Marcel

Marcel Overview

Volunteer monitoring began at Lake Marcel in 2000 and continued through 2004. The data indicate that this rural lake is relatively high in primary productivity (eutrophic to mesotrophic) with fair to good water quality.

Lake Marcel has no public access boat launch, but has a history of aquatic weed management, including stocking with grass carp. Residents should keep an eye on aquatic plants growing nearshore to catch early infestations of noxious weeds.

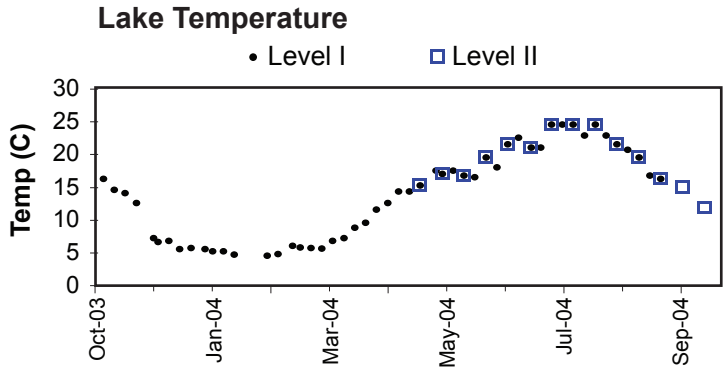
Physical Parameters

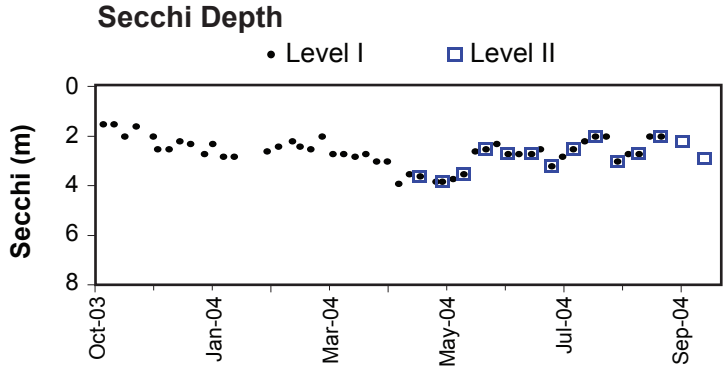
Secchi transparency ranged from 1.5 to 3.9 m through the year. The summer average was 2.6 m, which placed it in the lower part of the mid range for small lakes monitored in 2004. Annual water temperatures ranged from 4.5 to 24.5 degrees Celsius. The summer maximum placed it in the lower range for high temperatures recorded among the group.

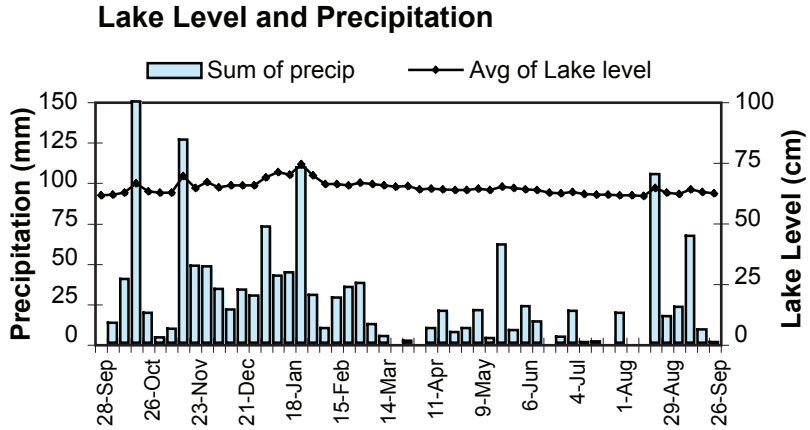
Excellent precipitation and water level records were kept over the year, showing that water levels remained steady through the year with relatively small responses to storms and without major seasonal fluctuations.

