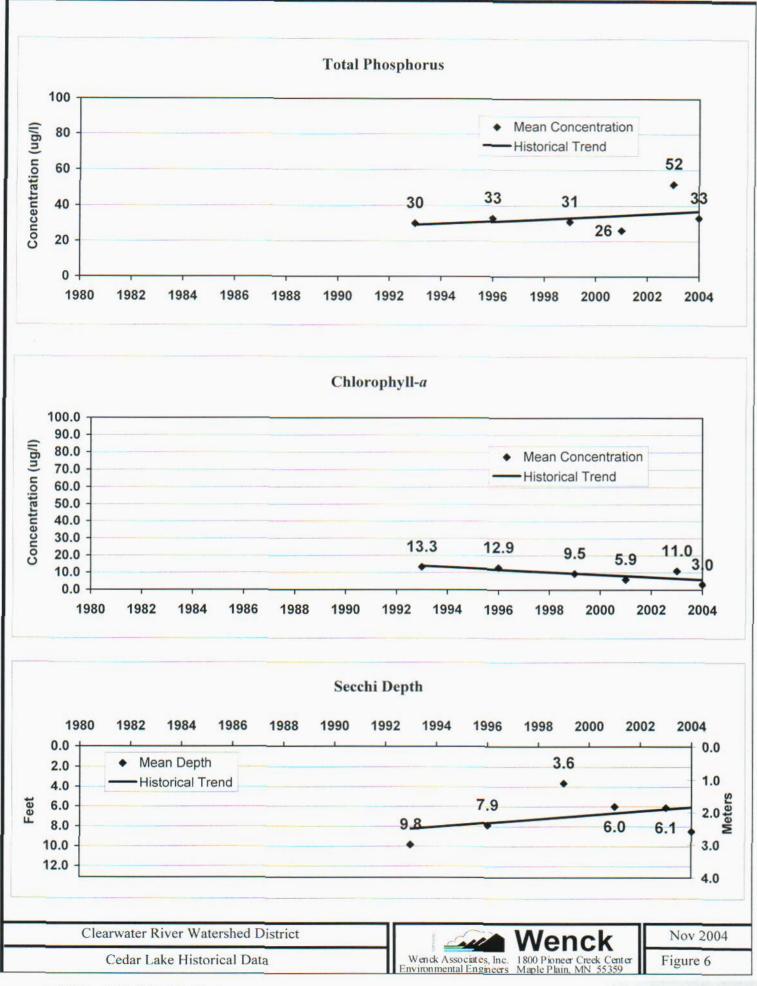


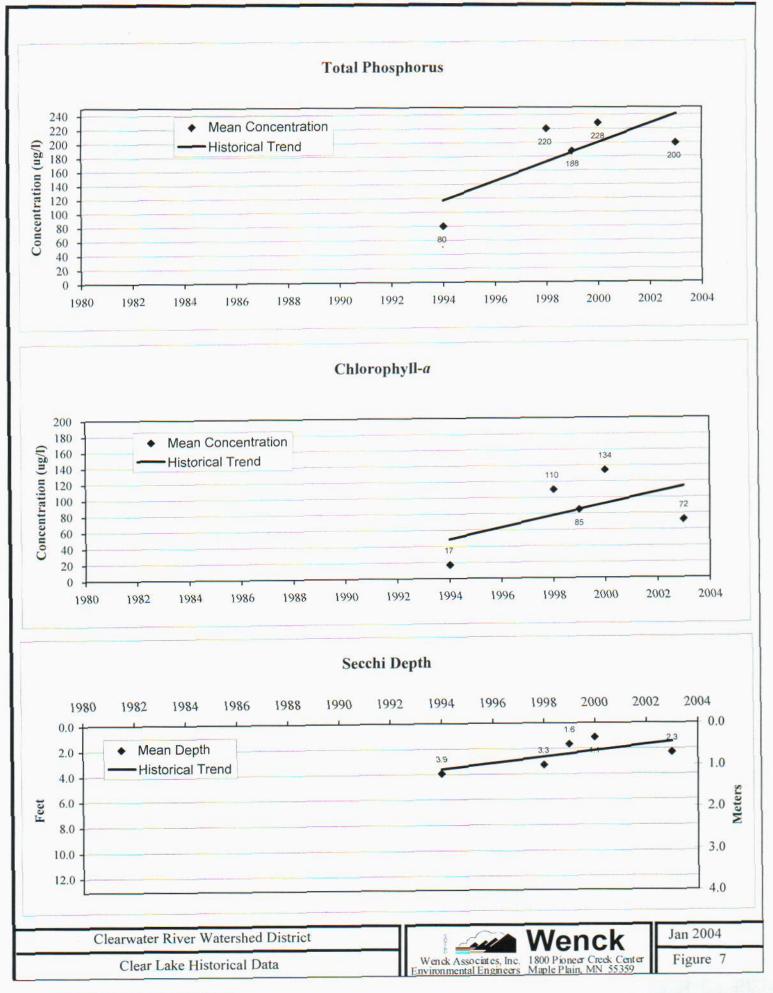
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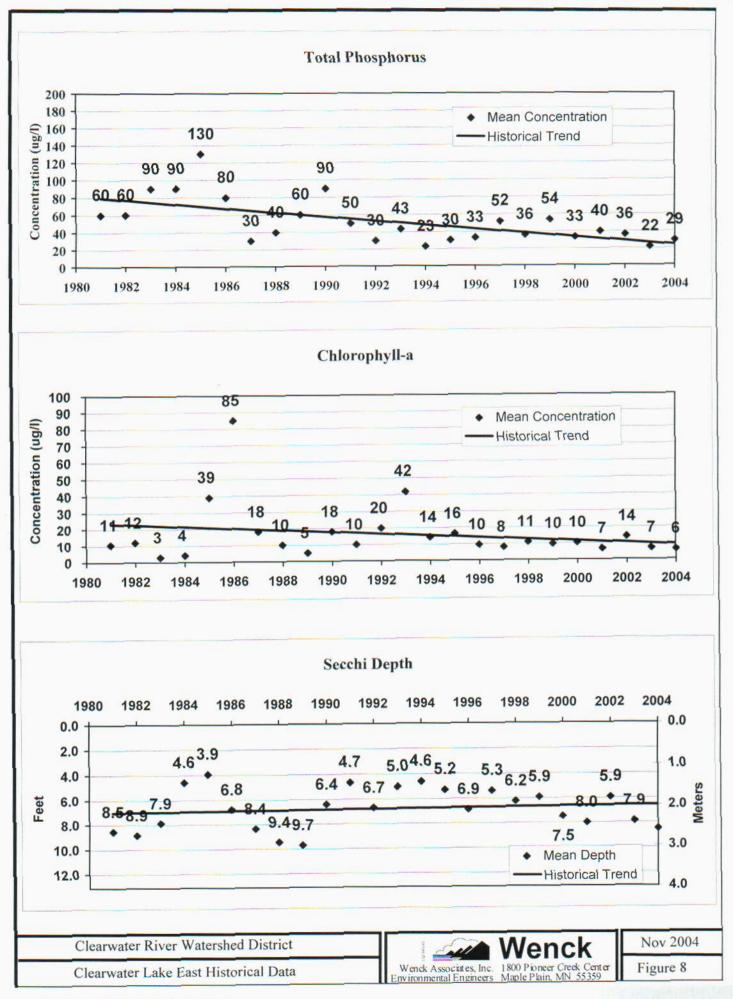




