Crooked Lake Laminar Flow Aeration Update: Overall Results

February, 2016

EXECUTIVE SUMMARY

Scientists from Restorative Lake Sciences (RLS) have carefully monitored the effectiveness of the laminar flow aeration system in Crooked Lake during the 2014-2015 seasons. The technology is showing great promise in reducing organic muck with a 16.74% reduction in soft organic bottom throughout the entire lake (confirmed by whole-lake BioBase® scans). Based on the sediment probe measurements, the West Basin lost a mean of 0.83 feet of muck; the North Basin lost a mean of 0.76 feet of muck; the Middle Basin lost a mean of 0.30 feet of muck; Hidden Cove lost a mean of 0.83 feet of muck. These measurements represent substantial muck loss in a single year of aeration system operation.

There was a significant reduction in Eurasian Watermilfoil but an increase in favorable native aquatic plants throughout the lake. The total aquatic plant biovolume increased in higher percent cover categories (6.76%) but decreased in the sparse cover category (17.67%). This means that some areas once occupied by aquatic vegetation are now free of vegetation and other areas with sparse vegetation now have more vegetation. The goal is to reduce the aquatic vegetation in areas where the density interferes with recreation and increase the native aquatic vegetation in areas once dominated by Eurasian Watermilfoil.

Relative to water quality, there were no significant differences in water quality parameters such as water temperature, secchi transparency, pH, and total suspended solids in the three shallow basins that included the North Basin, Middle Basin, and Hidden Cove. The West Basin experienced a significant increase in dissolved oxygen at the bottom with a 5.2 mg/l increase. The current dissolved oxygen concentration in the West Basin is a healthy 8.1 mg/l. Chlorophyll-a (a measure of algal pigment) declined in all four basins to a very low level (<1.0µg/l) and the quantity of blue-green algae (the least desired algal form) also declined by 57% throughout the entire lake. Conductivity was slightly higher in all basins but this could be attributed to runoff from heavy rains. Nutrients such as total phosphorus and ortho-phosphorus remained close to baseline concentrations which are very low and good for water quality. The water clarity of the West Basin declined by 2.6 feet but this may also be attributed to runoff from rigorous rainfall.

Overall, the laminar flow aeration system appears to be improving the water quality of Crooked Lake. Further monitoring and reporting will occur in 2016.