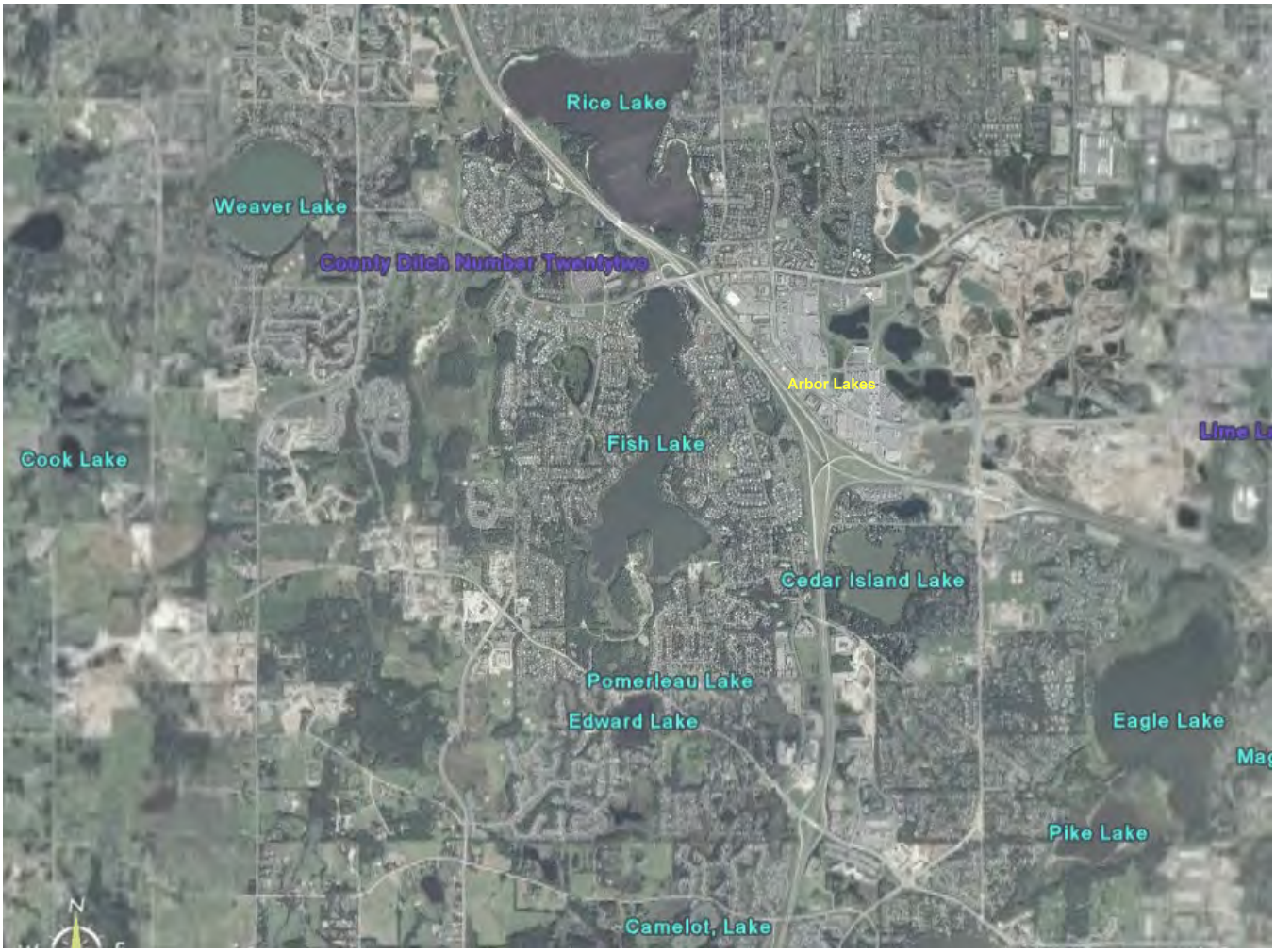


The Lakes of Maple Grove

Lake Water Quality Report for 2021

Maple Grove Lake Quality Commission

Prepared February 2022
by Steve McComas, Blue Water Science

The Lakes of Maple Grove
Status Report - 2021

Prepared for the Maple Grove Lake Quality Commission.

Commission Members - 2021

Karen Jaeger — Council liaison
Steve Lane — Cedar Island Lake
Rebecca Fahrenbrunch — Eagle Lake
Sharon Martin-Kotula — Edward Lake
Joe Randall — Fish Lake
George Schneider — Rice Lake
Nancy Bergstrand — Weaver Lake
Joe Ruegsegger – City-at-Large
Guarav Uppal - City-at-Large
Ben Zaker – City-at-Large

Derek Asche, Water Resources Engineer, City of Maple Grove
Mark Lahtinen, Water Resources, City of Maple Grove

Prepared by Steve McComas, Blue Water Science

February 2022

The Lakes of Maple Grove Status Report - 2021

Introduction and Background

The City of Maple Grove has numerous lakes and smaller water bodies within the City limits. In 2021, a total of 12 lakes were monitored. Blue Water Science monitored 7 lakes over the summer months, including Eagle, Edward, Norwood, Pike, and the 3 Arbor Lakes. Three Rivers Park District sampled Fish, Rice, and Weaver Lakes. Shingle Creek Watershed Management Commission sampled Cedar Island Lake. This report summarizes the summer sampling data from May-September for all 12 lakes. A summary of general lake characteristics is shown in Table 1.

Table 1. General lake characteristics of Maple Grove Lakes. Watershed acreage is from the 1996 Stormwater Management Plan.

Lake	State ID Number	Watershed District	Size (acres)	Maximum Depth (feet)	Mean Depth (feet)	Total Watershed Size (ac)	Lake Classification (shallow or deep)	Lake Water Retention Time (years)
Cedar Island	27-119	Shingle Creek	86	7.0*	4.3	389	shallow	1.8
Cook	27-0120	Elm Creek	16.5	20	8	196	shallow	2.3
Eagle	27-111	Shingle Creek	285	37	10.5	1,838	deep	3.1
Edward	27-121	Elm Creek	33	9.5	5.5	102	shallow	
Fish	27-118	Elm Creek	239	48*	17.7	860	deep	9.1
Pike	27-111-02	Shingle Creek	75	25	4.9	746	shallow	1.0
Rice	27-116	Elm Creek	333	11	6.6	13,400	shallow	0.3
Weaver	27-117	Elm Creek	165	57*	21*	320	deep	20

* from Hennepin Conservation District
**from Met Council

Guide to Interpreting Water Quality Information

SD = Secchi disc - a black and white disc lowered into the water until it can't be seen from the surface. This is the Secchi disc transparency reading.

TP = Total phosphorus - the fertilizing nutrient most responsible for causing excess algae to grow.

Chl a = Chlorophyll a - the green pigment in algae that is analyzed in the laboratory. It is correlated to the amount of algae in a lake.

ppb = parts per billion - concentrations of phosphorus and chlorophyll are often reported in ppb.

Lake Goals (based on eutrophication criteria for North Central Hardwood Forest Ecoregion)

- Secchi disc: 5-7 feet of transparency as a summer average.
- Total phosphorus: try to keep phosphorus concentrations below 40 ppb as a summer average for deep lakes and less than 60 ppb for shallow lakes.
- Chlorophyll a: try to keep chlorophyll concentrations below 14 ppb as a summer average for deep lakes and less than 20 ppb for shallow lakes.

2021 Summer Sampling Results - Status Report

The objectives of the 2021 water quality sampling program were to check the health of the lakes in the City of Maple Grove and to see if they were improving, degrading, or staying the same. Water quality parameters monitored included Secchi disc (measure of water clarity), total phosphorus (measure of the primary nutrient that stimulates algal growth), and chlorophyll (measure of the amount of algae in the water).

Water quality was checked from May through September and results are shown in Table 2. North Arbor Lake had the best transparency and Cedar Island had the lowest transparency in 2021 (Tables 2 and 3).

Table 2. Water chemistry summer averages for Maple Grove Lakes in 2021 (source: Three Rivers Park District collected data for Fish, Rice, and Weaver Lakes [sampled on 11 dates]. Shingle Creek Watershed Commission collected data for Cedar Island Lake. Elm Creek Watershed District collected data for Cook Lake. Other data collected by Blue Water Science [sampled on 5 dates]).

	May - Sept Averages, 2021		
	Secchi Disc (ft)	Total Phosphorus (ppb)	Chl a (ppb)
Cedar Island	3.2	88	41
Cook			
Eagle**	6.9	29	7
Edward	6.1	24	4
Fish*	10.8	17	8
Pike**	5.0	55	7
Rice*	3.6	337	72
Weaver*	7.5	25	11
North Arbor	16	9	3
South Arbor	13	12	3
West Arbor	10	24	9
Norwood	16	16	5

*sampled by Three Rivers Park District
**sampled by Shingle Creek Watershed Management Commission
***sampled by Elm Creek Watershed District

Table 3. Maple Grove water quality data 2021. Results for Secchi disc (SD) are in feet, total phosphorus (TP) are in ppb, chlorophyll a (chl) are in ppb, chlorides (chlor) are in ppm, and conductivity (cond) are in µS. Data for Fish, Rice, and Weaver are from Three Rivers Park District. Data for Cedar Island is from Shingle Creek Watershed Commission.

Lakes	Cedar Island					Cook					Eagle					Edward					Fish			Pike					Rice			Weaver		
	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	SD	TP	Chl
May																																		
week 1*																																		
week 2																					20.3	5	2						2.8	53	19	12.6	22	6
week 3																																		
week 4											9.6	23	2.7	1465	731	6.5	24	<1	44.4	280	18.0	20	2	6.3	40	2.7	288	1022	6.6	50	17	13.6	26	5
June																																		
week 1	4.0	55	10																		11.5	14	6						1.7	72	51	10.0	24	8
week 2	4.0	124	10.2																															
week 3																					9.5	18	6						3.9	278	108	9.1	31	11
week 4	2.5	85	21.4								8.7	21	5.3	165	770	5.7	13	8.0	47.7	266				4.8	37	8.0	310.0	1164						
July																																		
week 1																					7.5	14	5						3.6	404	93	4.0	25	15
week 2	3.0	93	21.4																															
week 3	2.5	87	42.7																		12.1	13	7						3.1	465	102	4.5	22	10
week 4											6.1	19	6	158	788	6.4	30	7.1	46.9	287				4.6	81	8.0	258.0	1051						
August																																		
week 1	2.5	78	65.9																		9.8	24	8						3.1	569	135	4.9	28	15
week 2																																		
week 3	1.5	113	72.6																		8.5	17	11						3.6	404	93	4.3	26	16
week 4	1.5	88	80.1								5.2	37	13.4	168	765	5.7	30	1.8	47.5	272	6.9	19	11	4.8	50	4.4	298.0	1105	1.5	544	125	5.1	20	14
September																																		
week 1																																		
week 2	1.5	86	49.8																		8.5	25	10						4.3	477	21	6.5	28	11
week 3	11																																	
week 4	1.5	71	40.9								4.9	45	9.8	165	837	6.1	22	<1	47.2	358	5.9	22	18	4.7	69	11.7	279.0	1067	5.9	389	23	7.8	26	11
May-September Average																																		
	3.2	88	41	0	0	0.0	0	0	0	0	6.9	29	7	424	778	6.1	24	4	47	293	10.8	17	8	5.0	55	7	287	1082	3.6	337	72	7.5	25	11

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

Lakes	North Arbor					South Arbor					West Arbor					Norwood				
	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond
May																				
week 1*																				
week 2																				
week 3																				
week 4	14.1	12	2.7	345	1336	12.2	14	1.8	426	1569	13.7	20	1.8	43.1	462	18.8	19	<1	89.6	517
June																				
week 1																				
week 2																				
week 3																				
week 4	16.3	6	2.7	355	1339	16.1	7	1.8	445	1549	13.9	6	4.5	45.4	403	20.1	8	1.8	105	498
July																				
week 1																				
week 2																				
week 3																				
week 4	16.2	8	<1	362	1352	14.1	9	3.6	427	1600	13.4	12	3.6	46.2	378	18.8	9	2.7	105	506
August																				
week 1																				
week 2																				
week 3																				
week 4	18.9	12	2.7	352	1232	14.4	14	<1	467	1580	4.6	36	13.4	49.0	479	14.1	17	1.8	109	580
September																				
week 1																				
week 2																				
week 3																				
week 4	16.4	9	3.6	337	1106	9.6	16	4.4	479	1531	4.6	44	20.3	49.1	485	7.4	26	16	103	605
May-September Average																				
	16	9	3	350	1273	13	12	3	449	1566	10.0	24	9	47	441	16	16	5	102	541

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

Eurasian Watermilfoil (EWM) Monitoring Summary

Eurasian watermilfoil (EWM) has been found in 8 lakes in Maple Grove - Fish, Eagle, Pike, Rice, Weaver, and all three Arbor Lakes. EWM in all 8 lakes is past the point of eradication, but typically nuisance growth is limited to several shoreline areas. Eagle Lake has a small infestation and little nuisance growth. Rice Lake had a new infestation in 1996 but milfoil was not found in 1997, 1998, or after 2007. Overall observations are summarized in Table 4.