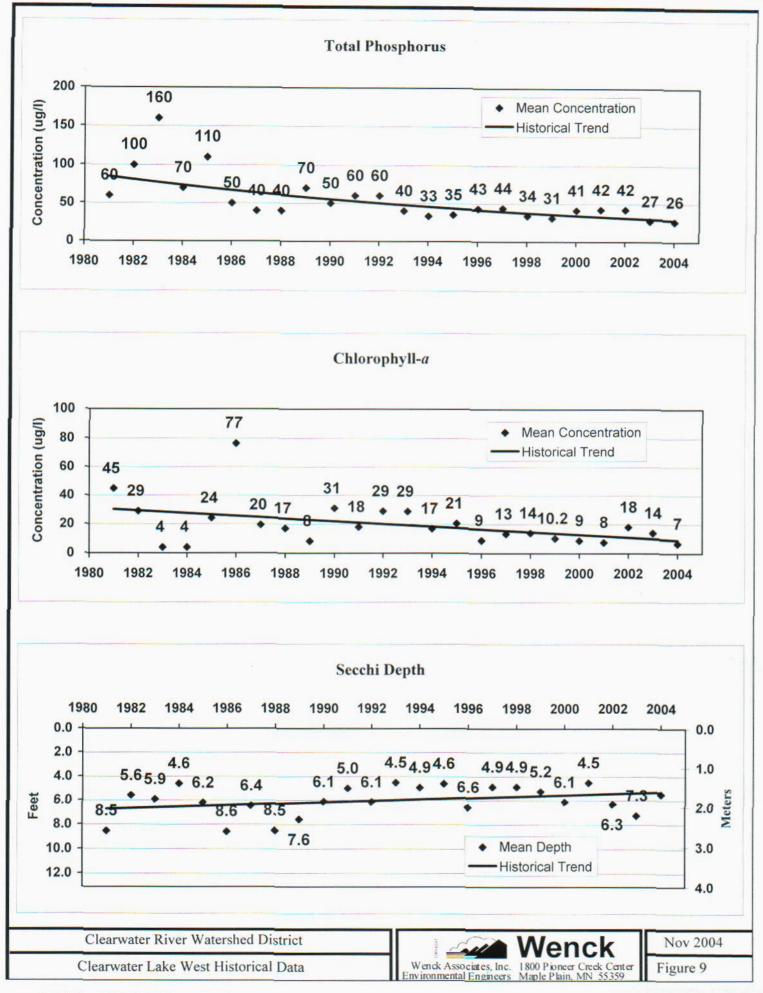




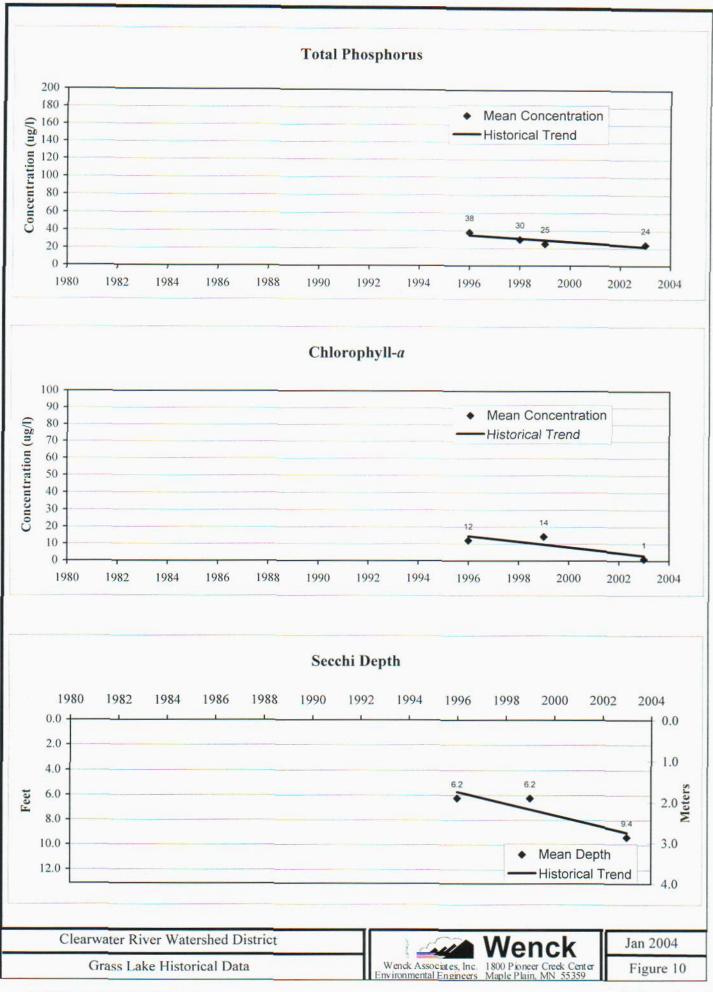
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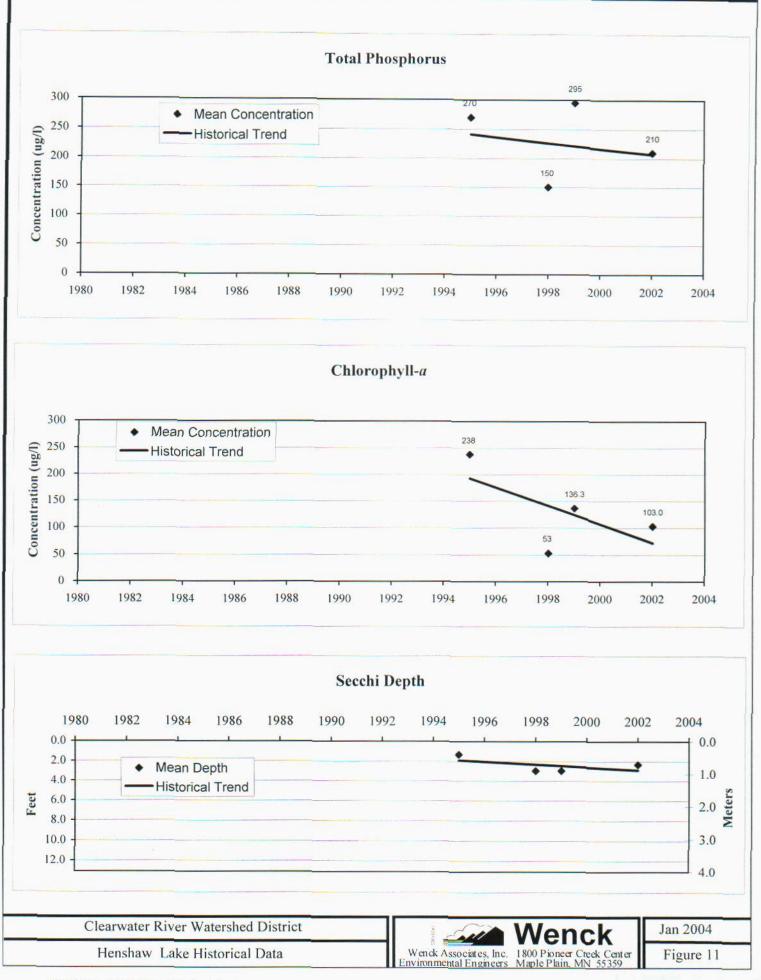
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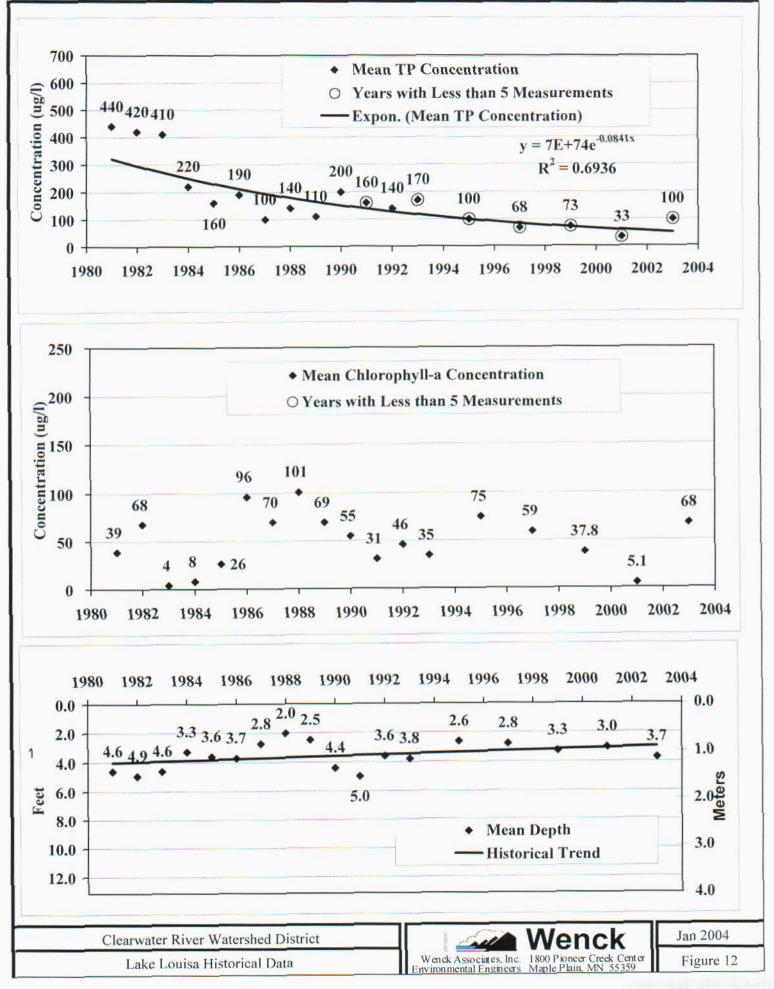
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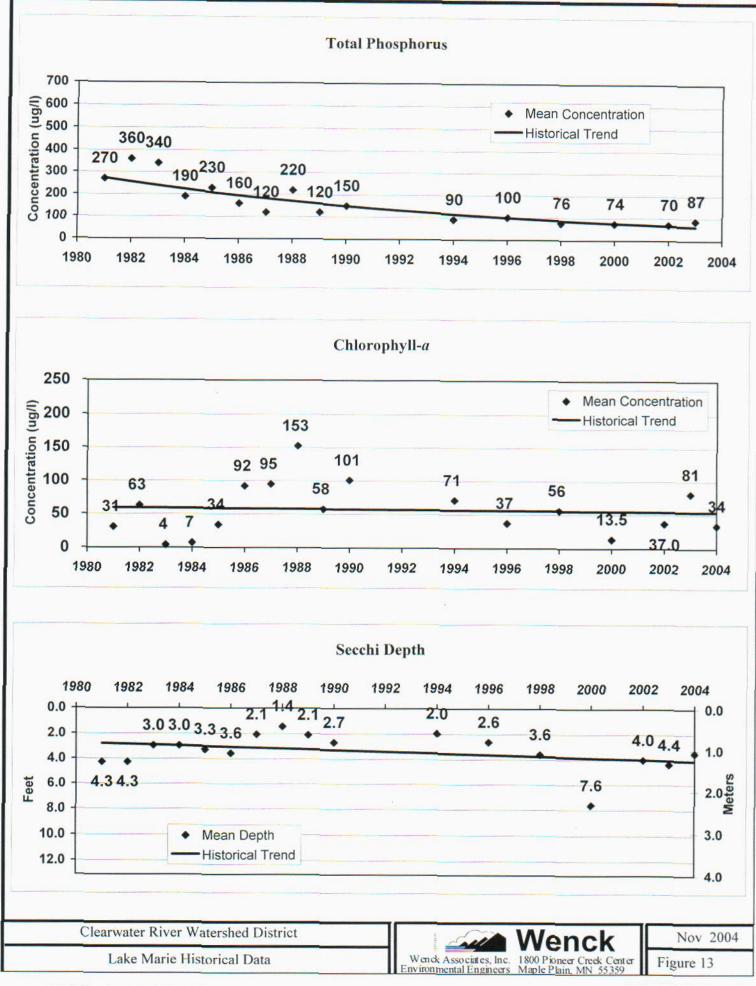
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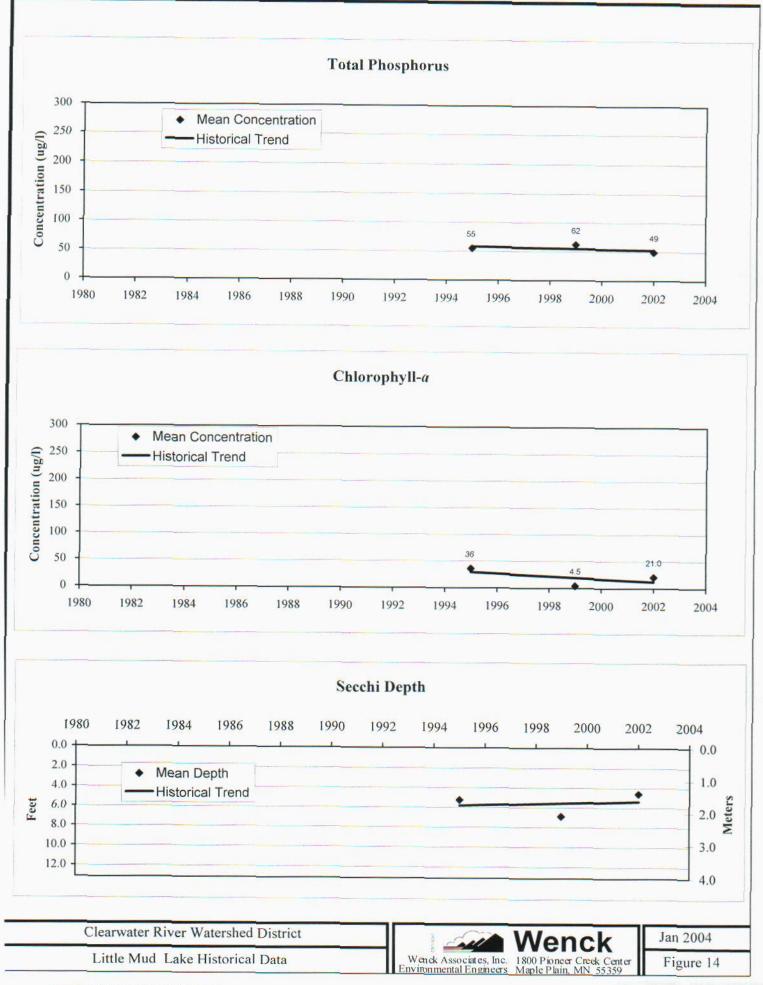
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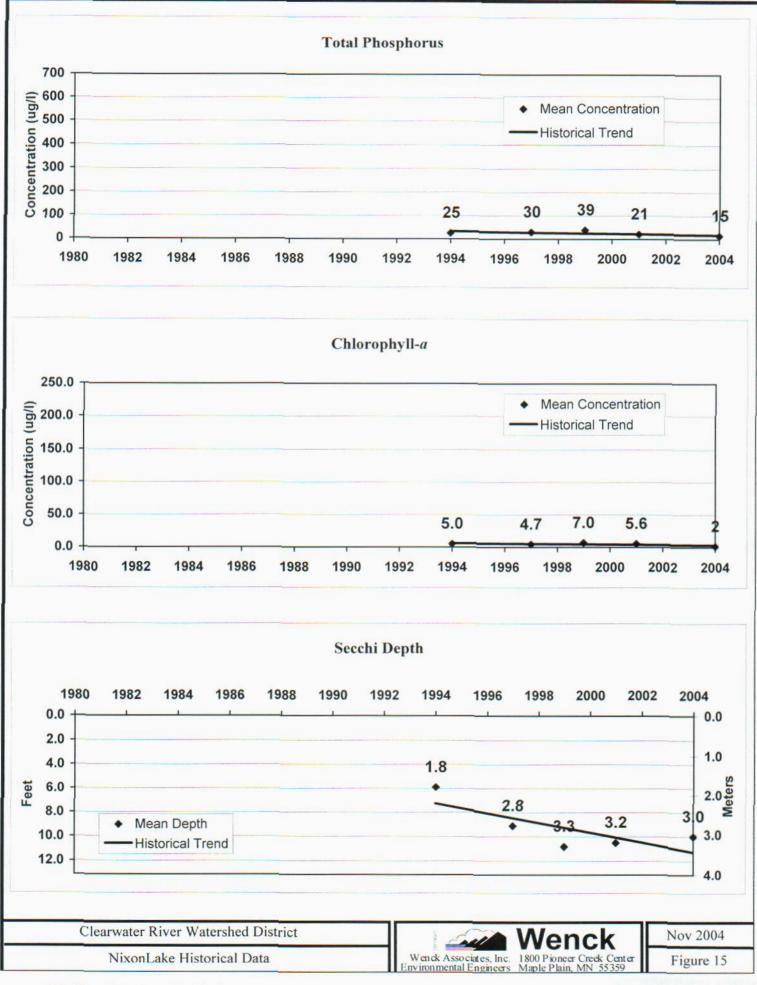
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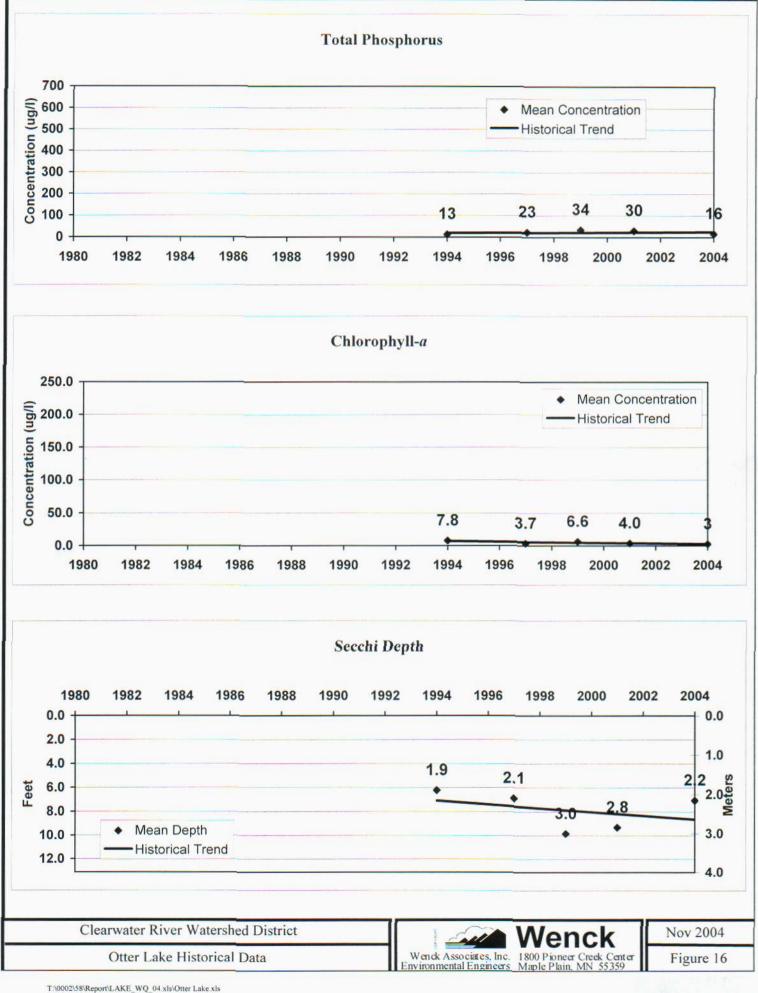
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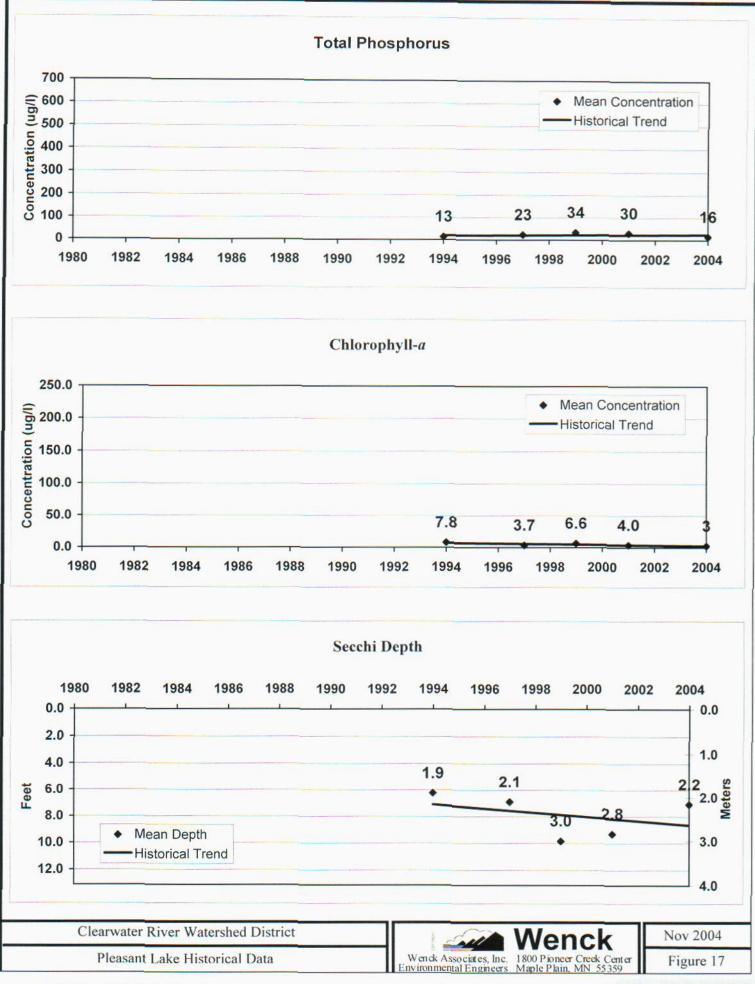


