STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ANGUS S. KING, JR.
GOVERNOR

EDWARD O. SULLIVAN
COMMISSIONER

March 10, 1996

Scott Lennox
173 Ash Street
Hopkinton, MA 01748

Dear Scott,

Enclosed is the Saturday Pond Water Quality Report for 1995. I hope you will find it useful. In the conclusions I indicated additional TP and DO sampling is warranted. For phosphorus, this means the possible addition of three to four more samples. The cost would be an addition $45 to $60 dollars. Last year's samples cost the watershed Association $210 dollars, bringing this year's lab bill total to approximately $255 to $270 dollars.

Dissolved oxygen should also be sampled more frequently. This can be accomplished by the Watershed Association sampling on a monthly cycle on the off weeks when I am not sampling. The equipment needed for this are a water sampler, DO kit, and DO bottles. I have a water sampler that I can lend to your organization. If you prefer to purchase one the cost is approximately $165 dollars. The DO kit cost $39 dollars, and five DO bottles will cost approximately $10. You can order the DO kit (model #5856) and additional bottles (#0688-DO), kit comes with two DO bottles, from the LaMotte Company. Address: PO Box 329
Chestertown, MD 21620
1-800-344-3100

Please review the report and contact me if you have any questions or comments. I look forward to working with you again in 1996.

Sincerely,

Webster Pearsall
Biologist, DEP
Web.E.Pearsall@state.me.us

Serving Maine People & Protecting Their Environment

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Saturday Pond Water Quality Report

for 1995

Saturday Pond is located in the Town of Otisfield, ~~Cumberland~~ OXFORD County. Physical characteristics of the lake include a surface area of 69 hectares (170.5 acre), 4.25 squared kilometer (1.6 square mile) drainage area, flushing rate of 1.03 flushes per year, maximum depth of 7.6 meters (25 feet), mean depth of 3.0 meters (9.8 feet), volume of 2,094,336 cubic meters.

In 1995, The Department of Environmental Protection (DEP) with assistance from members of the Saturday Pond Watershed Association performed monthly water quality sampling. Parameters included: temperature and dissolved oxygen (DO) profiles, Secchi disk transparency, total phosphorus (TP), chlorophyll a (Chl a), apparent color, and alkalinity. Temperature and dissolved oxygen readings were obtained at discrete one meter intervals throughout the water column. All other data were collected from composited epilimnetic (upper warmer water layer) core samples. In addition, discrete bottom grab samples were collected for TP during periods of low DO.

Temperature and Dissolved Oxygen: Temperature profiles indicate stratification started in May and continued through July, and started to break down during August (Table 1, Figure 1). This pattern is similar to ones recorded in the late 1980's (Appendix 1).

Slight dissolved oxygen depletion was recorded in June through August (Table 1, Figure 2). Again, a similar pattern was observed during the late 1980's (Appendix 1). Water containing less than 5 parts per million (ppm) of oxygen, the lower limit for many game species of fish, consisted of two percent of the lake's volume. This would have a very limited, if any, impact on the available fish habitat of Saturday Pond. The risk of internal recycling of phosphorus also appears to be low. Only in June and July was DO low enough in the bottom waters to facilitate internal recycling. However, only 2.9% of the lake sediments were in contact with anoxic waters, thus limiting any recycling.

Transparency: Saturday Pond transparency readings ranged from 4.3m to 6.6m and averaged 6.2m (Table 2). This average is above the State average of 5.0m. The 1995 average is the second best obtained for Saturday Pond (Appendix 2).

A possible explanation - - is weather. There was very little rain fall during the summer of 1995. This translated to very little runoff, thus lowering suspended sediments, and phosphorus import. Suspended sediments directly affect transparency, lower amount of sediments means higher transparency readings. Likewise, a smaller amount of phosphorus entering the lake translates to less phosphorus available for algal growth, and thus, higher transparency. Higher transparency readings were recorded for several lakes around the State.