Table 4. Summary of Eurasian watermilfoil observations for Maple Grove Lakes in 2021.

	2021 Summer
Arbor - North	Eurasian watermilfoil found in 2003
Arbor - South	Eurasian watermilfoil found in 2004
Arbor - West	Eurasian watermilfoil found in 2002
Cedar Island Lake	No Eurasian watermilfoil found
Cook Lake	No Eurasian watermilfoil found
Eagle Lake	Scattered Eurasian watermilfoil, found in 1992, hybrid maybe dominant in 2021
Lake Edward	No Eurasian watermilfoil found
Fish Lake	Scattered Eurasian watermilfoil, found in 1993
Norwood Lake	No Eurasian watermilfoil found
Pike Lake	Scattered Eurasian watermilfoil, found in 1992
Rice Lake	Scattered Eurasian watermilfoil, found in 1996
Weaver Lake	Eurasian watermilfoil found in 2012

Water Quality Summaries

Secchi Disc, Phosphorus, and Chlorophyll a

A 26 year summary of water quality results for Maple Grove Lakes (except for the 3 Arbor lakes and Norwood Lake) is shown in Table 5. City lakes have been stable in regard to water quality except for Lake Edward and Rice Lake. Fluctuating clarity in Lake Edward may be influenced by previous fish kills. Rice and Cedar Island Lakes have the highest phosphorus concentrations in town and Fish and Edward have the lowest.

Table 5. Growing season (May - September) averages for the Maple Grove Lakes [SD = secchi disc (ft), TP = total phosphorus (ppb), Chl a = chlorophyll a (ppb)].

	Cedar Island			Cook			Eagle			Edward			Fish			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
1995	2.0	106	73	--	--	--	5.8	51	7	5.0	61	16	6.4	51	16	3.9	78	20	2.2	233	44	7.8	40	18
1996	1.8	--	–	--	--	--	5.9	33	9	8.1	104	2	7.0	55	9	3.4	66	23	2.9	453	37	6.5	35	6
1997	1.5	117	40	--	--	--	5.4	31	11	5.8	47	4	5.4	50	17	3.6	76	24	2.3	316	39	6.6	32	10
1998	1.4	102	44	--	--	--	5.9	29	11	4.1	46	11	5.9	46	13	3.3	70	31	3.3	469	20	6.6	40	14
1999	1.1	203	66	--	--	--	5.9	53	23	4.5	43	13	4.8	45	19	3.9	74	35	3.5	248	35	6.4	42	21
2000	--	--	--	--	--	--	9.5	36	5	5.5	45	6	4.6	53	19	4.3	65	30	5.2	175	23	6.6	43	15
2001	2.1	78	47	--	--	--	11	34	18	7.1	26	4	5.4	38	17	4.9	83	30	4.5	339	22	5.5	42	38
2002	1.8	90	55	--	--	--	3.3	42	67	6.7	48	13	3.6	51	26	--	--	--	4.2	152	18	8.3	43	20
2003	1.1	163	116	--	--	--	7.0	44	31	3.2	118	102	4.5	55	37	3.5	80	60	3.2	185	35	6.6	46	31
2004	1.0	147	133	6.2	26	4	6.8	45	28	2.2	77	47	7.9	47	29	3.5	97	65	3.9	207	36	8.9	51	40
2005	1.1	123	134	6.6	51	2	8.8	18	20	2.4	104	61	5.4	40	25	3.5	95	54	4.6	214	44	16.5	23	4
2006	0.7	161	173	7.5	22	33	5.8	47	36	1.9	95	55	3.9	49	29	4.3	89	47	3.0	187	50	14.4	25	7
2007	0.8	240	194	7.8	19	6	--	--	--	1.6	115	62	4.1	51	31	--	--	--	2.2	206	48	9.0	35	7
2008	0.7	455	226	8.0	20	2	--	--	--	3.2	105	67	2.7	47	17	--	--	--	2.6	436	51	8.0	30	8
2009	0.6	330	147	10.6	23	3	5.7	44	30	2.2	149	82	4.6	57.9	17	3.5	80.6	20	3.5	395	151	9.2	30.8	5
2010	0.7	143	67	7.4	18	3	5.9	50	21	3.6	88	58	4.9	48	14	3.9	89	29	3.4	227	57	13.1	31	5
2011	1.8	94	61	5.7	32	3	5.4	38	25	2.5	94	40	6.2	50	19	3.6	52	14	3.7	153	36	7.9	30	8
2012	0.9	130	58	5.0	34	3	5.7	42	25	3.4	72	41	5.5	42	26	3.5	34.8	15	2.5	256	53	7.6	31	11
2013	1.0	138	49	5.6	31	2	5.7	30	6	3.2	97	50	4.9	53	33	3.9	66	14	2.5	326	114	7.2	37	17
2014	1.7	88	27	6.1	36	2	6.2	34	7	4.7	43	7	7.1	40	22	4.5	48	8	4.2	232	60	6.9	37	21
2015	1.0	133	65	5.6	33	3.1	4.7	41	10	4.8	56	7.7	6.1	44	25	4.3	67	14	2.2	236	88	6.7	37	15
2016	1.3	153	68	5.0	45	2.2	6.7	47	11	6.1	67	13.1	6.6	42	21	4.8	63	9	2.4	168	50	10.9	30	8
2017	1.4	111	35	4.7	33	4	8.6	37	17	6.3	41	7	7.0	50	18	5.3	82	40	3	162	56	7.7	33	14
2018	1.5	123	73	6.2	29	4	7.8	33	7	6.7	29	1	7.5	30	15	5.2	67	8	3.0	151	45	7.6	31	12
2019	1.9	110	62	5.7	35	4	5.3	39	11	5.2	30	3	6.8	25	19	5.1	70	9	3.1	116	49	12.9	20	12
2020	2.5	129	20	5.4	96	7	6.6	35	20	6.9	20	2	9.1	22	10	7.6	50	14	3.0	205	84	6.1	27	15
2021	3.2	88	41				6.9	29	7	6.1	24	4	10.8	17	8	5.0	55	7	3.6	337	72	7.5	25	11

Cedar Island Lake data: Met Council - 1995; MPCA - 1996; and Blue Water Science - 1997 through 2021.
Fish and Weaver Lake data collected by Three Rivers Park District.
Rice Lake data: Met Council and by Three Rivers Park District
Eagle and Pike Lake data collected by Shingle Creek Watershed Management Commission and Blue Water Science

Report Card

Water quality data have been converted to grades based on a Met Council grading scale. Grades are shown in Table 6.

Table 6. Lake grades for Maple Grove Lakes.

	Cedar Island			Cook			Eagle			Edward			Fish			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
1995	F	D	D	--	--	--	C	C	A	C	C	B	C	C	B	C	D	B	F	F	C	B	C	B
1996	F	--	--	--	--	--	C	B	A	B	D	A	C	C	A	D	D	C	D	F	C	C	C	A
1997	F	D	C	--	--	--	C	B	B	C	C	A	C	C	B	D	D	C	D	F	C	C	B	B
1998	F	D	D	--	--	--	C	B	B	C	C	B	C	C	B	D	D	C	D	F	D	C	C	B
1999	F	F	D	--	--	--	C	C	C	C	C	B	C	C	B	C	D	C	D	F	C	C	C	C
2000	--	--	--	--	--	--	B	C	A	C	C	A	C	C	B	C	C	C	C	F	C	C	C	B
2001	F	D	C	--	--	--	A	C	B	C	B	A	C	C	B	C	D	C	C	F	C	C	C	C
2002	F	D	D	--	--	--	D	C	D	C	C	B	D	C	C	--	--	--	C	D	B	B	C	B
2003	F	F	F	--	--	--	C	C	C	D	D	F	C	C	C	D	D	D	D	F	C	C	C	C
2004	F	D	F	C	B	A	B	C	C	F	D	C	B	C	C	D	D	D	D	F	C	B	C	C
2005	F	D	F	C	C	A	B	A	B	D	D	D	C	C	C	D	D	D	C	F	C	A	B	A
2006	F	F	F	B	A	C	C	C	C	F	D	D	C	C	C	C	D	C	D	F	D	A	B	A
2007	F	F	F	B	A	A	--	--	--	F	D	D	C	C	C	--	--	--	F	F	C	B	C	A
2008	F	F	F	B	A	A	--	--	--	D	D	D	D	C	B	--	--	--	D	F	D	B	B	A
2009	F	F	F	A	A	A	C	C	C	F	D	F	C	C	B	D	D	C	D	F	F	B	B	A
2010	F	D	D	B	A	A	C	C	C	D	D	C	C	C	B	C	D	C	D	F	D	A	B	A
2011	F	D	D	C	B	A	A	C	C	D	D	C	C	C	B	D	C	B	D	F	C	B	B	A
2012	F	D	D	C	C	A	C	C	C	D	D	C	C	C	C	D	C	B	D	F	D	B	B	B
2013	F	F	D	C	B	A	C	B	A	D	D	D	C	C	C	D	C	B	D	F	F	B	C	B
2014	F	D	C	C	C	A	C	C	A	C	C	A	C	C	C	C	C	A	C	F	D	C	C	C
2015	F	D	D	C	C	A	C	C	B	C	C	A	C	C	C	C	C	B	F	F	F	C	C	B
2016	F	F	D	C	C	A	C	C	B	C	C	B	C	C	C	C	C	A	D	F	D	A	B	A
2017	F	D	C	C	C	A	B	C	B	C	C	A	C	C	B	C	D	C	D	F	D	B	C	B
2018	F	D	C	C	B	A	B	C	A	B	B	A	B	B	B	C	C	A	D	F	C	B	B	B
2019	F	D	D	C	C	A	C	C	B	C	B	A	C	B	B	C	D	A	D	D	D	A	A	B
2020	D	D	D	C	D	A	C	C	B	C	A	A	B	A	B	C	C	A	D	F	F	C	B	B
2021	D	D	C				C	B	A	C	B	A	A	A	A	C	C	A	D	F	D	B	B	B

Arbor and Norwood Lakes: Results from sampling three Arbor Lakes and Norwood Lake are summarized in Tables 7 and 8 and Figure 1. All four have good water quality and relatively low phosphorus concentrations.

Table 7. Growing season averages for the Arbor Lakes and Norwood Lake.

	West Arbor			North Arbor			South Arbor			Norwood		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May-September Average												
1999 (1 date - Aug)	3.1	18	11	6.7	20	<1	5.4	13	<1	--	--	--
2001 (1 date - Sept)	5.3	--	--	16.0	--	--	8.2	--	--	--	--	--
2002 (3 dates)	9.0	16	1	8.9	11	2	13.0	12	1	--	--	--
2003 (5 dates)	7.0	19	4	12.3	9	3	11.7	10	3	--	--	--
2004 (5 dates)	9.6	18	5	11.5	12	2	12.4	12	2	--	--	--
2005 (5 dates)	10.7	28	2.4	13.2	17	3	10.7	17	2	--	--	--
2006 (5 dates)	9.7	23	2	13.8	13	2	7.9	29	17	--	--	--
2007 (5 dates)	9.4	19	2.6	12.1	9	2.2	11.3	15	5	--	--	--
2008 (5 dates)	8.4	24	7.0	14.3	12	3.7	10.2	16	4.4	--	--	--
2009 (5 dates)	9.6	28	5.3	13.9	14	1.1	13.9	17	2.0	--	--	--
2010 (5 dates)	7.9	36	11	13.8	9	1.7	13.4	14	1.7	--	--	--
2011 (5 dates)	7.1	27	12	12.7	12	4.4	12.4	14	2.6	--	--	--
2012 (5 dates)	6.6	28	12	14.5	11	6.1	13.0	15	5.3	--	--	--
2013 (5 dates)	7.6	24	5.7	15.3	11	1.5	12.2	18	2.7	--	--	--
2014 (5 dates)	9.1	24	6.7	18.1	8	1.1	12.9	11	2.4	14.9	13	2.2
2015 (5 dates)	5.0	57	14	15.0	12	1.7	12.0	18	3.2	16.4	14	2.1
2016 (5 dates)	7.7	40	10	14.8	15	2.8	10.7	20	3.3	11.1	28	6.3
2017 (5 dates)	7.0	33	13	16.2	15	3.0	12.0	19	3.0	19.0	14	2.0
2018 (5 dates)	9.5	23	9	15.2	13	2.2	13.6	12	2.3	17	20	6.5
2019 (5 dates)	8.8	22	8	24	10	2	16	17	3	16	19	4
2020 (5 dates)	8.9	24	11	20	20	3	14	12	4	16	12	2
2021 (5 dates)	10.0	24	9	16	9	3	13	12	3	16	16	5

Table 8. Lake grades for the Arbor Lakes and Norwood Lake.

