

Appendix A

Historic data for Lovers Lake and Stillwater Pond

Lovers Lake

Chatham

CH-428

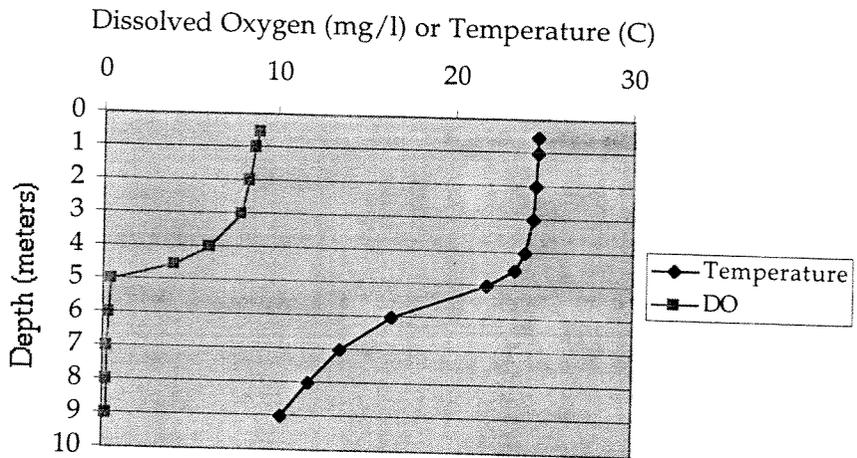
Acreage: 37.7
 Maximum Depth: 31 ft
 2001 Secchi Dip: 2.8 ft
 Lake Association: None

OVERVIEW

Lovers Lake is located mid-way between Old Comers Road and Queen Anne Road, just south of Ryders Cove. Groundwater recharges the pond from the south. The pond discharges surface water to the ground along the north shore as well to a small stream that flows to Stillwater Pond. The south and western shores are developed with single family homes. The west and north shores are undeveloped. Land ownership includes some conservation property and a municipal water supply. There is no public access to the pond, and recreational uses is limited to boating and fishing.

WATER QUALITY

Temperature and dissolved oxygen profiles have been collected in 2000, 2001, and 202. Profiles show gradual temperature drop below 5 to 7 meters, with a well mixed epilimnion. Profiles also have anoxic concentrations for a minimum of 40% of the water column and seem to indicate that the deep low conditions are impacting the upper well mixed waters. The high total phosphorus concentrations observed in the deep waters seem to indicate that phosphorus is being released from the sediments and the high surface chlorophyll a concentration (top 5% of all surface readings during the 2001 PALS Snapshot) seems to indicate that this phosphorus is being transferred to the epilimnion and prompting extensive algal growth. This hypothesis is consistent with the relatively shallow Secchi depth, high surface pH and TP concentration, but would need to be confirmed by additional sampling. The high chlorophyll a concentration results in a Carlson TSI ranking near the line between eutrophic with blue green algal dominance and hypereutrophic. It is recommended that annual monitoring of the pond continue and that a characterization of nutrient loads to and within the lake, including more refined monitoring, be considered in the future. Lovers Lake presents as a highly impacted pond with significant water quality problems.



Dissolved Oxygen and Temperature
 Lovers Lake, 8/28/01

August 28, 2001 Snapshot Results					
Depth	pH	Chlorophyll a	Alkalinity	Total Phosphorus	Total Nitrogen
meters		µg/L	as mg CaCO ₃ /L	µg/L	mg/L
0.5	8.07	46.63	17.7	35.0	0.90
3	7.93	24.99	18.3	26.6	0.76
9	6.47	3.76	64.8	130.7	1.99

Table A-1. PALS Monitoring Data for Lovers Lake (2001-2006)

2001

Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
CH-428	Lovers Lake	0.5			3	9.60	0.85	8.85	8.82	24.66	8.07	17.7	46.63	0	35	896
CH-428	Lovers Lake	1							8.61	24.61						
CH-428	Lovers Lake	2							8.23	24.53						
CH-428	Lovers Lake	3							7.8	24.45	7.93	18.3	24.99	4.13	27	764
CH-428	Lovers Lake	4							6.01	23.91						
CH-428	Lovers Lake	4.5							3.99	23.44						
CH-428	Lovers Lake	5							0.5	21.83						
CH-428	Lovers Lake	6							0.28	16.44						
CH-428	Lovers Lake	7							0.25	13.6						
CH-428	Lovers Lake	8							0.23	11.74						
CH-428	Lovers Lake	9							0.21	10.2	6.47	64.8	3.76	17.29	131	1992

2002

Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
CH-428	Lovers Lake	0.5			3	9.60	0.9	9.38	10.24	22.63	9.27	19.8	7.6	5.43	30	553
CH-428	Lovers Lake	1							10.3	22.63						
CH-428	Lovers Lake	2							10.33	22.67						
CH-428	Lovers Lake	3							10.33	22.6	8.2	20.0	11.13	4.1	27	538
CH-428	Lovers Lake	4							9.07	21.98						
CH-428	Lovers Lake	5							8.14	21.3						
CH-428	Lovers Lake	6							7.71	21.22						
CH-428	Lovers Lake	7							7.61	21.19						
CH-428	Lovers Lake	8							7.0	21.11						
CH-428	Lovers Lake	9							6.18	21	6.72(8.7m)	57.1(8.7m)	3.44(8.7m)	9.4(8.7m)		
CH-428	Lovers Lake	9.5							5.37	20.9						

2003

Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
CH-428	Lovers Lake	0.5			3	9.98	1.28	12.83	9.53	22.03	8.85	1.86	17.06	1.36	47	589
CH-428	Lovers Lake	1							9.55	22.01						
CH-428	Lovers Lake	2							9.45	21.91						
CH-428	Lovers Lake	2.5							9.1	21.84						
CH-428	Lovers Lake	3							5.83	21.38	6.97	1.8	15.25	2.8	62	599
CH-428	Lovers Lake	3.5							4.1	21.2						
CH-428	Lovers Lake	4							3.39	21.06						
CH-428	Lovers Lake	4.5							0.35	20.43						
CH-428	Lovers Lake	5							0.21	19.03						
CH-428	Lovers Lake	6							0.2	15.07						
CH-428	Lovers Lake	7							0.19	13.43						
CH-428	Lovers Lake	8							0.2	11.71	6.74	5.4	9.35	6.86	78	1935
CH-428	Lovers Lake	9							0.18	10.57						

