

Muck Reduction Application Using MuckBiotics Tablets in a Northern Wisconsin Lake

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SUMMARY

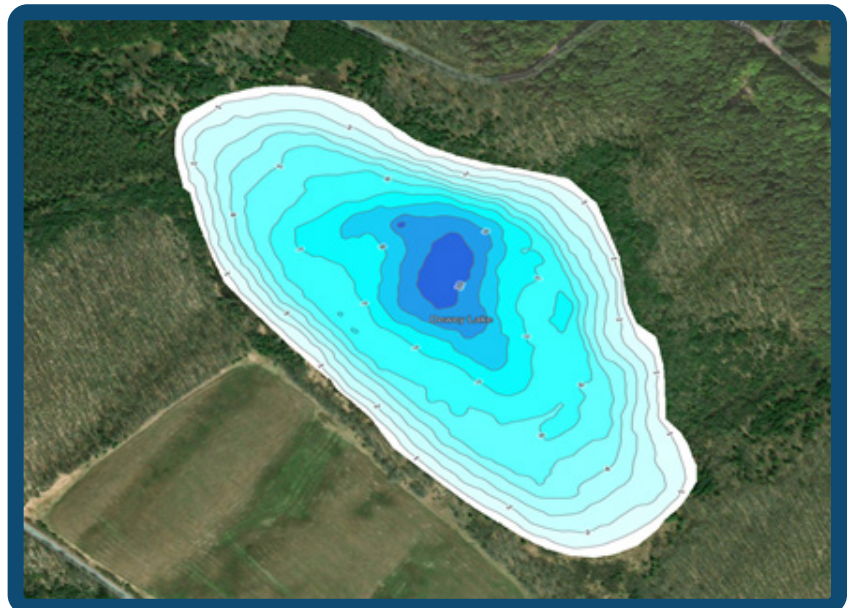
MuckBiotics tablets were evenly applied to a lake in northern Wisconsin to help reduce the muck. The sediment was high in organics and these organics were throughout the majority of the lake. A muck survey was conducted at 26 locations prior to each treatment resulting in 8.663 inches of removal.

OBJECTIVE

The objective of the MuckBiotics Tablet treatment was to decrease organic sediment in the lake with the goal of sediment reduction of 12 inches. The property owner wanted to improve the fishery. Reducing organics would not only make the lake healthier but it would increase water volume, expose more habitat, and increase the available spawning areas for fish.

SITE

The project site is a 48 acre lake in Vilas County, Wisconsin. The max depth is 11 feet with a variety of species of native aquatic plants. Woody debris, and rocks/boulders mainly on the west central and north east shorelines make up the remainder of the substrate. The shoreline is owned by one property owner and there is no public access.



MUCK ANALYSIS AND SURVEY

In 2020 a composite sample of muck was collected throughout the lake using an Eckman Dredge in order to determine the percent organics in the sediment. Organic percent in the sediment sample was 45%. The results of the sediment sample determined that MuckBiotics would be a good option at reducing the amount of sediment in the lake. A pre-treatment survey was conducted in 2020 at 26 locations as a baseline. Water depth and depth of sediment was recorded at each of these locations during the initial survey. A depth to sediment survey was conducted at each of these locations prior to each treatment to determine the amount of muck removed from the previous treatment. A ruler was placed in the lake to document water levels during each visit. The lake water levels fluctuated throughout the project. Water levels were important to document and account for in order to get an accurate comparison of muck removed. Depth of water in inches from the surface to the top of the sediment was recorded. The amount of muck removed was determined by taking the depth of water, adjusting the depth to account for water levels and comparing the pre-treatment depth to the depth of water at each visit.



APPLICATION

MuckBiotics Tablets were applied in September 2020, June, July, August, and September of 2021. 1800 pounds of Muck Biotic Tablets were applied during the initial application in September of 2020 and 1500 pounds each application in 2021.