	West Arbor			North Arbor			South Arbor			Norwood		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
1999	D	A	B	C	A	A	C	A	A	--	--	--
2001	C	--	--	A	--	--	B	--	--	--	--	--
2002	B	A	A	B	A	A	A	A	A	--	--	--
2003	C	A	A	A	A	A	A	A	A	--	--	--
2004	A	A	A	A	A	A	A	A	A	--	--	--
2005	A	B	A	A	A	A	A	A	A	--	--	--
2006	B	B	A	A	A	A	B	B	B	--	--	--
2007	B	A	A	A	A	A	A	A	A	--	--	--
2008	B	B	A	A	A	A	A	A	A	--	--	--
2009	B	B	A	A	A	A	A	A	A	--	--	--
2010	B	C	B	A	A	A	A	A	A	--	--	--
2011	B	B	B	A	A	A	A	A	A	--	--	--
2012	C	B	B	A	A	A	A	A	A	--	--	--
2013	B	B	A	A	A	A	A	A	A	–	--	--
2014	B	B	A	A	A	A	A	A	A	A	A	A
2015	C	C	B	A	A	A	A	A	A	A	A	A
2016	B	C	B	A	A	A	A	A	A	A	B	A
2017	B	C	B	A	A	A	A	A	A	A	A	A
2018	B	B	A	A	A	A	A	A	A	A	A	A
2019	B	A	A	A	A	A	A	A	A	A	A	A
2020	B	B	B	A	A	A	A	A	A	A	A	A
2021	A	B	A	A	A	A	A	A	A	A	A	A

Location map of lakes.

Arbor Lakes and Norwood Lake
Secchi Disc and Total Phosphorus Data

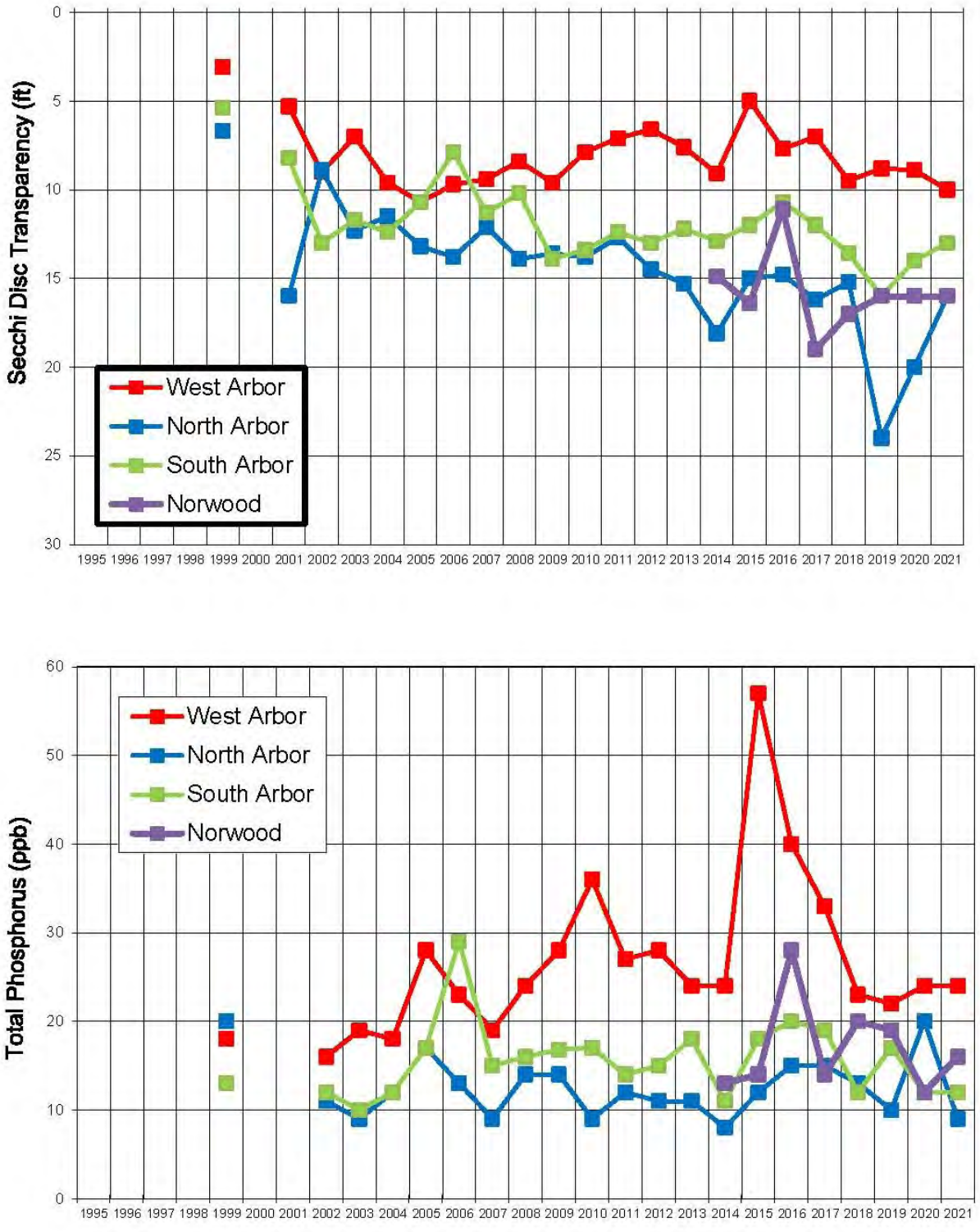


Figure 1. Secchi disc transparency (top) and total phosphorus concentrations (bottom) for the Arbor Lakes and Norwood Lake from 1999-2021.

Chloride Concentrations for Maple Grove Lakes

Lake chloride concentrations have been taken occasionally for the past few years. Several lakes have fluctuating concentrations. Edwards and West Arbor had the lowest chloride concentrations and North and South Arbor have the highest.

Table 9. Chloride concentrations for Maple Grove lakes in 2017-2021.

	2017	2018	2019	2020	2021
Cedar Island Lake	73	91	133	105	--
Cook Lake	30	28	34	40	--
Eagle Lake	--	--	150	--	424
Lake Edward	36	41	43	40	47
Fish Lake	--	--	--	--	--
Pike Lake	--	--	--	--	287
Rice Lake	--	--	--	--	--
Weaver Lake	--	--	--	--	--
North Arbor Lake	229	192	263	290	350
South Arbor Lake	235	187	267	330	449
West Arbor Lake	38	33	40	39	47
Norwood Lake	61	52	88	83	102

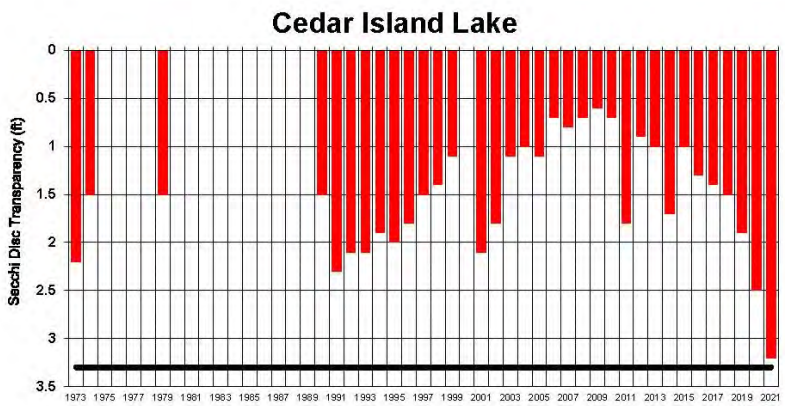
Secchi Disc Transparency Graphs for Maple Grove Lakes

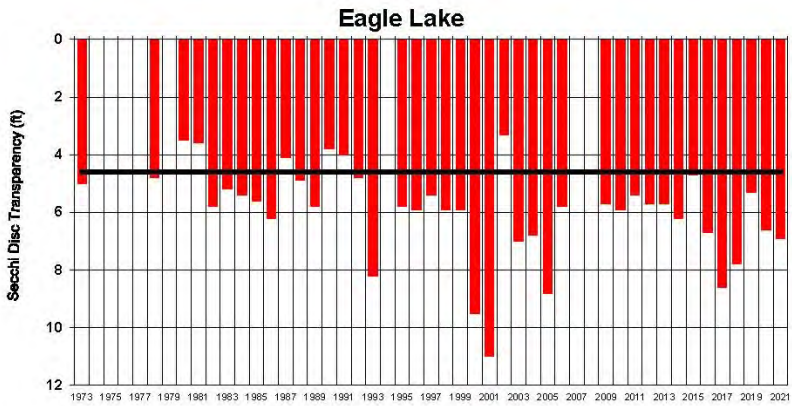
Graphs of average summer water transparency over the years for each of the major Maple Grove lakes are displayed on the next two pages. Eagle, Edward, Fish, Pike, and Weaver Lakes have summer water clarity averages generally over five feet. Cedar Island Lake generally has a summer average less than two feet. Rice Lake average is right around 3 feet. Transparency goals for all lakes should average 5 to 7 feet over the summer.

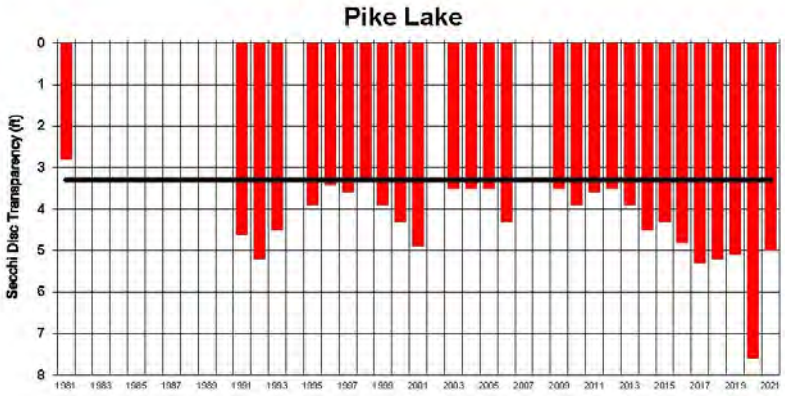
Total Phosphorus Graphs for Maple Grove Lakes

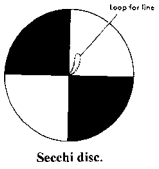
Graphs of average summer water total phosphorus for the major Maple Grove Lakes (not including the Arbor Lakes) are shown after the Secchi disc graphs. Fish Lake had the lowest summer phosphorus concentration of the lakes (although the Arbor Lakes also have low phosphorus concentrations). Rice Lake had the highest total phosphorus in 2021.

Shingle Creek Watershed District - Secchi Disc Data









Secchi Disc Results

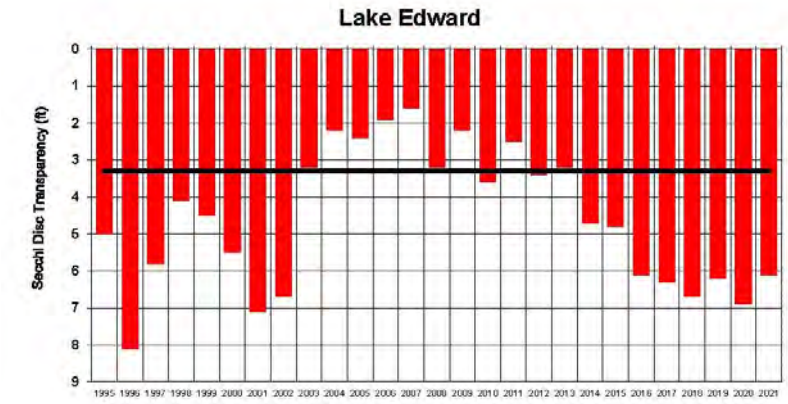
Cedar Island Lake has the lowest Secchi disc transparency in Maple Grove. Transparency fluctuates in the remaining Maple Grove lakes. Aquatic plants could grow to twice the average seasonal Secchi disc transparency. Aquatic plants are beneficial for lakes and help to maintain or improve water clarity.