Table A-1. PALS Monitoring Data for Lovers Lake (2001-2006)

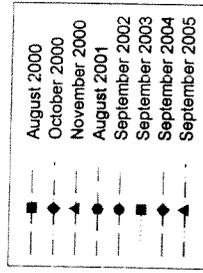
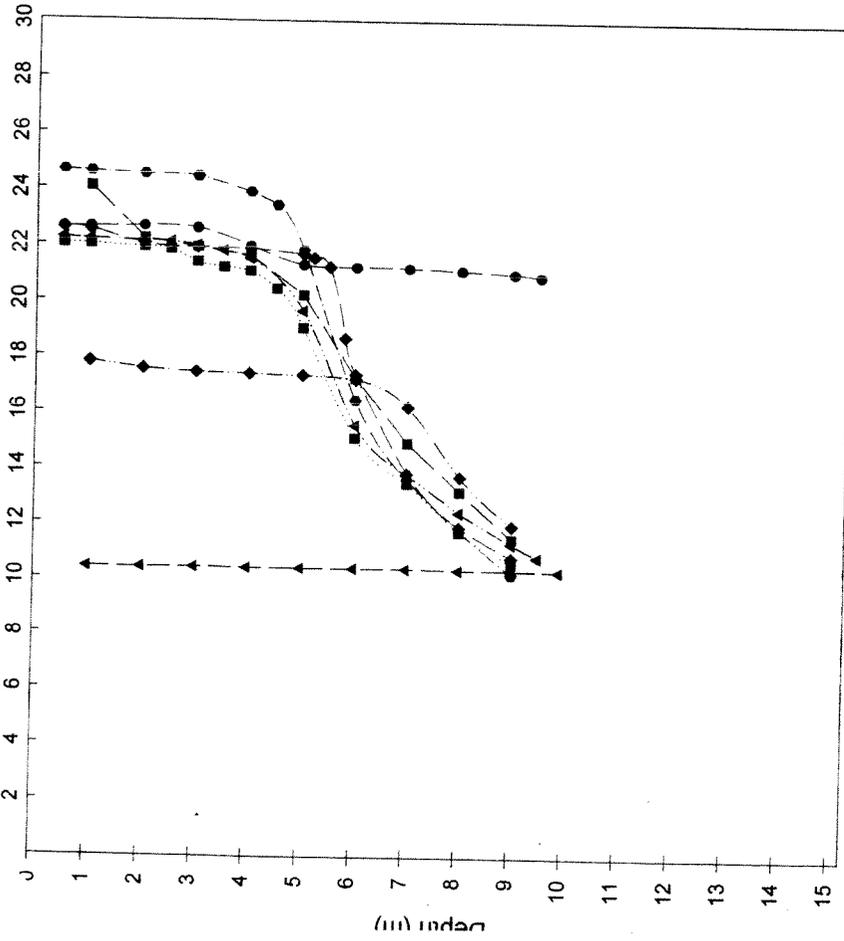
Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
CH-428	Lovers Lake	0.5	9/15/2004		3	10.12	1.69	16.7%	7.33	22.6	6.95	42.18	5.42	1.07	24	436
CH-428	Lovers Lake	1	9/15/2004						7.21	22.53						
CH-428	Lovers Lake	2	9/15/2004						7.03	22.03						
CH-428	Lovers Lake	3	9/15/2004						6.81	21.9	6.91	42.38	6.80	2.40	28	500
CH-428	Lovers Lake	4	9/15/2004						6.77	21.87						
CH-428	Lovers Lake	5	9/15/2004						6.02	21.68						
CH-428	Lovers Lake	5.2	9/15/2004						5.32	21.54						
CH-428	Lovers Lake	5.5	9/15/2004						3.35	21.21						
CH-428	Lovers Lake	5.8	9/15/2004						0.48	18.66						
CH-428	Lovers Lake	6	9/15/2004						0.33	17.36						
CH-428	Lovers Lake	7	9/15/2004						0.26	13.81						
CH-428	Lovers Lake	9	9/15/2004								6.71	150.95	1.93	18.96	135	3974

Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
2005	CH-428	Lovers Lake	0.5	9/19/2005	3amp	6	10.47	0.44	4%	8.00	8.085	35.82	68.25	5.97	33	1547
CH-428	Lovers Lake	1	9/19/2005						6.77	22.2						
CH-428	Lovers Lake	2	9/19/2005						6.06	22.1						
CH-428	Lovers Lake	2.5	9/19/2005						5.13	22.1						
CH-428	Lovers Lake	3	9/19/2005	3amp					3.37	22.0	6.825	37.53	13.34	6.44	24	743
CH-428	Lovers Lake	3.5	9/19/2005						1.97	21.8						
CH-428	Lovers Lake	4	9/19/2005						0.94	21.5						
CH-428	Lovers Lake	5	9/19/2005						0.16	19.6						
CH-428	Lovers Lake	6	9/19/2005						0.14	15.5						
CH-428	Lovers Lake	7	9/19/2005						0.13	13.8						
CH-428	Lovers Lake	8	9/19/2005						0.13	12.4						
CH-428	Lovers Lake	9	9/19/2005	3amp					0.14	11.3	6.62	97.77	2.54	4.35	132	2039

Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
2006	CH-428	Lovers Lake	0.5	8/23/2006	3	10.05	1.65	16%	8.84	24.4	7.47	38.14	7.09	3.22	26	669
CH-428	Lovers Lake	1	8/23/2006						8.87	24.3						
CH-428	Lovers Lake	2	8/23/2006						8.72	24.2						
CH-428	Lovers Lake	3	8/23/2006						8.23	24.1	7.33	38.14	8.59	4.34	29	674
CH-428	Lovers Lake	3.5	8/23/2006						7.19	24.0						
CH-428	Lovers Lake	4	8/23/2006						5.95	23.9						
CH-428	Lovers Lake	4.5	8/23/2006						2.41	23.4						
CH-428	Lovers Lake	5	8/23/2006						0.29	21.1						
CH-428	Lovers Lake	6	8/23/2006						0.20	16.3						
CH-428	Lovers Lake	7	8/23/2006						0.19	14.1						
CH-428	Lovers Lake	8	8/23/2006						0.19	12.0						
CH-428	Lovers Lake	9	8/23/2006						0.18	10.8	7.01	112.00	7.06	0.41	51	3231

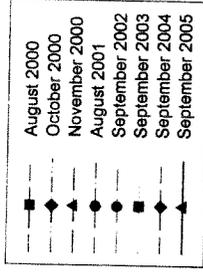
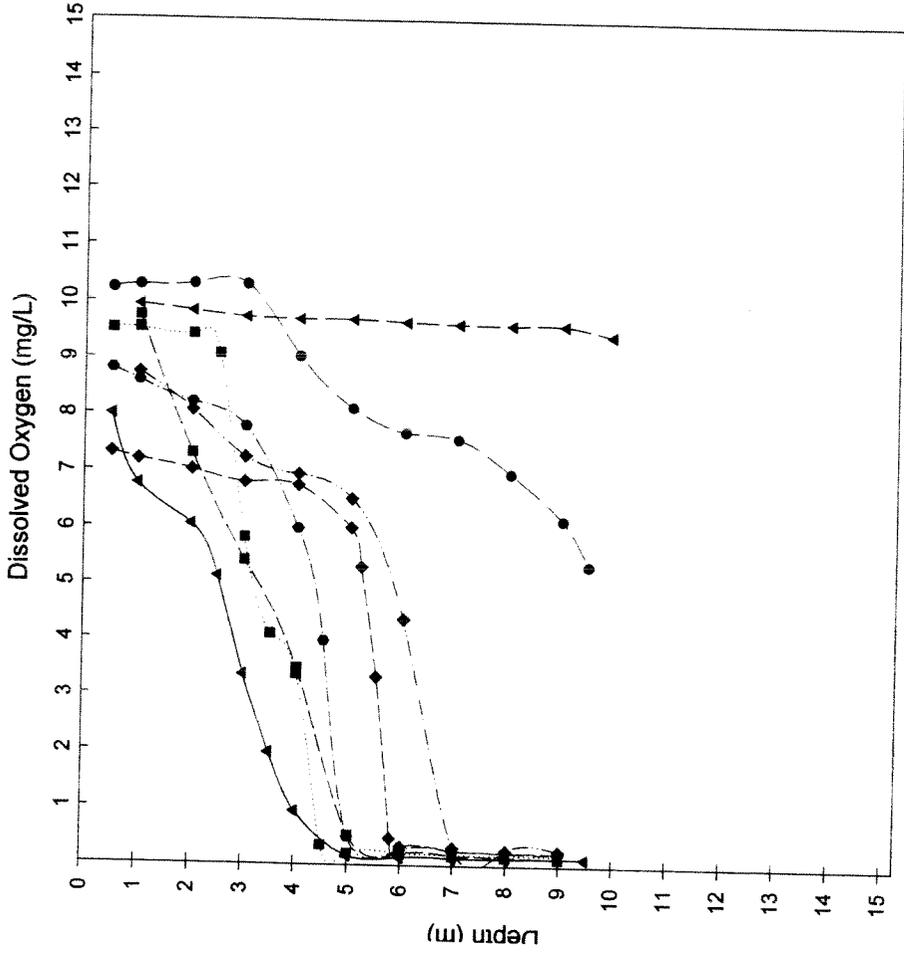
Lovers Lake Temperature Profiles

Temperature (°C)



Lovers Lake Dissolved Oxygen Profiles

Dissolved Oxygen (mg/L)





TOWN OF CHATHAM

WATER QUALITY LABORATORY



October 12, 2000

Fred O. Jensen
110 Lakeshore Dr.
Chatham, MA 02633

Dear Fred:

I'm writing in reply to your letter of September 9th expressing your concerns over water quality conditions in Lovers Lake.

As you are aware the issue of the condition of the surface freshwater bodies (lakes and ponds) of Chatham was raised in comments responding to the Comprehensive Wastewater Management Plan Needs Assessment Report (NAR) issued last year. In response to those comments additional efforts are being focused on better understanding the current condition and future impacts to these freshwater resources. The Town has initiated a freshwater pond monitoring program aimed at providing data upon which to evaluate future management decisions.

This monitoring program includes several components, some of which are short-term and others long-term. In general, the program includes: 1) bathymetric surveys to determine the depths, volume, etc. for those ponds lacking this data; and 2) a water quality component consisting of regular surface to bottom profiling for dissolved oxygen and temperature (the August & October results have been sent to you under separate cover) and the collection of surface and bottom water samples for analysis of various chemical (nutrient) parameters. This latter component will need to be a long-term effort to determine the seasonal variability within the ponds and to determine trends over time. In addition, there will be some examination of surface freshwater resources in the town-wide water quality modeling program.

As has been discussed on several occasions with the CAC surface freshwater resources are generally impacted by excessive phosphorus inputs, compared to estuarine/marine systems where nitrogen is primarily the nutrient of concern. The advantage to this, if one can call it an advantage, is that phosphorus is significantly less mobile in the groundwater than nitrogen due to its binding to soil particles. The consensus within the scientific community is that a horizontal distance of 300 feet from the phosphorus source (i.e. septic systems) to the water resource is generally sufficient to eliminate or limit phosphorus input. This was the basis for the recommendation in the NAR of a 300 foot buffer around freshwater resources. The Board of Health is currently implementing this recommendation on a case-by-case basis. Obviously this effort will not address the immediate

Mail: 549 Main Street, Chatham, Massachusetts 02633
Laboratory: 283 George Ryder Road, Chatham, Massachusetts 02633

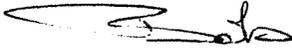
(508) 945-5188
Fax: (508) 945-5163

condition of Lovers Lake, and a similar condition which exists in Stillwater Pond.