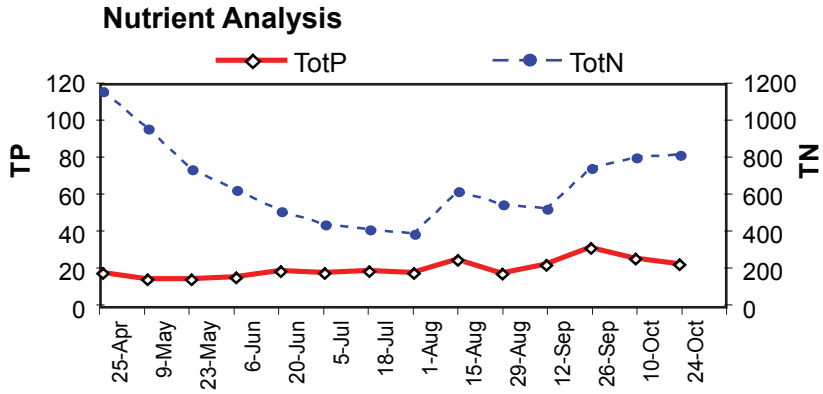
Nutrient Analysis and TSI Ratings

Total phosphorus and total nitrogen changed in proportion to each other as nitrogen decreased through spring and then rose slowly through autumn. The N:P ratio ranged from 23 to 70, averaging 37 which suggested poor conditions through much of the season for nuisance bluegreen growth.









Profile data indicate thermal stratification did not develop, and there was little phosphorus build-up in the deep water through the summer. The high phosphorus value at 3.5 m in May was coupled with high chlorophyll indicating an algal bloom near the bottom. In late August, the chlorophyll data indicated that algae were approximately equal in concentration through the water column.

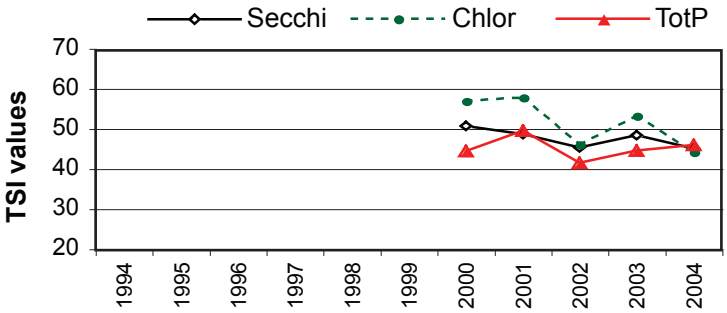
The 2004 TSI indicators were in the mid range of mesotrophy, with all the indicators close together, unlike all previous years of monitoring, but most similar to 2002.

Chlorophyll Concentrations and Algae

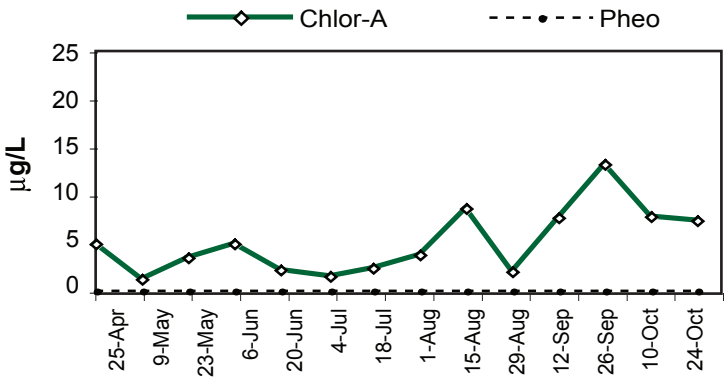
Chlorophyll remained relatively low until August, when it began climbing to a peak in late September. The autumn bloom was dominated by a combination of the euglenophyte *Trachelomonas*, and unidentified chrysophyte species, and the cryptophyte *Cryptomonas*. Other common algae included the diatom *Asterionella*, and the colonial bluegreen *Woronichinia.*

Date	Secchi	depth-m	degC	Chlor-A	TP µg/L	TN µg/L
5/23/04	3.5	1	16.7	3.52	13.4	737
		3.5	15.7	535.0	143.0	1990
8/29/04	3.0	1	21.5	2.10	16.6	546
		3	20.5	2.20	25.1	554

TSI Ratings



Chlorophyll a Concentrations (ug/L)



Common Algae

	Group
Cryptomonas sp	Cryptophyta
unidentified single cells	Chrysophyta
Asterionella formosa	Bacillariophyta

