Joy

Joy Overview

Volunteer monitoring began at Lake Joy in 2000 and continued through 2004. The data indicate that this lake is low to moderate in primary productivity (oligotrophic - mesotrophic), with excellent to good water quality.

Lake Joy has only a walk-in public access point, but residents should keep an eye on aquatic plants growing nearshore to catch early infestations of Eurasian milfoil, Brazilian elodea or other noxious weeds.

Physical Parameters

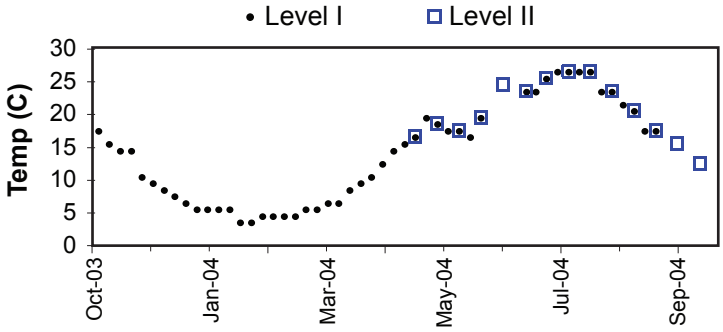
Secchi transparency ranged between 1.0 and 6.5 m through the year. The summer average of 3.8 m was in the upper mid range for monitored small lakes in 2004. Annual surface water temperatures ranged between 3.0 and 26.0 degrees Celsius, with the maximum recorded placing in the upper range for the group .

Nearly complete records of water level and precipitation were kept, showing that water levels followed the regional pattern of winter high – autumn low stands. Levels responded sensitively to large rain events.

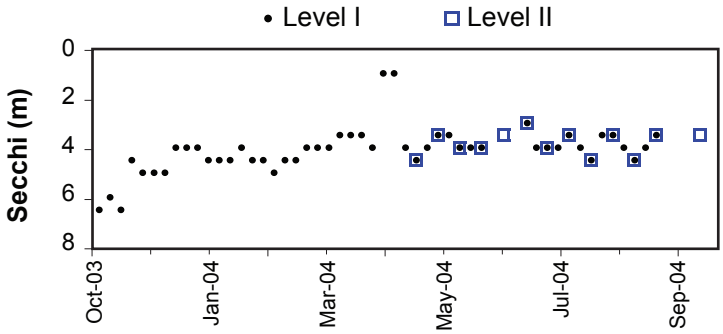
Nutrient Analysis and TSI Ratings

Total nitrogen decreased from an initial high to a consistent relationship to total phosphorus from mid-summer to the end of the sampling period. The N:P ratio ranged from 27 to 73, averaging 42 which signaled generally poor conditions for nuisance bluegreen growth.