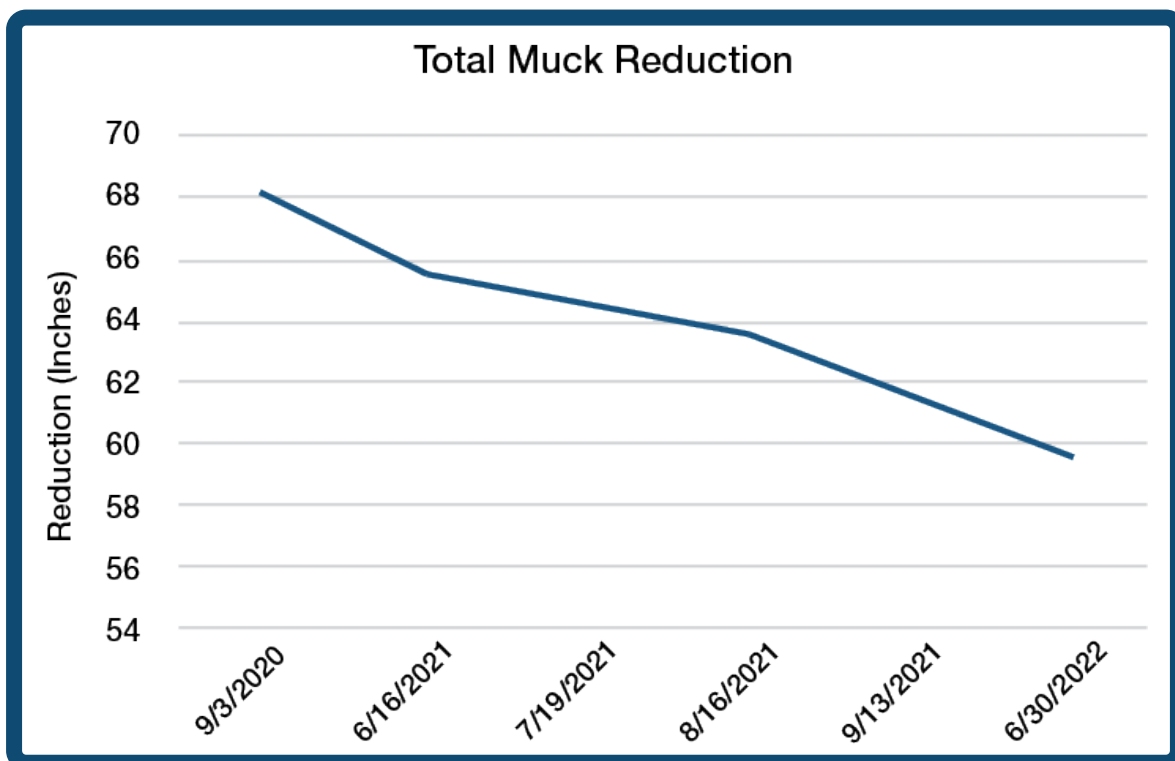
MuckBiotics Tablets were applied using a boat mounted blower with a hopper. We used this technique to get the most even coverage possible. Tablets were hand applied near the access point and any other areas near shore that was too shallow for the boat motor to operate.

RESULTS

The initial application that occurred in September of 2020 yielded a reduction of muck by 2.615 inches. The first survey was conducted on June 16, 2021, also the same day as the second application. The following applications from June 2021 to September 2021 resulted in 1.019, 1.025, 1.937, and 2.067 inches of muck reduction respectively. The survey from the final application in September 2021 was conducted in June of 2022. There was a total average of 8.663 inches of reduction of muck throughout the lake after 5 treatments of MuckBiotics.

The lake has an aeration system consisting of 12 diffusers. This aeration system was installed to ensure an area for year round oxygen for the fish population. Three of the application points were within this aerated area of the lake. These three areas consisted of 9.125, 11.125, and 13.125 inches of much removal. The survey point with 13.125 inches of removal was the most of any point in the lake.

to operate.