Marcel

2004 Level I Data

Daily Data Summary

Week of	Sum of precip. (mm)	# of days	Avg of lake level (cm)	# of days
28-Sep-03	0.0	4	61.0	4
5-Oct-03	12.2	7	61.1	7
12-Oct-03	39.6	7	62.0	7
19-Oct-03	164.6	7	65.8	7
26-Oct-03	18.5	7	62.6	7
2-Nov-03	3.3	7	61.8	7
9-Nov-03	8.8	7	61.9	7
16-Nov-03	125.8	7	68.9	7
23-Nov-03	47.8	7	63.9	7
30-Nov-03	47.1	7	66.4	7
7-Dec-03	33.2	6	64.0	6
14-Dec-03	20.7	7	64.9	7
21-Dec-03	32.7	6	65.0	6
28-Dec-03	29.0	7	64.8	7
4-Jan-04	72.1	6	68.3	3
11-Jan-04	41.6	6	70.5	7
18-Jan-04	43.7	7	69.4	7
25-Jan-04	108.3	7	73.8	7
1-Feb-04	29.4	7	69.1	7
8-Feb-04	9.1	7	65.4	7
15-Feb-04	28.0	7	65.5	7
22-Feb-04	34.5	7	64.8	7
29-Feb-04	36.8	7	66.1	7
7-Mar-04	11.4	7	65.6	7
14-Mar-04	4.1	7	64.8	7
21-Mar-04	0.0	7	64.5	7
28-Mar-04	1.3	7	64.8	4
4-Apr-04	0.0	7	63.3	3
11-Apr-04	9.1	7	63.4	7
18-Apr-04	19.6	7	63.4	7
25-Apr-04	6.6	7	63.1	7
2-May-04	8.9	7	63.0	7
9-May-04	20.3	8	63.4	7
16-May-04	2.8	6	63.1	7
23-May-04	60.7	7	64.4	7
30-May-04	7.7	7	63.9	7
6-Jun-04	22.4	7	63.4	7
13-Jun-04	13.2	7	62.9	7
20-Jun-04	0.1	7	62.0	7
27-Jun-04	3.6	7	61.7	7
4-Jul-04	19.7	7	62.2	7
11-Jul-04	0.5	7	61.4	7
18-Jul-04	0.8	7	61.0	7
25-Jul-04	0.0	7	61.2	7
1-Aug-04	18.3	6	60.9	6
8-Aug-04	0.0	7	60.9	7
15-Aug-04	0.0	7	60.6	7
22-Aug-04	104.4	7	63.8	7
29-Aug-04	16.6	7	61.8	7
5-Sep-04	22.3	7	61.5	7
12-Sep-04	66.0	7	63.2	7
19-Sep-04	8.3	7	62.1	7
26-Sep-04	0.6	5	61.7	5
Min	0.0		60.6	
Max	164.6		73.8	
Total	1436.1			

