BIOTIFX®
WASTEWATER TREATMENT

BIOTIFX® ULTRA REDUCES SLUDGE AND INCREASES RETENTION TIME IN LAGOONS IN SERIES

SUMMARY

A municipality treated their primary lagoon for sludge digestion with Biotifx® ULTRA and had additional benefits cascade into their second lagoon. The goal of this bioaugmentation treatment was to improve the rate of sludge digestion and save money compared to mechanical dredging, dewatering, and disposal. After one year of treatment with Biotifx® ULTRA, the system gained **12.3 days of hydraulic retention time** and saved **$185,700 compared to mechanical dredging.**

BACKGROUND

The municipality had an activated sludge system followed by a series of lagoons, here referred to as Lagoon 1 and Lagoon 2. The system received 300,000 gallons per day (GPD) of wastewater. After primary treatment in the activated sludge system, the water was polished through the series of lagoons to remove total suspended solids and additional nutrients. The lagoons had accumulated a significant amount of sludge, and at the time of treatment, Lagoon 1 would have required physical dredging.

The lagoon sludge profile was surveyed by a third party to determine a baseline of sludge accumulation. The survey found that sludge in the lagoon had built up enough that hydraulic retention time (HRT) was severely limited. HRT had been reduced by 50% in Lagoon 1 and by 17% in the subsequent Lagoon 2. The estimated physical dredging cost for Lagoon 1 was $350,000.

OBJECTIVE

The goal of treatment was to digest and biologically remove sludge through conversion of organic material into carbon dioxide. This digestion would restore hydraulic space within the lagoons, increasing retention time and the system's ability to treat the wastewater. This allows the system to continue to run without disruption and improves wastewater treatment over time as capacity is restored.

PROPOSAL FOR BIOAUGMENTATION TREATMENT

With our distribution partner, we surveyed the system and proposed using the Biotifx® bioaugmentation plan to biologically dredge the lagoons via organic sludge digestion. Compared to mechanical dredging, this method would restore HRT and improve wastewater treatment at a fraction of the cost and with a significant return on investment (ROI). The treatment plan consisted of dosing based on the daily average flow of 300,000 GPD.

TREATMENT APPLICATION

Treatment started by dosing Biotifx® ULTRA into both lagoons to initially populate them with the *Bacillus* bacteria in ULTRA, followed by daily dosing into the clarifier effluent to ensure all bioaugmentation organisms entered into Lagoon 1. Dosing into the clarifier effluent carries the bacteria into the aeration basin and, subsequently, into Lagoons 1 and 2 (Figure 1). This helps reduce solids and loading into Lagoon 1 and carries the treatment into Lagoon 2 for further digestion within that lagoon.

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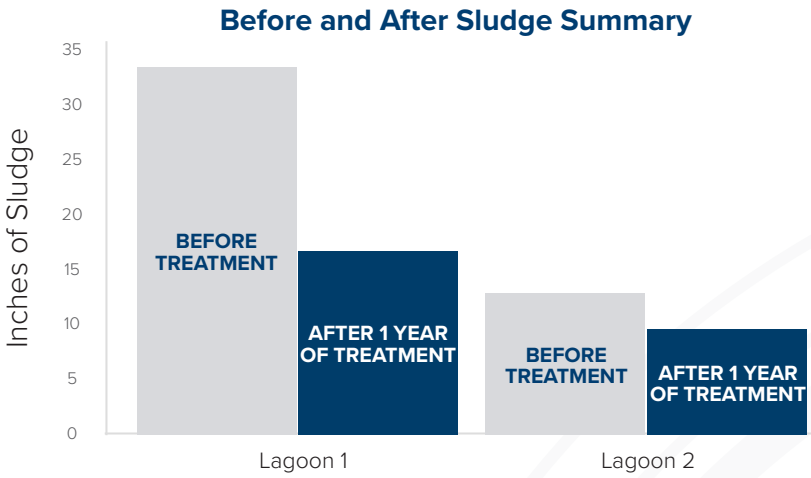
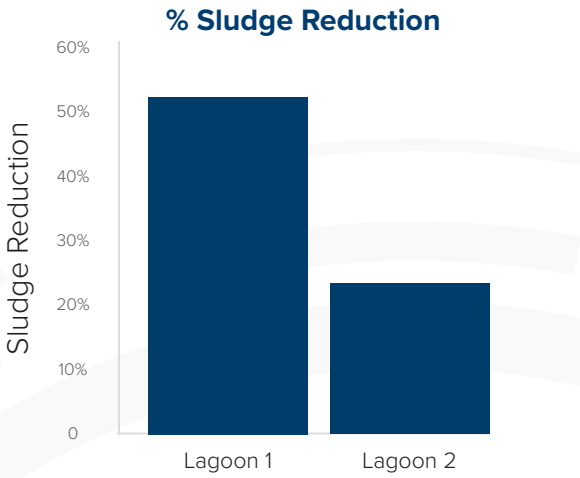
RESULTS

After one year of treatment, the lagoons were resurveyed by a third party to determine the amount of sludge digestion and capacity restoration. The survey found that **sludge was reduced by 53% in Lagoon 1 and by 24% in Lagoon 2.**

Figure 1: Layout of the municipality's lagoons.





Figures 2 and 3: Summary of sludge in inches before and after treatment **(Figure 2)**, and the total % reduction **(Figure 3)**.

Table 1: Total volume and treatment time restored due to treatment with Biotifx® ULTRA.

TOTAL HYDRAULIC CAPACITY RESTORED	**3,710,000 gallons**
INCREASED RETENTION TIME	**12.3 days HRT**

The calculations below detail the funds saved by the facility by using bioaugmentation instead of mechanical dredging, dewatering, and disposal.

Lagoon 1: 6.7 acres: 12MG – 3.19MG (53%) of removed sludge x $0.05/gallon = $159,500

Lagoon 2: 6.7 acres: 12MG – 0.52MG (24%) of removed sludge x $0.05/gallon = $26,200

TOTAL SAVINGS: $185,700

SIGNIFICANCE

The increased sludge digestion achieved by treating the municipality's lagoons with Biotifx® ULTRA restored capacity and improved wastewater treatment. By biologically digesting and removing sludge, the municipality saved $185,700 in estimated dredging costs. Ongoing annual treatment costs are $24,700, **bringing an ROI of 7.5:1.**

MDG
MICROBIAL DISCOVERY GROUP
MDGBio.com 7420 S. Howell Ave., Suite 300, Oak Creek, WI 53154 414-235-3767