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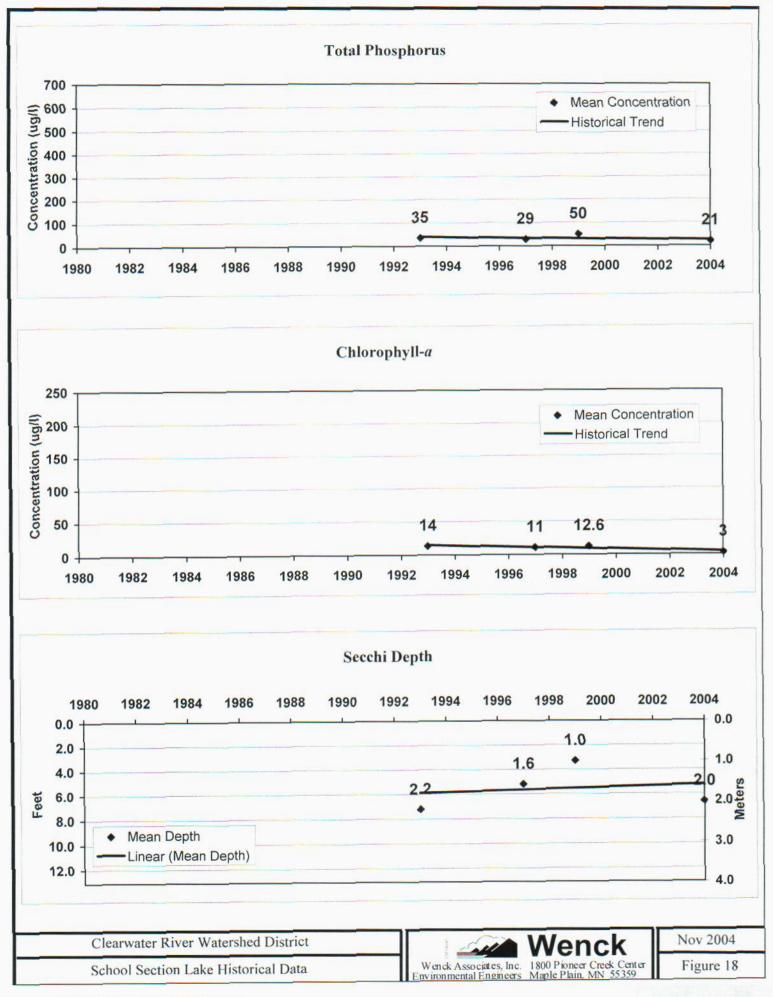


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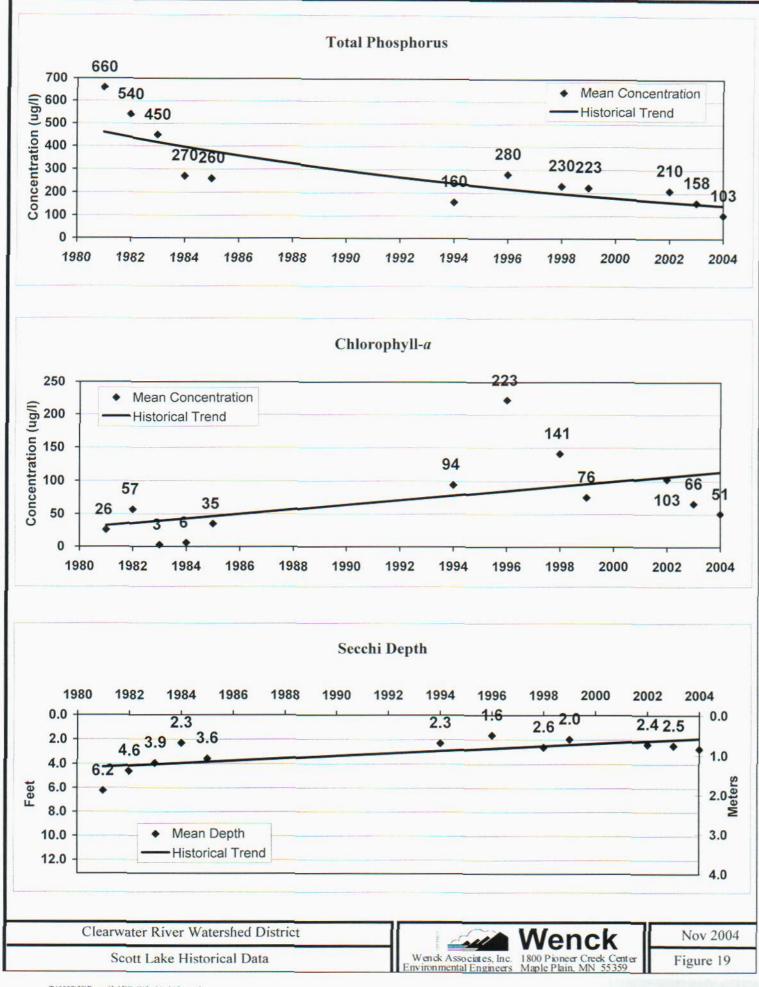