Table 1
1995 Temperture and Dissolved Oxygen

	May	12	May	25	June	30	July	24	August	18	Sept.	15
Depth	Temp (C)	DO (ppm)	Temp (C)	DO (ppm)	Temp (C)	DO (ppm)	Temp (C)	DO (ppm)	Temp (C)	DO (ppm)	Temp (C)	DO (ppm)
0	12.2	10.5	17	9.2	24.9	8.1	24	8.2	25.8	8.6	19	9.2
1	12.2	10.8	16.8	9.2	24.6	8.1	24	8.1	25.8	8.5	19	9.1
2	12	10.8	16.8	9.2	24.5	8.1	24	8.2	25.8	8.5	19	9.1
3	12.2	10.8	16.5	9	24	8	24	8.1	25.8	8.5	19	9.1
4	12.2	10.8	14.9	9	21.9	8.7	24	8.2	25.1	8.5	18.9	9
5	12.2	10.8	13.4	8.7	18.5	7.5	23.3	7.7	24.3	7.7	18.9	9
6	11.2	10.2	12.2	6.8	15	3.5	18.5	4.9	20.9	2.9	18.9	9
7			12	6	13.6	0.6	15.1	0.4				

Figure 1
Temperature Profiles

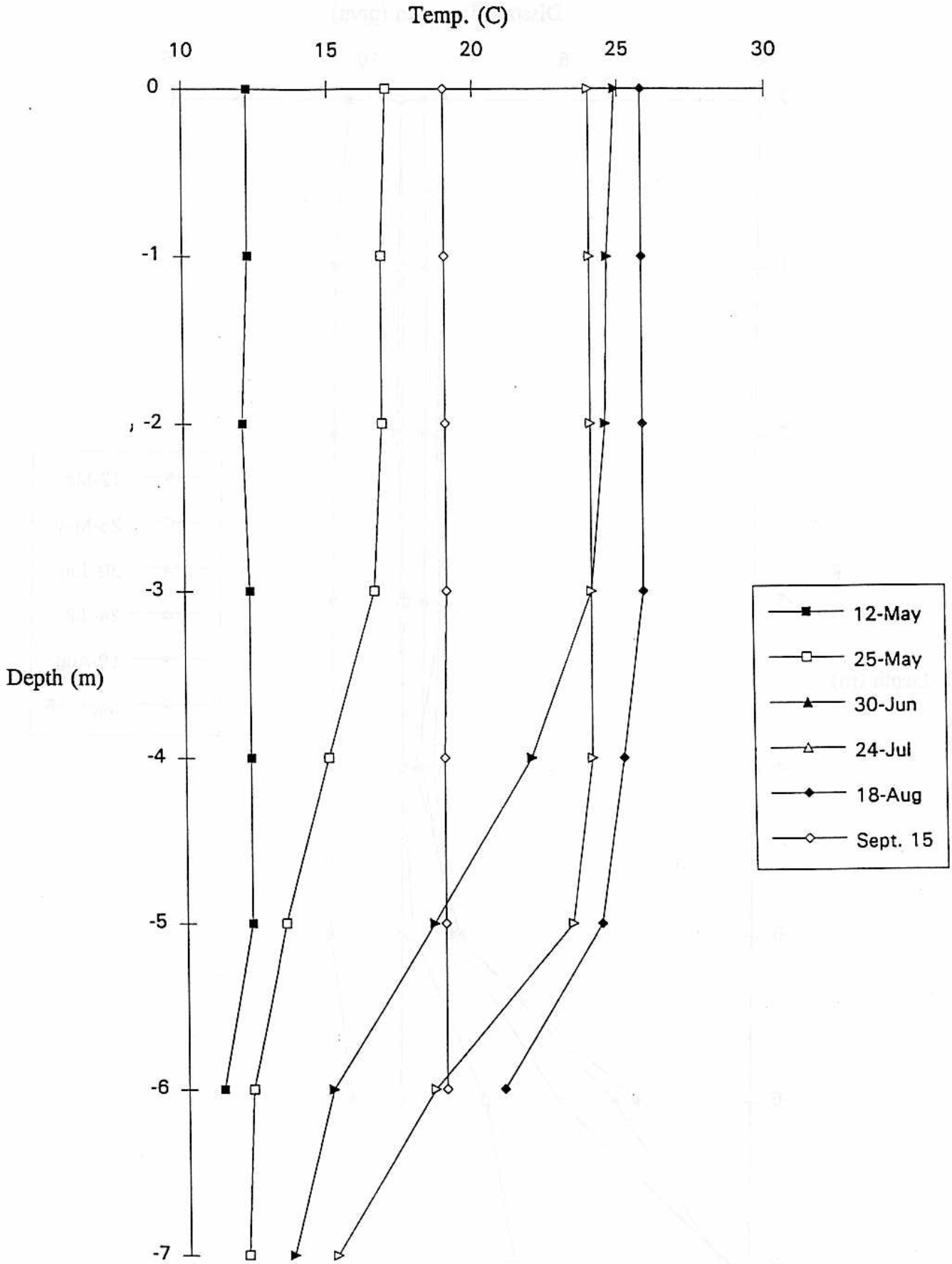

Figure 2
Dissolved Oxygen Profiles

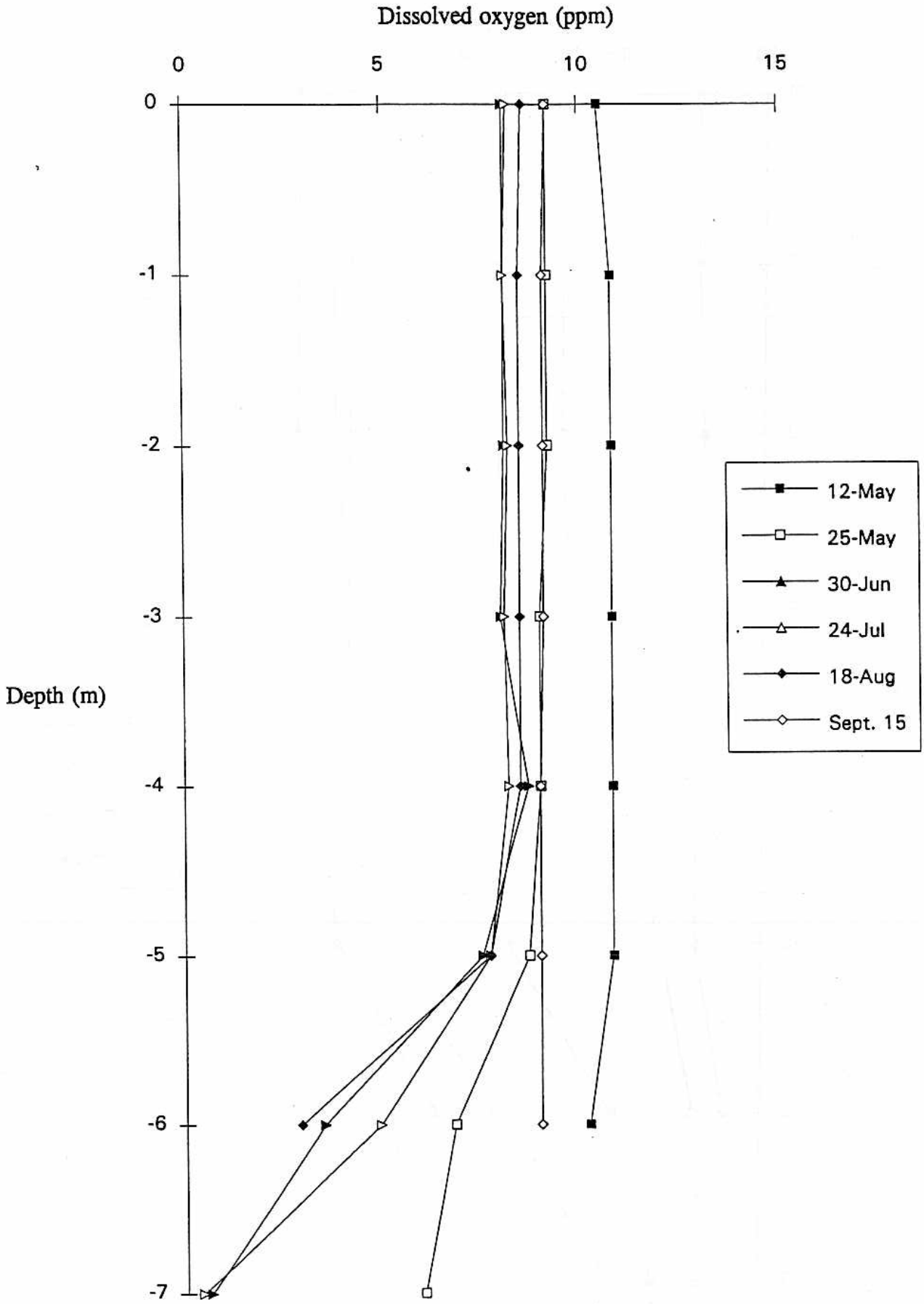

Table 2

1995 Quality Parameters of Saturday Pond

Date	Secchi disk (m)	Epi. TP core(ppb)	Hypo. TP grab(ppb)	Chl a (ppb)	Color (SPU)	Alkalinity (ppb)
5/12/95	4.3	NA	NA	NA	NA	NA
5/25/95	6.3	7 (5)	NA	0.72	8	8
5/28/95	5.9	NA	NA	NA	NA	NA
6/30/95	5.9	6 (5)	11 (7)	3.15	23	11.5
7/24/95	6.4	9 (6)	22 (6.5)	<0.5	12	10
8/18/95	6.6	6 (5)	6 (6)	1.92	6	9.5
9/15/95	6.4	7 (6)	NA	2.44	16	10.5
Average	**6.2**	**7**	**——**	**1.75**	**13**	**9.9**

Total Phosphorus: Epilimnetic core samples indicate stable phosphorus levels through the field season (Table 2). The seasonal average of 7 parts per billion (ppb) is lower than averages calculated in the 1980's (Appendix 2) and the State average of 14 ppb.

