

C

APPENDIX C

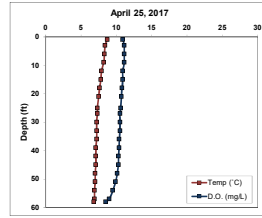
Water Quality Data

Plum Lake

Date: 4/25/2017
Time: 8:30
Weather: 80% clouds, Bmgh winds, 55F
Entry: EEH

Max Depth: 59.1
PLMB Depth (ft): 3.0
PLMB Depth (ft): 37.0
Secchi Depth (ft): 7.7

Depth (ft)	Temp (°C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	8.2	10.9		
3	8.4	11.1		
6	8.3	11.1		
9	8.2	11.1		
12	7.9	10.9		
15	7.8	10.9		
18	7.6	10.9		
21	7.5	10.7		
25	7.3	10.6		
27	7.3	10.4		
30	7.2	10.3		
33	7.2	10.3		
36	7.2	10.3		
39	7.1	10.4		
42	7.1	10.3		
45	7.1	10.3		
48	7.0	10.1		
51	7.0	9.9		
54	6.9	9.8		
57	6.9	9.0		
59	6.8	8.5		



Parameter	PLMS	PLMB
Total P (µg/L)	22.60	22.60
Dissolved P (µg/L)	4.10	2.00
Chl-a (µg/L)	3.13	NA
TPN (µg/L)	NA	NA
NO ₃ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	384.00	311.00
Lab Cond. (µS/cm)	91.00	81.00
Lab pH	7.50	7.45
Alkalinity (mg/L CaCO ₃)	39.60	39.50
Total Susp. Solids (mg/L)	2.90	ND
Calcium (mg/L)	11.10	NA
Magnesium (mg/L)	3.10	NA
Hardness (mg/L)	40.70	NA
Color (SU)	10.00	NA
Turbidity (NTU)	NA	NA

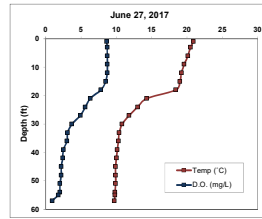
Data collected by JMB (Ontario)

Plum Lake

Date: 6/27/2017
Time: 14:00
Weather:
Entry: EEH

Max Depth: 57.8
PLMB Depth (ft): 3.0
PLMB Depth (ft): 55.0
Secchi Depth (ft): 10.3

Depth (ft)	Temp (°C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	20.0	8.8		
3	20.0	8.7		
6	20.1	8.7		
9	19.9	8.7		
12	19.9	8.5		
15	19.0	8.5		
18	18.4	8.4		
21	14.3	6.3		
24	13.0	6.0		
27	11.8	4.9		
30	10.8	3.7		
33	10.4	3.1		
36	10.3	3.0		
39	10.1	2.8		
42	10.0	2.4		
45	9.9	2.2		
48	9.9	2.2		
51	9.8	2.0		
54	9.8	2.0		
55	9.8	1.8		
57	9.2	0.8		



Parameter	PLMS	PLMB
Total P (µg/L)	15.30	17.00
Dissolved P (µg/L)	NA	NA
Chl-a (µg/L)	3.75	NA
TPN (µg/L)	NA	NA
NO ₃ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO ₃)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by TAH and JMB (Ontario)

Water Quality Data

Parameter	Surface		Bottom	
	Count	Mean	Count	Mean
Secchi Depth (feet)	6	9.1	NA	NA
Total P (µg/L)	6	20.6	6	51.3
Dissolved P (µg/L)	3	3.3	3	6.9
Chl a (µg/L)	5	4.2	0	NA
TKN (µg/L)	0	NA	0	NA
NO ₃ +NO ₂ -N (µg/L)	0	NA	0	NA
NH ₃ -N (µg/L)	0	NA	0	NA
Total N (µg/L)	3	407.7	3	539.0
Lab Cond. (µS/cm)	2	88.7	2	94.9
Alkal (mg/l CaCO ₃)	2	38.8	2	41.8
Total Susp. Solids (mg/l)	2	2.2	3	4.6
Calcium (mg/L)	2	11.1	0	NA
Magnesium (mg/L)	2	3.2	0	NA
Hardness (mg/L)	2	40.9	0	NA
Color (SU)	2	20.0	0	NA
Turbidity (NTU)	0	NA	0	NA

Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
1989	33.8	43.3	46.8
1990			38.7
1991			
1992			38.9
1993			38.5
1994	41.7	44.5	35.4
1995	38.7	43.5	39.5
1997			36.4
1998			39.6
1999			37.7
2000			37.9
2001			36.1
2002			
2003			37.2
2004			39.7
2005			37.3
2006			37.1
2007	34.1	35.6	37.7
2008			
2009			
2010	39.6	39.4	38.0
2011	41.1	42.6	39.9
2012	39.2	41.1	37.2
2013	45.5	41.2	37.2
2014	39.9	42.4	39.9
2015	44.9	42.0	40.7
2016			
2017	45.0	47.1	44.1
All Years (Weighted)	40.7	42.7	38.1
DLDL Median	49.4	49.7	46.2
NLF Ecoregion Median	48.1	47.5	45.7

Year	Secchi (feet)				Chlorophyll-a (µg/L)				Total Phosphorus (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer	
	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
1989	1	8.2	1	8.2	3	3.7	3	3.7	0	7.8	0	7.8
1990	4	14.4	4	14.4	0	0	0	0	0	0.0	0	0.0
1991	0	0	0	0	0	0	0	0	0	0.0	0	0.0
1992	0	0	0	0	0	0	0	0	0	0.0	0	0.0
1993	10	13.7	8	14.2	0	0	0	0	0	0.0	0	0.0
1994	20	13.8	11	14.6	2	4.1	2	4.1	3	16.0	2	13.5
1995	22	15.2	10	18.2	0	0	0	0	0	0.0	0	0.0
1996	20	12.5	14	13.6	4	3.7	4	3.7	4	11.0	4	11.0
1997	11	15.5	7	16.8	0	0	0	0	0	0.0	0	0.0
1998	20	13.3	9	13.5	0	0	0	0	0	0.0	0	0.0
1999	16	15.7	12	15.4	0	0	0	0	0	0.0	0	0.0
2000	13	14.0	8	15.2	0	0	0	0	0	0.0	0	0.0
2001	18	16.5	10	17.3	0	0	0	0	0	0.0	0	0.0
2002	0	0	0	0	0	0	0	0	0	0.0	0	0.0
2003	3	15.6	1	16.0	0	0	0	0	0	0.0	0	0.0
2004	9	13.6	6	13.5	0	0	0	0	0	0.0	0	0.0
2005	7	15.9	5	15.9	0	0	0	0	0	0.0	0	0.0
2006	7	15.8	5	16.1	0	0	0	0	0	0.0	0	0.0
2007	1	15.4	1	15.4	1	1.7	1	1.7	1	8.0	1	8.0
2008	0	0	0	0	0	0	0	0	0	0.0	0	0.0
2009	0	0	0	0	0	0	0	0	0	0.0	0	0.0
2010	8	15.1	6	15.1	3	2.5	3	2.5	3	11.7	3	11.7
2011	5	13.2	5	13.2	3	3.4	3	3.4	4	14.8	3	13.0
2012	4	16.0	4	16.0	4	2.9	4	2.9	4	14.0	3	11.3
2013	3	16.0	3	16.0	3	3.0	3	3.0	4	17.3	3	17.5
2014	2	13.3	2	13.3	2	3.3	2	3.3	2	11.9	2	11.9
2015	4	12.5	4	12.5	3	3.2	3	3.2	4	16.8	4	16.8
2016	0	0	0	0	0	0	0	0	0	0.0	0	0.0
2017	5	9.7	3	9.9	5	4.2	3	5.4	5	21.4	3	17.0
All Years (Weighted)		14.4		14.9		3.4		3.4		14.1		12.6
DLDL Median				8.5				7.0				23.0
NLF Ecoregion Median				8.9				5.6				21.0

Water Quality Data

Parameter	Surface		Bottom	
	Count	Mean	Count	Mean
Secchi Depth (feet)	0	NA	NA	NA
Total P (µg/L)	3	31.8	0	NA
Dissolved P (µg/L)	0	NA	0	NA
Chl a (µg/L)	3	8.2	0	NA
TKN (µg/L)	0	NA	0	NA
NO ₃ +NO ₂ -N (µg/L)	0	NA	0	NA
NH ₄ -N (µg/L)	0	NA	0	NA
Total N (µg/L)	3	485.3	0	NA
Lab Cond. (µS/cm)	0	NA	0	NA
Alkal (mg/l CaCO ₃)	0	NA	0	NA
Total Susp. Solids (mg/l)	0	NA	0	NA
Calcium (mg/L)	0	NA	0	NA
Magnesium (mg/L)	0	NA	0	NA
Hardness (mg/L)	0	NA	0	NA
Color (SU)	0	NA	0	NA
Turbidity (NTU)	0	NA	0	NA

