

Introduction and Objective:

Introduction

Muck-reducing bacterial pellets are an innovative, relatively new treatment option for lake and pond owners to reduce organic material build-up along the benthic layer of their water body. Organic material reduction is achieved by bolstering populations of microbial decomposers along the substrate. MuckBiotics pellets are Naturalake Bioscience's newest iteration of pelletized bacterial product. One of the major potential benefits of this treatment method is the ability to proactively extend the length of time until dredging becomes a necessity for a water body. This could both save lake and pond owners money as well as extend the window in which they can accumulate funding for necessary dredging. Figure 1 shows an aerial photo of the study site.

Objective

The goal of this study was to assess the effectiveness of MuckBiotics pellets in reducing organic substrate of a Northwest Ohio lake.

Results and Conclusions:

Results

- Mean water depth increased from 7.06 ft to 8.08ft
- Mean sediment depth decreased from 3.29 ft to 2.64 ft
- Change in mean sediment depth was significant ($p < 0.05$, $t = 3.10$, $df = 35$)
- Total sediment decreased from 26580 yds³ to 21309 yds³

Conclusions

There is evidence that sediment depth decreases after the use of MuckBiotics pellets. It is important to note, however, that the nature of our sampling technique likely introduces some degree of human error. Further treatment has already been planned for the 2023 sampling season, which will increase our ability to test this product's effectiveness and strengthen our current dataset. Hidden Harbour, the lake sampled in this study, is also not at a point where dredging may be required, making it an ideal waterbody for testing proactive muck reduction strategies.



Figure 1: Area of the lake in which the study took place.
Photo by Michael Bruhl.



Figure 2: Treatment area gridded for sediment probing.

Methods:

Water and Sediment Depth Surveying

- Sample area was chosen based on prior sediment depth analysis that indicated that sediment accumulation in this area of the lake was the most susceptible to potential microbial breakdown.
- Sediment build-up calculated through the use of a sediment probe along transects of a 75x75 ft grid within a predetermined sampling area both before and after treatment (Figure 2).

Treatment

- Treatment rates of pellets were 420 lbs on 6/29/22 followed by 330 lbs on 7/28/22 for a total of 750 lbs.

Analysis

- A paired t-test was performed to compare mean sediment depth before and after application of pellets.
- Statistical analysis was done using R statistical software.

Table 1: Water and sediment depth data collected before and after treatment.

Parameter	Pre-Treatment	Post-Treatment
Area (acres)	5	5
Max Water Depth (ft)	9.0	11.0
Mean Water Depth (ft)	7.06	8.08
Mean Sediment Depth (ft)	3.29	2.64
Total Sediment (yds ³)	26580	21309