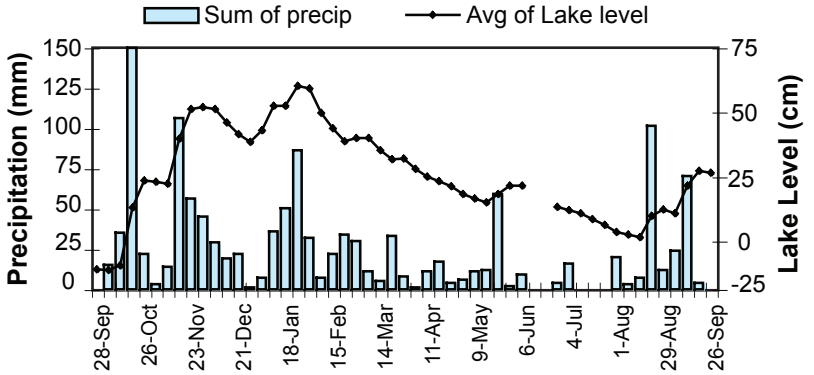
Lake Temperature



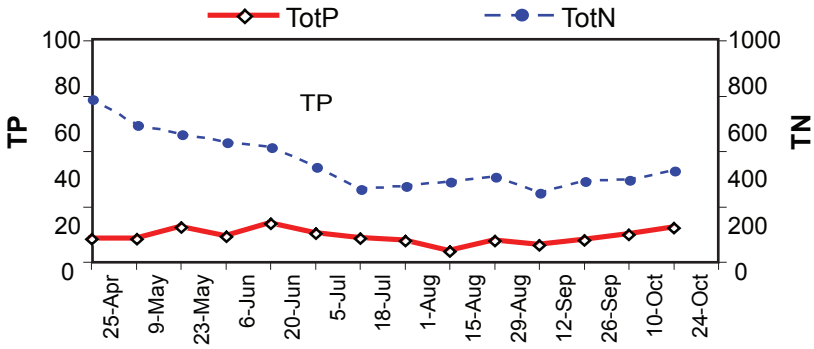
Secchi Depth



Lake Level and Precipitation



Nutrient Analysis



Profile data indicate that thermal stratification was present early in the season and persisted through the summer. However, there was little accumulation of phosphorus in the deep water. Chlorophyll data indicated that algae were higher in abundance in the middle of the water column, possibly around the thermocline.

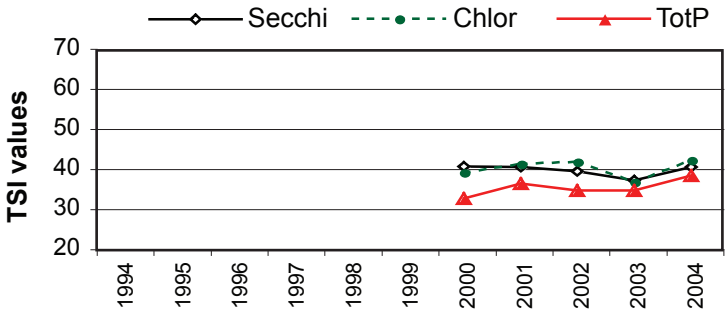
The 2004 TSI values were close to each other, across the threshold between oligotrophy and eutrophy. They were all higher than values obtained in 2003, more similar to previous years.

Chlorophyll Concentrations and Algae

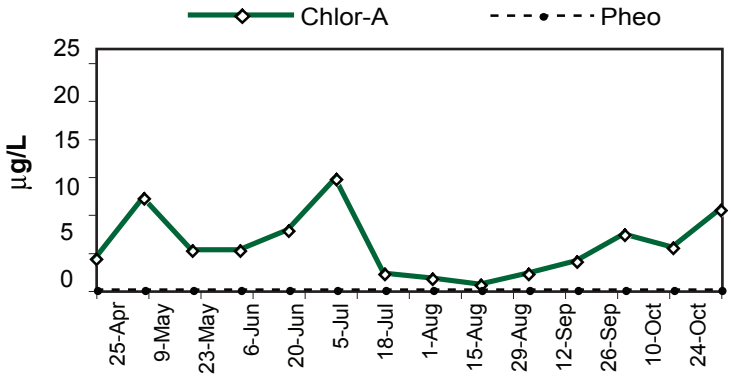
Chlorophyll peaked in early May and again in early July, dropped to low summer values and began climbing in mid-fall. The May peak was characterized by the colonial chrysophyte *Gloeobotrys*, while the July peak was dominated by the chlorophyte *Crucigenia rectangularis*. Dominant species in the fall included the colonial bluegreens *Chroococcus limneticus* and *Anacystis*. Other commonly found taxa included the chlorophyte *Cosmarium*, the chrysophyte *Dinobryon*, and the colonial bluegreen *Aphanothece*.

Date	Secchi	depth-m	degC	Chlor-A	TP µg/L	TN µg/L
5/23/04	4.0	1	17.0	4.01	15.7	577
		6	9.0	14.60	14.9	761
	11.5		5.0		38.7	748
8/29/04	3.5	1	23.0	1.60	9.8	387
		6	14.0	5.90	13.0	442
		12	7.0		19.5	938

TSI Ratings



Chlorophyll a Concentrations (ug/L)



Common Algae

	Group
Crucigenia rectangularis	Chlorophyta
Gleoebotrys colonies	Chrysophyta
Chroococcus limneticus	Cyanobacteria

