Prepared for: Normanoch Association
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Ecosystem Consulting Service, Inc.
July 17, 2009

Culver Lake – Status 2009 (a brief mid-summer report)

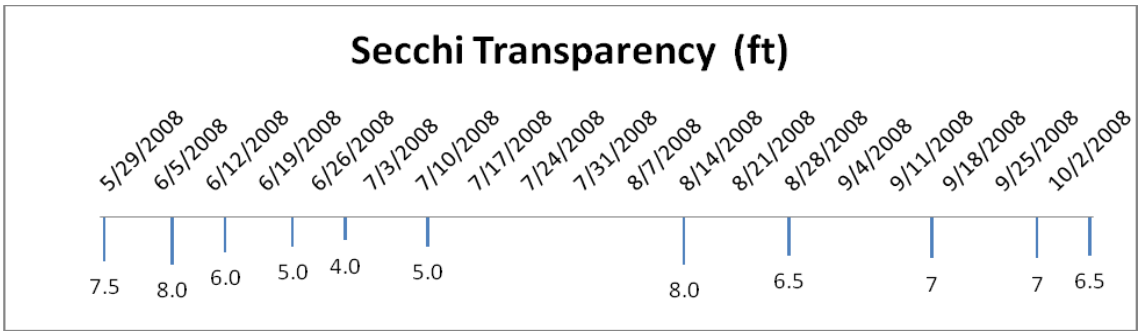
A new airflow distribution manifold was installed to increase stability of airflow to each aeration component and make re-starts following storm outages easier and more consistent.

The new anchor weight was deployed and the second Layer Aerator was put back into service. This work encountered a number of challenges, water depths for launching the weight, additional buoyancy needed to maintain upright positioning during outages. After much under water work the system was completed and put back into service.

Alewife: During the deployment of the new anchor weight at dusk, a number of schools of alewife were observed moving along the shore in shallow water. A cursory review of collected samples, and review of recent years' trends suggest that large-bodied Cladocera are becoming more rare again. The alewife population may be increasing again, since terminating the annual hybrid striped bass stocking program.

Secchi Transparency (ft)			
5/15/2009	6/4/2009	7/3/2009	7/10/2009
7.8	6.5	3.3	3.0

2008 Below



Transparency has been similar this year to 2008. However, water clarity decreased earlier and transparency declined a bit more.

Total Phosphorus as P (ug/L)			
Depth (m)	15-May	15-Jun	
1	28	25	
3		23	
5		14	
7	18	12	
9		12	
12	19	29	
14		118	

2009: Total phosphorus is slightly higher in the surface water than during 2008. This does not appear to be due to internal loading, oxygen loss, etc., since TP has remained relatively low below 3 meters. The algae may have initiated growth deeper in the water column and ascended. In 2008 the Controlled Mixing Diffuser Module (CMD) was activated to cool/dilute the surface layer. With the poor light penetration it may be prudent to activate the CMD earlier, using some of the airflow being sent to the Layer units (keeping the hypolimnetic aerator the same.

2008

	Total Phosphorus as P (ug/L)						
Depth (m)	25-Jun	23-Jul	2-Sep	14-Oct			
1	22	17	16	19			
3	22	20	16				
5	12	13	17				
7	11	9	20	13			
9	11	20	13				
12	34	31	121	15			
14		363	502				

Ammonia as N (ug/L)			
Depth (m)	15-May	15-Jun	
1	149	0	
3		0	
5		0	
7	84	0	
9		0	
12	149	32	
14		545	

Ammonia-N was also relatively high in mid-May, which can also stimulate additional algae. This may also be related to an increased alewife population, or a variety of other sources.