Trophic State Index (TSI)

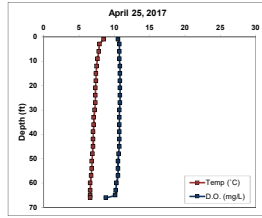
Year	TP	Chl-a	Secchi
2017	54.0	51.2	
All Years (Weighted)	54.0	51.2	
SHDL Median	52.7	50.4	52.4
NLF Ecoregion Median	48.1	47.5	45.7

Year	Secchi (feet)				Chlorophyll-a (µg/L)				Total Phosphorus (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer	
	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
2017	0		0		3	8.2	3	8.2	3	31.8	3.0	31.8
All Years (Weighted)		#VALUE!		#VALUE!		8.2		8.2		31.8		31.8
SHDL Median				8.9				7.5				29.0
NLF Ecoregion Median				8.9				5.6				21.0

Star Lake

Date: 4/25/2017
Time: 9:55
Weather: 50% clouds, 7mph winds, 60F
Entry: EEH
Max Depth: 66.9
STRB Depth (ft): 3.0
STRB Depth (ft): 63.0
Secchi Depth (ft): 12.3

Depth (ft)	Temp (C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	8.2	10.3		
3	7.8	10.7		
6	7.6	10.7		
9	7.6	10.7		
12	7.5	10.8		
15	7.4	10.8		
18	7.4	10.8		
21	7.3	10.8		
24	7.3	10.8		
27	7.3	10.8		
30	7.2	10.7		
33	7.1	10.7		
36	7.1	10.7		
39	7.0	10.7		
42	7.0	10.7		
45	7.0	10.7		
48	6.9	10.6		
51	6.8	10.5		
54	6.8	10.5		
57	6.7	10.4		
60	6.6	10.3		
63	6.6	10.2		
65	6.6	10.1		
66	6.6	8.8		



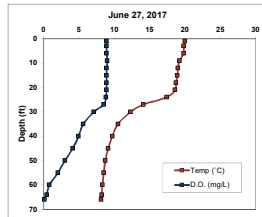
Parameter	STRB	STRB
Total P (µg/L)	21.00	21.00
Dissolved P (µg/L)	2.60	2.60
Chloro (µg/L)	1.58	NA
TPN (µg/L)	NA	NA
NO ₃ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	348.00	348.00
Lab Cond. (µS/cm)	77.40	76.40
Lab pH	7.45	7.35
Alkalinity (mg/L CaCO ₃)	31.30	31.00
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	8.63	NA
Magnesium (mg/L)	2.57	NA
Hardness (mg/L)	32.10	NA
Color (SU)	15.00	NA
Turbidity (NTU)	NA	NA

Data collected by JMB (Criteria)

Star Lake

Date: 6/27/2017
Time: 10:45
Weather: 50% clouds 68F, light breeze
Entry: EEH
Max Depth: 66.9
STRB Depth (ft): 3.0
STRB Depth (ft): 64.0
Secchi Depth (ft): 20.2

Depth (ft)	Temp (C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	20	8.9		
3	19.8	8.8		
6	19.8	8.8		
9	19.4	8.9		
12	19.4	8.9		
15	18.9	8.9		
18	18.7	8.8		
21	18.8	8.9		
24	17.2	8.8		
27	14.1	8.9		
30	12.3	7.1		
33	10.9	5.0		
40	9.7	4.0		
45	9.3	4.1		
50	8.7	3.0		
55	8.3	2.0		
60	8.3	0.8		
64	8.2	0.4		
66	8.3	0.1		



Parameter	STRB	STRB
Total P (µg/L)	17.00	16.10
Dissolved P (µg/L)	NA	NA
Chloro (µg/L)	0.65	NA
TPN (µg/L)	NA	NA
NO ₃ -N (µg/L)	NA	NA
NH ₄ -N (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO ₃)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

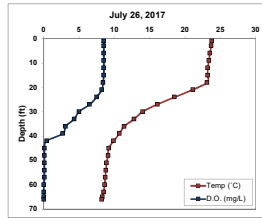
Data collected by TAH and JMB (Criteria)