Again weather could be affecting the phosphorus levels recorded in 1995. As stated above, little rain fell during the summer of 1995, which translated to very little runoff, thus lowering phosphorus import.

There is a chance that internal recycling of phosphorus from the lake's sediments is occurring, although it does not appear to be extensive or significant. Grab samples collected from the bottom anoxic waters during June and July showed elevated TP concentrations. However, the volume of water affected is currently small, 0.3 percent in June and 2.0 percent in July. In addition, the period of anoxia is relatively short, thus reducing the effects of internal recycling.

It should be noted that the two samples were taken very close to the sediments (0.4m and 0.7m, respectively). By collecting so close to the sediments, the chance of contamination from the sediments or possible flock layer increase.

Chlorophyll a: Chlorophyll a measurements from Saturday Pond remained low throughout the 1995 field season (Table 2). The average of 1.75 ppb is much lower than the State average of 4.6 ppb, and previous recorded readings (Appendix 2).

Color: Color readings measured in 1995 (Table 2) indicate that Saturday Pond is a clear water pond. Its average of 13 SPU is well below the State average of 28 SPU.

Alkalinity: The 1995 average of 9.9 ppm (Table 2) indicates that Saturday Pond has good buffering capacity.

Trophic State Index (TSI): TSI values calculated for Saturday Pond in 1995 are: Transparency - 40, TP - 34, and Chl a - 27. These numbers reflect good water quality, with the transparency value being similar to the State average of 42.

Lakes with TSI values greater than 60 may support blooms and values over 100 indicate extreme productivity. However, productive lakes with stable water quality can have TSI values over 70 without supporting blooms.

Conclusions: Saturday Pond is a moderately productive lake with apparently stable water quality. More data are required before trends can be analyzed. Transparency, TP, Chl a data indicate increased water quality in 1995. This could be attributed to weather or a general increased in water quality. Addition samplings are needed to address this issue.

There is evidence of slight DO depletion. This depletion is similar to ones observed in the late 1980's, again indicating stable conditions. Associated with the slight DO depletion is a possible internal recycling event. Currently, this event is not long lasting or significant. However, the monitoring of this condition should continue.

Since the amount of historic data are limited, additional sampling should be encouraged. At a minimum, I recommend the same sampling frequency for 1996 as in 1995. Additional TP grab samples during low DO conditions might help identify the extent of internal recycling. Finally if the Watershed Association could sample DO once a month, so as to allow bi-weekly sampling when combined with the DEP effort, the DO depletion picture could become clearer.

