Angle

Lake Overview

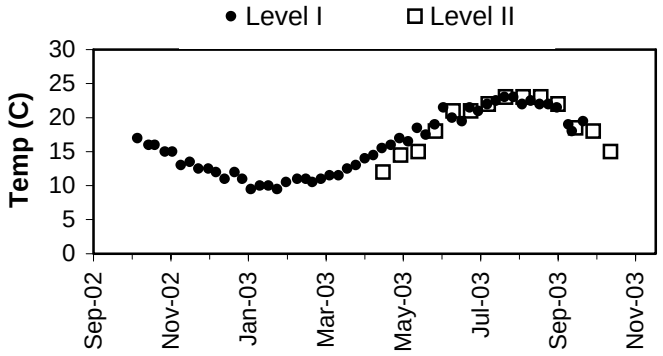
Volunteer monitoring began at Angle Lake in the 1980s and continued through 2003. Collected data show that this lake inside the city of SeaTac is low in primary productivity (oligotrophic), with excellent water quality. However, productivity appears to be increasing over the last six years. Since the lake surface makes up 20% of the total drainage area, direct precipitation is an important input, although stormwater runoff and groundwater also contribute. Land use analysis of 2002 aerial photographs showed 90% of the surrounding watershed has been developed for uses other than agriculture or forestry. There are no inventoried wetlands in the basin (King County, 1990), and the urban nature of area land use is an important factor.

Angle Lake has a public access boat ramp, and residents should monitor aquatic plants growing nearshore to catch early infestations of Eurasian milfoil, Brazilian elodea or other noxious aquatic weeds.

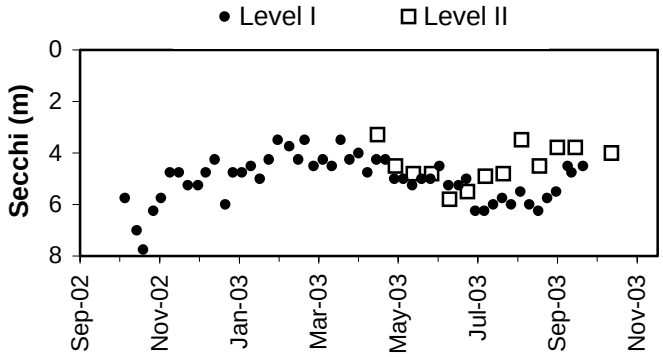
Physical Parameters

Secchi transparency ranged from 3.5 to 7.8m during the year. Surface water temperatures ranged from 9.5 to 23 degrees Celsius. Water levels climbed steadily from a low stand in fall to a high in April, dropping steadily through the rest of the water year. Precipitation was concentrated in November through April typical of the region and consistent with water levels in the lake.