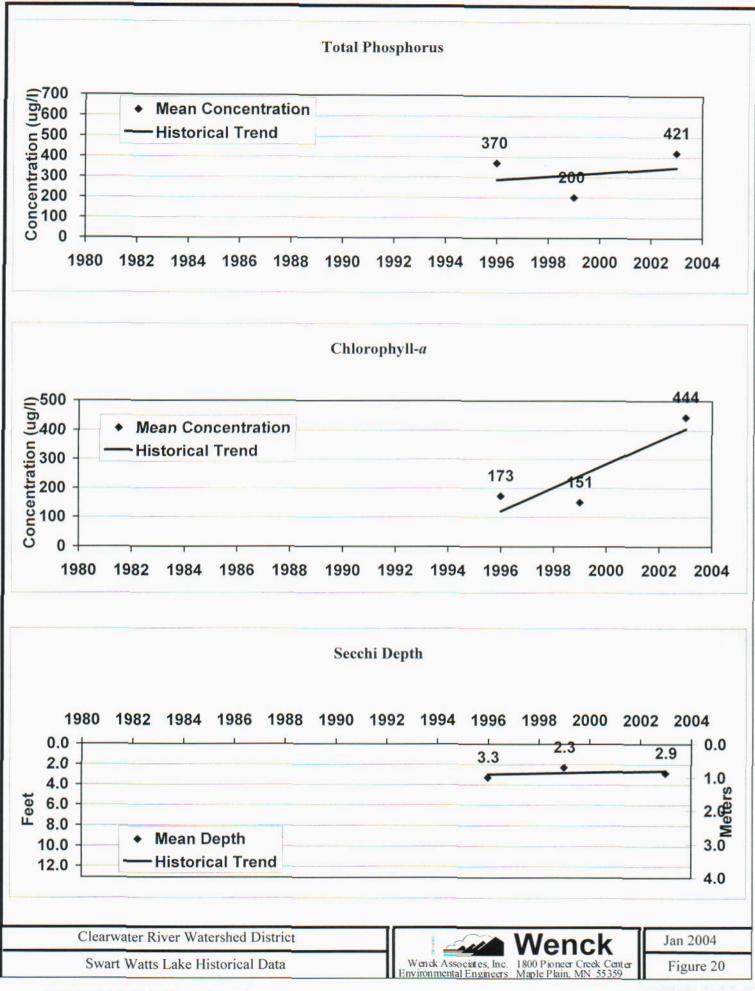
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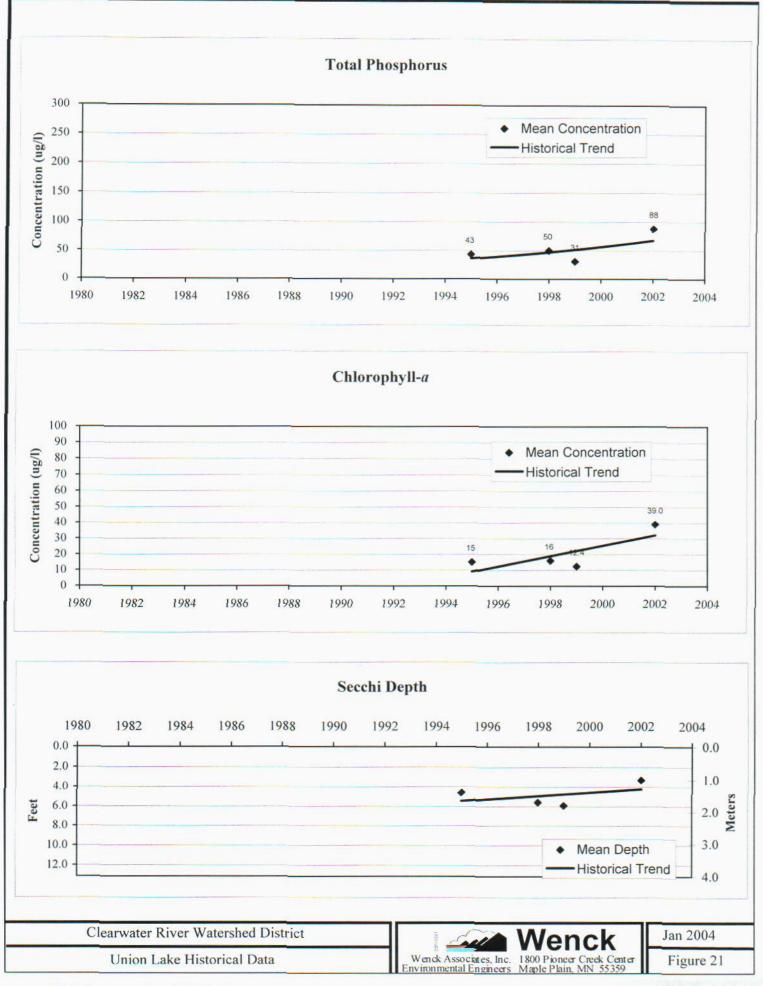
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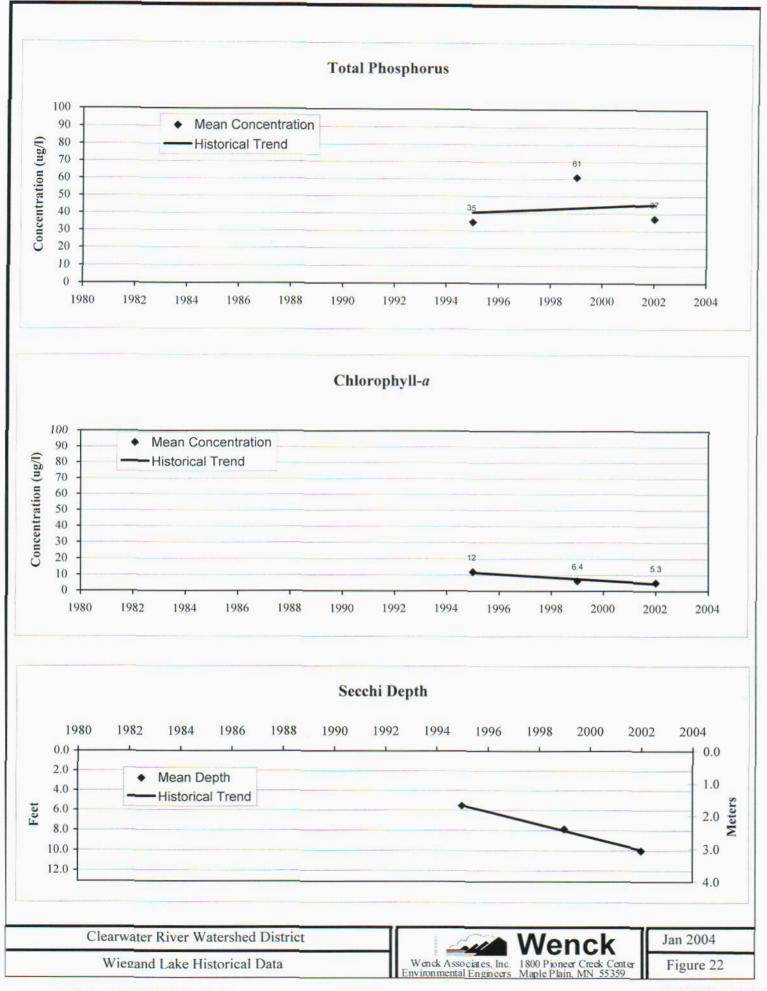
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T.\0002\58\Report\LAKE_WQ_04.xls\Wiegand Lake.xls

#### **Clearwater River Watershed District**

	Number of Samples		otal orous (ug/l) Std. Dev.	Chloroph Mean	yll-a (ug/l) Std. Dev.	Secchi Disk Transparency (m) Mean Std. Dev.		
ALBION								
1996	4	130	24	204	224	0.5	0.2	
1999	4(5)	220	65	168.7		0.5	0.3	
2003	4	199	78	117	72 73	0.8	0.0	
Mean		183	56	163	123	0.8	0.1	
AUGUSTA								
1981	7	260	400	25	14	1.4	0.3	
1982	7	140	120	34	21	1.4	0.6	
983	7	300	90	4	3	1.8	1.0	
984	7	90	30	4	2	1.6	0.8	
1985	7	120	120	23	12			
986	6	90	40	69		1.2	0.2	
987	0				91	1.9	0.5	
988	7	30	10	20	12	1.3	0.3	
	5	40	10	19	6	1.4	0.3	
989	6	80	30	26	40	1.5	0.4	
990	5	90	20	73	105	1.7	0.7	
991	3	80	40	56	73	1.1	0.4	
992	8	30	20	19	6	1.6	0.7	
993	4 (1)	68	20	42	19	1.2	0.4	
995	4 (2)		(4) 15	21	12	1.8	0.7	
997	4		(4) 13	20 (5)	1	1.7	0.2	
999	4(6)	37	4	8.5	2.7	1.6	0.2	
2001	2	48	6	6.4	0.0	1.8	0.0	
2002	SWCD	84.3		13.5		1.9		
2003	3	42	15	29	23	1.5		
Mean		90	56	27	25	1.5	0.4	
BASS								
994	4	13	(4) 14	4.8	0.8	3.2	0.4	
998	4	28	11	2.0	1.0	3.1	0.6	
999	3	22	5	2.9	1.4	3.1	0.7	
001	2	25	4	2.7	1.0	4.2	1.8	
Mean		22	9	3.1	1.1	3.4	0.9	
BETSY								
981	7	700	190	7.7	5.6	2.4	1.1	
1982	7	650	90	59	50	1.3	0.7	
983	7	560	270	59 5 7	4	1.1	1.3	
984	7	350	160	7	5	0.8	0.2	
985	7 7 7 2	280	230	30	26	1.1	0.6	
987	2	120	0	74	35	0.87	0.41	
995	4 (2)	290	183	18	13	1.0	0.34	
997	4	245	108	100 (5)	98	0.83		
999	3(8)	243	110	170 (5)			0.05	
001	2(0)	420	368	4.3	85	0.8	0.2	
001	2 4				1	0.46	0.0	
003	1	104	70					
003	4	194	78	45.0	52.0	1.3		

#### Clearwater River Watershed District

		N		otal				chi Disk
		Number of		rous (ug/l)		phyll-a (ug/l)		arency (m)
CAROLI	INF	Samples	Mean (3)	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
CAROLI	INE							
1981		7	220	100	39	33	1.3	0.3
1982		7	260	140	54	35	1.5	
1982		7	300	140				0.8
1983		7			3 5	3	1.8	1.1
		7	140	50		2	1.3	0.3
1985			170	150	41	46	1.5	0.6
1987		2	50	10	46	30	1.1	0.4
1994		4	40	18	55	16	0.8	0.2
1996		4	88	33	36	12	1.2	0.2
1998		4	86	24	55	43	1.2	0.1
2001	(SCWD)	5	43	18	12	10	1.8	0.8
2002			95		45		1.6	
2003	(SCWD)	5	66		28.6		1.5	
2004		4	45	8	25	18	1.1	0.0
Mean			123	63	34	23	1	0
CED I D								
CEDAR								
1002		4	20	10	12.2	<i>2</i> 25	2.0	
1993		4	30	10	13.3	5.9	3.0	0.4
1996		4	33	8	12.9	6.5	2.4	0.3
1999		4	31	8	9.5	4.4	1.1	0.2
2001		2	26	5	5.9	1.0	1.8	1.4
2003		4	52	41	11.0	6	1.9	
2004		4	33	15	3.0	3	2.6	1 reading
Mean			34	15	9	4	2	1
CLEAR								
00850			10.70	1270				
1994		4	80	24	17	8	1.2	0.3
1998		4	220	141	110	141	1.0	0.1
1999		4	188	43	85	47	0.5	0.0
2000		4	228	30	134	42.6	0.3	0.1
2003		4	200	52	72	23	0.7	
Mean			183	58				
		-						
	VATER EAST						202	
1981		7	60	20	11	8	2.6	0.7
1982		7	60	30	12	9	2.7	1.6
1983		7	90	50	3	2	2.4	1.8
1984		7	90	40	4	2	1.4	0.2
1985		7	130	60	39	28	1.2	0.3
1986		6	80	40	85	132	2.1	0.8
1987		7	30	10	18	20	2.6	1.2
1988			40	10	10	5	2.9	1.8
1989		5	60	20	5	4	3.0	1.9
1990		5	90	100	18	9	2.0	0.6
1990		3	50	20	10	7		
1991		8					1.4	0.2
			30	10	20	10	2.0	0.6
1993		4(1)	43	15	42	38	1.5	0.8
1994		4	23	5	14	9	1.4	0.2
1995		4 (2)	30	8	16	10	1.6	0.4
1996		4	33	8	10	3	2.1	0.3
1997		4	52	17		5) 2 3	1.6	0.2
1998		4 (6)	36	18	11		1.9	0.4
1999		4	54	6	10	2.1	1.8	0.2
2000		4	33	18	10	3.4	2.3	1.0
2001		2	40	25	7	0.0	2.4	0.7
2002		-	36	the set	14	0.0	1.8	w.,
2002		3	22	5	7	6		
2003		3 4	22	13	7 6	6 3	2.4 2.6	0
							2.0	0
Mean			51.7	23.8	16.2	13.7	2.1	0.7