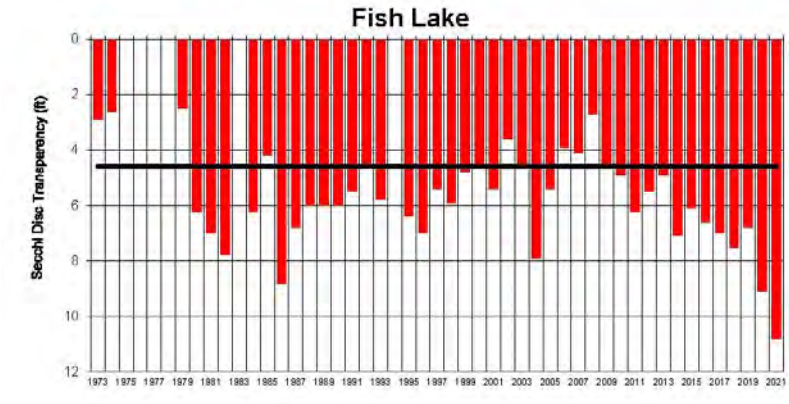
Legend: Secchi Disc Clarity Criteria (shown with line in above graphs)

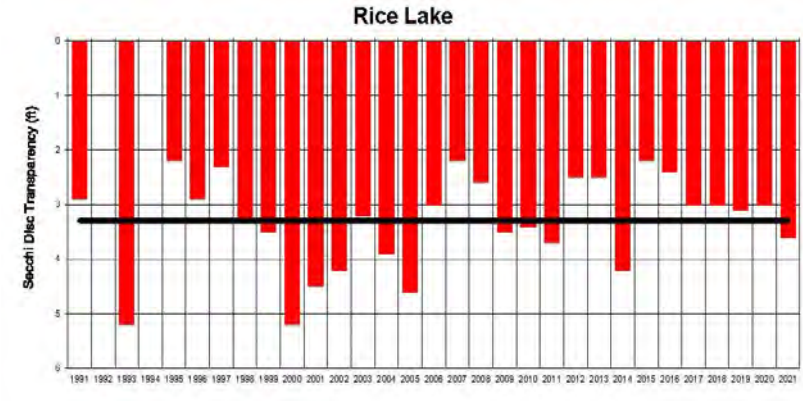
Shallow Lakes: Secchi disc transparency greater than 3.3 feet is considered to be unimpaired.

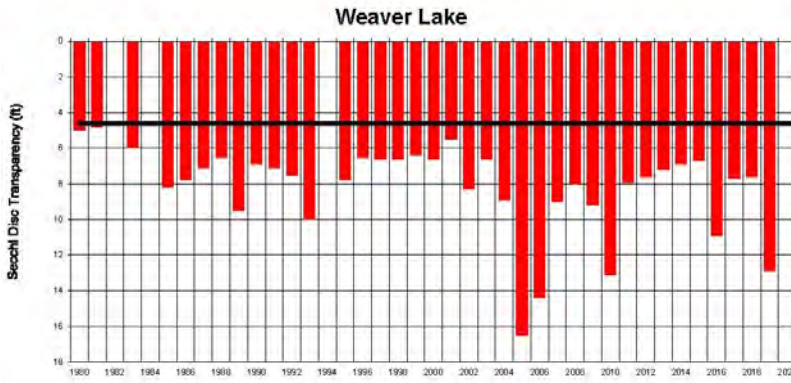
Deep Lakes: Secchi disc transparency greater than 4.6 feet is considered to be unimpaired.

Elm Creek Watershed District - Secchi Disc Data







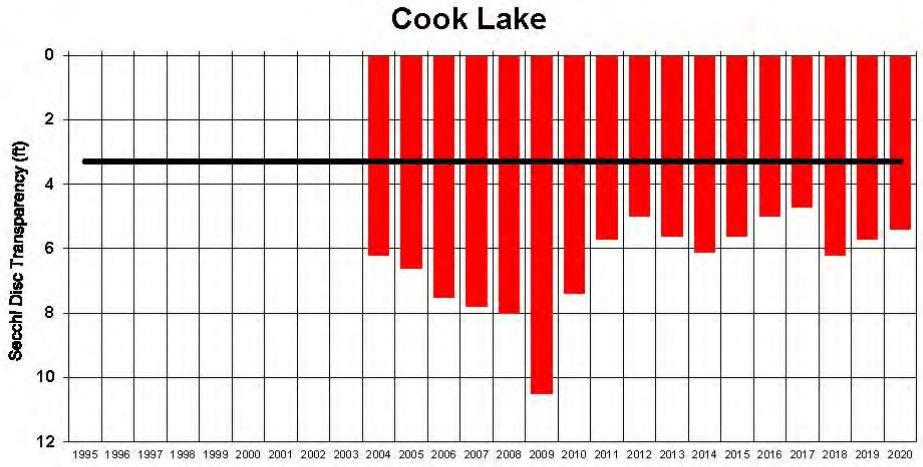


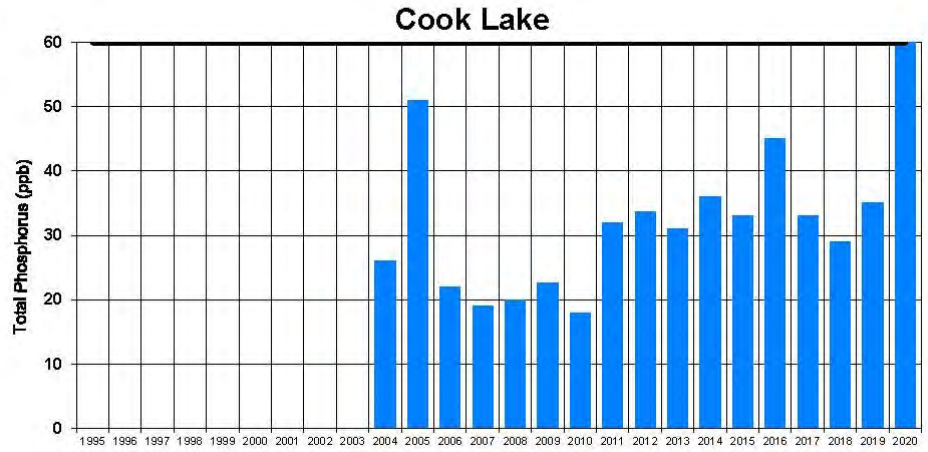
Legend: Secchi Disc Clarity Criteria
(shown with line in above graphs)

Shallow Lakes: Secchi disc transparency greater than 3.3 feet is considered to be unimpaired.

Deep Lakes: Secchi disc transparency greater than 4.6 feet is considered to be unimpaired.

Cook Lake Data





Legend: Secchi Disc Clarity Criteria
(shown with line in above graphs)

Shallow Lakes: Secchi disc transparency greater than 3.3 feet is considered to be unimpaired.

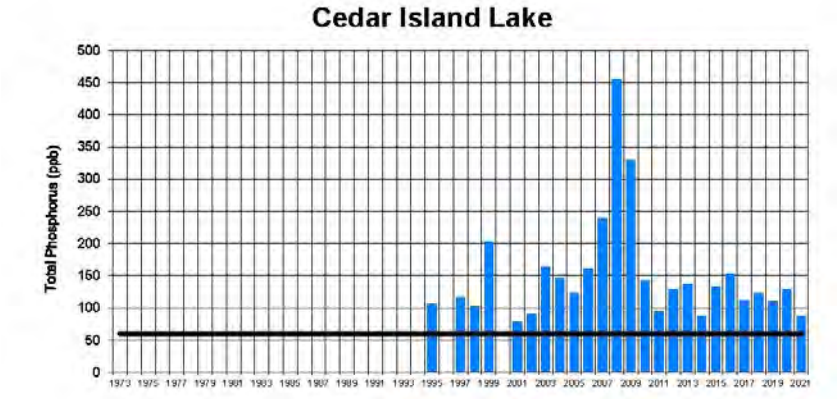
Deep Lakes: Secchi disc transparency greater than 4.6 feet is considered to be unimpaired.

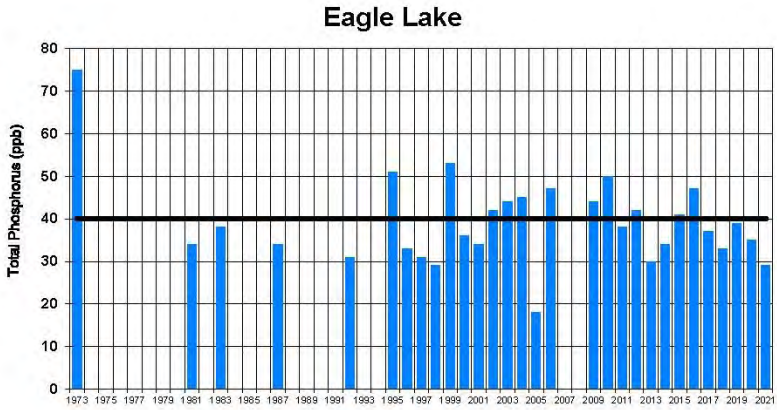
Legend: Total Phosphorus Criteria
(shown with line in above graphs)

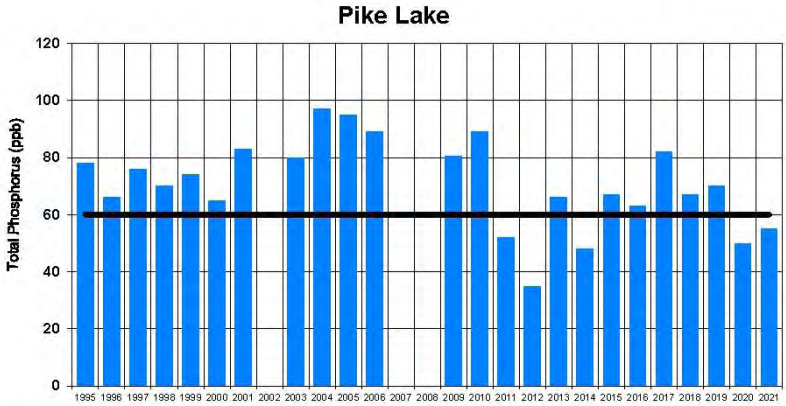
Shallow Lakes: Total phosphorus concentrations less than 60 ppb are considered to be unimpaired.

Deep Lakes: Total phosphorus concentrations less than 40 ppb is considered to be unimpaired.

Shingle Creek Watershed District - Total Phosphorus Data





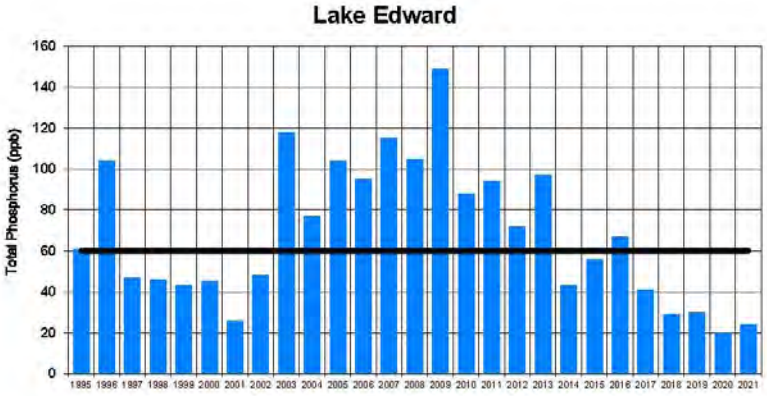


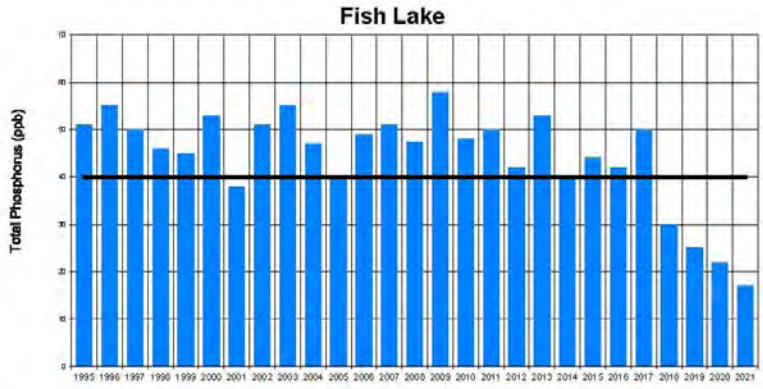
Legend: Total Phosphorus Criteria
(shown with line in above graphs)

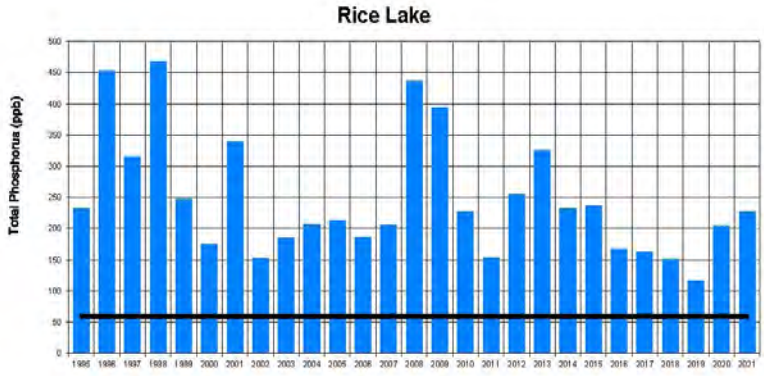
Shallow Lakes: Total phosphorus concentrations less than 60 ppb are considered to be unimpaired.