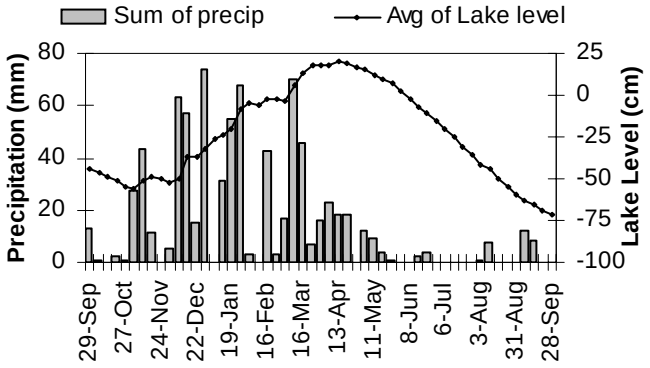
Lake Temperature



Secchi Depth



Lake Level and Precipitation



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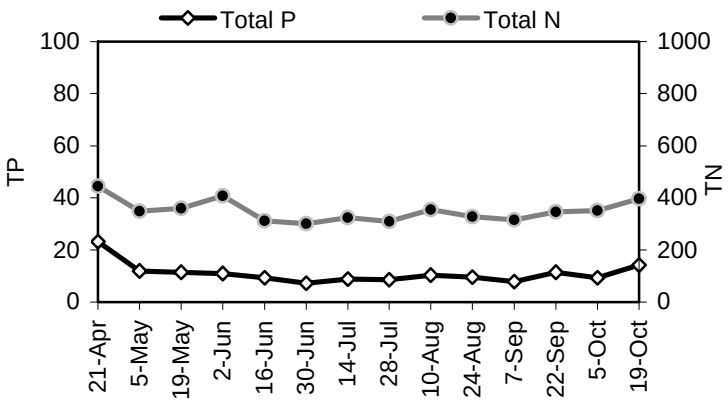
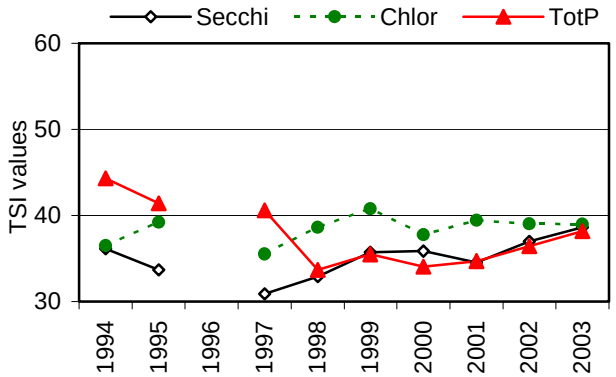
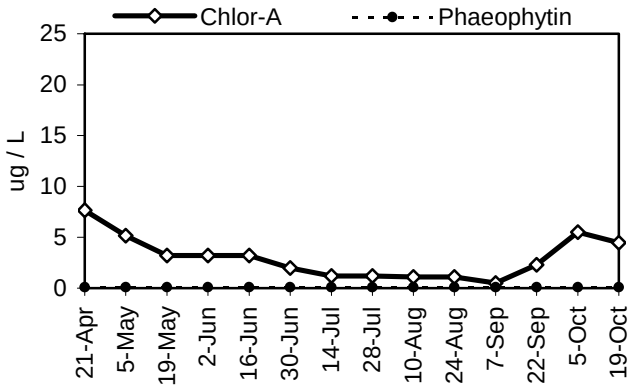
Nutrient Analysis



TSI Ratings



Chlorophyll a Concentrations (ug/L)



Common algae	Group
unidentified species	chrysophyte
Staurastrum sp.	chlorophyte
Anabaena sp.	bluegreen

Nutrient Analysis and TSI Ratings

Total phosphorus and total nitrogen remained closely proportional to each other through the period of measurement, with their ratio ranging from 19 to 41, indicating generally poor conditions for bluegreens. The three TSI values were very similar, falling within the higher end of the oligotrophic range.

Chlorophyll and Algae

Chlorophyll concentrations were generally low, with small elevations in spring and fall. There were many species of algae present, with no one species predominating over the others. Bluegreen algae were present, but not common until autumn, when *Anabaena* became prominent in the phytoplankton community.