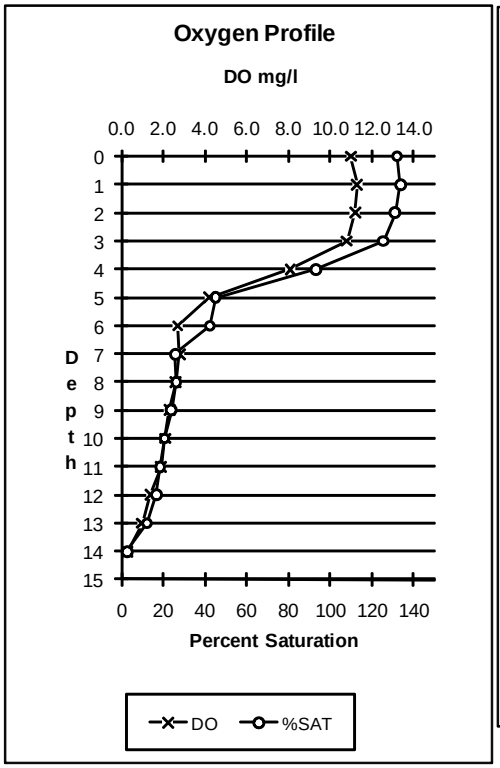
Culver Lake

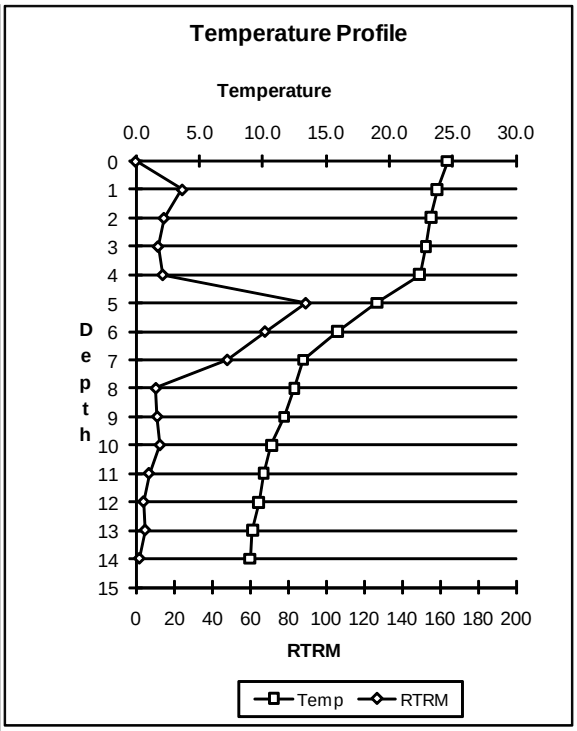
900 N

Date	7/3/2009		72'
SECCHI	3.3	*Feet*	sun,clouds
Anoxic Boundry	13.00	*meters*	Tom
Sum RTRM	325		1:40PM

Depth	*Temp*	*DO*	*%SAT*	*RTRM*	*RVG*
0	24.6	11.0	132	0	0
1	23.8	11.3	134	25	32
2	23.3	11.2	131	15	20
3	22.9	10.8	126	12	16
4	22.4	8.1	93	14	20
5	19.0	4.2	45	90	136
6	15.9	2.7	42	68	124
7	13.2	2.8	26	48	191
8	12.5	2.6	26	11	60
9	11.7	2.3	24	11	68
10	10.7	2.1	21	13	86
11	10.1	1.9	19	7	51
12	9.7	1.4	17	4	34
13	9.2	1.0	12	5	43
14	9.0	0.3	3	2	17

ORP





Legend	
DO	Dissolved Oxygen Concentration
RTRM	Relative Thermal Resistance to Mixing
%SAT	DO Saturation as a function of Temperature
RVG	Relative Viscosity Gradient

Culver Lake

900 N

Normanoch Association
Data Services Division

Date	7/10/2009		80F
SECCHI	3.0	*Feet*	sun,clouds
Anoxic Boundry	12.86	*meters*	Paul,Iam,Tom
Sum RTRM	401		1:21PM

Very green **Starting to come to surface.**

Depth	*Temp*	*DO*	*%SAT*	*RTRM*	*RVG*	ORP
0	26.9	9.4	118	0	0	
1	23.5	10.8	127	108	136	
2	22.8	10.2	118	21	28	
3	22.6	9.6	111	6	8	
4	22.0	6.2	71	17	24	
5	19.5	3.1	34	66	100	
6	15.7	1.8	31	84	152	
7	13.7	2.4	17	36	140	
8	13.0	2.5	23	11	60	
9	12.4	2.3	23	9	51	
10	11.6	1.5	21	11	68	
11	10.6	1.6	13	13	86	
12	10.1	1.6	14	6	43	
13	9.5	0.9	14	6	51	
14	8.9	0.2	2	6	51	

The last two samplings exhibit high % oxygen saturation – indicating a high degree of photosynthetic activity (i.e. lots of algae growth). However, % saturation decreased the last week (hopefully this indicates the "bloom" peaked and transparency will increase some – like last year). When there is abundant algae, and poor light penetration, deep oxygen demands increase. Activation of the CMD unit earlier this year may be warranted.

Suggestions:

- Consider activating the CMD Module to mix down to approximately 20 ft. Perhaps activate it a week-on, week-off, and used monitoring data to guide operations.
- Consider re-instating the striped bass stacking program next year, and reduce total annual stock rate if forage base appears to decline (rather than stopping the stocking program entirely).
- Plan to do a Winter Circulation Treatment again next winter (information attached)

Sincerely,

Robert W. Kortmann

Robert W. Kortmann, Ph.D.