#### Clearwater River Watershed District

		T	otal			Sec	chi Disk
	Number of		rous (ug/l)	Chloro	phyll-a (ug/l)		arency (m)
	Samples	Mean (3)	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
CLEARWATER WE	ST						
1981	7	60	20	45	71	2.6	0.9
1982	7	100	60	29	25	1.7	0.7
1983	7	160	100	4	5	1.8	1.4
1984	7	70	30	4	2	1.4	0.2
1985	7	110	80	24	17	1.9	1.3
1986	6	50	20	77	137	2.6	1.0
1987	7	40	10	20	12	2.0	0.4
1988	5	40	10	17	10	2.6	1.2
1989	6	70	10	8	4	2.3	0.9
1990	5	50	20	31	15	1.9	0.8
1991	3	60	40	18	12	1.5	0.0
1992	8	60	70	29	24	1.9	0.6
1993	4(1)	40	0	29	6	1.4	0.3
1994	4	33	15	17	8	1.5	0.2
1995	4 (2)	35	11	21	10	1.4	0.3
1996	4	43	11	9	2	2.0	0.3
1997	4	44	3	13	6	1.5	0.1
1998	4 (7)	34	11	14	3	1.5	0.1
1999	4(6)	31	4	10.2	2.0	1.6	0.3
2000	- <b>4</b>	41	31	9	2.9	1.9	0.4
2001	2	42	11	8	1.0	1.4	0.0
2002	-	42		18		1.9	
2003	3	27	9	14	9	2.2	
2004	4	26	8	7	4	1.7	0.0
				20	17	2	
Mean		55	25	20	17	2	1
GRASS							
1996	4	38	26	12	5	1.9	0.5
1998	i	30	0				
1999	4	25	2	14	9.3	1.9	0.4
2003	2	24	2 2	1	1	2.9	
Mean		29	8	13	7	1.9	0.4
HENSHAW							
1995	4	270	58	238	67	0.4	0.1
1998	4 (5)	150	48	53	22	0.9	0.2
1999	4 (5)	295	156	136.3	166	0.9	0.1
2002		210		103.0		0.7	
2002							
Mean		238	87	142	85	0.7	0.1
LITTLE MUD							
1005		55	50	36	38	1.6	0.5
1995	4		42	4.5	4	2.1	0.1
1999	3	62	42			1.4	0.1
2002		49		21.0		1.4	
Mean		55	46	20	21	1.7	0.3

1

#### **Clearwater River Watershed District**

			otal				chi Disk
	Number of		rous (ug/l)		yll-a (ug/l)		arency (m)
LOUISA	Samples	Mean (3)	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
LOUISA 1981	7	110	110	20			
1981	7	440	110	39	29	1.4	0.4
1982	7 7	420	140	68	26	1.5	0.5
		410	170	4	4	1.4	1.4
1984	7	220	80	8	6	1.0	0.1
1985	7	160	100	26	17	1.1	0.3
1986	6	190	50	96	86	1.1	0.1
1987	7	100	10	70	44	0.8	0.2
1988	5	140	60	101	39	0.6	0.3
1989	6	110	40	69	78	0.8	0.5
1990	5	200	80	55	35	1.3	0.5
1991	3	160	70	31	18	1.5	0.3
1992	8	140	140	46	22	1.1	0.3
1993	4(1)	170	40	35	13	1.2	0.2
1995	4 (2)	100	36	75	27	0.8	0.2
1997	4	68	7	59 (5)	8	0.9	0.2
1999	4	73	29	37.8	20	1	0.1
2001	2	33	30	5.1	4	0.9	
2003	3	100	13	68	28.0	1.1	
Mean		180	67	50	28	1.1	0.3
MARIE							
1981	7	270	130	31	19	1.3	0.5
1982	7 7	360	120	63	57	1.3	0.6
1983	7	340	160	4	4	0.9	0.3
1984	7	190	60	7	5	0.9	0.3
1985	7	230	210	34	14	1.0	0.2
1986	6	160	30	92	91	1.1	0.1
1987	7	120	30	95	30	0.6	0.1
1988	5	220	80	153	91	0.4	0.1
1989	6	120	40	58	54	0.6	0.4
1990	5	150	60	101	33	0.8	0.2
1994	4	90	99	71	19	0.6	0.1
1996	4	100	39	37	5	0.8	0.1
1998	4	76	15	56	12	1.1	0.1
2000	4	74	18	13.5	7.7	2.3	1.0
2002	25	70	10	37.0	1.1	1.2	1.0
2002	3	87	50	81	67	1.2	
2004	4	84	45	34	16	1.1	0.0
Mean		166	76	58	34	1.0	0.3
NIXON							
1994	4	25 (	4) 25	5.0 (4)	3.4	1.8	0.7
1997	4	30	*) 25	4.7 (5)	1.5	2.8	0.7
1999	4	39	17	7.0	8.7		
2001	2	21	1	5.6	3.0	3.3	0.5
2004	4 2 4	15	4	2	3.0	3.2 ( 3.0	8)
Mean		26	11	5	3	3	0

#### **Clearwater River Watershed District**

	Number of Samples	To Phosphor Mean (3)	ous (	ug/l) . Dev.	Chlor Mean		-a (ug/l) 1. Dev.		chi Disk arency (m) Std. Dev.
OTTER	Samples	inean (5)	ora	. Der.					
1994	4	13 (	4)	4	7.8		1.8	1.9	0.3
1997	4	23		10	3.7	(5)	1.5	2.1	0.3
1999	4	34		5	6.6		4.8	3.0	0.4
2001	4 2	30		22	4.0		1.0	2.8	0.4
2004	4	16		10	3		2	2.2	0.0
Mean		23		10	5		2	2	0
<u>PLEASANT</u>									
1993	4		4)	9	12		8	2.0	0.6
1997	4	51		31	9	(5)	2	2.4	0.6
1999	4(6)	<u>25</u>		<u>5</u> 9	9.1		5.8	3.0	0.9
2004	4	20		9	4		1	2.3	0.0
Mean		27.8		13.5	8.4		4.3	2.4	0.5
SCHOOL SECTION									
1993	4	35 (	(4)	38	14		9	2.2	0.8
1997	4	29		9	11	(5)	5	1.6	0.4
1999	4(5)	50		12	12.6		10	1.0	0.5
2004	4	21		9	3		2	2.0	0.0
Mean		38		20	12.4		7.8	1.6	0.6
<u>SCOTT</u>									
1981	7	660		340	26		27	1.9	0.9
1982	6	540		220	57		39	1.4	0.7
1983	7	450		170	3		3	1.2	1.4
1984	7	270		100	6		5	0.7	0.1
1985	7	260		280	35		29	1.1 0.7	0.5
1994	4	160		117	94		71 68	0.7	0.1
1996	4	280		174	223 141		77	0.8	0.1
1998	4 (5)	230 223		176 163	76		30	0.6	0.1
1999	3	223		105	103		50	0.7	0.11
2002	4	158		52	66		33	0.8	
2003 2004	4	103		20	51		4	0.8	0.0
Mean		295		165	73		35	0.9	0.4
SWART WATTS									
1996	4	370		181	173		164	1.0	0.7
1999	4(6)	200		75	151		91	0.7	0.2
2003	4	421		293	444		524	0.9	
Mean		330		183	256		260	0.9	0.5

#### **Clearwater River Watershed District**

	Number of		otal rous (ug/l)	Chloro	phyll-a (ug/l)	Secchi Disk Transparency (m)		
UNION	Samples	Mean (3)	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
1995	4	43	15	15	1	1.4	0.3	
1998	4 (5)	50	27	16	9	1.7	0.4	
1999	3	31	15	12.4	10	1.8	0.9	
2002		88		39.0		1.0	0.7	
Mean		41	19	14	7	2	1	
WIEGAND								
1995	4	35	5	12	2	1.7	0.2	
1999	4(5)	61	44	6.4	1.1	2.4	0.6	
2002		37		5.3		3.0	0.0	
Mean		44	25	8	2	2.4	0.4	

Notes:

(1) The fourth sample was collected on October 6, 1993.

(2) The fourth sample was collected on October 2 or 3, 1995

(3) Starting in 1993, Total phosphorus means are rounded to two significant figures. Prior to 1993, the mean values were rounded to the nearest 10 ug/l.

(4) Values reported as "Less than" the detection limit were estimated as half of the detection limit.(5) Three samples were analyzed for chlorophyll-a.

(6) Three samples were analyzed for total phosphorus.(7) Three secchi disk readings were recorded.

(8) One secchi disk reading was recorded.

# Appendix E

Secchi Data from Citizen's Lake Monitoring Program

# MEMO

To: Rebecca Kluckhohn

From: Merie Anderson

Subject: 2004 Secchi Disk Readings

Date: November 1, 2004

Rebecca, attached are the 2004 Secchi Disk Reports.

John Tracy estimates his readings on Millpond should be 1.5 ft average for the season.

Tony Bechtold lost his report for Caroline; but, remembers the range of 3-8 ft. for his lake.

	•			-A	AX 25	51-4	,4	6		hi Data Sh		86-0284
MP	PC /	\ Ci	ti	zen Lake-	Monitorin	ig Prog	ram	2004	Seco	hi Data Sh	eet 🔜	Breakiast
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	<b>ـ</b> د			12:52 10.1	1 Misto	4-10	.1				arate data sheet	
Au	are	89:						•		• If disk is	on lake bottom, i	nark "B" next to Secchi,
			ć	South A	WAY MN	52:27	<b>ن</b> ,ډ	ر دید ر	1.2			RC = Decreational Softability
					<u></u>			~~~	Υ <b>Τ</b>			in is 6.75 ft - NOT 6.9 ft.
			٠.				<u>`</u>			<ul> <li>For NEW</li> </ul>	sites, send in ju	nu sao has la ke asig.
				1 . 10	Δ						1.27 <b>9</b> 1.	
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				))- <u>274</u>		🛌 = sun ( ( manit	nme	T; (	)·		= **ia	ter.
Line		2004		ис запри	Seco	hi <u>mona</u>	lore	PC	RC	Color of	Data Entered	npling site: <u>BA</u> ft.
#	]]	Date		Tirae	(nearest		<b>*</b> ₿			Water	Önlim :	Notes
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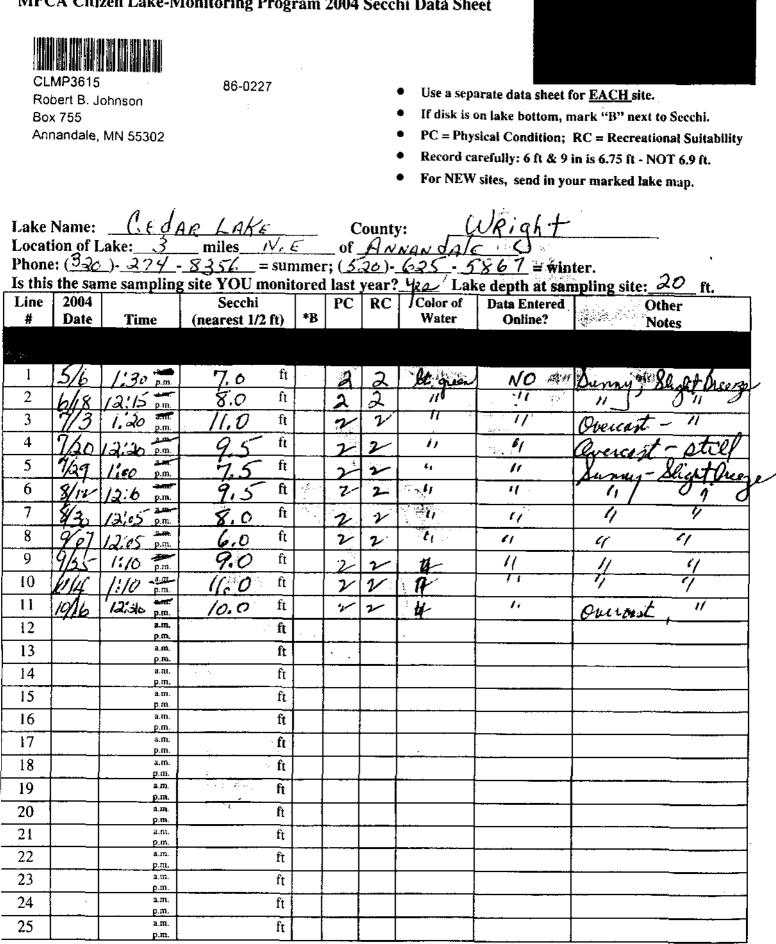