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2003 Level I Data

Daily Data Summary

Week of	Sum of precip. (mm)	# of days	Avg of lake level (cm)	# of days
29-Sep-02	13.1	5	-44.4	5
6-Oct-02	0.5	7	-46.0	7
13-Oct-02	0.0	7	-49.1	7
20-Oct-02	2.1	7	-51.5	7
27-Oct-02	1.0	7	-54.3	7
3-Nov-02	27.5	7	-55.5	7
10-Nov-02	43.1	7	-50.9	7
17-Nov-02	11.6	7	-48.9	7
24-Nov-02	0.1	7	-50.3	7
1-Dec-02	5.1	7	-52.0	7
8-Dec-02	63.1	7	-49.9	7
15-Dec-02	57.0	7	-37.4	7
22-Dec-02	15.1	7	-36.5	7
29-Dec-02	74.0	7	-31.7	7
5-Jan-03	0.1	7	-26.3	7
12-Jan-03	31.1	7	-24.0	7
19-Jan-03	55.0	7	-20.8	7
26-Jan-03	67.5	6	-8.2	6
2-Feb-03	3.1	7	-4.8	7
9-Feb-03	0.1	6	-6.1	6
16-Feb-03	43.0	7	-2.8	7
23-Feb-03	3.0	7	-2.5	7
2-Mar-03	16.6	7	-3.0	7
9-Mar-03	70.0	7	5.8	7
16-Mar-03	45.5	7	12.7	7
23-Mar-03	7.0	7	17.6	7
30-Mar-03	16.0	7	17.4	7
6-Apr-03	23.0	7	18.1	7
13-Apr-03	18.0	7	20.0	7
20-Apr-03	18.0	7	18.7	7
27-Apr-03	0.0	7	17.0	7
4-May-03	12.0	7	15.0	7
11-May-03	9.1	7	11.7	7
18-May-03	4.0	7	9.4	7
25-May-03	1.0	7	6.7	7
1-Jun-03	0.0	7	2.4	7
8-Jun-03	0.1	7	-2.7	7
15-Jun-03	2.1	7	-6.9	7
22-Jun-03	4.0	7	-10.5	7
29-Jun-03	0.0	7	-15.5	7
6-Jul-03	0.0	7	-20.3	7
13-Jul-03	0.0	7	-25.2	7
20-Jul-03	0.0	7	-30.5	7
27-Jul-03	0.0	7	-36.1	7
3-Aug-03	1.0	7	-41.3	7
10-Aug-03	8.0	7	-44.5	7
17-Aug-03	0.0	7	-49.8	7
24-Aug-03	0.0	7	-55.0	7
31-Aug-03	0.0	7	-59.6	7
7-Sep-03	12.0	7	-62.9	7
14-Sep-03	8.1	7	-65.7	7
21-Sep-03	0.0	7	-68.6	7
28-Sep-03	0.0	3	-71.0	3
Min	0.0		-71.0	
Max	74.0		20.0	
Total	791.0			

Weekly Data Summary

Sample date	Sample time	Secchi (m)	Temp (°C)	Algae* (Shore)	Algae* (at site)	Goose Count*
6-Oct-02	13:55	5.8	17.0	P1	P1	5
15-Oct-02	11:25	7.0	16.0	P1	C1/P1	15
20-Oct-02	11:17	7.8	16.0	P1	P1	2
28-Oct-02	12:05	6.3	15.0	NA	C1	2
3-Nov-02	11:33	5.8	15.0	C2	C2/P1	23
10-Nov-02	15:07	4.8	13.0	C2	C2	0
17-Nov-02	11:00	4.8	13.5	C1	C1	11
24-Nov-02	15:21	5.3	12.5	P1	P1	2
2-Dec-02	11:25	5.3	12.5	C1	C1	0
8-Dec-02	14:59	4.8	12.0	C1	C1	24
15-Dec-02	14:07	4.3	11.0	C1	C2	0
23-Dec-02	11:42	6.0	12.0	C1	C1	19
29-Dec-02	11:40	4.8	11.0	C1	C1	17
5-Jan-03	14:33	4.8	9.5	C1/P1	C1/P1	17
12-Jan-03	11:16	4.5	10.0	C1/P1	C1/P1	23
19-Jan-03	15:14	5.0	10.0	P1	P1	1
26-Jan-03	11:17	4.3	9.5	P1	P1	1
2-Feb-03	14:00	3.5	10.5	P1	P1	18
11-Feb-03	9:00	3.8	11.0	P2	P2	9
18-Feb-03	10:38	4.3	11.0	P1	P1	13
23-Feb-03	15:59	3.5	10.5	P1	P1	5
2-Mar-03	14:32	4.5	11.0	P1	P1	2
9-Mar-03	11:54	4.3	11.5	P1	P1	5
16-Mar-03	11:02	4.5	11.5	P1	P2	6
23-Mar-03	15:45	3.5	12.5	P1	P2	2
30-Mar-03	14:42	4.3	13.0	P1	P2	2
6-Apr-03	15:00	4.0	14.0	P2	P2	5
13-Apr-03	13:45	4.8	14.5	P2	P2	14
20-Apr-03	16:00	4.3	15.5	P2	P2	5
27-Apr-03	14:15	4.3	16.0	P2	P2	4
4-May-03	11:10	5.0	17.0	P2	P2	10
11-May-03	12:00	5.0	16.5	P2	P2	5
18-May-03	12:40	5.3	18.5	P2	P2	6
25-May-03	12:30	5.0	17.5	P2	P2	5
1-Jun-03	16:55	5.0	19.0	P2	P2	38
8-Jun-03	16:30	4.5	21.5	P1	P1	36
15-Jun-03	16:10	5.3	20.0	P1	P1	62
23-Jun-03	13:31	5.3	19.5	P1	P1	43
29-Jun-03	15:19	5.0	21.5	P1	P1	64
6-Jul-03	11:25	6.3	21.0	P1	P1	68
13-Jul-03	13:30	6.3	22.0	P1	P1	38
20-Jul-03	11:30	6.0	22.5	P1	P1	13
27-Jul-03	11:15	5.8	23.0	P1	P1	25
3-Aug-03	11:20	6.0	23.0	P2	P2	2
10-Aug-03	11:55	5.5	22.0	P2	P2	0
17-Aug-03	11:25	6.0	22.5	P1	P1	33
24-Aug-03	7:55	6.3	22.0	P1	P1	40
31-Aug-03	11:18	5.8	22.0	P2	P2	24
7-Sep-03	11:20	5.5	21.5	P1	P1	3
16-Sep-03	15:35	4.5	19.0	P1	P1	2
19-Sep-03	11:53	4.8	18.0	P2	P2	7
28-Sep-03	16:00	4.5	19.5	P2	P2	
	Min	3.5	9.5			0
	Max	6.3	23.0			68