Weekly Data Summary

Sample date	Sample time	Secchi (m)	Temp (°C)	Algae* (Shore)	Algae* (at site)	Goose Count*
5-Oct-03	15:05	1.5	16.2	P2, C3	P2, C3	0
12-Oct-03	15:28	1.5	14.5	P2, C3	P2, C3	0
19-Oct-03	15:05	2.0	14.0	P2, C2	P2, C2	0
26-Oct-03	15:25	1.6	12.5	P2	P2	0
6-Nov-03	14:35	2.0	7.2	P1	P1	0
9-Nov-03	14:45	2.5	6.6	P2, C2	P2, C2	0
16-Nov-03	15:15	2.5	6.8	P2	P2	0
23-Nov-03	13:50	2.2	5.5	P2	P2	0
30-Nov-03	13:50	2.3	5.7	P2	P2	0
9-Dec-03	13:25	2.7	5.5	P1	P1	0
14-Dec-03	14:20	2.3	5.2	P1	P1	0
21-Dec-03	14:40	2.8	5.2	P1	P1	0
28-Dec-03	14:40	2.8	4.7	P1	P1	0
4-Jan-04						
11-Jan-04						
18-Jan-04	15:55	2.6	4.5	P1	P1	0
25-Jan-04	15:40	2.4	4.8	P1	P1	0
3-Feb-04	12:55	2.2	6.0	P1	P1	0
8-Feb-04	15:00	2.4	5.8	P1	P1	0
15-Feb-04	13:35	2.5	5.7	P1	P1	0
22-Feb-04	14:20	2.0	5.6	P1	P1	0
29-Feb-04	15:35	2.7	6.8	P1	P1	0
7-Mar-04	13:45	2.7	7.2	P1	P1	0
14-Mar-04	16:00	2.8	8.8	P1	P1	0
21-Mar-04	14:20	2.7	9.5	P1	P1	0
28-Mar-04	14:36	3.0	11.5	P1	P1	
4-Apr-04	15:51	3.0	12.5	P1	P1	0
11-Apr-04	14:30	3.9	14.3	P1	P1	0
18-Apr-04	16:40	3.5	14.3	P1	P1	0
25-Apr-04	15:30	3.6	15.2	P1	P1	4
5-May-04	15:35	3.8	17.5	P1	P1	2
9-May-04	14:25	3.8	17.0	P1	P1	2
16-May-04	15:25	3.7	17.5	P1	P1	2
23-May-04	14:25	3.5	16.7	P1	P1	3
30-May-04	14:40	2.6	16.5	P1	P1	3
6-Jun-04	14:45	2.5	19.5	P1	P1	20
13-Jun-04	14:25	2.3	18.0	P2	P2	6
20-Jun-04	13:53	2.7	21.5	P1	P1	3
27-Jun-04	14:23	2.7	22.5	P1	P1	0
5-Jul-04	14:35	2.7	21.0	P1	P1	3
11-Jul-04	15:00	2.5	21.0	P3	P3	3
18-Jul-04	15:10	3.2	24.5	P3	P3	3
25-Jul-04	15:00	2.8	24.5	P3	P3	
1-Aug-04	14:10	2.5	24.5	P2	P2	0
8-Aug-04	14:10	2.2	22.8	P2	P2	0
15-Aug-04	15:05	2.0	24.5	P3	P3	0
22-Aug-04	15:00	2.0	22.8	P2	P2	30
29-Aug-04	14:50	3.0	21.5	P3	P3	
5-Sep-04	15:20	2.7	20.6	P2	P2	0
12-Sep-04	15:27	2.7	19.5	P2	P2	0
19-Sep-04	15:30	2.0	16.7	P2	P2	0
26-Sep-04	14:50	2.0	16.2	P1	P1	0
	Min	2.0	4.5			
	Max	3.9	24.5			

* See introduction for discussion of algae assessment and goose count methods.

2004 Level II Data

Date (2004)	Temp (°C)	Secchi (m)	Chl-*a* (µg/l)	TP (µg/l)	TN (µg/l)	Algae Obsv.	N:P	Calculated TSI Secc	Calculated TSI chl-a	Calculated TSI TP
25-Apr	15.2	3.6	4.97	16.9	1160	1	69	41.5	46.3	44.9
9-May	17.0	3.8	1.30	13.6	955	1	70	40.7	33.1	41.8
23-May	16.7	3.5	3.52	13.4	737	1	55	41.9	42.9	41.6
6-Jun	19.5	2.5	4.97	14.5	625	1	43	46.8	46.3	42.7
20-Jun	21.5	2.7	2.24	18.0	508	1	28	45.7	38.5	45.8
5-Jul	21.0	2.7	1.60	17.0	438	1	26	45.7	35.2	45.0
18-Jul	24.5	3.2	2.40	17.8	410	2	23	43.2	39.2	45.7
1-Aug	24.5	2.5	3.84	16.8	385	2	23	46.8	43.8	44.9
15-Aug	24.5	2.0	8.65	24.1	617	3	26	50.0	51.7	50.1
29-Aug	21.5	3.0	2.08	16.6	546	3	33	44.1	37.8	44.7
12-Sep	19.5	2.7	7.69	21.2	522	1	25	45.7	50.6	48.2
26-Sep	16.2	2.0	13.30	30.4	744	1	24	50.0	56.0	53.4
10-Oct	15.0	2.2	7.85	24.9	800	2	32	48.6	50.8	50.5
24-Oct	11.8	2.9	7.41	21.8	814	0	37	44.6	50.2	48.6

	Temp (°C)	Secchi (m)	Chl-*a* (µg/l)	TP (µg/l)	TN (µg/l)	Algae	N:P	Calculated TSI Secc	Calculated TSI chl-a	Calculated TSI TP
Mean	19.2	2.8	5.1	19.1	661.5	1.4	37	45.4	44.4	46.3
Median	19.5	2.7	4.4	17.4	621.0	1	30	45.7	45.0	45.4
Min	11.8	2.0	1.3	13.4	385.0	0	23	40.7	33.1	41.6
Max	24.5	3.8	13.3	30.4	1160.0	3	70	50.0	56.0	53.4
Count	14	14	14	14	14	14	14	14	14	14

TSI Average = 45.4