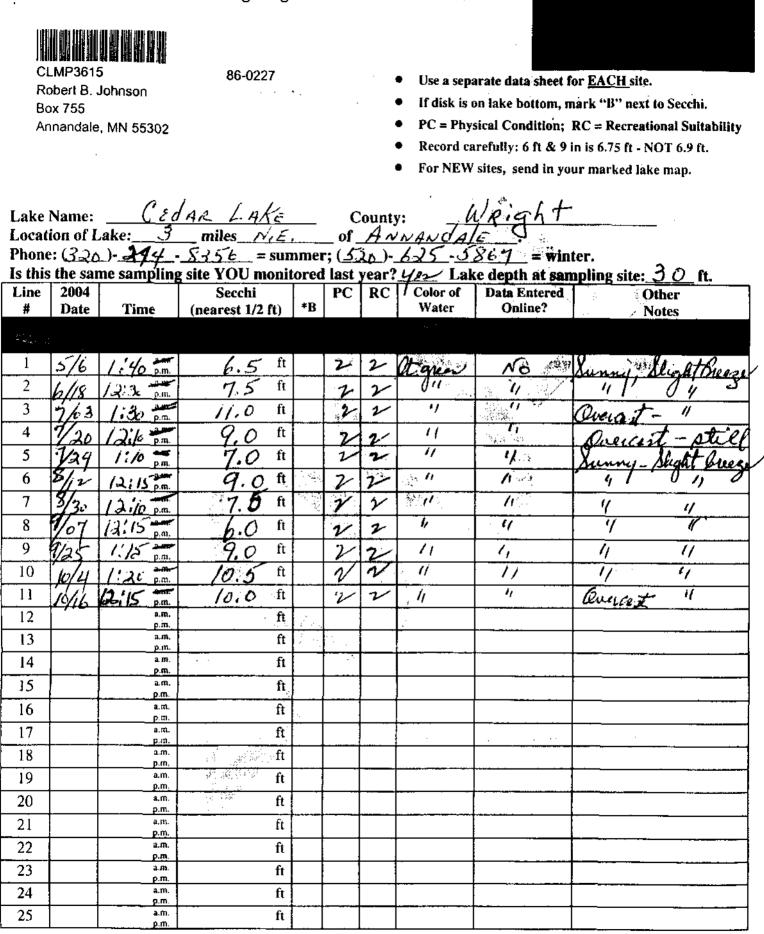
You	r Name		· · · · · · · · · · · · · · · · · · ·		-				<u> </u>	
		DC	NALD C. BADGER	ł			<ul> <li>Use a sepa</li> </ul>	arate data sheet f	or <u>EACH</u> site.	
Add	ress:		IO IRVINE AVE. NW.				• If disk is o	on lake bottom, n	nark "B" next to Secchi.	
				<b>e.</b>			• $PC = Phys$	sical Condition;	RC = Recreational Suitab	ility
		·····					• Record ca	refully: 6 ft & 9	in is 6.75 ft - NOT 6.9 ft.	
							• For NEW	sites, send in yo	ur marked lake map.	
		<u> </u>		<u> </u>				-	-	
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			g site YOU moni		d last	vear	Yes Lak	te denth at san	npling site: <u>15</u> ft.	
Line	2004	,	Secchi	T	PC	RC	Color of	Data Entered	Other	
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	4-50	Nern p.m.					17PA Y			
2	5-17	// p.m.	20 ft	∔		$\downarrow L$	11.5038			
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4	6-3	6:10 6	17,5 ft	·		Sty.	11		······································	
5	6-14	11:00	4.5 ft	×	<u> </u>		11	line is		
6	6.23	10.06 p.m.	4 ft				5 AV			
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10	8-25	210	2.5 ft	†—	1	17	<u>а</u> л			
11	9.5	ligg and	L ft	<u> </u>	1	5	11	· ··		
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13	10-5	3.00	$10^{\circ}$ ft			1	11		··· n	[
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15	Υ. V.	a.m. p.m.	ft	†	Į		·		······································	
16		a.m. p.m.	ft					· ···		
17		<u>р,лж</u> а, <b>л</b> , р,л,	n a fi							
18		a.m.	, ft				· · · · · · · · · · · · · · · · · · ·			
19		<u>p.m.</u> a.m.	ft ft	<u> </u>	· ···				· · · · · · · · · · · · · · · · · · ·	
20		p.m. a.m.	ft			·				
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24		p. <u>m.</u> 8.m.	ft						<b>_</b>	[
25		<u>p.m.</u> a.m.	ft				······			1

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You	ır Nam	e:		_	_				
	•	D	ONALD C. BADGE	3	_		• Use a sep	oarate data sheet	for <u>EACH</u> site.
Ado	dress:		10 IRVINE AVE. NW		-		• If disk is	on lake bottom, i	nark "B" next to Secchi.
				-			• $PC = Phy$	sical Condition;	<b>RC = Recreational Suitability</b>
							• Record ca	arefully: 6 ft & 9	in is 6.75 ft - NOT 6.9 ft.
							• For NEW	/ sites, send in yo	our marked lake map.
		~	,						
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	tion of		miles_ <u>/a_s_</u>	<u>+</u>	of	4	nnndg)	<u>C</u>	
		2.)- <u>274</u>	· <u>√3⊁3</u> = sun g site YOU moni			)-		$\underline{\leq_A m \mathcal{C}} = \text{win}$	
Line	2004		Secchi	lore	PC	RC	Color of	Data Entered	npling site: <u>15</u> ft.
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THE REPORT OF A DECK

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CLMP5168 George Saukkola 73880 - 362nd St. Kimball, MN 55353 47-0042



• Use a separate data sheet for <u>EACH</u> site.

- If disk is on lake bottom, mark "B" next to Secchi.
- PC = Physical Condition; RC = Recreational Suitability
- Record carefully: 6 ft & 9 in is 6.75 ft NOT 6.9 ft.
- For NEW sites, send in your marked lake map.

Lake	Name: #	LAKE	BETSY miles So		С	ounty	/:			
Loca	tion of L	.ake: <u>3</u>			of _	<u>/\$/^</u>	n: nEANA 1	Y/W		
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		ne sampling	site YOU mon	itored	last			e depth at sa	pling site:	_ ft.
Line #	2004 Date	Time	Secchi (nearest 1/2 ft)	*B	PC	RC	Color of Water	Data Entered Online?	Other Notes	
1.	5-15		5,5 f				mall		P S Star	
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17	10,6						- da d	· · · · · · · · · · · · · · · · · · ·	Clean.	
18	10,22	<u>, p.m.</u> a.m.	$\frac{2}{1}$		·  ·	1400	- <u>Ale</u> G	<u> </u>	akeon	
19		ມ.ກາ. p.m. ຄ.ກາ.	i de				. <u>.</u>			
20	· .	p.m. 8.m.	f				· · · · ·		<u> </u>	•
21		p.ma.m.	f	_	+					•
23		p.m. a.m.	f	·   · -			· · ·	н 1		
23		<u>p.m.</u> a.m.	f		+	<u>.</u>			l	
24		p.m. a.m.	f							
		p.m.	I				L	I	I	

25

a.m.

<u>p.m</u>.

a.m

 $\rho.m$ 

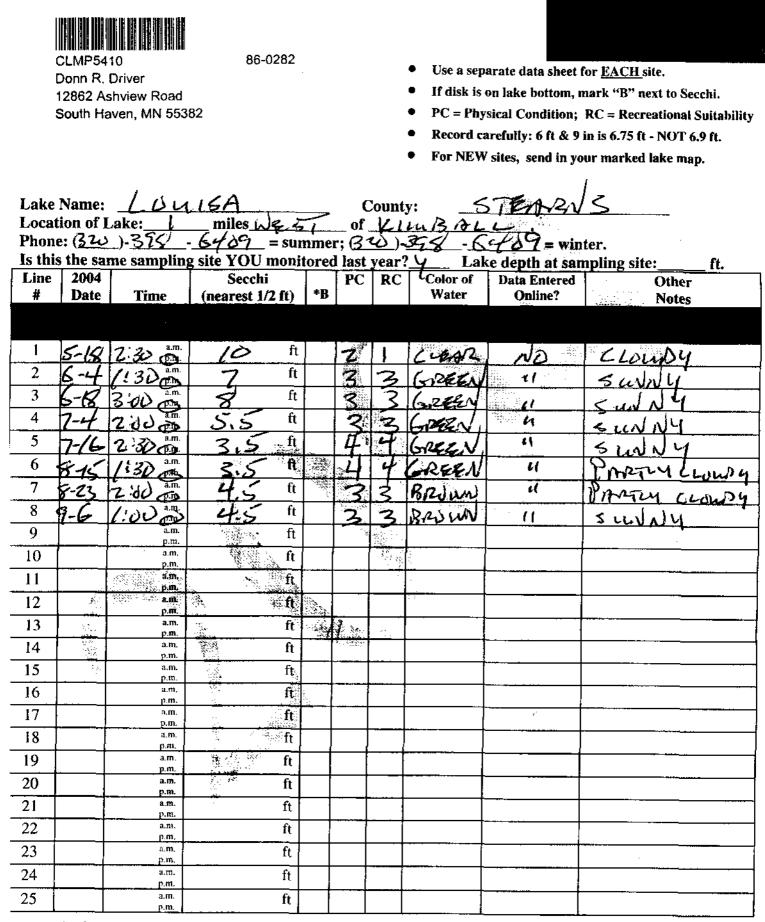


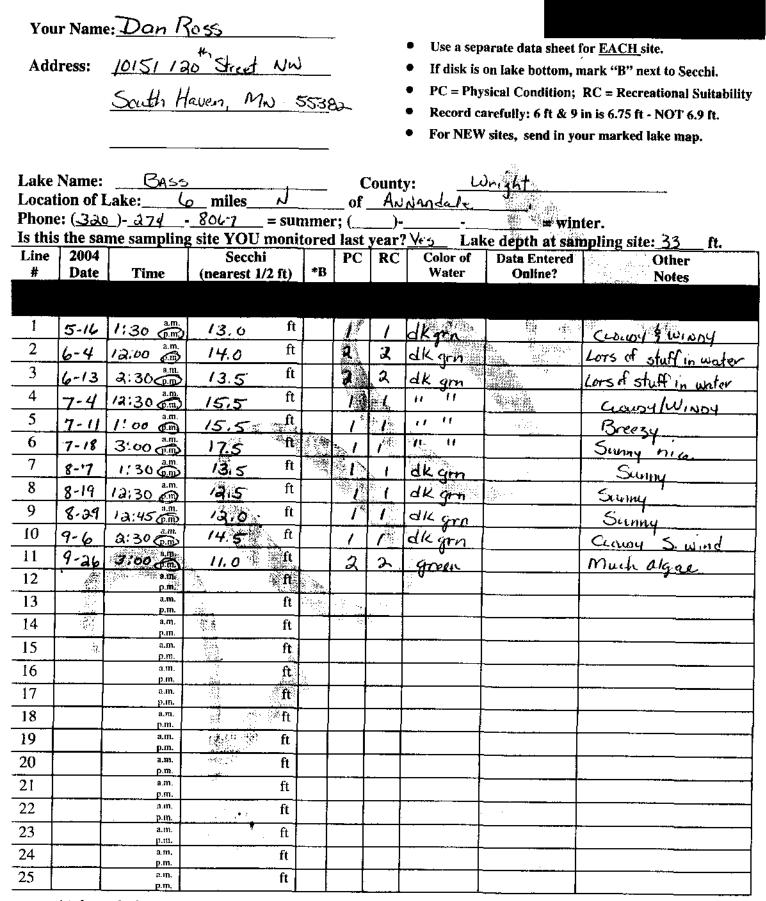
You	ır Nam	e: <u>RicHAN</u>	ED BRANDI	ENB	URG	-			
			657TH AVE				• If disk is		mark "B" next to Secchi.
		WATK	INS MN.	<u> </u>	_				$RC \approx Recreational Suitability$
		55389							in is 6.75 ft - NOT 6.9 ft. our marked lake map.
		CLEAL				Count	iy: <u>M</u>	EFISER	
		Lake:	miles		of	$\frac{1}{1}$		• • = win	
			<u>- 93:2 8</u> = su g site YOU mon					= Win	nter. mpling site: <u>ノス</u> ft.
Line	2004		Secchi		PC			Data Entered	Other
#	Date	Time	(nearest 1/2 ft)	*B			Water	Online?	Notes
1	6-10	1. 30 (m)	2 ft	t j	2	3	treen		Sunny
2	6-17	1.00 p.m	12 ft	: <b> </b>	2	す	11 11 11 11 11 11 11 11 11 11 11 11 11		11 P
3	64	1 am.	1/2 ft	: [	2		11		11
4	7-1	1.00 (p.m)	/4ft	-	24		11		11
5	7-8	1:00 6.0	15		ス	3	11		11
6	7-15	1:00 am.	15 ft		2	3		1.2	[]
7	7-22	1.56 (3.	25 ft		2	3			μ
	7.29	1.00 m	/ <u>}</u> ft		2	3	, <b>1</b> 980, 1993	· .	1 >
9	8-5	1.00 6m	14 ft	<u> </u>	2	3	./		tx
10	8-12	1:00 p.m.	15 ft	<u> </u>	2	3	۱۲		11
	8-20	1:06 m	/ / ft	<u></u>	2	3	B ()		<u> </u>
12	8-12	1.00 6	<b>⊘/</b> ≷ft		2	3	9 <b>1</b> 1		·/
13	9-3	<u>יט ט מיה (הה</u>	fi fi	1.251	1.12.12.12.12.12.12.12.12.12.12.12.12.12	3	11		<u>, 1</u>
14	9-10	1:00	ft ft	_	2	3	1)		1 *
15	7-17	1.00 G.D.	<u> </u>	<u> </u>	2	3	,/		11
16	9-24	1.00 mm	<u> </u> ft		2	3	. /		Candy
17	10-1	1.0 6 6m) a.m.	J ft	· · · · · · · · · · · · · · · · · · ·	2	3	, J		Sundy.
$\frac{18}{19}$	10-9	100 (m)	1 ft ft	<u> </u>	2	3	11		<i>n (</i>
$\frac{19}{20}$		<u>p.m.</u> a.m.	ft ft		╞──┤		 		
$\frac{20}{21}$		p.m. a,m.	ft	<b> </b>			<b> </b>		
$\frac{21}{22}$		<u>р.т.</u> а.т.	£4.	-			 		
		<u>р.т.</u> а.т.	· · · · · · · · · · · · · · · · · · ·	<b>┿╌</b> ╼┥			<u> </u>	······································	
23		p.m.	ft	1	i l				

