

Bottom Aeration Assessment for Ponds 6 & 7

Cole Hulon, Foster Lake and Pond Management

Overview

Foster Lake and Pond Management (FLPM) began a pond maintenance program with a new HOA in March 2017. On March 22, 2017 an initial assessment of the muck layers was done in pond 6 and pond 7. Pond 6 had an existing aerating fountain centered in the middle of the pond. Pond 7 had a diffused aeration head installed in April of 2017 with no existing aeration prior to the installation. During monthly pond maintenance, a muck reducing bacteria, made by Naturalake Biosciences, was also added to each pond. FLPM added the MD Pellets at a rate of 10 pounds per acre, per month when water temperatures were above 60 degrees. On May 21, 2018, 1 year after starting, sampling of the muck layer was completed. This report will review the results from the last sampling and compare bottom aeration to fountain aeration.



Pond 6: Classic aerating fountain; 0.23 ac



Pond 7: One diffuser head from bottom aeration; 0.11ac

Materials and Methods

Pond 6 located uphill from pond 7 is not connected to pond 7. Pond 6 had an existing $\frac{1}{2}$ horse power aerating fountain that was previously installed 2+ years prior to the study taking place. Aerating fountains like this model pull water from just below the surface and force it through a nozzle to create a trumpet pattern. The fountain creates tension on the surface of the pond, allowing the transfer of oxygen into the water primarily at the surface.

Pond 7 did not have any type of aeration in the pond prior to the study. A diffuser head from a compressor was added to the pond after the initial sampling of the pond for this study. Diffused aeration uses a compressor located on the shoreline of the pond to push air through hoses to the diffuser head placed at the bottom of the pond. The air is pushed through air stones, creating small bubbles that transfer oxygen as they move through the water. Tension is also created at the surface of the pond allowing for oxygen to transfer through surface tension as well.

The upward force of the bubbles causes a constant mixing of the pond water from the bottom to the top. This mixing causes the entire body of water to become oxygenated and greatly reduces stratification.

MD Pellets made by Naturalake Biosciences are beneficial bacteria designed to reduce muck layers in ponds over time. A medium rate of 10 pounds per acre is a normal rate to be added once a month to ponds for faster muck reduction. This bacterium was added to both pond 7 and pond 6 each month while the water temperature was above 60°F. Once the water temperatures get below 60 degrees, the bacterium is inactive and not necessary to be added.

Two PVC poles were used to measure the depths of the pond and muck. The poles were marked at one-inch intervals to determine depth. One of the poles was fitted with a flat bottom to reduce sinking into the muck layer and the other was cut to have a pointed end that with easily move through the muck. Both were sampled simultaneously in the same spot. The depths were recorded and analyzed to determine differences in depths of the water and depths of the hard bottom. The muck layer was found by subtracting the depths to the hard bottom by the depth to the start of the pond muck. This sampling was done 8 times in both ponds to get an average throughout each pond. The average from the initial sampling and the average from 1 year after sampling was taken to finalize results.

Results

Pond 6 started at an average of 5.625 inches of muck on the bottom of the pond. After 1 year of continuing the fountain aeration and adding MD Pellets the average muck layer reduced to 4.75 inches. This is a difference of 0.85 inches of muck in one year.

Pond 7 started at an average of 6 inches of muck on the bottom of the pond. After 1 year of bottom aeration and adding MD Pellets to pond 7 the average muck layer reduced to 3.5 inches. This is a difference of 2.5 inches of muck in one year.

There was a difference of 1.65 inches of reduction between the two ponds. This significant difference would suggest the that adding diffused aeration to a pond can help to increase the muck reduction with help from MD pellets faster than using fountain aeration with help from MD pellets.

Exhibit A

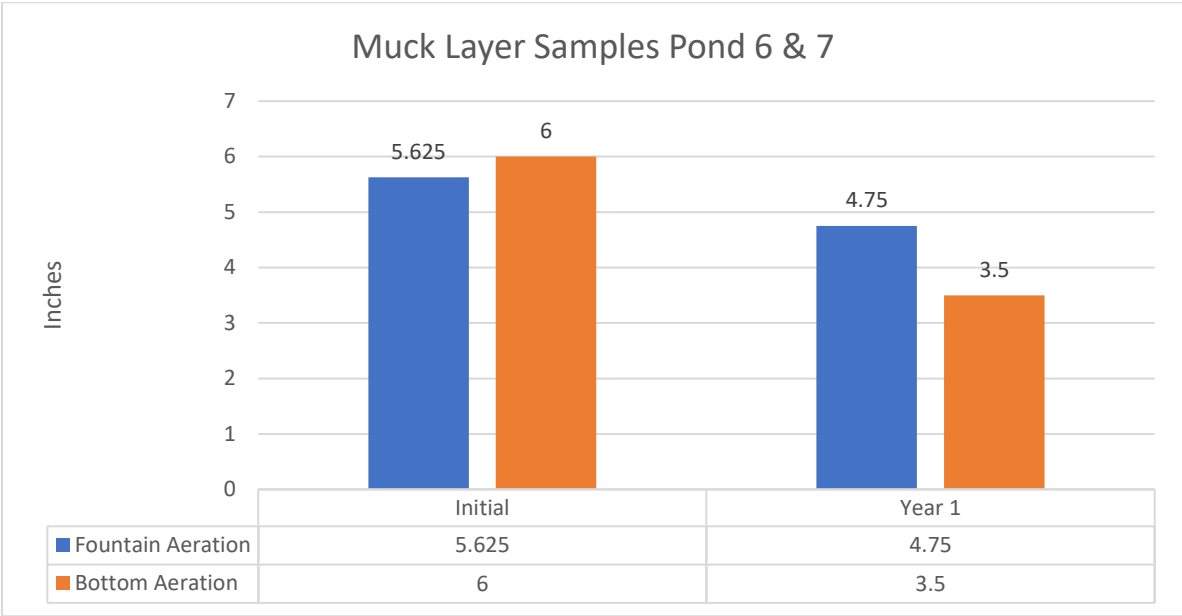


Exhibit B

3/22/20 17	Initial measurement of Muck Layer			5/21/20 18	1 year of adding MD pellets	
Pond 6	(Using Fountain Aeration)			Pond 6	(Using Fountain Aeration)	
Depth (in)	Hard bottom depth (in)	Muck Layer (in)		Depth (in)	Hard bottom depth (in)	Muck Layer (in)
58	62	4		59	62	3
62	66	4		58	65	7
60	65	5		65	69	4
62	69	7		66	71	5
62	70	8		63	70	7
61	65	4		66	70	4
59	64	5		67	70	3
58	66	8		66	71	5
	Average	5.625			Average	4.75
Pond 7	(Using bottom aeration)			Pond 7	(Using bottom aeration)	
Depth (in)	Hard bottom depth (in)	Muck Layer (in)		Depth (in)	Hard bottom depth (in)	Muck Layer (in)
45	51	6		44	50	6
50	53	3		46	51	5
52	58	6		50	52	2
56	65	9		51	53	2
51	58	7		53	56	3
48	53	5		57	61	4
43	50	7		58	61	3
36	41	5		56	59	3
	Average	6			Average	3.5