Date	Average Muck Removed (inches)
6/16/2021	2.615
7/19/2021	1.019
8/16/2021	1.025
9/13/2021	1.937
6/30/2022	2.067
Total	8.663

CONCLUSION

The MuckBiotics tablets work well in an aquatic environment with a large organic sediment composition. Although our goal was 12 inches of removal, we still achieved 8.663 inches which is equivalent to 6,451 cubic yards or 430 dump truck loads (using an average of 15 cubic yards per load). The property owner considered dredging the lake. Dredging, dewatering, and removal, would have been much more costly than applying MuckBiotics. Aeration and adequate oxygen is important and can help increase and or speed up the aerobic bacteria activity and consumption of organics. The data indicates that one of the survey locations within the aerated area had 2 more inches of removal than any other survey point.

The initial application yielded the most muck removed. Even though the second survey resulted in the lowest amount of muck removal, we increased from treatment 2 through 5. I believe we would continue to increase had another treatment occurred. It takes time for the beneficial bacteria population to change and I believe this change was starting to be seen after each treatment.

Date	9/3/2020				6/16/2021	7/19/2021	8/16/2021	9/13/201	6/30/2022
GPS Location	Water Depth (ft)	Water Depth (in)	*Lake Water Level (in)	Muck Depth (ft)	Muck Removed (in)	Muck Removed (in)	Muck Removed (in)	Muck Removed (in)	Muck Removed (in)
157	4.417	53.000	40.000	2.000	2.000	0.750	0.563	3.937	0.875
158	5.500	66.000	40.000	3.000	0.000	-0.250	2.563	1.937	4.875
159	6.660	80.000	40.000	10+	-1.000	0.750	2.563	0.937	1.875
160	7.083	85.000	40.000	9.500	4.000	1.750	0.563	-0.063	2.875
161	5.583	67.000	40.000	1.670	2.000	-0.250	0.563	1.937	3.875
162	5.500	66.000	40.000	1.000	4.000	-0.250	0.563	1.937	1.875
163	6.750	81.000	40.000	7.500	6.000	1.750	-0.437	1.937	1.875
164	8.500	102.000	40.000	7.000	0.000	-0.250	2.563	1.937	0.875
166	9.330	112.000	40.000	6.000	5.000	-0.250	1.563	1.937	2.875
167	7.416	89.000	40.000	10+	5.000	2.750	0.563	-0.063	0.875
168	6.750	81.000	40.000	3.833	1.000	0.750	0.563	0.937	1.875
169	5.666	68.000	40.000	0.500	1.000	-0.250	-1.563	0.937	0.875
170	7.250	87.000	40.000	9.500	1.000	5.750	-0.437	1.937	1.875
171	4.833	58.000	40.000	1.500	1.000	1.750	0.563	4.937	1.875
172	6.666	80.000	40.000	10+	6.000	-0.250	0.563	1.937	1.875
173	9.166	110.000	40.000	10+	4.000	1.750	0.563	0.937	1.875
174	8.583	103.000	40.000	10+	2.000	-0.250	6.563	1.937	0.875
176	7.833	94.000	40.000	10+	-1.000	-0.250	0.563	0.937	3.875
177	8.083	97.000	40.000	10+	2.000	2.750	0.563	2.937	0.875
178	6.250	75.000	40.000	4.000	2.000	4.750	0.563	1.937	1.875
179	6.080	73.000	40.000	3.500	8.000	-0.250	0.563	2.937	1.875
180	5.330	64.000	40.000	1.830	4.000	-0.250	1.563	1.937	1.875
181	5.000	60.000	40.000	2.000	2.000	1.750	0.563	2.937	2.875
182	4.750	57.000	40.000	2.500	5.000	-0.250	-0.437	3.937	0.875
183	4.083	49.000	40.000	7.500	2.000	0.750	0.563	1.937	1.875
184	4.583	55.000	40.000	3.500	1.000	1.750	0.563	0.937	3.875
					2.615	1.019	1.025	1.937	2.067