Appendix 1
Historic Temp. and DO Data

Date	Depth (m)	Temp (C)	DO (ppm)	Date	Depth (m)	Temp (C)	DO (ppm)
8/30/84	0.5	24.0	8.2	9/18/87	2.0	18.5	9.0
8/30/84	1.0	23.9	8.2	9/18/87	3.0	18.5	8.9
8/30/84	2.0	23.8	8.2	9/18/87	4.0	18.4	8.9
8/30/84	3.0	23.8	8.1	9/18/87	5.0	18.2	8.9
8/30/84	4.0	23.5	8.1	9/18/87	6.0	18.1	8.9
8/30/84	5.0	23.2	7.6	10/16/87	0.5	10.8	10.5
8/30/84	6.0	22.8	0.1	10/16/87	1.0	10.5	10.6
5/4/87	0.0	11.0	10.5	10/16/87	2.0	10.5	10.6
5/4/87	1.0	11.0	10.5	10/16/87	3.0	10.2	10.6
5/4/87	2.0	11.0	10.5	10/16/87	4.0	10.0	10.7
5/4/87	3.0	11.0	10.5	10/16/87	5.0	10.0	10.5
5/4/87	4.0	10.8	10.2	10/16/87	6.0	10.0	10.5
5/4/87	5.0	10.0	10.0	10/16/87	6.5	10.0	10.3
5/4/87	6.0	9.2	9.8	5/4/88	0.5	9.0	11.8
5/4/87	7.0	9.0	7.1	5/4/88	1.0	9.0	11.8
5/19/87	0.0	15.2	10.2	5/4/88	2.0	9.0	11.8
5/19/87	1.0	14.5	10.1	5/4/88	3.0	9.0	11.8
5/19/87	2.0	14.5	10.9	5/4/88	4.0	9.0	11.8
5/19/87	3.0	13.8	10.1	5/4/88	5.0	9.0	11.8
5/19/87	4.0	13.5	9.9	5/4/88	6.0	9.0	11.8
5/19/87	5.0	12.9	9.6	5/21/88	0.5	15.5	10.4
5/19/87	6.0	12.9	9.6	5/21/88	1.0	15.3	10.4
5/19/87	7.0	12.0	8.4	5/21/88	2.0	15.2	10.4
6/9/87	0.3	18.0	8.8	5/21/88	3.0	15.0	9.9
6/9/87	0.8	18.0	8.8	5/21/88	4.0	14.0	9.4
6/9/87	1.5	18.0	8.8	5/21/88	5.0	12.0	10.0
6/9/87	2.3	18.0	8.7	5/21/88	6.0	10.5	9.4
6/9/87	3.0	18.0	8.6	6/11/88	0.5	17.0	9.5
6/9/87	3.8	15.0	7.6	6/11/88	1.0	16.5	9.6
6/9/87	4.6	14.0	7.0	6/11/88	2.0	16.0	9.5
6/9/87	6.1	13.0	5.3	6/11/88	3.0	16.0	9.4
6/9/87	6.9	12.8	4.5	6/11/88	4.0	16.0	9.3
7/17/87	0.5	24.0	8.3	6/11/88	5.0	15.9	9.3
7/17/87	1.0	24.0	8.3	6/11/88	6.0	15.3	8.7
7/17/87	2.0	23.2	8.4	6/11/88	7.0	11.5	1.3
7/17/87	3.0	22.9	8.4	7/11/88	0.5	26.9	8.6
7/17/87	4.0	21.5	6.9	7/11/88	1.0	26.8	8.6
7/17/87	5.0	19.2	4.4	7/11/88	2.0	25.0	9.4
7/17/87	6.0	15.6	0.9	7/11/88	3.0	21.0	9.7
8/24/87	0.5	20.8	8.2	7/11/88	4.0	20.0	9.4
8/24/87	1.0	20.8	8.2	7/11/88	5.0	17.8	5.8
8/24/87	2.0	20.8	8.2	7/11/88	6.0	16.0	1.8
8/24/87	3.0	20.8	8.2	9/16/88	0.5	18.2	9.0
8/24/87	4.0	20.8	8.2	9/16/88	1.0	18.2	9.0
8/24/87	5.0	20.8	8.2	9/16/88	2.0	18.2	9.0
8/24/87	6.0	20.5	8.2	9/16/88	3.0	18.0	9.0
9/18/87	0.5	18.5	9.0	9/16/88	4.0	17.8	9.0
9/18/87	1.0	18.5	9.0	9/16/88	5.0	17.5	9.0

