Sanctuary Housing Development Utilizes MICROBE-LIFT® Technology on Seven Lakes in Jacksonville, FL

Location: Sanctuary Housing Development, Jacksonville Beach, FL

Background: After a dramatically successful remediation of a pond in their upscale housing development using MICROBE-LIFT® technology, the management of this development chose to treat all the lakes within its borders.

MICROBE-LIFT® technology is incorporated into a series of bioremediation products developed and manufactured by Ecological Laboratories inc. This series includes the following formulations designed for lake or pond treatment:

- MICROBE-LIFT®/PL – for organic removal
- MICROBE-LIFT®/SA – for bottom solids reduction
- MICROBE-LIFT®/PDB – professional dry blend for leaves & twigs
- MICROBE-LIFT®/BARLEY (BSP) – binds nutrients

Initially it is important to first inspect pond and lake conditions by assessing water quality (nutrients and organics) and measure bottom solids to assess cause of pollution to determine proper product application. Establish baseline data for water clarity, pH, nutrient levels and presence of algae. Once the analysis is completed, a treatment plan is developed. General application rates per surface acre are listed below:

Product	Initial Dose	Weeks 3 - 5 Weekly Dose	Maintenance Dose (Monthly)
MICROBE-LIFT/PL	10 Gal	2 Gal	2 Gal
MICROBE-LIFT/SA	3 Gal	1 Gal	¼ Gal Based on Bottom Solids
MICROBELIFT/PBD	20 - 8 oz Packets	4- 8 oz Packets	2- 8 oz Packets
MICROBE-LIFT/BSP	40 Lbs	See Application Chart	See Application Chart

Fig. 1: *Dosage rates per acre/by product. Note that application rates may vary depending on site conditions.*

This development had a total of seven lakes and three creeks with a total surface area of 8.5 acres. The waters were all brackish with salinity between 10 and 17 ppt. The Intracoastal Waterway fills three lakes directly through creeks at high tide. The lakes are created by weirs that stop the water flow on outgoing tides. Another three lakes are fed directly from the Intracoastal Waterway annually during storm season through breaching the spillway systems. Lake number seven is totally landlocked. All lakes have loading from storm drains, watering from lawn-care companies, run-off, and natural debris. The homes are close to the waterways, some as close as four feet.

The following picture shows the position of the lakes and the general location of the homes. Lake two was the first lake treated with "before" pictures taken in February 2007 and “after” pictures taken in October 2007, eight months later.

Fig. 2: *Aerial view of the property showing all lakes to be treated, the location of homes, and the relationship to the Intracoastal Waterway.*

Each lake was assessed and treatment modified slightly based on conditions of each lake. Overall objectives are to decrease or eliminate surface scum of oils and green water events, reduce bottom solids and organic debris, and improve water clarity.

Results Achieved: Lake #1:

This is a 2-acre lake with a spillway to the Intercoastal Waterway connected by two culverts that will backflow in the event of storms. While there was a healthy, beneficial population of natural plants growing in the southwest corner of the lake, there was erosion along the entire west bank. There was moderate nutrient loading from lawn care companies, run-off and natural debris. This lake had a history of moderate algae blooms

Fig. 3: *Overview of Lake #1.*

The pictures below show the condition of Lake #1 before and after treatment. The first set of pictures show the north shore of the lake.

Fig. 4: *These are pictures of before treatment (left) and after treatment (right). These are views of the north side of lake #1. Surface scum on the left has been completely removed.*

Fig. 5: *These pictures show the removal of organic pollutants that were so evident prior to treatment in the pictures on the left versus the clear water in the right set of pictures resulting from* MICROBE-LIFT® *treatment. This is the south shore of lake #1.*

Results Achieved: Lake #2:

Lake #2 is a 2-acre lake connected to Lake #1 by one culvert. Heavy loading from lawn care companies, run-off, natural debris, and development on the east bank have degraded the water quality. There is no Intercoastal Waterway.

Fig. 6*.: Aerial view of lake #2*

Fig. 7: *Based on "before treatment" pictures on the left and "after treatment" pictures on the right,* MICROBE-LIFT® *treatments were very successful in #2.*

Fig. 8: Additional "before" (left) and "after" (right) pictures of lake #2.

Results Achieved: Lake #3:

Creek and Lake #3:

The creek and Lake #3 make an hourglass shape as seen on the right of this aerial view. This lake is fed by a creek from the Intercoastal Waterway transferring under the road as seen by the white section in this view. The creek is impaired at low tide by accumulated bottom solids of approximately 3 ft. Moderate load from lawn care and heavy load of natural debris are targeted for remediation.

Fig. 10: **Lake #3** *also shows dramatic results from* MICROBE-LIFT® *treatment. Pictures prior to treatment on the left show organic ssurface pollution and scum, which is no longer present in pictures of treated lake on the right.*

Fig. 11: *The adjoining creek also showed benefits of treatment.*

Results Achieved: Lake #4:

Creek and Lake #4:

This one-acre lake is fed by a tidal creek from the Intercoastal Waterway. It is an elongated lake with the creek running under the white section in this aerial view. Heavy bottom solids have accumulated on the eastern section of the lake. There is good flow from the tidal creek to the Intercoastal Waterway.

