



A Study of Naturalake Bioscience's MD Pellets on Two Small Northeast Ohio Ponds

Edward J. Kwietniewski, Matthew Mayher, Bobby Joe Rhodes
 AQUA DOC Lake and Pond Management, Chardon, OH



Introduction and Goal:

Introduction

Pelletized bacterial products are an exciting and relatively new technique to reduce benthic organic build-up found in ponds via enhancement of decomposition processes. One product in particular, Naturalake Bioscience's MD pellets seem to have heightened potential to decrease these materials. The benefit of this is a potential substitute to expensive and aggressive dredging operations which have historically been the only effective way of organic sediment removal from waterbodies.

Goal

The goal of this study was to assess the effectiveness of MD pellets to reduce benthic organic substrate in two Northeast Ohio ponds (Figures 1 & 2).



Figures 1 & 2: Images of the two sample ponds used during this study. Both have aeration and are surrounded by sources of organic materials.

Table 2: bathymetric information relevant to the study pre- and post- treatment for Pond

Pre-Treatment	Post-Treatment
0.05 SA	0.05 SA
Max Water Depth = 5.0 ft	Max Water Depth = 6.0 ft
Average Water Depth = 2.5 ft	Average Water Depth = 2.8 ft
Average Sediment Depth = 1.7 ft	Average Sediment Depth = 0.90 ft
136 yds ³ sediment	73 yds³ sediment

Table 3: bathymetric information relevant to the study pre- and post- treatment for Pond

Pre-Treatment	Post-Treatment
0.09 SA	0.09 SA
Max Water Depth = 5.0 ft	Max Water Depth = 5.0 ft
Average Water Depth = 2.7 ft	Average Water Depth = 2.7 ft
Average Sediment Depth = 1.4 ft	Average Sediment Depth = 1.1 ft
208 yds ³ sediment	156 yds³ sediment

Methods:

Bathymetry

- Pond size determined through the use of a range finder and satellite imagery.
- Sediment build-up determination accomplished through the use of a sediment probe along individualized standard grids (30 minimum; Figure 3).
- Probing was conducted at the same gridded location pre as well as post treatment.

Treatment

- Treatment rates of MD pellets were 2.5 lbs initial and 1.25 lbs thereafter for Pond A and 5.0 lbs initial and 2.5 lbs thereafter for Pond B. Treatments were applied on a biweekly basis from June until October.

Analysis

- Post-data collection, water and sediment depth were recorded in depth profiles at each corresponding transect where color coding indicated trends in water and sediment depth (Table 1).

Results and Conclusions:

Results

- Organic sediment build-up in Pond A was found to have been reduced by approximately 63 yds³ (46% reduction; Tables 2 and 3) while Pond B was found to have been reduced by 52 yds³ (25% reduction).
- Both reductions were found to be statistically significant via Welch two sample t-test (Pond 1: $t = 4.13$, $p\text{-value} = 0.0002$, $\alpha = 0.05$; Pond 2: $t = 2.75$, $p\text{-value} = 0.007$, $\alpha = 0.05$)
- The average sediment depths of the two ponds were reduced by 0.8 ft and 0.3 ft for Pond A and B respectively.
- The max depth of Pond A also was shown to increase by 1.0 ft with a measurable increase in average depth as well (0.3 ft). Pond B did not show any measurable change in max depth or average depth.

Conclusions

Based on the findings of this study, it would appear as though the use of MD pellets effectively reduced benthic organic substrate from the two test ponds. Additional studies should be conducted however to determine sources of variability from one water body to another and to create necessary models to allow for effective rate changes.

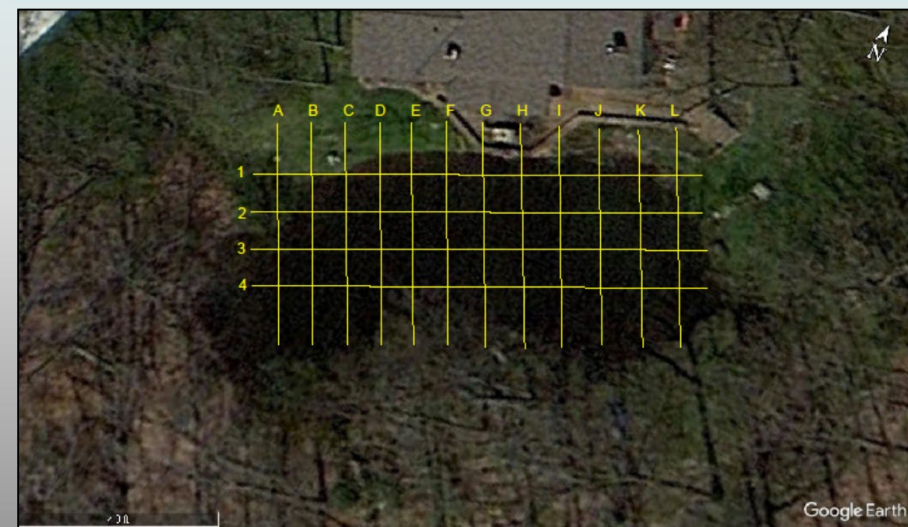


Figure 3: Pond 2 gridded for sediment probing.

Table 1: Water and sediment depth data example for Pond 2 (pre-treatment) .

ft	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Depth	0.50	1.00	2.50	3.50	3.00	3.50	3.00	3.00	2.50	1.00		
	Sed.	1.50	1.00	0.50	1.00	1.00	1.00	1.50	1.50	2.00	1.50		
2	Depth	1.00	1.00	4.00	4.00	4.00	4.50	4.00	4.50	4.00	3.50	0.50	
	Sed.	2.50	3.00	1.00	0.50	0.50	1.00	2.00	2.00	2.00	1.50	3.00	
3	Depth	0.50	2.00	3.50	4.00	4.50	4.50	5.00	4.50	4.50	3.50	3.00	0.50
	Sed.	2.00	1.50	1.00	1.00	0.50	1.00	1.00	1.50	1.50	2.00	2.00	2.50
4	Depth	0.50	2.00	2.00	2.00	2.50	2.50	2.00	2.00	2.00	1.00	0.50	
	Sed.	2.00	1.00	1.50	1.00	0.50	1.00	1.00	1.00	1.00	2.00	2.00	
Avg Water Depth =				2.70 ft									
Avg Sediment Depth =				1.40 ft									
Total Sediment (1.4 ft sed. x 0.09 SA) =				0.13 ac-ft									
Total Sediment (0.13 ac-ft x 1615 yd ³ /ac-ft) =				208 yd ³									