At the end of your sampling season, please return the top page of this form by November 15, 2004

ft

ft







86-0252

Delores Roeder 463 Beachwood Rd South Haven, MN 55382-9294 5:4e 211



- Use a separate data sheet for <u>EACH</u> site.
- If disk is on lake bottom, mark "B" next to Secchi.
- PC = Physical Condition; RC = Recreational Suitability
- Record carefully: 6 ft & 9 in is 6.75 ft NOT 6.9 ft.
- For NEW sites, send in your marked lake map.

Lake	Name:	Clea	rwater		C	Count	y: U	right	<b></b>
Locat	ion of I	ake: 7	miles N		of _	as	man	dallo	
Phone	:: ( <b>3</b> 2(	<u>2). 274</u> .	2272= sun	ımeı	; (	)	_sau		ter.
<u>Is this</u>	the sau	<u>ne sampling</u>	<u>g site YOU monit</u>	ored	last	year?	yes Lak	e depth at san	tpling site: <u>30</u> ft.
Line	2004		Secchi		PC	RC	Color of	Data Entered	Other
#	Date	Time	(nearest 1/2 ft)	*B			Water	Quline?	Notes
1	5/8	11:15 m	15 ft		3	2	40 milar	en is inte	Lemdy - Hozy Sur
2	5/18	11:32	17 ft	-	3	3	Green	14. 148.1815	Sumis - ralu
3	5/28	11 3 (m)	1 - 2 ft		3	. 3	CVL and the	(2) 2 4 4 1 (2) 2 ¹ 章言波表。	Viersey Service Mething
4	6/3	12:30 m	7.5 ft		4	4	aneen	19819943. 1968242	lots of your hast Man
5	6/12	1:45	8.5 It		3'	3	green	2 # 1 \$ ; * * * * ;	Suma !!
6	6/20	10:15	5,0 ft;	1928 - 297 - 49 297 - 49	:3	جحر	ancen		Sunny-Verywords
7	6129	12'00	<del>اکسی , کی</del>	24: 52 24: 52 24: 52	2	.3	Summershi	2n li	Haza-lecence
8	719	A1500	6.0 ft		3	<u>, 3</u>	Meca	5 34 ( 2 % ¹	Partil Claude day
9	16	C L a.m. p.m.	$\mathcal{Y}, \leq \mathfrak{n}$		- Ci	12	V n		" " (veen)
10	7/25	11:45 Om	5.01		3	3	i 4		Sum calm
11	7129	10:45	5.0 ^{ft}		3	.3	<u> </u>		Sundy becagey
12	815	1'30	5. 5 ft	· ·	, i		1		1 01
13	8 21	11:30	6,0 ft	2 B.S.	3		<i></i>		pourchaldense.
14	9/12	10 3 2	$(I, q^{*\mathfrak{n}})$		S	13.	of the star	Jam	account locarde
15		a,m. p.m.	. ' ft				V		
16		a.m. p.m.	ft						
17		g.m, p.m.	ft						
18		0.111. p.10).	ft						
19		e.m. p.m.	ft						· · · · · · · · · · · · · · · · · · ·
20		a.m. p.m.	ft						
21		a.m. p.m.	ft						·····
22		a.m. p.m.	ft ft			-			
23	-	a.m.	ft			· ·			
24		a.m. p.m.	ft	f			· · · — — –		
25		a.m. p.m.	ft						



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CLMP4571

**86**-025**2** 

Delores Roeder 463 Beachwood Rd South Haven, MN 55382-9294 • Use a separate data sheet for EACH site.

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- If disk is on lake bottom, mark "B" next to Secchi.
- PC = Physical Condition; RC = Recreational Suitability
- Record carefully: 6 ft & 9 in is 6.75 ft NOT 6.9 ft.
- For NEW sites, send in your marked lake map.

Lake	Name:	Clear	water		C	ounty	ý:	$\underline{w}$	right				
		ake:	miles N		_ of _	ai	me	m	lale;				
Dhone	. 1221	えっひょ	2272-sum	mer	•• (	}-		-	🗢 Wini	ter.	0.4	_	
Is this	the san	ne sampling	site YOU monit	ored	last	year?	40	Lak	e depth at sau	pling site	<u>: 20</u>	<u>it.</u>	1
Line	2004		Secchi	*B	PC	RC	Colo Wa		Date Entered . Online?		Other Notes		ŀ
#	Date	Time	(nearest 1/2 ft)	er pe Sectori	1.45 - 1.45	1.77854	64.TW				Indites		
1	5/8	11:00 Dm.	1 <u>3</u> ft		3	3	gree	nish	3 5 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	undy	Hazy 9	<u>xm</u>	4
2	5/18	11:15 0	110.5 ft		3	2	gre	en_		clein	- cal	2m	+
3	5728	11/1 5 p.m.	<u>/3 ft</u>		3	3	qua	<u>.</u>		Harry	dere an	<u>cal</u>	<u>k-</u>
4	613	12:45	dis ft		4	4	22	ea	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1011302	days	calm	۲.
5	610	1,30p.m.	9.5 ft	×	3	3	gre	<u> </u>		Sum	uj "		-
6	6/20	10:00 P.m.	8,5 ft		3.	3	gre	en		Sung	-veryu	omd'	7
7	6/29	11:45 🗭	7.5 ^{ft}		a	3	green	1 Th	n :	10034	Sun-1	<u>رەمەس</u> را	Ł
8	b/q	2:00 a.m.	<b>8</b> , <b>r</b> ^{ft}		3	3		1	· · · · · · · · · · · · · · · · · · ·	Panel	pelan,		]{
9	116	D. W p.m.	ft			<u> </u>	15	1		1	د د. چانه		-
10	7/25	[1] 3 Sm.	9.5 ft		2	2	H.	"		Sum	<u>1 - car</u>	lin	-
11	1/29	10:30	10.0 ft		2	3	14	H		Sam	-BK	<u>eep4</u>	-
12	8/15	11500	9,5 ft			ļ	Į.				/		
13	8127	11:15 8	<b>9.0</b> ft		2	2	<u> </u>	1		1 Lever	by set in	<u></u>	$\frac{1}{2}$
14	7/12	10.15 pm	13,0 ft		a	2	4		<u> </u>	11	· · · · · ·	·····	ļ
15	10/7	10'30 pm	13, 5 ^{ft}		2	2		<u> </u>	~	t*		•••	
16		¥.m. _p.m.	ft		ļ					·			4
17		a.u. p.u.	ft										
18	 	ມ.ເກ. p.m.	ft										
19		а.ғп). р.г.п.	ft					_					
20		a.m. p.m.	ft										
21		a.m. p.n.	ft										
22		a.m. p.m.	ft										
23	<u> </u>	a.m. p.m	ft										
24		a.m. p.n.	ft										
25		្ន.π. p.ta.	ft										

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CLMP5522 Jim Peterson Box 21 Annandale, MN 55302

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86-0251

- Use a separate data sheet for <u>EACH</u> site.
- If disk is on lake bottom, mark "B" next to Secchi.
- PC = Physical Condition; RC = Recreational Suitability
- Record carefully: 6 ft & 9 in is 6.75 ft NOT 6.9 ft.
- For NEW sites, send in your marked lake map.

Lake	Name:	Plea	<u> Sant</u> miles		C	Count	y:	Wright	
Locat	tion of I	Lake:	miles		of ]	In	Annanda	1e .	
Phone	e: (スシィ	)•279 ·	・ <i>509</i> 3 =su	mme	er: (	)-	-	= win	ter.
Is this	s the sa	me sampling	g site YOU mon	itore	d last	year:	? <u>Yes</u> Lal	ke depth at sar	npling site: <u>15</u> ft.
Line	2004		Secchi	i i	PC	RC	Color of	Data Entered	Other
#	Date	Time	(nearest 1/2 ft)	*B			Water	Online?	Notes
1.	4-27	8:00 m			2	1	Cleor		Calm-Nosun
2	5-17	6:00 m	ft ک. <i>ور</i>		2	1	Clear		Colm-No Sun
3	5-31	7:45	)/ ^{ft}		a	1	Clear		Colm-Nosun
4		3:15 a.m.	ft		3		Clear/G		Junny Hot
5	6-29	2 30	/0 📰 ft		2	120	Clear	1 11871111111	Sunny Colm
6		3-30 am.	8.5 ft	1	3	2	Clear	+ ¹	Hazy Cloudy NoSio
7	T	3.30	<b>7-5</b> ft	1000	3	a	ClearGree	0	Hazy Cloudy Nosin Suppy Clear Calm
8	8-25	1:00 (D.m)	6.5 ft		3	2	dearGreen		Nosun HBreeze Humid
9	9-4	12:15	∑ ft		3	2	ClearGree	h	Sunny Li Breeze
10	9-28	5:30	6.5 ft				Green		Suppy Clear
11	10-9	3:00	Rft		3		Green		Suppy Calm
12	10-14	10:30 pm	84 tt	- Da	3	3	arra Clear		Sunny Clear Sunny Calm Nosyn Lt.Brace 45
13		a.m. p.m.	ft	8	2 m	1. C. 1			
14		a.m. p.m.	ft ft						
15	19 (B)	a.m. p.m.	ft.						
16		a.m. p.m.	ft	1					
17		a.m. p.m.	ft						· · · · · · · · · · · · · · · · · · ·
18		a.m. p.m.							
19		a,m.	ft					· · ·	
20		p.m. a.m.	ft ft						······
21		<u>p.m.</u> a.m.	ft						
22		p.m. a.m.	ft						
23		p.m. a.m.	ft						
24	、	p.m. a. <b>m</b> .	ft						
25		p.m. a.m.	ft						
		p.m.		1			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		