Appendix 1
Historic Temp. and DO Data

Date	Depth (m)	Temp (C)	DO (ppm)	Date	Depth (m)	Temp (C)	DO (ppm)
9/16/88	6.0	17.3	9.0	6/14/90	1.0	17.8	10.0
5/1/89	0.5	10.7	12.0	6/14/90	2.0	16.9	10.1
5/1/89	1.0	9.0	12.2	6/14/90	3.0	16.0	9.7
5/1/89	2.0	8.5	12.2	6/14/90	4.0	15.2	9.4
5/1/89	3.0	8.0	12.2	6/14/90	5.0	15.0	9.1
5/1/89	4.0	7.8	12.1	6/14/90	6.0	13.7	6.5
5/1/89	5.0	7.6	11.9	6/14/90	7.0	11.9	1.6
5/1/89	6.0	7.5	11.9				
5/1/89	7.0	7.2	10.3				
6/3/89	0.5	21.2	9.1				
6/3/89	1.0	19.9	9.3				
6/3/89	2.0	18.8	9.2				
6/3/89	3.0	17.0	8.6				
6/3/89	4.0	15.3	6.6				
6/3/89	5.0	13.5	6.7				
6/3/89	6.0	11.6	3.0				
6/3/89	6.1	11.2	1.2				
7/10/89	0.5	24.7	8.4				
7/10/89	1.0	23.4	8.5				
7/10/89	2.0	23.0	8.5				
7/10/89	3.0	22.2	8.1				
7/10/89	4.0	18.6	4.9				
7/10/89	5.0	16.0	2.8				
7/10/89	6.0	13.7	0.2				
7/10/89	7.0	12.6	0.2				
8/3/89	0.5	24.5	8.2				
8/3/89	1.0	24.0	8.2				
8/3/89	2.0	23.8	8.1				
8/3/89	3.0	23.4	7.9				
8/3/89	4.0	23.0	7.6				
8/3/89	5.0	18.7	4.0				
8/3/89	6.0	14.5	0.2				
9/7/89	0.5	19.8	9.2				
9/7/89	1.0	18.8	9.2				
9/7/89	2.0	18.5	9.3				
9/7/89	3.0	18.3	9.3				
9/7/89	4.0	18.1	9.2				
9/7/89	5.0	18.0	9.1				
9/7/89	6.0	17.9	8.1				
5/12/90	0.0	12.5	10.8				
5/12/90	1.0	12.2	10.9				
5/12/90	2.0	12.2	10.8				
5/12/90	3.0	12.0	10.8				
5/12/90	4.0	12.0	10.8				
5/12/90	5.0	11.5	10.8				
5/12/90	6.0	10.5	10.5				
5/12/90	7.0	8.0	8.8				
6/14/90	0.0	18.2	9.9				

Appendix 2
Historic Transparency Data

Date	Time	Secchi (m)	Bias
5/21/84	1500	4.5	
6/1/84	1055	4.5	
6/18/84	1100	3.8	
7/2/84	1130	4.5	
7/16/84	1000	4.3	
8/1/84	1100	5.4	
8/13/84	1030	5.5	
8/30/84	1200	6.0	B
9/4/84	1000	5.6	
9/16/84	1000	4.9	
10/1/84	1000	5.8	
10/22/84	1000	5.7	
5/4/87	1430	5.4	
5/19/87	1230	6.2	
6/9/87	1030	5.7	
7/17/87	1415	6.6	B
8/24/87	1300	6.5	B
9/18/87	1030	6.6	B
10/16/87	1215	7.0	B
5/4/88	1300	4.9	
5/21/88	1150	5.0	
6/11/88	1100	5.5	
7/11/88	1420	5.0	
8/17/88	1420	6.2	
9/16/88	1503	6.5	
5/1/89	1300	5.2	
6/3/89	1300	5.5	
7/10/89	1330	4.7	
8/3/89	1100	5.3	
9/7/89	1300	6.8	B
6/14/90	1215	4.0	
5/12/90	1410	6.0	

Appendix 2
Historic TP Data

Date	Depth (m)	Type	TP (ppb)
5/21/84	5.0	C	16
6/1/84	5.0	C	13
6/18/84	5.0	C	14
7/2/84	6.0	C	16
7/16/84	5.0	C	16
8/1/84	5.0	C	15
8/13/84	5.0	C	8
9/4/84	5.0	C	8
9/16/84	5.0	C	8
10/1/84	5.0	C	13
10/22/84	6.0	C	11
5/1/89	6.0	C	14
6/3/89	5.0	C	10
7/10/89	5.0	C	11
8/3/89	5.0	C	5
9/7/89	5.0	C	7
5/12/90	6.0	C	9

Appendix 2
Historic Chlorophyll a Data

Date	Depth (m)	Type	Chl a (ppb)
5/21/84	5.0	C	4.5
5/21/84	5.0	C	4.7
5/21/84	5.0	C	4.2
6/18/84	5.0	C	2.9
6/18/84	5.0	C	3.0
7/2/84	6.0	C	3.8
8/1/84	5.0	C	8.7
8/30/84	5.0	C	1.8
9/17/84	5.0	C	2.5
10/22/84	6.0	C	2.5