Joy

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	4.0	-16.8	4
5-Oct-03	15.0	7.0	-17.0	7
12-Oct-03	35.0	7.0	-15.1	7
19-Oct-03	159.0	7.0	8.6	7
26-Oct-03	22.0	7.0	19.9	7
2-Nov-03	3.0	7.0	19.3	7
9-Nov-03	14.0	6.0	18.6	7
16-Nov-03	106.0	7.0	37.1	7
23-Nov-03	56.0	7.0	49.1	7
30-Nov-03	45.0	7.0	50.1	7
7-Dec-03	29.0	7.0	49.1	7
14-Dec-03	19.0	7.0	43.7	7
21-Dec-03	22.0	7.0	39.0	7
28-Dec-03	1.0	2.0	35.9	7
4-Jan-04	7.0	2.0	40.6	7
11-Jan-04	36.0	7.0	50.7	7
18-Jan-04	50.0	7.0	50.6	7
25-Jan-04	86.0	7.0	58.7	7
1-Feb-04	32.0	7.0	57.9	7
8-Feb-04	7.0	7.0	47.7	7
15-Feb-04	22.0	7.0	41.3	7
22-Feb-04	34.0	7.0	36.0	7
29-Feb-04	30.0	7.0	37.3	7
7-Mar-04	11.0	7.0	37.4	7
14-Mar-04	5.0	6.0	32.3	7
21-Mar-04	33.0	7.0	28.6	7
28-Mar-04	8.0	7.0	28.7	7
4-Apr-04	1.0	7.0	24.7	7
11-Apr-04	11.0	7.0	21.4	7
18-Apr-04	17.0	7.0	19.6	7
25-Apr-04	4.0	7.0	17.4	7
2-May-04	6.0	7.0	14.3	7
9-May-04	11.0	7.0	12.4	7
16-May-04	12.0	7.0	10.9	7
23-May-04	59.0	7.0	14.3	7
30-May-04	2.0	7.0	17.7	7
6-Jun-04	9.0	3.0	17.7	3
13-Jun-04				
20-Jun-04				
27-Jun-04	4.0	3.0	9.0	3
4-Jul-04	16.0	7.0	7.7	7
11-Jul-04	0.0	7.0	6.3	7
18-Jul-04	0.0	7.0	4.0	7
25-Jul-04	0.0	7.0	1.4	7
1-Aug-04	20.0	7.0	-1.3	7
8-Aug-04	3.0	7.0	-2.6	7
15-Aug-04	7.0	7.0	-3.6	7
22-Aug-04	101.0	6.0	5.3	7
29-Aug-04	12.0	7.0	8.0	7
5-Sep-04	24.0	7.0	6.4	7
12-Sep-04	70.0	6.0	17.7	7
19-Sep-04	4.0	7.0	23.7	7
26-Sep-04	0.0	5.0	23.0	5
Min	0.0		-17.0	
Max	159.0		58.7	
Total	1280.0			