Star Lake

Date: 7/26/2017
Time: 14:00
Weather: 80% clouds, light breeze, 77F
Entry: EEH

Max Depth: 66.7
STRS Depth (ft): 3.0
STRB Depth (ft): 63.0
Secchi Depth (ft): 14.6

Depth (ft)	Temp (C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	22.9	8.9		
3	22.1	8.4		
6	22.0	8.5		
9	22.4	8.4		
12	22.2	8.5		
15	22.2	8.8		
18	22.1	8.4		
21	21.1	8.2		
24	18.5	7.4		
27	16.3	6.5		
30	14.0	5.8		
33	12.8	4.3		
36	10.9	3.1		
39	10.5	2.7		
42	9.8	0.4		
45	9.2	0.1		
48	8.3	0.1		
51	8.2	0.1		
54	8.8	0.1		
57	8.3	0.0		
60	8.3	0.0		
63	8.3	0.0		
66	8.2	0.0		
69				
72				



Parameter	STRS	STRB
Total P (µg/L)	12.00	105.00
Dissolved P (µg/L)	2.36	31.70
Chl.a (µg/L)	1.65	NA
TN (µg/L)	NA	NA
NH ₄ ⁺ + NO ₂ ⁻ + NO ₃ ⁻ (µg/L)	NA	NA
NH ₄ ⁺ (µg/L)	NA	NA
Total N (µg/L)	271.00	744.00
Lab Cond. (µS/cm)	72.00	84.30
Lab pH	7.74	7.00
Alkalinity (mg/L CaCO ₃)	11.20	36.00
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	8.90	NA
Magnesium (mg/L)	2.54	NA
Hardness (mg/L)	11.70	NA
Color (SU)	10.00	NA
Turbidity (NTU)	NA	NA

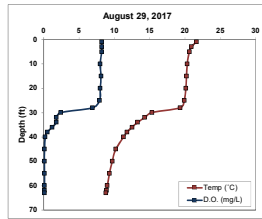
Data collected by JMB and AMS (Criteria)

Star Lake

Date: 8/29/2017
Time: 11:30
Weather: 80% wind, 50% clouds
Entry: EEH

Max Depth: 65.6
STRS Depth (ft): 3.0
STRB Depth (ft): 62.0
Secchi Depth (ft): 30.1

Depth (ft)	Temp (C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	21.5	8.2		
3	20.5	8.2		
6	20.0	8.2		
9	20.3	8.8		
12	20.0	8.1		
15	20.0	8.1		
18	19.8	7.9		
21	19.3	6.8		
24	15.3	2.4		
27	14.2	1.8		
30	13.3	1.8		
33	12.5	1.2		
36	11.8	0.4		
39	11.8	0.2		
42	11.3	0.2		
45	10.2	0.1		
48	9.7	0.1		
51	9.2	0.1		
54	9.2	0.1		
57	8.8	0.1		
60	8.8	0.1		
63	8.8	0.1		
66				
69				
72				



Parameter	STRS	STRB
Total P (µg/L)	7.01	222.00
Dissolved P (µg/L)	NA	NA
Chl.a (µg/L)	0.58	NA
TN (µg/L)	NA	NA
NH ₄ ⁺ + NO ₂ ⁻ + NO ₃ ⁻ (µg/L)	NA	NA
NH ₄ ⁺ (µg/L)	NA	NA
Total N (µg/L)	NA	NA
Lab Cond. (µS/cm)	NA	NA
Lab pH	NA	NA
Alkalinity (mg/L CaCO ₃)	NA	NA
Total Susp. Solids (mg/L)	NA	NA
Calcium (mg/L)	NA	NA
Magnesium (mg/L)	NA	NA
Hardness (mg/L)	NA	NA
Color (SU)	NA	NA
Turbidity (NTU)	NA	NA

Data collected by JMB & AMS (Criteria)

Water Quality Data

Parameter	Surface		Bottom	
	Count	Mean	Count	Mean
Secchi Depth (feet)	6	16.2	NA	NA
Total P (µg/L)	6	14.1	6	121.6
Dissolved P (µg/L)	3	2.9	3	12.7
Chl a (µg/L)	5	2.2	0	NA
TKN (µg/L)	0	NA	0	NA
NO ₃ +NO ₂ -N (µg/L)	0	NA	0	NA
NH ₄ -N (µg/L)	0	NA	0	NA
Total N (µg/L)	3	335.3	3	656.0
Lab Cond. (µS/cm)	2	75.2	2	89.3
Alkal (mg/l CaCO ₃)	2	31.3	2	33.8
Total Susp. Solids (mg/l)	2	ND	2	3.7
Calcium (mg/L)	2	8.6	0	NA
Magnesium (mg/L)	2	2.6	0	NA
Hardness (mg/L)	2	31.9	0	NA
Color (SU)	2	12.5	0	NA
Turbidity (NTU)	0	NA	0	NA