As you have noted Lovers Lake, and Stillwater Pond, are behaving quite differently from other ponds around Chatham. Hopefully, the current efforts will provide an explanation for why conditions are so different so that effective remediation efforts can be undertaken. One area that will be evaluated is the impacts of artificially controlling the lake level for the herring run. All these efforts will provide additional input into the completion of the Comprehensive Wastewater Management Plan.

If you have any questions do not hesitate to contact me.

Sincerely,



Robert A. Duncanson, Ph.D.
Laboratory Director

cc: Margaret Martin, President, Great Hill Estates Association, Inc.
William Hinchey, Town Manager
CWMP Technical Advisory Committee
Nate Weeks, Stearns & Wheler

Fred O Jensen
110 Lakeshore Drive
Chatham, MA 02633
Tel: 508-945-3076

RECEIVED
SEP 21 2000

WATER QUALITY LABORATORY
TOWN OF CHATHAM

September 9, 2000

Dr. Robert Duncanson, Director
Chatham Water Quality Laboratory
283 George Ryder Road
Chatham, MA 02633

Dear Bob:

I am writing to you to express my concern about the changes I have observed in the water of Lovers Lake.

As you probably know, I have lived on Lovers Lake for four years now and I have swam and canoed on the lake for four summers. Based on my observations while swimming and canoeing on the lake this summer, it seems to me that there is more grass growing up from the lake bottom and a greater area of the lake covered by lily pads than ever before. (I've enclosed a sample of the grass which is growing up from the lake bottom.)

Moreover, around mid-August of this year, an unusually dense amount of algae appeared throughout the entire lake. The entire lake took on a green hue and the waters along the lakeshore were totally covered with a blue-green film. The intensity of this "algae bloom" has clearly been greater than in any of the previous three summers. Understandably, this has been very uninviting to residents who have wanted to swim in the lake. Importantly, during this period (the last two weeks of August), I inspected School House Pond, Trout Pond and Pickerel Pond all of which appeared to have clear water with no algae.

Again, Bob, I'm concerned that Lovers Lake may be degrading due to too much nutrient entering the Lake. Since you are a member of the Technical Advisory Committee of Chatham's Wastewater Management Study, I ask that your committee ensure that the Study team assess the needs of and propose solutions for Chatham's endangered fresh water ponds, such as Lovers Lake, just as it is doing for Chatham's bays and estuaries.

Sincerely,


Fred O. Jensen

Cc: Margaret Martin, President, Great Hill Estates Assn. Inc.



TOWN OF CHATHAM

OFFICE OF THE SELECTMEN
TOWN MANAGER

549 Main Street, Chatham, Massachusetts 02633
(508) 945-5100

Dr. Dunk



August 13, 2002

Ms. Margaret Martin, President
Great Hills Association, Inc.
25 Horizon Circle
Chatham, MA 02633

RECEIVED
AUG 13 2002

WATER QUALITY LABORATORY
TOWN OF CHATHAM

Dear Ms. Martin:

Thank you for your letter of August 11, 2002 regarding your legitimate concerns on the health of Lovers Lake.

Your letter, along with your petition, has been forwarded to our Town Manager, Bill Hinchey, as well as Dr. Bob Duncanson, the Director of Health & Environment.

The Board of Selectmen share your observations and concerns. We will continue to utilize all resources at our disposal in order to increase and maintain our water quality throughout Chatham.

Sincerely,

Thomas P. Bernarde
Chairman
Board of Selectmen

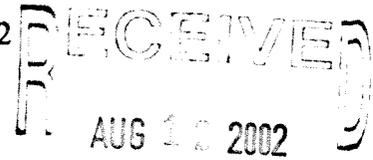
/sh

GREAT HILLS ASSOCIATION, INC.

25 Horizon Circle
Chatham, MA 02633



August 11, 2002



Mr. Tom Bernardo, Chairman
Board of Selectmen
Town of Chatham
549 Main Street, Chatham, MA 02633

WATER QUALITY LABORATORY
TOWN OF CHATHAM

Dear Mr. Bernardo:

I am writing you on behalf of the members of Great Hills Association, Inc. We are property owners and residents of Chatham who either have waterfront property on Lovers Lake or have deeded access rights to Lovers Lake for recreational purposes.

We are greatly concerned about the continuing deterioration over the past several years of the water quality in this lake. For example, a dense algae "bloom" occurred in the lake during the last week of July. In our recollection, this is the earliest in the summer season that this has occurred. Moreover, anecdotal reports from our members who use the lake indicate that the amount of grass growing throughout the lake is greater than ever.

We believe it is the Town's responsibility to develop a cost-effective plan for improving the quality of the water in Lovers Lake and to do so within a reasonable time frame. With this in mind, and to show the depth of our concern, I have enclosed a petition to the Town which has been signed by many of our members.

Our Association would welcome your comments on this matter which, if not properly remedied, can adversely affect our property values.

Sincerely yours,

Margaret Martin
President

B.S.

Bill H.

Dr. Dunk

Encl:

GREAT HILLS ASSOCIATION, INC.

25 Horizon Circle
Chatham, MA 02633

PETITION TO TOWN OF CHATHAM - 8/10/02

We, the undersigned property owners and residents of Chatham, MA, either own property on Lovers Lake or have deeded access rights to Lovers Lake for recreational purposes. We are greatly concerned about the continuing deterioration over the past several years of the water quality in this lake. A dense algae "bloom" occurred in the lake during the last week of July, 2002. In our recollection, this is the earliest in the summer season that this has occurred. In addition, anecdotal reports indicate that the amount of grass growing throughout the lake is greater than ever.