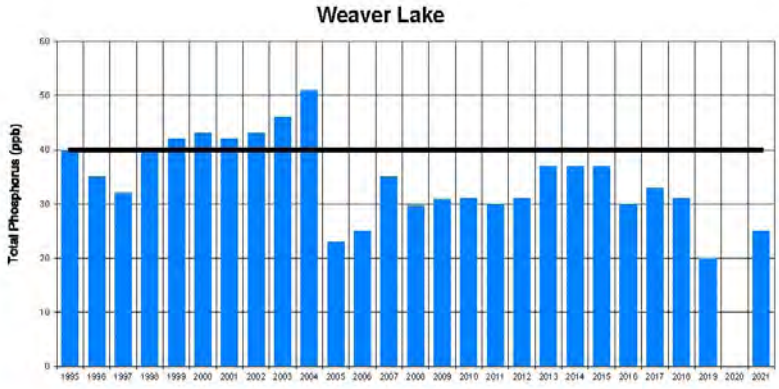
Deep Lakes: Total phosphorus concentrations less than 40 ppb is considered to be unimpaired.

Elm Creek Watershed District - Total Phosphorus Data









Legend: Total Phosphorus Criteria
(shown with line in above graphs)

Shallow Lakes: Total phosphorus concentrations less than 60 ppb are considered to be unimpaired.

Deep Lakes: Total phosphorus concentrations less than 40 ppb is considered to be unimpaired.

Appendix

2009 data.

Lakes	North Arbor			South Arbor			West Arbor			Cedar Island			Cook			Eagle			Edward			Fish			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																																	
week 1*																						3.6	61.7	32.0				2.5	102	19	9.3	46.5	8.49
week 2																																	
week 3																						9.3	55.9	9.61				2.5	164	110	14.8	35.6	4.85
week 4	11.0	17	<1	15.5	17	1.3	10.0	18	1.3	0.8	171	14.1	10.8	21	5.0	10.7	26	5.0	2.6	56	8.7				4.9	56	6.2	4.0 2.5	138	98			
June																																	
week 1																						7.0	70.1	17.9							9.4	37.6	6.74
week 2																												2.0					
week 3																						4.3	59.1	21.8				6.5			8.8	32.3	6.8
week 4	8.3	15	<1	11.8	14	<1	12.8	19	1.5	0.5	314	121	8.3	25	<1	7.0	33	2.9	4.1	80	7.7	3.7	54.6	14.7	3.5	103	3.7	2.5			7.1	24	4.25
July																																	
week 1																												3.0 2.5	338	91			
week 2																						3.4	65.7	13.7							8.5	19.5	2.44
week 3																												1.0	632	500			
week 4	15.9	12	<1	14.5	17	1.6	12.2	24	3.1	0.6	506	235	9.0	30	<1	4.5	50	19.9	1.2	183	186	3.6	87	10.2	1.8	102	56.1	2.0			7.7	31.6	3.52
August																																	
week 1																												1.5					
week 2																						5.2	46.9	15.0				1.5	750	370	8.0	33	3.31
week 3																																	
week 4	15.7	13	<1	15.9	14	1.7	9.8	24	7.1	0.4	351	189	12.1	16	<1	3.1	62	95.3	1.2	223	86.0	3.0	48.4	24.9	4.2	70	9.8	5.0 3.5	529	78	9.6	26.3	3.6
September																																	
week 1																												5.5	333	56			
week 2																						3.8	47	21.4				8.5			9.1	24	2.46
week 3	17.1	12	1.3	11.8	22	4.3	3.1	57	13.7	0.6	306	177	12.2	21	5.0	3.1	50	24.6	2.1	203	123				2.9	72	23.7	6.0	566	34	8.6	28.3	3.67
week 4																						3.7	40.9	20.1									
May-September Average																																	
	13.6	13.8	1.1	13.9	16.8	2.0	9.6	28.4	5.3	0.6	330	147	10.5	22.6	2.6	5.7	44.2	29.5	2.2	149	81.7	4.6	57.9	16.5	3.5	80.6	19.9	3.5	395	151	9.2	30.8	4.6

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

2010 data

Lakes	North Arbor			South Arbor			West Arbor			Cedar Island			Cook			Eagle			Edward			Fish			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																																	
week 1*																7.0	45	13.5				5.4	61	14.3							23.6	40	1.5
week 2																												5.9	76	6.1			
week 3	9.25	18		7	17		6.7	53		0.67	159	32	7.3	19		13.3	37	3.3	6.7	65		5.7	61	9.7	5.6	64	11.1	5.2	103	15	22.7	29	1.4
week 4																												7.2	116	22			
June																																	
week 1																11.3	48	4.1				9.6	39	4.7	4.8	65	19.2	2.3	92	140	16.6	21	2.9
week 2																																	
week 3																5.1	49	18.0				59	45	12.2	4.1	121	40.2	2.6	130	62	13.6	50	4.8
week 4	10.7	6	1.8	16.8	11	1.2	6.7	20	12.4	0.58	161	74.3	7.4	22	6.2	6.0	46	13.6	3.8	90	41.3	5.0	40	12.7	3.8	75	25.8				14.9	31	3.1
July																																	
week 1																																	
week 2																3.9	47	22.7				3.2	38	15.1	2.1	85	38.1	3.3	448	94	16.5	27	2.1
week 3																																	
week 4	14.4	5	1.2	16.5	7	2.4	9.6	16	4.8	0.9	161	87.8	8.2	12	3.6	3.2	51	35.3	1.9	94	41.3	3.5	34	12.9	3.4	68	20.6	3.3	480	86	9.5	28	4.5
August																																	
week 1																												1.6	233	110			
week 2																3.0	47	36.8				3.3	39	19.1	3.4	54	26.3				9.4	24	4.2
week 3																																	
week 4	17.2	7	1.31	14.7	13	3.7	7.6	47	6.8	0.67	154	70.3	7.4	23	2.4	3.0	53	24.3	2.2	114	77	3.7	51	20.8	3.0	98	35.6	1.6	354	21	6.1	27	8.9
September																																	
week 1																3.2	68	42.7							2.3	164	73.3	1.6	287	38	5.3	27	11.4
week 2																																	
week 3																												2.3	174	36			
week 4	17.5	11	2.4	12.4	22	10.4	4.8	45	18.2	0.7	81	72.1	6.8	15	1.2	4.2	58	16.0	3.7	80	70.5	3.3	74	18.8	7.6	93	9.3				5.9	42	14.1
May-September Average																																	
	13.8	9.4	1.7	13.5	14	4.4	7.9	36	10.5	0.7	143	67.3	7.4	18	3.4	5.9	50	20.9	3.65	88	57.5	4.9	48	14.0	3.9	89	28.8	3.4	227	57.3	13.1	31	5.4

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

2011 Data

Lakes	North Arbor			South Arbor			West Arbor			Cedar Island			Cook			Eagle			Edward			Fish			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																																	
week 1*																												3.3	52	5.9			
week 2	7.5	19	3.6	7.2	23	3.6	8.9	15	5.9	4.1	37	18	6.0	29	1.2	5.8	42	<1	4.2	64	19.7	5.3	78	26.6	2.9	61	4.5				6.2	33	8.9
week 3																												3.6	62	14			
week 4																						9.4	50	2.9							9.3	33	2.1
June																																	
week 1																						15.6	44	3.2				5.9	68	7.8	14.1	28	6.1
week 2																												4.3	113	40			
week 3										1.3	130	61.2				6.6	42	1.6				8.7	30	7.7	3.0	70	13.5				8.4	32	9.5
week 4	9.5	12	1.2	13.3	9	1.2	11.5	17	1.8										3.1	59	13.4												
July																																	
week 1																						6.5	43	12.0				4.3	106	6.6	4.9	32	6.9
week 2																																	
week 3																						4.7	49	20.2							7.3	30	6.5
week 4	15.8			14.2			5.5			1.7			6.3			6.0			2.3						3.8			4.3	184	29			
August																																	
week 1		11	<1		11	1.1		20	8.7		48	42.2		18	1.8		25	7.4		63	36.8	4.3	45	25.3		36	6.0				7.4	34	9.5
week 2																												4.3	176	35			
week 3																						1.9	49	44.5							5.2	26	11.7
week 4	17.5	12	15.3	18.1	16	1.2	5.5	34	11.6	1.0	111	65	5.1	58	3.1	4.6	30	14.5	1.5	115	66.5	3.1	61	17.7	4.9	51	28.9	1.3	311	110	5.1	27.6	8.6
September																																	
week 1																												3.3	261	53			
week 2																						3.0	49	21.9							9.3	24.3	<5
week 3																																	
week 4	13.1	7	<1	9.2	12	5.8	4.1	47	31.8	0.9	142	120	5.3	24	5.8	3.8	52	102	1.4	170	60.9	5.4	55	21.9	3.6	42	27.6	2.6	194	56	9.8	33.3	8.2
May-September Average																																	
	12.7	12	4.4	12.4	14	2.6	7.1	27	12	1.8	94	61.3	5.7	32	3	5.4	38	25.3	2.5	94	39.5	6.2	50	19	3.6	52	14.1	3.7	153	35.7	7.9	30	7.6

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

2012 Data

Lakes	North Arbor			South Arbor			West Arbor			Cedar Island			Cook			Eagle			Edward			Fish			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																																	
week 1*																10.8	32	8.8				12.7	32	8.4									
week 2																13.5	25	6.5													13.6	30.5	6.4
week 3																						10.9	31	6.9									
week 4	7.3	10.8	23	14.8	11	1	7.1	28	12.4	0.8	58	34.4	4.8	30	3.8	9.2	29	13.5	5.4	67	19.2	8.7	31	15.3	4.7	32	6.1	3.6	75	23.5	8.5	44	17.1
June																																	
week 1																																	
week 2																5.3	37	16.6				5.3	35	18.2							6.4	33	14.9
week 3																																	
week 4	14.4	13	1.8	18.1	16	1.4	7.7	20	3.8	0.9	124	59.8	6.1	38	2.7	5.9	37	15.3	4.2	56	12.7	4.9	58	16.5	4.1	28	4.8	3.1	246	87.5	8.5	29	7.2
July																																	
week 1																																	
week 2																3.8	35	31.6				6.1	34	15							6.9	25	8
week 3																																	
week 4	14.2	10	2.1	16.1	10	2.9	3.7	26	14.4	0.9	122	70.1	4.3	48	5.3	3.0	42	35	2.9	57	36.9	1.6	42	62	3.2	32	19.2	2.4	511	74.4	4.4	29	17.3
August																																	
week 1																2.5	50	41				2.1	41	41							6.4	32	13
week 2																																	
week 3																2.6	53	41				2.1	48	35							6.0	32	11.8
week 4	18.4	10	2.2	7.1	16	12.5	6.7	27	8.9	0.9	123	37.6	4.6	36	2.2				1.7	77	65.7				2.6	33	25.8	1.5	302	40.4			
September																																	
week 1																3.1	65	29.2				3.1	50	23.6							7.7	35	6.8
week 2																																	
week 3																3.0	58	32				3.1	59	39							8.2	29	8.3
week 4	18.2	12	1.6	8.8	24	8.7	7.9	29	7.7	0.9	221	90.3	5.4	16	1.6				2.6	104	68.5				3.1	49	19.2	1.9	148	38.3			
May-September Average																																	
	14.5	11.2	6.1	13.0	15.4	9.4	6.6	26	9.4	0.88	130	58.4	5.0	33.6	3.1	5.7	42	25	3.4	72.2	40.6	5.5	42	26	3.54	34.8	15.0	2.5	256	52.8	7.6	31	10.6