Trophic State Index (TSI)

Year	TP	Chl-a	Secchi
1979		38.7	36.3
1989	30.0	39.6	
1993			41.0
1994			41.2
1995			42.2
1996			41.9
1997			38.7
1998			43.1
1999			43.2
2000			43.9
2001			43.1
2002			44.7
2017	38.5	31.8	32.8
All Years (Weighted)	34.3	36.3	41.2
DLDL Median	49.4	49.7	46.2
NLF Ecoregion Median	48.1	47.5	45.7

Year	Secchi (feet)				Chlorophyll- <i>a</i> (µg/L)				Total Phosphorus (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer	
	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
1979	1	17.0	1	17.0	1	2.3	1	2.3				
1989					2	2.5	2	2.5	4	6.0	4.0	6.0
1993	13	12.2	8	12.3								
1994	8	11.9	5	12.1								
1995	5	11.6	4	11.3								
1996	8	11.6	5	11.5								
1997	5	14.4	5	14.4								
1998	5	10.4	4	10.6								
1999	10	10.8	5	10.5								
2000	7	9.9	6	10.0								
2001	8	10.0	4	10.6								
2002	5	10.0	3	9.5								
2017	5	17.8	3	21.7	5	2.2	3	1.1	5	14.4	3.0	10.8
All Years (Weighted)		11.8		12.1		2.3		1.8		10.7		8.1
DLDL Median				6.5				7.0				23.0
NLF Ecoregion Median				8.9				5.6				21.0

Water Quality Data				
Parameter	Surface		Bottom	
	Count	Mean	Count	Mean
Secchi Depth (feet)	4	2.3	NA	NA
Total P (ug/L)	3	53.8	0	NA
Chlorophyll P (ug/L)	0	NA	0	NA
Chl-a (ug/L)	3	32.1	0	NA
TSS (ug/L)	0	NA	0	NA
NO ₃ -N (ug/L)	0	NA	0	NA
NO ₂ -N (ug/L)	0	NA	0	NA
Total N (ug/L)	3	752.7	0	NA
Lab Conc. (ug/L)	0	NA	0	NA
Phos (ug/L-Calc)	0	NA	0	NA
Total Susp. Solids (mg/l)	0	NA	0	NA
Cadmium (mg/L)	0	NA	0	NA
Magnesium (mg/L)	0	NA	0	NA
Iron (mg/L)	0	NA	0	NA
Color (PCU)	0	NA	0	NA
Conductivity (uS/cm)	0	NA	0	NA

Trophic State Index (TSI)			
Year	TP	Chl-a	Secchi
1979	41.1	41.2	
2007	68.0	61.2	73.2
2008			
2009			
2010			
2011			
2012			
2013			
2014			
2015			
2016	61.6	64.6	64.7
2017			
All Years (Weighted) 95% Median	61.0	62.3	66.4
MLP Ecoregion Median	48.1	47.5	45.7

Year	Secchi (feet)			Chlorophyll-a (ug/L)			Total Phosphorus (ug/L)		
	Growing Season Count	Summer Mean	Summer Count	Growing Season Count	Summer Mean	Summer Count	Growing Season Count	Summer Mean	Summer Count
1979	1	1.3	1	1	5.4	1	13.0	1.0	13.0
2007	1	1.3	1	1	27.8	1	84.0	1.0	84.0
2008	0	0	0	0	0	0	0	0.0	0
2009	0	0	0	0	0	0	0	0.0	0
2010	0	0	0	0	0	0	0	0.0	0
2011	0	0	0	0	0	0	0	0.0	0
2012	0	0	0	0	0	0	0	0.0	0
2013	0	0	0	0	0	0	0	0.0	0
2014	0	0	0	0	0	0	0	0.0	0
2015	0	0	0	0	0	0	0	0.0	0
2016	4	2.2	3	3	32.1	3	53.8	3.0	53.8
All Years (Weighted) 95% Median	2.0	2.1	2	25.9	25.9	3	51.7	51.7	28.0
MLP Ecoregion Median		8.9			7.5			28.0	21.0