In view of these adverse trends in the lake's water, we urge the Chatham Board of Selectmen to ensure that the Chatham Wastewater Management Study thoroughly evaluates the environmental factors impacting Lovers Lake and includes a recommendation of a cost-effective plan for improving the water quality of the lake.

Property Owner Signature	Address
<i>Rydstrom</i>	25 Horizon Circle, Chatham
Margaret L. Martin	192 N. Skyline Dr. Chatham
Rubyth Jones	192 N SKYLINE DR Chatham
Thomas Jones	97 Horizon Dr Chatham
Anne Witt	" " " "
Flora Springer	162 HORIZON DR, CHATHAM, MA
RAY SPRINGER	" " " "
Ingrid Nurse	113 Ayer Rd / 79 Lakeshore Dr
Pat Venable	74 Horizon Drive Chatham MA
ANN WANN	74 HANN BEN LOWE CHATHAM
Bred Jensen	110 Lake Shore Drive
Lisa Colby	56 Horizon Drive, Chatham
John Colby	56 Horizon Drive, Chatham
Michael Holan	69 HORIZON DRIVE, CHATHAM
Shirley Jensen	117 Lakeshore Drive, Chatham
Judith Langella	253 N. SKYLINE ✓
Paol R. Lanzetta	253 N. Skyline Dr. "
Er. Conrad	57 N. Skyline Dr.
Richard Murr	79 Lakeshore Dr. Chatham
J. Woodward Pronger	55 Horizon Drive, Chatham
Joseph P. Nasstrom	202 Horizon Drive, "
Lawson McClellan	10 Horizon Circle, Chatham
John R. Johnson	78 Lakeshore Drive Chatham
Grade J. Johnson	" " " "
Termin Mayson	174 Horizon Drive, Chatham
Maureen Jensen	110 Lake Shore Drive Chatham
Maureen Jensen	10 Horizon Circle
Maureen Jensen	

Stillwater Pond

Chatham

CH-396

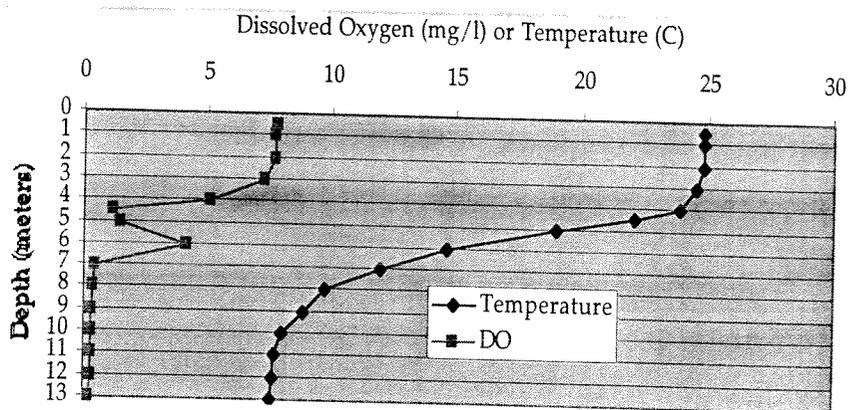
Acreage: 18.7
 Maximum Depth: 45 ft
 2001 Secchi Dip: 9.9 ft
 Lake Association: None

OVERVIEW

Stillwater Pond is located north of Old Comers Road and east of Training Field Road. The pond is recharged by groundwater from the southwest and by a surface water inlet from Lovers Lake. The pond discharges surface water to groundwater along its northern shoreline and to a herring run that leads to Ryder Cove. The shoreline is moderately developed with single family homes. Recreational uses include boating and fishing.

WATER QUALITY

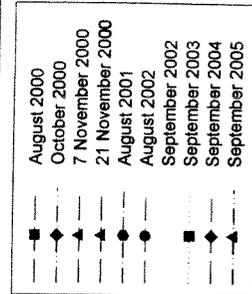
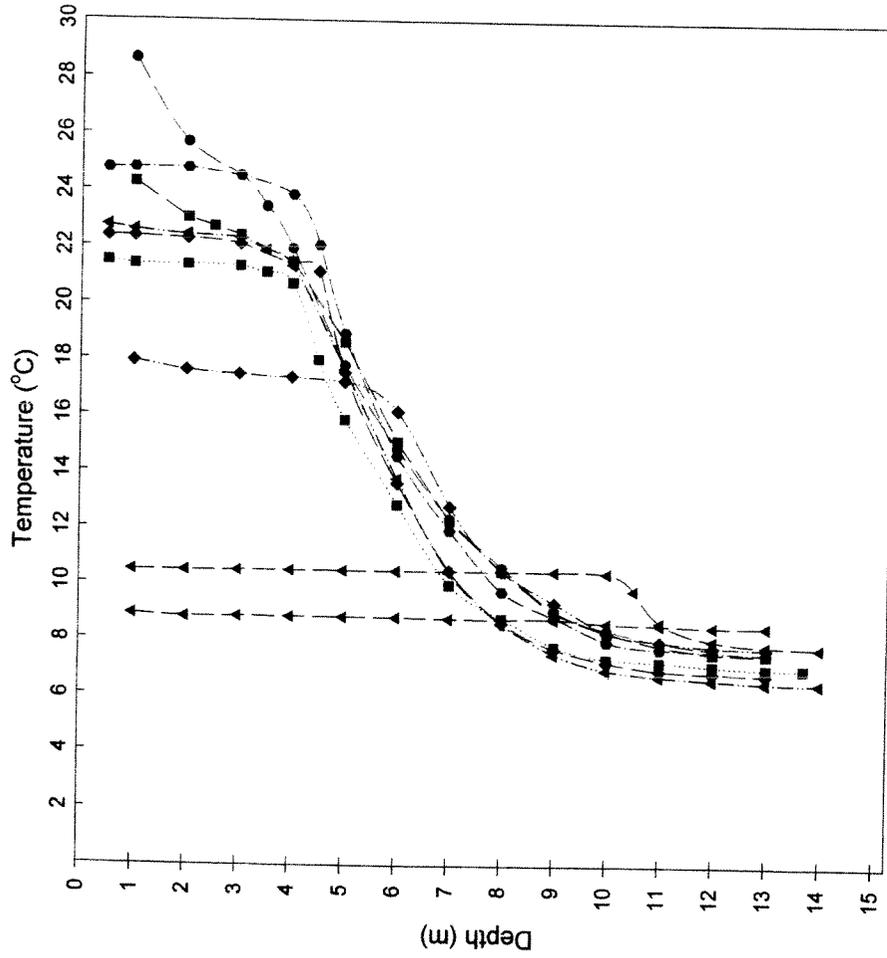
Temperature and dissolved oxygen profiles have been collected in 2000, 2001, and 2002. Profiles show gradual temperature drop below 4 to 5 meters, with a well mixed epilimnion. Profiles also have anoxic concentrations for a minimum of 40% of the water column. The 2001 PALS Snapshot profile (shown above) also shows an area of higher than expected DO at 6 meters, which is likely due photosynthetic algae floating lower in the water column. The observed anoxic conditions appear to be releasing significant phosphorus loads back into the water column, although it appears that is not reaching the epilimnion of the pond based on the slightly impacted surface chlorophyll a concentration. The deep TN concentration is the fourth highest among all the ponds sampled during the 2001 Snapshot, while the deep TP concentration is the fifth highest. The relatively low surface chlorophyll a concentration results in a Carlson TSI ranking near the line between mesotrophic and eutrophic, although the deep water conditions readily indicate that significant nutrients are available within the pond. It is recommended that annual monitoring of the pond continue and that a characterization of nutrient loads to and within the lake, including more refined monitoring, be considered in the future. Stillwater Pond presents as a highly impacted pond with significant water quality problems.