Weekly Data Summary

Sample date	Sample time	Secchi (m)	Temp (°C)	Algae* (Shore)	Algae* (at site)	Goose Count*
5-Oct-03	14:30	6.5	17.0	NA	P1	1
12-Oct-03	13:00	6.0	15.0	NA	P1	0
19-Oct-03	12:30	6.5	14.0	NA	P1	0
26-Oct-03	14:00	4.5	14.0	NA	P1	0
2-Nov-03	16:00	5.0	10.0	NA	P1	0
9-Nov-03	15:00	5.0	9.0	NA	P1	0
16-Nov-03	12:00	5.0	8.0	P1	P1	8
23-Nov-03	14:00	4.0	7.0	P1	P2	0
30-Nov-03	15:00	4.0	6.0	P1	P1	0
7-Dec-03	13:00	4.0	5.0	P1	P1	0
14-Dec-03	11:00	4.5	5.0	P1	P1	0
21-Dec-03	14:00	4.5	5.0	P1	P1	0
28-Dec-03	11:00	4.5	5.0	P1	P1	0
4-Jan-04	14:00	4.0	3.0	P1	P1	0
11-Jan-04	12:00	4.5	3.0	P1	P1	60
18-Jan-04	15:00	4.5	4.0	P1	P1	60
25-Jan-04	12:30	5.0	4.0	P1	P1	0
1-Feb-04	12:00	4.5	4.0	P2	P2	0
8-Feb-04	12:00	4.5	4.0	P1	P1	0
15-Feb-04	14:00	4.0	5.0	P1	P1	0
22-Feb-04	12:00	4.0	5.0	P1	P1	0
29-Feb-04	9:00	4.0	6.0	P1	P1	0
7-Mar-04	14:30	3.5	6.0	P1	P1	0
14-Mar-04	9:30	3.5	8.0	P1	P1	0
21-Mar-04	12:00	3.5	9.0	P1	P1	4
28-Mar-04	11:00	4.0	10.0	P1	P1	8
4-Apr-04	12:00	1.0	12.0	P1	P1	4
11-Apr-04	13:00	1.0	14.0	P1	P1	4
18-Apr-04	12:00	4.0	15.0	P1	P1	8
25-Apr-04	17:00	4.5	16.0	P1	P1	4
2-May-04	13:00	4.0	19.0	P1	P1	0
9-May-04	18:00	3.5	18.0	P1	P2	6
16-May-04	14:00	3.5	17.0	P1	P2	8
23-May-04	18:30	4.0	17.0	P1	P2	12
30-May-04	10:30	4.0	16.0	P1	P2	2
6-Jun-04	18:00	4.0	19.0	P1	P1	6
5-Jul-04	18:00	3.0	23.0	P1	P2	2
11-Jul-04	12:00	4.0	23.0	P1	P1	2
18-Jul-04	17:00	4.0	25.0	P1	P1	4
25-Jul-04	12:00	4.0	26.0	P1	P1	2
1-Aug-04	19:15	3.5	26.0	P1	P1	0
8-Aug-04	12:00	4.0	26.0	P1	P1	0
15-Aug-04	19:00	4.5	26.0	P1	P1	0
22-Aug-04	19:00	3.5	23.0	P2	P2	0
29-Aug-04	18:00	3.5	23.0	P2	P2	0
5-Sep-04	17:00	4.0	21.0	P1	P1	0
12-Sep-04	17:30	4.5	20.0	P1	P1	4
19-Sep-04	18:00	4.0	17.0	P2	P2	0
26-Sep-04	17:45	3.5	17.0	P2	P2	0
	Min	1.0	3.0			
	Max	5.0	26.0			

* 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	chl-a	TP
25-Apr	16.0	4.5	3.20	10.5	736	1	70	38.3	42.0	38.1
9-May	18.0	3.5	9.45	10.5	618	2	59	41.9	52.6	38.1
23-May	17.0	4.0	4.01	15.7	577	1	37	40.0	44.2	43.9
6-Jun	19.0	4.0	4.01	11.7	542	1	46	40.0	44.2	39.6
20-Jun	24.0	3.5	6.09	17.4	520	2	30	41.9	48.3	45.4
5-Jul	23.0	3.0	11.40	12.9	430	2	33	44.1	54.4	41.0
18-Jul	25.0	4.0	1.60	10.7	332	1	31	40.0	35.2	38.3
1-Aug	26.0	3.5	1.10	9.6	344	1	36	41.9	31.5	36.8
15-Aug	26.0	4.5	<detect	<detect	365	1	73	38.3	23.8	27.4
29-Aug	23.0	3.5	1.60	9.8	387	2	39	41.9	35.2	37.1
12-Sep	20.0	4.5	2.88	7.7	316	1	41	38.3	40.9	33.6
26-Sep	17.0	3.5	5.69	9.9	369	2	37	41.9	47.6	37.2
10-Oct	15.0	NR	4.33	12.5	372		30		44.9	40.6
24-Oct	12.0	3.5	8.19	15.5	413	2	27	41.9	51.2	43.7

	Temp (°C)	Secchi (m)	Chl-*a* (µg/l)	TP (µg/l)	TN (µg/l)	Algae	N:P	Calculated TSI		
								Secc	chl-a	TP
Mean	20.1	3.8	4.9	11.9	451.5	1.5	42	40.8	42.6	38.6
Median	19.5	3.5	4.0	10.7	400.0	1	37	41.9	44.2	38.2
Min	12.0	3.0	1.1	7.7	316.0	1	27	38.3	23.8	27.4
Max	26.0	4.5	11.4	17.4	736.0	2	73	44.1	54.4	45.4
Count	14	13	13	13	14	13	14	13	14	14

TSI Average = 40.7