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

2013 Data

Lakes	North Arbor			South Arbor			West Arbor			Cedar Island			Cook			Eagle			Edward			Fish			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																																	
week 1*																						3.6	125	66				3.4	87	55	4.8	30	17
week 2																																	
week 3	5.4	18	2.0	6.7	42	2.9	4.9	21	1.9	1.2	119	28.4	6.0	13	2.5	5.6	31	2.9	3.1	89	45.7	4.3	66	22	3.6	38	12.0	3.1	102	22	6.9	53	<5
week 4																																	
June																																	
week 1																						12.8	46	<5				4.4	73	18	23.1	35	<5
week 2																																	
week 3																						12.5	48	8				5.9	106	24	8.5	33	15
week 4	16.9	12	1.2	13.6	13	1.4	11.1	19	3.7	1.3	149	24.7	4.5	52	4.1	9.2	35	2.2	3.8	73	23.3				3.0	117	20.1						
July																																	
week 1																						3.8	46	34				2.3	247	110	3.0	49	51
week 2																																	
week 3	14.2	10	1.8	14.8	10	1.9	7.4	18	4.2	0.8	153	63.5	6.4	28	2.7	5.3	24	10.8	4.2	78	36.2	4.3	45	26	4.0	54	19.1	1.3	410	309	4.3	38	24
week 4																						4.9	50	28				1.7	344	179	6.1	41	11
August																																	
week 1																																	
week 2																						1.9	41	37				1.3	487	208	6.1	29	<10
week 3																																	
week 4	16.4	7	1.3	17.2	7	>1	5.4	25	6.1	0.7	160	75.3	5.4	44	<1	4.2	24	8.6	2.9	70	37.6	1.8	39	40	3.7	73	8.7	1.1	572	203	5.9	37	10
September																																	
week 1																																	
week 2																						1.7	35	50				1.3	572	79	5.8	30	16
week 3																																	
week 4	23.6	8	<1	8.9	17	6.1	9.2	36	12.7	0.9	108	52.2	5.5	20	<1	4.2	34	7.7	2.1	173	108	2.2	39	43	5.1	46	7.7	1.8	584	47	4.9	32	17
May-September Average																																	
	15.3	11	1.5	12.2	18	2.7	7.6	24	5.7	1.0	138	48.8	5.6	31	2.3	5.7	30	6.4	3.2	97	50.2	4.9	53	32.6	3.9	66	13.5	2.5	326	114	7.2	37	16.5

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

Arbor Lakes profile data for temp, diss oxygen, pH, conductivity, oxidation/reduction potential (ORP) for 2013.

South Arbor Lake

Depth (m)	June 24					July 18					August 29					September 24				
	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)
0	24.4	9.6	8.7	0.99	366	27.5	9.2	9.5	0.92	341	27.1	8.3	9.6	0.95	309	18.6	8.6	9.3	1.03	349
1	23.7	9.1	8.8	0.99	365	27.4	9.2	9.5	0.92	338	27	8.2	9.7	0.95	307	18.5	8.6	9.3	1.03	354
2	23.4	8.9	8.8	0.99	364	26.3	9.5	9.5	0.92	339	27	8.1	9.7	0.95	306	18.4	8.6	9.3	1.03	358
3	21.5	9	8.8	1.06	366	25.2	8.5	9.3	0.93	341	25	8.3	9.7	0.95	304	18.2	8.6	9.3	1.03	362
4	16.45	9	8.5	1.13	377	21.4	8.5	87	1.12	355	23.6	7	8.9	1.01	289	18.1	8.6	9.3	1.04	368
5	12.3	6.2	8.2	1.22	388	15.4	8.2	8.4	1.21	369	22.1	5.1	8.6	1.09	226	18	7.8	9.1	1.04	375
6	9.5	5	8	1.29	393	11.8	5.8	8.1	1.29	376	20.3	4.2	8.5	1.1	208	16.8	3.1	8.5	1.28	398
7	7.9	2.2	7.9	1.35	352	10.2	4.6	8.1	1.33	365						13.9	0.8	8.3	1.36	177

North Arbor Lake

Depth (m)	June 24					July 18					August 29					September 24				
	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)
0	23.8	9	8.7	1.035	372	27.1	8.2	9.1	0.989	380	26.9	8.1	9.2	1.03	290	18.7	8.9	9.3	1.1	284
1	23.5	8.7	8.8	1.048	371	27	8.1	9	0.99	374	26.7	8.1	9.2	1.03	291	18.5	9	9.3	1.1	291
2	234	8.5	8.77	1.05	370	26.2	8.2	9.1	0.995	372	26.7	8	9.2	1.02	291	18.4	9	9.3	1.1	299
3	22	8.6	8.7	1.086	372	25.3	8.5	9.1	1	369	25.8	8.3	9.2	1.04	292	18.4	9	9.3	1.1	305
4	18.4	8.8	8.6	1.165	375	23.9	8.5	9	1.05	369	25	8.6	9.2	1.04	294	18.4	9	9.3	1.1	309
5	13.89	10.7	8.5	1.2	381	18.6	12.6	8.9	1.178	376	22.5	9.8	9	1.12	302	18.3	8.9	9.3	1.1	314
6	10.2	12.43	8.4	1.256	385	12.8	15.9	8.8	1.26	382	16.8	15	8.8	1.275	313	18.3	9	9.3	1.1	316
7	7.72	12.7	8.3	1.29	391	9.4	14.2	8.5	1.3	389	12.4	12.5	8.6	1.31	323	14.8	9.5	8.7	1.3	335
8	6.3	8.2	8.1	1.317	396	7.4	9	8.3	1.32	396	9.5	6.5	8.5	1.35	308	11.3	5.9	8.5	1.35	342
9	5.6	4	7.9	1.343	399	6.4	5.2	8.1	1.35	399	8.3	3.6	8.3	1.35	289	9.6	3.2	8.4	1.35	344
10	5.4	1	7.9	1.368	298	6	1.4	8	1.35	389						8.4	1.8	8.4	1.34	345
11																7.3	0.7	8.3	1.35	95

West Arbor Lake

Depth (m)	June 24					July 18					August 29					September 24				
	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (µs)	ORP (mV)
0	24.8	9.3	9.1	0.347	377	28	8.7	9.5	0.334	354	28	9	9.6	0.367	312	19.7	8.8	9.4	0.39	261
1	24	9.1	9.2	0.347	374	27.9	8.6	9.5	0.334	351	27.7	8.3	9.6	0.367	310	19.6	8	9.4	0.39	268
2	23.4	8.8	9.1	0.347	373	26.4	8.8	9.5	0.334	350	26.9	8.2	9.6	0.362	309	19.2	8	9.4	0.39	272
3	19.5	8.5	8.8	0.408	381	25.5	8.7	9.5	0.337	351	25.8	6.3	9.4	0.38	313	19	7.7	9.3	0.39	276
4	16	8.3	8.6	0.434	390	21.7	8.6	8.9	0.458	365	24.9	3.2	8.8	0.94	324	18.9	7.6	9.3	0.39	279
5	13.8	4.3	8.3	0.492	399	19	5.3	8.5	0.495	376	23.7	1	8.5	0.413	101	18.8	7.3	9.3	0.39	281
6	12.7	2	8.1	0.51	357	16.3	1.3	8.3	0.499	338	21.6	0.3	8.2	0.475	26	18.8	7.3	9.3	0.39	284
7						12.5	0.4	8	0.55	64						18.7	7	9.2	0.39	176

2014 Data

Lakes	North Arbor			South Arbor			West Arbor			Cedar Island			Cook			Eagle			Edward			Fish			Norwood			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																																				
week 1*																						4.9	69	56							2.6	102	16	3.9	62	47
week 2																																				
week 3																						5.6	43	22							5.6	59	14	6.6	33	17
week 4	19.6	11	<1	11.2	11	2.1	8.3	13	1.1	1.3	74	16	6.5	33	3.2	5.8	31	2.1	4.4	40	7.5				14.5	11	2.1	5.1	38	2.1						
June																																				
week 1																						13.3	46	0.79							8.2	122	6.5	21.7	37	2.0
week 2																																				
week 3																						11.3	37	19							6.7	226	31	8.2	41	23
week 4	16.3	7	<1	13.4	7	2.1	15.6	7	1.1	2.0	83	19	6.0	64	<1	9.2	49	5.3	3.7	67	21	6.7	37	16	14.8	14	1.1	5.1	51	6.4	5.9	276	35	3.6	43	33
July																																				
week 1																																				
week 2																						8.0	35	12										6.9	40	21
week 3	17.4	5	<1	15.1	9	<1	11.7	16	1.7	2.7	106	15	6.0	32	<1	6.1	20	2.6	7.8	25	<1				10.8	13	2.6	3.2	55	8.5	3.4	297	49			
week 4																						5.0	40	23							2.5	278	143	4.4	38	28
August																																				
week 1																																				
week 2																						8.0	30	15							1.8	242	126	5.1	30	16
week 3	19.6	7	1.7	14.7	12	1.7	5.8	25	10	1.2	103	58	6.3	28	<1	6.2	23	3.4	3.4	42	5.1				17.1	9	1.7	4.8	55	9.4						
week 4																						5.9	29	26							7.5	407	137	4.4	40	16
September																																				
week 1																																				
week 2																						5.1	26	20							1.0	316	62	5.2	18	14
week 3																																				
week 4	17.7	11	<1	10.2	18	5.0	4.1	58	19	1.5	74	26	5.6	23	3.6	3.6	45	21	4.3	42	2.1	4.2	43	30	17.1	16	3.6	4.1	40	11.4	1.5	227	43	5.6	25	13
May-September Average																																				
	18.1	8	1.1	12.9	11	2.4	9.1	24	6.6	1.7	88	26.8	6.1	36	2.0	6.2	34	6.9	4.7	43	7.3	7.1	40	21.8	14.9	13	2.2	4.5	48	7.6	4.2	232	60	6.9	37	20.9

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

Arbor Lakes and Norwood Lake profile data for temp, diss oxygen, pH, conductivity, oxidation/reduction potential (ORP) for 2014.