Dissolved Oxygen and Temperature
 Stillwater Pond, 8/28/01

August 28, 2001 Snapshot Results					
Depth	pH	Chlorophyll a	Alkalinity	Total Phosphorus	Total Nitrogen
meters		µg/L	as mg CaCO3/L	µg/L	mg/L
0.5	6.97	8.25	16.4	15.2	0.44
3	6.51	4.92	16.3	13.3	0.45
8	6.54	6.17	35.6	71.2	1.51
12.5	5.94	3.65	48.2	325.5	2.40

Stillwater Pond Temperature Profiles



Stillwater Pond Dissolved Oxygen Profiles

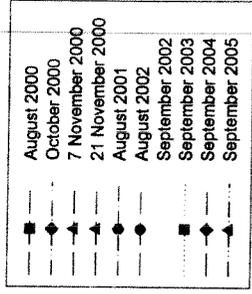
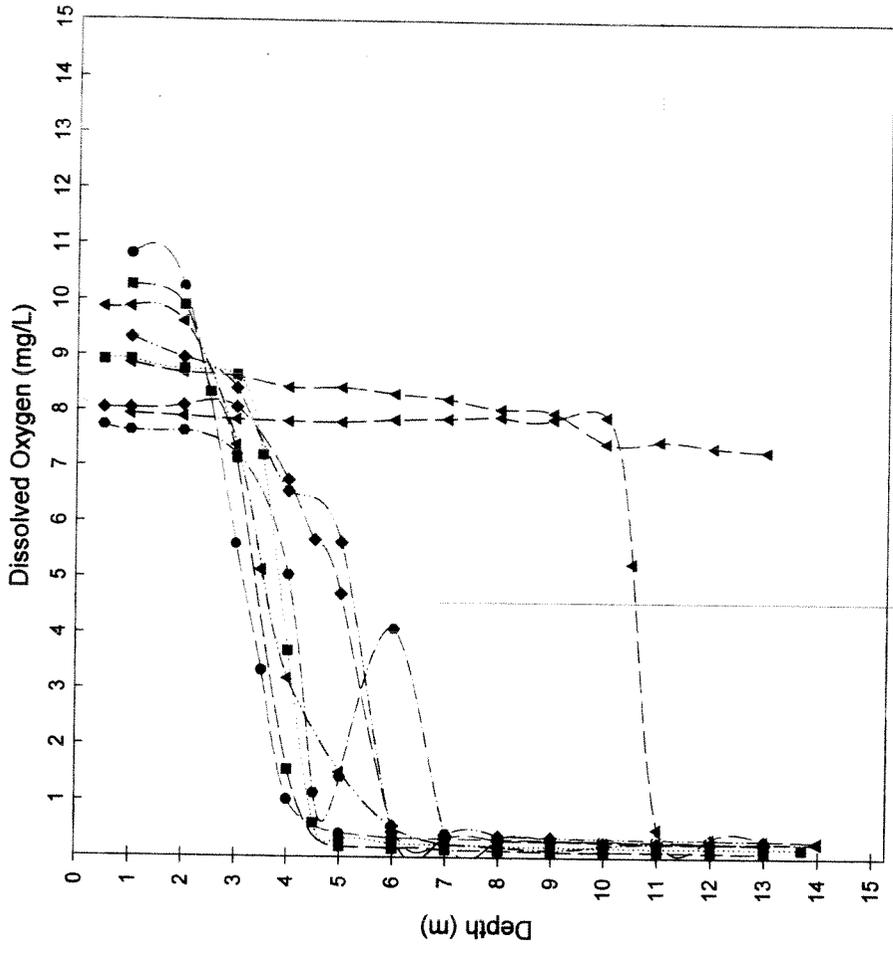


Table A-2., PALS Monitoring Data for Stillwater Pond (2001-2006)