MPC	CA Citi	izen Lake-	Monitoring	Pro	ogra	m 20	03 S	ecchi Data	Sheet	Lak	xe #		Í
		orenz er Rd aven, MN 553	382	)243				<ul> <li>If you can the column</li> <li>PC = Phys</li> <li>Record al feet - NOT</li> </ul>	see the di followin sical Cond l values c f 6.9 ft.	Site sheet fo sk on tl g the "S ition; I arefully	e # or <u>EACH</u> site. he lake bottom, Secchi" column. RS = Recreation y: 6 feet and 9 n your marked l	al Suitability inches is 6.75	
		E-Ril	55			С	ounty	y: <u>57</u>	Eak	<u>n</u>	Ś		
		lake:	míles			of _			. <u></u> •				
			- 4032=							= win		-32	
		me sampling	g site YOU n	<u>ionit</u>	ored						npling site:	ft.	,
Line #	2003 Date	Time	Secchi (nearest 1/2	En l	*B	PC	RS	Color of Water	Data En Onlir		Oth	_	
<u></u> .	5-20	2:00 (p.m.)	7.5 ¹⁰	ft	U	2	2	clear	yes		No Sunny, sligt		
<u> </u>	6/1		· · ·	ft		L		mill	Ł <u></u> ſ		21/ (		1 ]
2	6	p.m.	8	ft				mill			32'60.5	na/1/	J.P
3	2		\$1	ft				CHEAN.			31- 68- 331- 77	6 C	
4	1.10	430 Pm	\$'	ft				11 1			36 76	1911	
5	7/25	-3°am	۶'	ft				Clear			30	- <u>Cuperso</u>	
6	8-11	10:03 pan	51	ft				offat			31' 6	4.5" LA	-
7	8-26		<u>× /</u>	ft				CLEAR	C.V.Y	Y	31' 6	(" BRIEZ	-
8	12-12	1.30		ft				AFFAR	OLFa.	K		10, 4 GF	EZ
9 10	10-2	14:30	42	ft ft		{	[	11 16			32' !	st, Iva	1m
10		<u>р.т.</u> а.т.		ft	-+								
12		<u>թ.m.</u> մ.m. թ. <b>ա</b> .		ft									
13		a.m. p.m.		ſt					·····			[	
14		али. р.м.		ſt									
15		a.m. p.m,		ft									
16	. <u>.</u>	a.m. p.m. a.m.		ft									
17 18		p.m. j 1.m.		ft ft									
19		р. <b>т</b> . а.т.		ft									
20		p.m. a.m.		ft	-+								
21		p.m. a.au p.m,		ft									
22		р.ш. а.т. р.т.		ft								i	
23		a.m. p.m.	······································	ft					, <u>, , , , , , , , , , , , , , , , </u>	<u> </u>	······································		
24		a.m. p.m.		ft									
25		a.m, p.m.		ft	T								

You	r Name	: <u>Wjll</u>	AM M HUBE AN JALO	A	LE	E	<i>"</i> )	_	arate data sheet f	
Aud	1688:	-17951	TUPE	4	<u>// / /</u>		~		-	ark "B" next to Secchi. RC = Recreational Suitability
		AININ	ANDALO	I				_		in is 6.75 ft • NOT 6.9 ft.
									-	n is 0.75 h • NOT 0.9 h. ur marked lake map.
	•	MINN	1 55	30	2				sites, send in yo	ur markeu iake map.
		1?	8	26	-0,	238	•		u) n al	·
	Name:	/// .ake:4	<u>9(                                    </u>		Ŧ,	of	ount C.Z.	y: Anusta	Wrigh	<u> </u>
		2) - 558 -	<u>6394</u> :	<i>061. /</i> = sun	_222 nmei	 r: (	<u>ر بر ا</u> -(	-	-7 = win	ter.
							year?	le Lak		npling site: <u>30</u> ft.
Line	2004		Secchi		4.5	PC	RC		Data Entered	Other
#	Date	Time	(nearest 1/2	<b>:</b> ft)	<u>*B</u>			Water	Online?	Notes
1	5-18	3,00 200	13.	ft		1	1	Clear	NO	
2	(-25	a.m. p.m.	14.	ft		1	17	Clean	<u> </u>	
3	6-1	2.111. a.m. p.m.	1.3.	ft		1.5	1	Clind		
4	6-8	a.m.	11.	ft			1	Clean	The second se	
5	6-15	р.т. а.т.	11.	tt.		1	126.0	Clado		
	6-22	<u>p.m.</u> a.m.	10.5	- ft		<u> </u>	1280	C. Les A	1	
7		voet in	+cation	ft				<u>~~~~</u>		- <u></u>
8	6-3	a.m.	10.5	ft			1	CLOW		
9	8-11	p.m. a.m.	10,5	ft			Z	Clera		·
10	8-18	p.m. a.m.	11:0	, ft		<b>7</b>		AlarA		
11	8-26	p.m. a.m.	1/	a. Stift		;	/	Man		······
12	9-2	р. <b>п</b> . А.ш.	11.5	• ft		1	/	Plan	1	<u> </u>
13	9-14	<u>թ.m.</u> մ.m. p.m.		ft			<u> </u>	Clean		
14	9-21	a.m. p.m.	11.5	ft			1	CLEAT		····
15	9-28		/ 3.	ft		1	1	Clean	NO	VOLY Col M+Sum
16	/ /	a.m. p.m.		ft					<b></b>	V.S. C.
17		a.m. p.m.		ft	<u></u>					
18		а, т. р. т.		ft						
19		a.m. p.m.		ft						
20		a.m. p.m.		ft						
21	h	a.m. p.m.		ft					·	
22		a.m. p.m.	4 <u>.</u>	ft						
23		a.m. p.m.		ft						
24		a.m. p.m.		ft						
25		դ.m. դ.m. թ.m.		ft						
	[						· · · · ·	······································		

You	ır Name	e: Rich	Land Ech	M	<u>a</u> N	,				
							_	arate data sheet f		_
Add	ress:	7905	137-	57	-				hark "B" next to Seco	
		KIM6	- 137 # all Minn	<u>/</u>					RC = Recreational S in is 6.75 ft - NOT 6.9	-
		51	5353					•	ur marked lake map	
I aka	Nomo		/ Section 		C	Tours		1.5		
Lanc	frame.	Jake: 7 U	miles N		of	oum. האו	y: <u>o</u> 12011			
Phone	e: (	_)Z	= sur	nme	 r; (	)•		* = wint	ter.	
<u>Is this</u>	s the sa	me samplin	g site YOU monit	tored	l last	year?	<u>145</u> Lak	te depth at san	apling site:	_ ft.
Line	2004		Secchi	*B	PC	RC'		Data Entered	Other	
#	Date	Time	(nearest 1/2 ft)	*D			Water	Online?	Notes	
1	5-17		<b>9.0</b> ft		2	2,	Jear			
2	1015		8.5 ft			2	Cl.ar			
3	7:16	a.m. p.m.	8~ ft		2	2	1/ear			
4	819	a.m. p.m.	8.0 ft		24	2	alaur			
5	9-28	8.m. p.m.	9.0 ft		2	Z	eloat	5.# 5.#		
6	10-17	в.т. р.т.	90 ft		λZ	2.	Clear	27 B 4		
7	<b>*</b>	a.m, p.m.	ft			÷.				
8		a.m. p.m.	ft							
9		a.m. p.m.	ft ft					<b>1</b>	// <del></del> .	· · · · · · · · · · · · · · · · · · ·
10		a,m, p,m,	ft ft			1883) 1883)	1 15 2			
11		s.m. p.m.	ft						· · · · · · · · · · · · · · · · · · ·	
12	<u>e</u>	a mi p.m.	i fi							
13		a.m. p.m.	ft.		$\hat{\mathbf{Q}}$	11. 11. 11.				
14		a.m. p.m.	ft ft							
15		a.m. p.m.	ft.						-	
16		a.m. p.m.	ft	- }_						
17		a.m. p.m.	<b>f</b> ¢							
18		a.m. p.m.	ft							
19		а,т, p.m.	ft						- ·· · · · · ···	····
20		a,m, p,m.	ft							
21		р.т. a.m. p.m.	ft							
22		a.m.	ft	$\neg$						
23		p.m. a.m.	ft							
24		p.m. a.m.	ft	$\rightarrow$						
25		p.m. a.m.	ft	-+						····
	. 1	p.m.			1			1		

# Appendix F

## **2004 Water Quality Laboratory Reports and Data**

This information is not included in the on-line report. Please visit the Clearwater River Watershed District office to review this data.

# Appendix G

# **Field Notes and Measurements**

This information is not included in the on-line report. Please visit the Clearwater River Watershed District office to review this data.

# Appendix H

# **Cedar Lake Monitoring Results**

Table 1	
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							1
Date	Site	Q (cfs)	TP (mg/L)	TP (ibs/day)	TP (lbs/yr)	SRP (mg/L)	
5/12/2004	CR 28.2	10.91	0.212		4,556		
6/2/2004		72.1	0.149		1		
7/22/2004		6.1	0.282		3,390		
8/16/2004		0	0.227		0		
9/20/2004		0	0.246	0.00	0	0.197	
							FC
							(CFU/10
Date	Site	Q (cfs)	TP (mg/L)	TP (lbs/day)	TP (lbs/yr)	SRP (mg/L)	mL)
5/12/2004	CR 10.5	45	0.025	6.09	2,223	0.005	
6/2/2004		193	0.022	22.89	8,354	< 0.005	
7/22/2004		61	0.02	6.55	2,391	<0.005	<
8/16/2004		16	0.023	2.02	736	<0.005	
9/20/2004		21	0.018	2.00	728	<u>0.</u> 01	
							FC
							(CFU/10
Date	Site	Q (cfs)	TP (mg/L)	TP (lbs/day)	TP (lbs/yr)	SRP (mg/L)	`mL)
5/12/2004 V	NC 0.2	2.3	0.073	0.92	335	0.039	-
6/2/2004		6.0	0.063	2.03	743	0.024	
7/22/2004		4.6	0.059	1.47	538	0.024	
8/16/2004		0.5	0.057	0.15	54	0.034	
9/20/2004		0.5	0.068	0.19	68	0.064	
			Fecal				
			Coliform				
			(CFU/100				
Date	Site	<b>A</b> (-f-)	•				
	+	Q (cfs)	mL)				
6/2/2004 C	Clearwater River at CR 40	75.89					
6/2/2004 7/ <b>22/2</b> 004		111.53	5				
		43.95					
8/16/2004 9/20/2004		23.38	37				
9/20/2004		not gauged	28				
							FC
							(CFU/10
Date	Site	Q (cfs)	TP (mg/L)	TP (lbs/day)	TP (lbs/yr)	SRP (mg/L)	` mL)
	nnandale Wetland						
6/2/2004							
7/22/2004			0.652			0.194	
						0.104	
8/16/2004 9/20/2004		0	0.16				1

### Table 1

### **Cedar Lake Monitoring Results**

Profile:						
Date	Site	Q (cfs)	TP (mg/L)	TP (ibs/day)	TP (lbs/yr)	SRP (mg/L)
6/11/2004	SE Inlet to Swart Watts	4	0.213	4.60	1,678	0.157
6/11/2004 \$	SW Inlet to Swart Watts	2	0.126	1.36	496	0.08
6/11/2004	lwy 55	20	0.179	19.31	7,049	0.09
	Cedar Outlet	24	0.058	7.37	2,690	0.006

Date	Site	Q (cts)	TP (mg/L)	TP (Ibs/day)	TP (lbs/yr)	SRP (mg/L)
	Northwest Tributary to					
	Cedar Lake (North of 79th,					
5/12/2004	east of 6)	0.03	0.166	0.03	11	0.019
6/2/2004		0.07	0.154	0.03	10	
6/11/2004		0.6	0.143	0.46	169	0.12
7/22/2004		0				
8/16/2004		0				
9/20/2004		0				

Date	Site	Q (cfs)	TP (mg/L)	TP (lbs/day)	TP (lbs/yr)	SRP (mg/L)
S	outhwest Tributary to					
C	edar Lake (off 70th					
5/12/2004 St	reet)	0.16	0.098	0.08	31	0.138
6/2/2004		1.89	0.074	0.76	276	-
6/11/2004		3.0	0.089	1.45	529	0.061
7/22/2004		BDL	0.121			0.008
8/16/2004		0.0				_
9/20/2004		0.0				

Date	Site	Q (cfs)	TP (mg/L)	TP (lbs/day)	TP (lbs/yr)	SRP (mg/L)
6/2/2004 Sv	vart Watts Outlet	6	0.254	8.28	3,023	0.016
6/11/2004		16	0.307	27.22	9,934	0.014
7/22/2004		0				
8/16/2004		0				
9/20/2004		0				

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