Angle **2003 Level II Data**

Date (2003)	Temp (°C)	Secchi (m)	Chl-*a* (µg/l)	TP (µg/l)	TN (µg/l)	Algae Obsv.	N:P	Calculated TSI			Notes
								Secc	chl-a	TP	
21-Apr	12.0	3.3	7.7	23.1	445	2	19	42.8	50.5	49.4	
5-May	14.5	4.5	5.2	12.0	349	2	29	38.3	46.7	40.0	
19-May	15.0	4.8	3.2	11.5	360	2	31	37.4	42.0	39.4	
2-Jun	18.0	4.8	3.2	10.9	408	1	37	37.4	42.0	38.6	
16-Jun	21.0	5.8	3.2	9.4	311	1	33	34.6	42.0	36.5	No algae.
30-Jun	21.0	5.5	2.0	7.3	300	1	41	35.4	37.4	32.8	
14-Jul	22.0	4.9	1.2	8.9	324	1	36	37.1	32.4	35.7	
28-Jul	23.0	4.8	1.2	8.6	309	1	36	37.4	32.4	35.2	
11-Aug	23.0	3.5	1.1	10.3	355		34	41.9	31.5	37.8	
25-Aug	23.0	4.5	1.1	9.6	327	1	34	38.3	31.5	36.8	
8-Sep	22.0	3.8	0.6	7.9	315	1	40	40.7		34.0	Chlor-a value was <MDL. Reported as .6µgl.
22-Sep	18.5	3.8	2.3	11.4	346	2	30	40.7	38.8	39.3	
6-Oct	18.0		5.5	9.3	351	1	38		47.3	36.3	No secchi recorded.
20-Oct	15.0	4.0	4.5	14.2	397	1	28	40.0	45.3	42.4	
	Temp (°C)	**Secchi (m)**	**Chl-*a* (µg/l)**	**TP (µg/l)**	**TN (µg/l)**	**Algae Obsv.**	**N:P**	**Calculated TSI**			
								Secc	**chl-a**	**TP**	
Mean	19.0	4.5	3.0	11.0	349.8	1.3	33	38.6	40.0	38.2	**TSI Average = 38.9**
Median	19.8	4.5	2.8	10.0	347.5	1	34	38.3	42.0	37.3	
Min	12.0	3.3	0.6	7.3	300.0	1	19	34.6	31.5	32.8	
Max	23.0	5.8	7.7	23.1	445.0	2	41	42.8	50.5	49.4	
Count	14	13	14	14	14	13	14	13	13	14	