2003																
Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi (%)	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
CH-396	Stillwater Pond	0.5			4	14.57	1.76	12.08	8.92	21.48	6.92	1.84	6.22	0.55	40	550
CH-396	Stillwater Pond	1							8.93	21.37						
CH-396	Stillwater Pond	2							8.76	21.34						
CH-396	Stillwater Pond	3							8.66	21.3	7.14	1.89	5.24	1.26	19	608
CH-396	Stillwater Pond	3.5							7.21	21.08						
CH-396	Stillwater Pond	4							3.7	20.68						
CH-396	Stillwater Pond	4.5							0.61	19.97						
CH-396	Stillwater Pond	5							0.32	15.83						
CH-396	Stillwater Pond	6							0.23	12.81						
CH-396	Stillwater Pond	7							0.23	9.94						
CH-396	Stillwater Pond	8							0.2	8.74						
CH-396	Stillwater Pond	9							0.19	7.75	6.46	3.13	<0.05	21.84	25	1554
CH-396	Stillwater Pond	10							0.18	7.32						
CH-396	Stillwater Pond	11							0.17	7.22						
CH-396	Stillwater Pond	12							0.17	7.08						
CH-396	Stillwater Pond	13							0.17	6.98						
CH-396	Stillwater Pond	14							0.16	6.97	6.46	4.87	6.36	13.96	177	3027

2004																
Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi (%)	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
CH-396	Stillwater Pond	0.5	9/15/2004		4	13.83	2.26	16.3%	8.05	22.37	6.96	39.35	4.84	0.29	14	371
CH-396	Stillwater Pond	1	9/15/2004						8.05	22.36						
CH-396	Stillwater Pond	2	9/15/2004						8.1	22.27						
CH-396	Stillwater Pond	3	9/15/2004						8.07	22.08	6.98	40.16	6.03	1.00	17	440
CH-396	Stillwater Pond	4	9/15/2004						6.76	21.43						
CH-396	Stillwater Pond	4.5	9/15/2004						5.69	21.11						
CH-396	Stillwater Pond	5	9/15/2004						4.72	17.52						
CH-396	Stillwater Pond	6	9/15/2004						0.56	13.59						
CH-396	Stillwater Pond	7	9/15/2004						0.33	10.46						
CH-396	Stillwater Pond	8	9/15/2004						0.29	8.59						
CH-396	Stillwater Pond	9	9/15/2004						0.29	7.67	6.63	75.47	<0.05	58.33	37	1894
CH-396	Stillwater Pond	10	9/15/2004						0.27	7.2						
CH-396	Stillwater Pond	11	9/15/2004						0.25	6.92						
CH-396	Stillwater Pond	12	9/15/2004						0.25	6.83						
CH-396	Stillwater Pond	12.8	9/15/2004						0.25	6.83						
CH-396	Stillwater Pond	13	9/15/2004						0.24	6.76	6.68	102.31	2.13	20.70	349	3261

Table A-2., PALS Monitoring Data for Stillwater Pond (2001-2006)

2005																
Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi (%)	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
CH-396	Stillwater Pond	0.5	9/19/2005	4	15.06	0.66	4%	7%	9.87	22.8	8.13	35.52	56.10	<0.05	22	1019
CH-396	Stillwater Pond	1	9/19/2005						9.88	22.6						
CH-396	Stillwater Pond	2	9/19/2005						9.61	22.4						
CH-396	Stillwater Pond	3	9/19/2005						7.39	22.3	6.96	36.12	26.78	1.71	22	622
CH-396	Stillwater Pond	3.5	9/19/2005						5.14	21.9						
CH-396	Stillwater Pond	4	9/19/2005						3.20	21.3						
CH-396	Stillwater Pond	5	9/19/2005						1.51	17.6						
CH-396	Stillwater Pond	6	9/19/2005						0.53	13.7						
CH-396	Stillwater Pond	7	9/19/2005						0.23	10.4						
CH-396	Stillwater Pond	8	9/19/2005						0.18	8.6						
CH-396	Stillwater Pond	9	9/19/2005						0.13	7.5	6.57	69.42	<0.05	24.69	55	1565
CH-396	Stillwater Pond	10	9/19/2005						0.21	6.9						
CH-396	Stillwater Pond	11	9/19/2005						0.26	9.7						
CH-396	Stillwater Pond	12	9/19/2005						0.26	9.6						
CH-396	Stillwater Pond	13	9/19/2005						0.26	6.5						
CH-396	Stillwater Pond	14	9/19/2005						0.26	6.4	6.64	101.30	<0.05	22.16	427	3721

2006																
Town	Pond	Depth (M)	Date	QC	Number Samples	Total Depth (M)	Secchi Depth (M)	% Secchi (%)	DO (mg/L)	Temp (°C)	pH (S.U.)	Alkalinity (mgCaCO ₃ /L)	Chlorophylla (ug/L)	Phaeophytin (ug/L)	TP (ug/L)	TN (ug/L)
CH-396	Stillwater Pond	0.5	8/23/2006		4	14.1	1.22	9%	10.10	24.5	8.86	36.32	15.27	<0.05	29	967
CH-396	Stillwater Pond	1	8/23/2006					10.19	10.19	24.4						
CH-396	Stillwater Pond	2	8/23/2006					10.10	10.10	24.0						
CH-396	Stillwater Pond	2.5	8/23/2006					8.77	8.77	23.8						
CH-396	Stillwater Pond	3	8/23/2006					2.34	2.34	23.0	7.29	36.93	25.80	<0.05	43	1037
CH-396	Stillwater Pond	3.5	8/23/2006					1.33	1.33	20.8						
CH-396	Stillwater Pond	4	8/23/2006					1.60	1.60	18.4						
CH-396	Stillwater Pond	5	8/23/2006					0.29	0.29	14.8						
CH-396	Stillwater Pond	6	8/23/2006					0.19	0.19	12.1						
CH-396	Stillwater Pond	7	8/23/2006					0.18	0.18	10.4						
CH-396	Stillwater Pond	8	8/23/2006					0.20	0.20	8.6						
CH-396	Stillwater Pond	9	8/23/2006					0.20	0.20	7.4	6.72	68.41	8.83	<0.05	67	2018
CH-396	Stillwater Pond	10	8/23/2006					0.20	0.20	7.0						
CH-396	Stillwater Pond	11	8/23/2006					0.20	0.20	6.8						
CH-396	Stillwater Pond	12	8/23/2006					0.20	0.20	6.6						
CH-396	Stillwater Pond	13	8/23/2006					0.20	0.20	6.5	6.63	76.48	7.49	1.37	218	3158