Fig. 12: *Aerial view of Lake #4 and the creek feeding it.*

Fig. 13: Before and after pictures show results of treatment in Lake #4. Surface scum visible in "before" pictures on left are no longer visible and water clarity has substantially improved. Bottom solids have also been reduced.

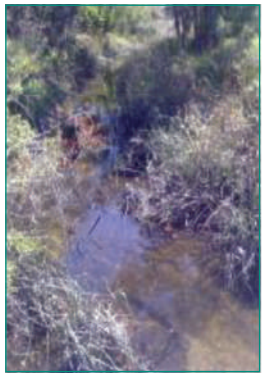
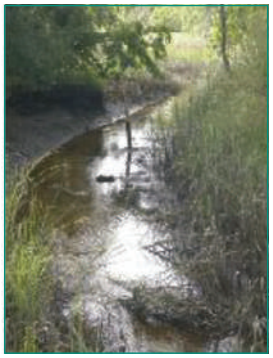


Fig. 14: Likewise the river responded to treatment with less scum and dramatically increased water clarity.



Results Achieved: Lake #5:

Creek and Lake #5:
This is a 0.75-acre lake with a tidal stream that connects to the Intercoastal Waterway. Both the lake and creek have moderate to heavy bottom solids. There is a heavy load from the accumulation of natural debris.

Fig. 15: *The aerial view on the right shows the lake and the channel to the Intercoastal Waterway.*

Fig. 16: *Pictures below on the left prior to treatment show scum, turbidity, and debris that is no longer present in pictures on the right taken after treatment.*

Fig.17: *Before (left) and after (right) pictures of the creek.*

Fig. 18: *Additional pictures of the creek associated with Lake 5 show the increased clarity of water after treatment (right) as opposed to those taken prior to treatment (left). The major benefit was reduction in bottom solids, which provides additional turbidity to be degraded.*

Results Achieved: Lake #6:

Lake 6:

Lake 6 is a 1.5-acre lake with a spillway that flows into a creek totally obstructed by accumulated bottom solids that are overgrown with vegetation. This lake experiences moderate loading from lawn care, nutrient run off and natural debris.

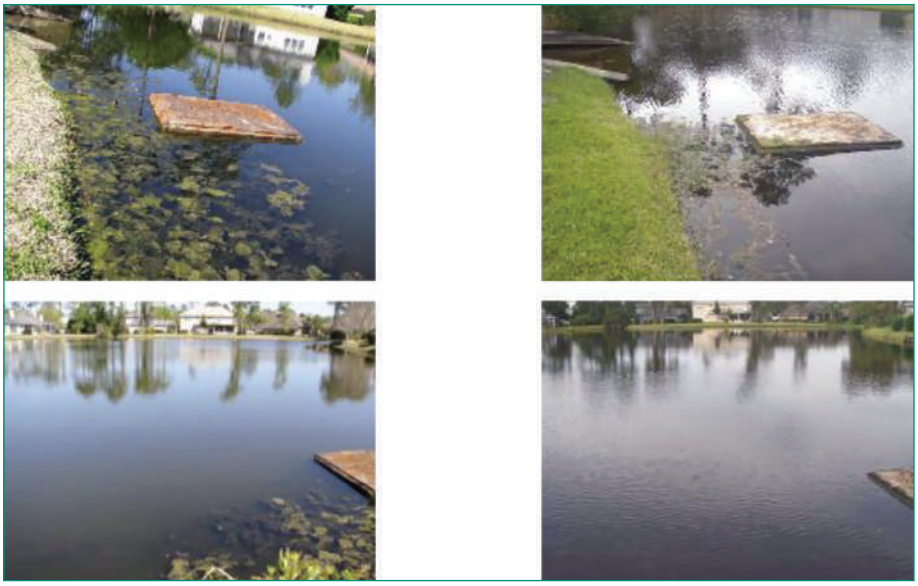


Fig. 19: *Note the scum in pictures of untreated lake (l eft), which are dramatically reduced or eliminated with treatment (right).*

Results Achieved: Lake #7:

Lake 7:

A 0.75-acre lake connected to storm drains from the street, this lake has no connection to the Intercoastal Waterway. There is a great natural wetland on the southern edge of the lake. This lake still suffers from collected debris and increased nutrients from nearby homes.

Interestingly, MICROBE-LIFT® technology was able to remediate all seven lakes in spite of heavy influx of seawater and homes very close-by with associated debris and run off of harmful home care chemicals including fertilizer and pesticides. MICROBE-LIFT®'s reduction of bottom solids helps restore the natural and bioaugmented restorative powers of such waterways allowing reduction of dosage to maintenance levels for continued remediation.

Fig. 20: *Pictures demonstrate improved surface cleanliness and improved water clarity.*

For more information on MICROBE-LIFT® Technology contact
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