West Arbor Lake

Depth (m)	May 29		June 26					July 17					August 21		September 29				
	Temp (C)	DO (mg/l)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)	Temp (C)	DO (mg/l)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)
0	22.6	15.1	23.9	9.9	7.4	0.331	277	24.0	8.5	8.7	0.36	328	25.2	9.1	20.0	9.6	9.1	0.36	247
1	22.5	14.5	23.8	10.5	7.4	0.339	282	23.3	8.5				25.1	8.8	20.0	9.7	9.0	0.36	256
2	20.6	14.3	23.4	10.8	7.5	0.335	285	22.8	8.3				25.0	8.6	19.6	9.8	9.0	0.37	266
3	16.5	13.0	21.7	9.3	7.1	0.366	297	22.5	7.8				24.9	6.2	18.4	7.9	8.4	0.37	282
4	14.6	4.1	19.2	8.3	6.8	0.411	309	22.2	7.3	8.5	0.37	346	24.6	2.2	18.3	6.0	8.3	0.37	282
5	12.0	3.0	16.6	5.2	6.4	0.45	317	21.3	3.4	8.1	0.42	60	23.6	0.8	18.2	6.1	8.3	0.37	282
6	11.0	3.1	15.5	1.7	6.2	0.45	315	19.2	1.8				21.8	0.5	18.1	6.3	8.3	0.37	286
7	9.7	2.7	12.5	1.45	6.2	0.47	173	15.3	0.6	7.7	0.49		18.8	0.4	17.6	3.0	7.9	0.39	275
8	9.0	2.4											16.7	0.3	16.9	1.1	7.7	0.40	38

North Arbor Lake

Depth (m)	May 29		June 26					July 17					August 29		September 29				
	Temp (C)	DO (mg/l)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)	Temp (C)	DO (mg/l)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)
0	21.4	11.7	23.3	10.3				22.1	9.1	8.5	1.06		24.5	8.6	19.1	9.0	8.5	1.10	308
1	21.4	10.8	23.2	10.4				22.3	9.4	8.5			24.5	8.5	19.1	9.0	8.5	1.10	315
2	20.7	9.1	22.9	10.5				22.1	9.3				24.5	8.4	19.1	8.9	8.5	1.10	321
3	16.4	9.1	22.6	10.3				21.9	9.3	8.5	1.06	431	24.4	8.3	19.1	9.0	8.5	1.10	330
4	14.6	10.5	20.7	10.5				21.6	9.3	8.5			24.4	8.3	18.1	9.3	8.5	1.10	338
5	13.1	10.6	16.7	10.2				20.1	9.1	8.4	1.1	441	23.4	9.1	18.0	9.5	8.5	1.10	343
6	9.8	11.1	12.3	8.7				14.6	13.9	8.3	1.2	450	17.6	12.8	17.8	9.6	8.5	1.11	348
7	7.9	10.9	9.39	7.0				12.2	14.0	8.2			14.1	12.9	17.2	9.0	8.3	1.12	355
8	7.0	11.5	8.2	6.3				10.1	11.2	8.1	1.3	463	10.9	10.0	14.3	7.6	7.9	1.27	372
9	6.6	10.1	7.6	6.0				8.5	9.9				9.8	6.0	11.8	4.4	7.7	1.31	376
10	6.4	8.9	6.7	5.4				7.8	6.0	7.8			9.0	2.5	10.5	1.9	7.6	1.32	376
11	6.2	8.1	6.4	5.0				7.1	2.1	7.6			8.2	1.4	9.2	0.8	7.5	1.33	171
12	6.1	6.0	6.1	3.9				6.7	0.9	7.5	1.3	57	7.5	0.8	8.1	0.6	7.4	1.38	60
13	5.9	5.0													7.6	0.4	7.3	1.41	23

South Arbor Lake

Depth (m)	May 29		June 26					July 17					August 21		September 29				
	Temp (C)	DO (mg/l)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)	Temp (C)	DO (mg/l)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)
0	21.9	11.3	23.6	12.0	7.2	0.887	396	23.7	10.6				24.7	8.4	19.4	8.8	8.3	0.91	353
1	21.9	10.9	23.6	12.0	7.3	0.887	390	23.0	10.6	9.1	0.87	459	24.7	8.3	19.4	8.6	8.3	0.91	356
2	21.5	9.4	23.6	12.0	7.3	0.890	388	22.3	10.0	9.0			24.7	8.2	19.3	8.6	8.3	0.91	360
3	16.8	9.1	21.3	12.2	7.3	0.97	384	21.8	9.6				24.6	8.0	18.4	8.6	8.3	0.91	365
4	14.2	8.5	17.13	11.0	6.8	1.10	395	21.0	9.5	8.8		473	22.6	7.7	18.0	8.0	8.2	0.91	371
5	12.1	9.3	13.6	8.0	6.4	1.14	401	16.8	8.5				19.4	4.8	17.5	7.4	8.0	0.92	378
6	9.7	9.6	10.3	4.6	6.2	1.14	405	12.2	4.0	8.0	1.16	517	185.0	1.4	16.3	2.2	7.6	1.01	362
7	8.2	7.0	9.0	2.6	6.1	1.16	288	9.7	1.5	7.8	1.20	521	12.1	0.8	13.2	0.7	7.4	1.20	190
8	7.6	4.4	8.2	2.4	6.1	1.17	271	8.9	1.0				11.4	0.7	11.2	0.5	7.4	1.20	127
9	7.6	3.4	6.9	2.0	6.0	1.17	211												

Norwood Lake

Depth (m)	May 29		June 26					July 17					August 21		September 29				
	Temp (C)	DO (mg/l)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)	Temp (C)	DO (mg/l)	Temp (C)	DO (mg/l)	pH	Cond (mS/cm)	ORP (mV)
0	22.5	12.3	24.4	9.52	7.1	0.433	301	24.1	9.0	8.8			24.9	8.3	19.6	9.2	8.8	0.45	241
1	22.3	10.5	24.3	10.0	7.1	0.433	303	23.1	9.1				24.9	8.2	19.6	8.8	8.8	0.44	260
2	20.6	6.6	24.3	8.6	7.1	0.435	304	22.7	9.0				24.9	8.2	19.6	8.9	8.8	0.45	264
3	16.3	5.7	22.9	8.8	7.0	0.458	310	22.5	8.9	8.9			24.9	8.2	19.5	8.9	8.8	0.45	267
4	15.1	5.5	20.2	7.0	6.8	0.490	318	22.1	8.6				23.9	7.0	19.2	9.0	8.8	0.45	271
5	14.3	6.0	16.4	6.2	6.6	0.556	322	19.7	6.6	8.3	0.56	366	18.5	4.7	17.4	7.9	8.6	0.45	281
6	12.0	6.3	13.6	6.0	6.6	0.566	324	13.2	6.7				14.3	2.5	16.8	6.0	8.3	0.46	286
7	10.0	6.3	10.8	5.3	6.5	0.255	328	11.5	6.0	8.1	0.58		12.4	1.3	14.3	3.2	8.0	0.56	290
8	9.0	6.3	9.8	5.1	6.5	0.264	331	10.0	4.6	8.0			10.3	0.8	14.5	1.2	7.9	0.57	282
9	8.6	7.0	9.1	4.7	6.3	0.572	335	9.3	1.8	7.9	0.58	325	10.1	0.5	10.5	0.7	7.9	0.59	71
10	8.3	6.1																	
11	8.3	5.0																	

2015

Lakes	North Arbor			South Arbor			West Arbor			Cedar Island			Cook			Eagle			Edward			Fish			Norwood			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																																				
week 1*																						11.1	40.9	12										13.2	40.4	13.4
week 2																																				
week 3																						15.2	49.6	6.4										4.8	40.8	26.8
week 4	15.5	13	2.1	13.0	17	2.1	7.0	18	7.1	1.0	140	88	5.6b	25	<1	6.8	28	1.4	5.9	30	<1				15+	19	2.1	6.1	77	7.1						
June																																				
week 1																						9.8	48.8	15.9							3.0	228	77.1	3.2	52.3	43.5
week 2																																				
week 3																						7.1	38.8	14.7							2.1	236	140	5.3	56.1	19.4
week 4	15+	14	1.4	12.2	14	1.4	4.7	34	2.8	0.9	236	71	6 b	41	<1	4.8	29	<1	4.1	57	<1	3.0	42.3	28.9	15+	18	1.4	3.1	73	21	1.9	227	145	8.8	31.5	7.8
July																																				
week 1																																				
week 2																						5.1	39.5	17.4							2.5	350	115	6.7	31.8	10.9
week 3																																				
week 4	14.7	7	2.0	11.9	17	<1	4.1	34	10.7	0.8	117	24	3.9	42	8.5	4.4	27	9.3	4.2	68	29	2.2	36.5	51.3	17.1	13	2.1	4.9	56	20	2.3	214	61.4	4.8	29.1	9.2
August																																				
week 1																																				
week 2																						3.0	38.5	32.7							2.0	255	77.5	7.3	26.9	6.8
week 3																																				
week 4	14.8	14	<1	11.6	23	5.0	4.6	99	4.3	1.3	86	69	6.2	27	2.1	4.2	64	26	5.9	62	2.1	2.6	54.6	34.1	17.2	19	3.6	3.4	66	17	1.9	235	63.6	6.7	33.8	8.2
September																																				
week 1																																				
week 2																						4.8	46.4	23.1							2.4	171	43.2	6.5	30.8	8.5
week 3	15.2	12	2.1	11.4	21	6.4	4.4	99	46	1.1	87	75	6.1	32	2.8	3.2	56	15	4.1	75	5.7	3.3	49.1	35.3	17.8	2+	1.4	3.9	61	4	1.6	205	72.5	6.7	36.5	9.1
week 4																																				
May-September Average																																				
	15.0	12	1.7	12.0	18	3.2	5.0	57	14	1.0	133	65	5.6	33	3.1	4.7	41	10	4.8	58	7.7	6.1	44	25	16.4	14	2.1	4.3	67	14	2.2	236	88	6.7	37	15

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

2016. Numbers in parentheses are bottom samples.

Lakes	North Arbor			South Arbor			West Arbor			Cedar Island			Cook			Eagle			Edward			Fish			Norwood			Pike			Rice			Weaver		
	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																																				
week 1*																						13.2	48	9.7							3.1	83	14	20	32	1.2
week 2																																				
week 3																						16.6	38	8.3							2.7	102	7.4	25.6	26	1.1
week 4	14.4	9 (30)	2.8	11.1	16 (25)	5.0	13.3	13 (21)	<1	1.4	93	87	6.2	67	2.1	12.4	41	3.6	5.7	74	15	7.6	36	21	20.4	15 (17)	1.4	6.5	45	6.4	3.0	111	68	17.5	32	2.4
June																																				
week 1																																				
week 2																						6.5	34	17								110	39	8.8	29	6.2
week 3																																				
week 4	17.2	14 (44)	3.6	13.6	19 (32)	3.6	10.3	27 (47)	<1	1.2	240	58	6.0	40	<1	6.6	31	6.4	6.9	53	2.1	5.9	36	16	13.4	25 (25)	3.6	3.8	82	5	2.0	155	57	6.7	28	6.4
July																																				
week 1																																				
week 2																						6.0	48	17							1.6	253	75	8.5	27	9.9
week 3																																				
week 4	14.7	13 (28)	<1	13.8	16	<1	7.4	24 (58)	5.7		195	140		35	4.3		49	15.7		123	43	3.9	38	25	7.5	21 (24)	10.7		64	15	1.6	274	81	8.0	45	8.8
August																																				
week 1																																				
week 2																						2.0	31	34							3.5	201	51	6.4	22	11
week 3																																				
week 4	17.9	<20 (54)	3.6	9.6	20 (52)	5.7	4.0	52 (47)	15	1.4	137	42		28	2.1	2.4	50	25		44	3.6	3.6	39	23	4.8	29 (137)	13.5	4.4	54	12	1.9	241	65	6.0	33	15
September																																				
week 1																															2.4	174	49	5.6	33	16
week 2																						4.1	49	20												
week 3																						3.1	70	41							2.1	147	39	7.2	26	14
week 4	9.8	19 (17)	2.8	5.6	30 (27)	<1	3.7	86 (83)	27.1	1.2	101	14	2.8	54	1.4	5.2	66	4.3	5.8	39	2.1				9.5	48	2.1	4.5	71	7						
May-September Average																																				
	14.8	15	2.8	10.7	20	3.3	7.7	40	10	1.3	153	68	5.0	45	2.2	6.7	47	11	6.1	67	13.1	6.6	42	21	11.1	28	6.3	4.8	63	9	2.4	168	50	10.9	30	8

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

2017

Lakes	Cedar Island				Cook				Eagle			Edward				Fish			Pike			Rice			Weaver		
	SD	TP	Chl	Chlor	SD	TP	Chl	Chlor	SD	TP	Chl	SD	TP	Chl	Chlor	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																											
week 1*									12.7	35	4.2					8.1	64	18.1	5.1	54	14.9	3.2	115	22.1	10.0	48	5.1
week 2																											
week 3									14.1	18	3.5					2.8	72	36.0	8.2	34	10.4	4.7	39	11.6	12.1	32	7.5
week 4	1.2	144	43.4	74	5.1	33	3.6	31	11.6	15	5.0	6.5	51	3.6	36.7	11.2	55	9.8	8.9	53	14.6	3.6	108	35.7	11.8	28	
June																											
week 1																											
week 2									12.8	27	7.3					9.2	46	11.6	8.4	70.9	27.1	4.4	90	34.7	7.2	26	12.0
week 3																											
week 4	1.3	157	52.9	75	5.2	37	4.3	30.1	8.2	30	9.0	4.3	61	27.1	35.7	7.8	45	16.5	4.9	143	52.5	4.3	131	48.2	9.4	32	10.7
July																											
week 1																											
week 2									10.3	33	7.0					6.9	50	10.7	2.6	113	111.6	2.7	210	118.4	4.8	32	17.1
week 3																											
week 4	1.4	124	45.3	79	4.1	42	6.4	31.0	7.8	32	12	6.8	35	2.1	37.7	6.9	42	11.3	4.3	76	41.9	1.5	243	123.4	4.4	55	22.8
August																											
week 1									5.2	36	28.0					4.1	32	18.6	4.7	76	39.0	1.3	286	92.4	6.6	29	9.9
week 2																											
week 3									4.4	47	32.7					4.3	37	22.5	5.0	74	23.0	2.1	230	49.1	5.1	28	21.7
week 4	1.4	77	12.8	65	5.1	26	2.1	29.1				5.7	34	1.1	31.9												
September																											
week 1									4.3	59	33.8					11.5	52	9.7	3.3	91	37.0	2.8	189	38.1	6.8	30	16.1
week 2																											
week 3									3.7	75	46.8					4.2	58	37.3	3.2	116	72.1	2.6	136	40.5	6.9	26	14.5
week 4	1.6	54	19.2	69	4.3	26	2.1	30.7				6.1	22	<1	35.8												
May-September Average																											
	1.4	111	35	73	4.8	33	4	30.4	8.6	37	17	5.9	41	7	35.6	7.0	50	18	5.3	82	40	3.0	162	56	7.7	33	14