TOWN OF CHATHAM

WATER QUALITY LABORATORY



Great Hill Estate Association
c/o Mr. John Scott
97 Horizon Dr.
Chatham, MA 02633

Dear Mr. Scott:

In response to your inquiry we have sampled a number of locations around Lovers Lake to determine water quality relative to applicable swimming standards. Attached please find the results of the bacteriological test performed on Lovers Lake on August 18, 1998. The results obtained show that the sample met the Massachusetts Water Quality Criteria for recreational waters at the time of collection.

The bacterial levels at station LL-2, the ramp off Lake Shore Dr., were elevated compared to the other stations. This is most likely the result of stormwater runoff entering the pond from the ramp and adjacent roadways.

We are planning to begin a more comprehensive lake monitoring program over the upcoming winter and will most likely include Lovers Lake due to its size and connection with the herring run.

If you have any questions do not hesitate to contact me at 945-5188.

Sincerely

Robert A. Duncanson, Ph.D.
Laboratory Director

cc: Chatham Health Department

c:\ow\scott.wp

Mail: 549 Main Street, Chatham, Massachusetts 02633
Laboratory: 283 George Ryder Road, Chatham, Massachusetts 02633

(508) 945-5188
Fax: (508) 945-5163

TOWN OF CHATHAM WATER QUALITY LABORATORY RECREATIONAL WATER BACTERIAL RESULTS

Date of Collection: 8/18/98 Time of Collection: 1215-1244 Collector: R. Duncanson
 Date of Analysis: 8/18/98 Time Analysis Completed: 1410 Method of Analysis: mTEC/mEI
 Date Last Rain: 8/18/98 Amt. Last Rain: 0.54" High Tide: _____ Low Tide: _____

Lab No.	Sta. #	Location	Bather Density	Fecal Coliform /100ml	E. coli /100ml	Enterococci /100ml	Meets Recommended Standard (fecal coliform)
7171	LL-1	Lovers Lake, Old Town Ln, end	0	24	20	1	YES
7172	LL-2	Lovers Lake, Lake Shore Dr. ramp	0	130	110	5	YES
7173	LL-3	Lovers Lake, #102 Lakeshore Dr.	0	9	9	<1	YES
7174	LL-4	Lovers Lake, Lovers Lake Cir., end	0	21	21	<1	YES

Comments: _____

WX: sunny, hot; Wind 5-10mph, NW

Standards: Mass. Water Quality Criteria
 1,000 Total Coliform/100ml OR
 200 Fecal Coliform/100ml

EPA Criteria (information only)
 35 Enterococci/100ml (marine waters)
 33 Enterococci/100ml OR
 126 E. coli/100ml (fresh waters)

Laboratory Director: Robert A. Duncanson, Ph.D. Report Date: 08/24/98



TOWN OF CHATHAM



WATER QUALITY LABORATORY

Department of Environmental Protection Certification No. M-05551

SURFACE WATER BACTERIOLOGICAL ANALYSIS RESULTS

CLIENT: Great Hill Association

COLLECTOR: R. Duncanson

MAILING ADDRESS: c/o John Scott

AFFILIATION: _____

#97 Horizon Dr.

DATE OF COLLECTION: 6/30/99

Chatham, MA 02633

DATE OF ANALYSIS: 6/30/99

TELEPHONE: _____

METHOD OF ANALYSIS: mTEC

Lab. No.	Location	Coliform* /100ml	Background /100ml
7584	LL-1, Old Towne Ln, end of	50	NA
7585	LL-2, Lake Shore Dr., ramp	< 5	NA
7586	LL-4, Lovers Lake Circle, end of	< 5	NA

*~~FC~~ Fecal ND = Not Detected

COMMENTS: Swimming standard is 200 Fecal Coliform/100ml.
< = less than value shown.

Robert A. Duncanson, Ph.D. 
Laboratory Director

Report Date: 7/22/99

c:\ow\sufresul.wp 12/22/97

Mail: 549 Main Street, Chatham, Massachusetts 02633

(508) 945-5188

Laboratory: 283 George Ryder Road, Chatham, Massachusetts 02633

Fax: (508) 945-5163



TOWN OF CHATHAM



WATER QUALITY LABORATORY

Department of Environmental Protection Certification No. M-05551

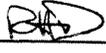
SURFACE WATER BACTERIOLOGICAL ANALYSIS RESULTS

CLIENT: Great Hill Association COLLECTOR: RAD
 MAILING ADDRESS: c/o Margaret Martin AFFILIATION: WQL
24 Horizon Circle DATE OF COLLECTION: 7/20/00
 DATE OF ANALYSIS: 7/20/00
 TELEPHONE: 945-3696 METHOD OF ANALYSIS: mTEC

Lab. No.	Location	Coliform* /100ml	Background /100ml
8299	Olde Town Lane, Lovers Lake	140	na
8300	Boatramp, Lakeshore Dr., Lovers Lk.	5	na
8301	Lovers Lake Circle, Lovers Lake	<5	na

~~XXXX~~ Fecal ND = Not Detected

COMMENTS: = less than value shown. na = not applicable.
Swimming standard is 200 fecal coliform per 100ml.

Robert A. Duncanson, Ph.D. 
 Laboratory Director

Report Date: 7/21/00

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Mail: 549 Main Street, Chatham, Massachusetts 02633

(508) 945-5188

Laboratory: 283 George Ryder Road, Chatham, Massachusetts 02633

Fax: (508) 945-5163