Lakes	North Arbor					South Arbor					West Arbor					Norwood				
	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond
May																				
week 1*																				
week 2																				
week 3																				
week 4	9.6	19	6.4	238		9.2	26	6.4	238		11.7	18	3.6	37.6		16.1	16	2.1	61.4	
June																				
week 1																				
week 2																				
week 3																				
week 4	11.1	17 (30)	4.3	234		13.5	15 (52)	2.8	236		7.9	20 (23)	5.0	37.7		12.1	21 (25)	2.8	57.5	
July																				
week 1																				
week 2																				
week 3																				
week 4	20.2	13	1.4	235		13.4	16	2.1	236		10.8	20	5.0	38.3		12.8	13	3.4	64.5	
August																				
week 1																				
week 2																				
week 3																				
week 4	14.8	16	2.1	213		12.2	16	2.8	224		3.8	54	24.6	37.2		23.8	9	2.1	59.4	
September																				
week 1																				
week 2																				
week 3																				
week 4	20.1	9	<1	224	800	14.2	20	2.8	243	900	2.2	53	27.1	39.8	350	21.8	9	<1	61.7	325
May-September Average																				
	15.2	15	3	229	800	13	19	3	235	900	7	33	13	38	350	17	14	2	61	325

2018

Lakes	Cedar Island				Cook				Eagle			Edward				Fish			Pike			Rice			Weaver		
	SD	TP	Chl	Chlor	SD	TP	Chl	Chlor	SD	TP	Chl	SD	TP	Chl	Chlor	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																											
week 1*																4.6	39	19.5				3.7	79	34.4	4.3	44.1	8.1
week 2																											
week 3																14.4	37	2.2				3.1	93	20.8	13.3	55	2.4
week 4	2.3	105	7.7	91	5.9	37	7.9	28	10.3	22	3.8	6.4	28	1.6	40.9				7.4	55	2.3						
June																											
week 1																12.3	21	9.0				4.6	106	11.2	13.3	26	8.9
week 2																											
week 3																9.7	25	5.4				2.8	99	61.4	8.0	37	6.6
week 4	1.1	130	63.5		5.8	30	4.6		9.8	24	4.6	7	17	4.7					4.6	50	12.8						
July																											
week 1																7.7	29	12.6				2.9	143	56.4	3.9	32	21.4
week 2																											
week 3																9.3	29	9.3				3.6	130	38.2	5.9	27	12.2
week 4	1.2	141	51.1		6.5	33	3.5		9.8	24	5	7.1	32	3.4		5.1	24	17.2	4.6	69	8.1	3.3	181	29.2	4.8	29	16.0
August																											
week 1																											
week 2																3.9	26	24.6				2.5	263	70.5	3.1	25	21.6
week 3																											
week 4	1.2	143	53.4		6.2	26	2.3		5.9	28	8.2	6.5	46	1.6		4.5	29	29.0	5.8	52	4.6	2.3	211	54.6	6.3	23	14.0
September																											
week 1																											
week 2																4.6	26	18.9				2.2	175	42.4	9.7	21	7.0
week 3																											
week 4	1.7	94	189		6.7	19	2.3		4.7	61	14.4	6.3	23	2.2		6.3	40	15.3	3.4	109	11.2	2.3	179	76.0	10.7	26	10.8
May-September Average																											
	1.5	123	73	91	6.2	29	4	28.0	8.1	32	7	6.7	29	3	40.9	7.5	30	15	5.2	67	8	3.0	151	45	7.6	31	12

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

Lakes	North Arbor					South Arbor					West Arbor					Norwood				
	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond
May																				
week 1*																				
week 2																				
week 3																				
week 4	17.1	20	1.5	192	800	12.2	14	<1	187	800	13.9	185	3.1	32.8	330	22.9	11	<1	51.6	370
June																				
week 1																				
week 2																				
week 3																				
week 4	13.7	11	3.5		900	14.1	12	2.3		900	12.7	13	2.3		315	12.9	13	3.5		470
July																				
week 1																				
week 2																				
week 3																				
week 4	14.7	9	2.3		900	14.1	13	1.2		900	6.9	24	12.6		310	16.4	14	1.1		460
August																				
week 1																				
week 2																				
week 3																				
week 4	17.2	9	2.8		980	14.9	14	3.4		1050	6.7	37	19.2		397	16.4	12	2.2		471
September																				
week 1																				
week 2																				
week 3																				
week 4	13.4	16	1.1		990	12.9	9	2.3		1088	7.4	25	7.4		390	16.4	51	19.2		501
May-September Average																				
	15.2	13	2	192	914	14	12	2	187	948	10	57	9	32.8	348	17	20	5	51.6	454

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

2019

Lakes	Cedar Island					Cook					Eagle					Edward					Fish			Pike					Rice			Weaver		
	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	SD	TP	Chl
May																																		
week 1*																					11.0	23	<10						3.9	65	13	13.0	29	<10
week 2																																		
week 3	2.4	63	5.3	147	570	6.5	20	2.7	37.0	356	8.7	28	8.0	160	730	6.7	23	3.6	47.0	350	13.4	37	10	6.8	65	21.4	285	1080	2.7	80	24	27.5	25	<10
week 4																																		
June																																		
week 1																					6.6	29	18						5.4	71	16	21.8	19	<10
week 2																																		
week 3																					7.5	17	<10						3.8	93	26	12.6	16	<10
week 4	1.7	127	16		546	6.4	32	1.8		308	5.3	28	1.8		691	6.4	41	<1		293				4.8	61	<1		985						
July																																		
week 1																					7.9	32	13						3.4	92	77	10.8	17	<10
week 2																																		
week 3																					4.5	23	22						3.1	100	48	11.6	18	<10
week 4	1.8	106	33.8	130	510	5.7	57	6.2	32.9	330	3.9	39	21	147	720	5.7	31	2.7	41.9	280	3.1	27	39	4.4	62	8.9	192.0	800	2.5	188	44	7.9	16	<10
August																																		
week 1																																		
week 2																					3.9	24	25						1.5	158	101	7.1	15	<10
week 3	1.8	172	232	121	494	5.4	28	7.1	31.8	276	3.5	39	18.7	144	680	5.9	28	5.3	40.6	297				4.9	56	9.8	177.0	819						
week 4																					4.2	25	31						1.8	141	70	9.7	19	25.9
September																																		
week 1																																		
week 2																					6.7	19	<13						1.7	148	52	8.9	27	<13
week 3																																		
week 4	1.7	83	25.6		450	4.7	38	1.8		343	5.1	62	6.7		673	6.1	25	2.7		303	6.5	19	20	4.4	104	1.8		742	3.9	139	66	10.8	22	<10
May-September Average																																		
	1.9	110	63	133	514	5.7	35	4	34	323	5.3	39	11	150	699	6.2	30	3	43	305	6.8	25	19	5.1	70	9	218	885	3.1	116	49	12.9	20	12

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

Lakes	North Arbor					South Arbor					West Arbor					Norwood				
	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond
May																				
week 1*																				
week 2																				
week 3	29.2	10	1.8	267	1040	12.6	25	7.1	272	1056	8.7	13	4.4	41.7	367	13.1	15	2.7	98.1	535
week 4																				
June																				
week 1																				
week 2																				
week 3																				
week 4	16.4	10	1.8		1062	15.8	14	1.8		1048	9.3	14	5.3		384	18.5	19	1.8		517
July																				
week 1																				
week 2																				
week 3																				
week 4	23.9	8	1.8	258	1030	17.7	13	1.8	262	1020	12.4	20	4.4	39.1	350	12.8	23	5.3	83.8	470
August																				
week 1																				
week 2																				
week 3	26.1	10	2.7	265	1064	23.2	13	2.7	267	1014	8.1	25	15.1	39.0	329	19.7	19	5.3	81.0	473
week 4																				
September																				
week 1																				
week 2																				
week 3																				
week 4	24.1	11	1.8		1090	9.6	21	4.0		1197	5.7	37	9.8		342	14.4	18	2.7		433
May-September Average																				
	24	10	2	263	1057	16	17	3	267	1067	8.8	22	8	40	354	16	19	4	88	486

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

2020

Lakes	Cedar Island					Cook					Eagle			Edward					Fish			Pike			Rice			Weaver		
	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl	SD	TP	Chl
May																														
week 1*																			5.9	24	18				4.6	35	7.9	8.2	34	19
week 2																						6.6	41	4.67						
week 3	3.7	63	10.7	105	446	5.4	51	16	39.8	439				8.1	20	1	39.9	358	8.5	31	3.8				5.9	54	6.9	7.5	38	17
week 4											10.2	22	5.34									8.5	40	11.2						
June																														
week 1																			18.4	16	2.3				4.3	49	34	4.3	30	25
week 2											13.1	22	2.67																	
week 3	2.5	328	3.6		517	6.1	51	1.8		376				6.5	24	3.6		283	7.5	20	12				4.3	76	23	4.6	40	25
week 4											7.5	30	10.7						10.2	22	7.2	8.5	63	4.7	3.6	93	51	5.6	29	10
July																														
week 1																														
week 2											6.6	30	13.4						9.8	24	5.3	6.9	65	22.1	1.6	206	205	5.9	14	6.9
week 3											4.9	33	19.8									7.9	60	19.2						
week 4	1.6	105	36.5		470	4.2	208*	11		370				8.5	17	3.6		254	10.8	21	6.7				1.6	324	221	4.6	20	14
August																														
week 1																														
week 2																			8.2	22	12				2.3	560	74	6.2	20	13
week 3											3.5	36	32									7.5	32	9.9						
week 4	2.2	99	25.8		466	5.9	130	1.8		337				6.1	21	1.8		349	6.2	25	15				2.0	377	131	6.2	30	13
September																														
week 1											3.5	48	41.1									7.5	49	23.5						
week 2																			5.2	14	16				1.3	279	118	6.6	16	13
week 3	2.3	51	24.9		538	5.5	42	5.3		355	3.5	55	38.4	5.5	20	<1		343												
week 4																			8.9	21	6.3				1.6	204	57	7.9	23	10
May-September Average																														
	2.5	129	20	105	487	5.4	96	7	40	375	6.6	35	20	6.9	20	2	40	317	9.1	22	10	7.6	50	14	3.0	205	84	6.1	27	15

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4

Lakes	North Arbor					South Arbor					West Arbor					Norwood				
	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond	SD	TP	Chl	Chlor	Cond
May																				
week 1*																				
week 2																				
week 3	14.4	13	8	290	1185	13.6	20	5.3	330	1335	13	17	8	39	488	17.1	17	2.7	82.7	485
week 4																				
June																				
week 1																				
week 2																				
week 3	22.1	11	<1		1190	11.6	15	2.7		1298	12.9	16	1.8		436	15	17	2.7		441
week 4																				
July																				
week 1																				
week 2																				
week 3																				
week 4	20.6	63	1.8		1158	18.2	10	<1		1131	9.4	24	8		350	16.8	11	3.6		435
August																				
week 1																				
week 2																				
week 3																				
week 4	23.2	10	1.8		1136	16.4	14	1.8		1295	5.2	30	17.8		385	14.8	15	1.8		502
September																				
week 1																				
week 2																				
week 3	20.6	<2	<1		1135	9.3	<2	8.9		1387	3.8	33	18.7		402	14.4	<2	<1		
week 4																				
May-September Average																				
	20	20	3	290	1161	14	12	4	330	1289	8.9	24	11	39	412	16	12	2	83	466

* Weeks: days 1-7 = week 1; days 8-14 = week 2; days 15-21 = week 3; days 22+ = week 4