

INDIAN LAKE AQUATIC VEGETATION CONTROL:
A PLAN FOR THE INDIAN LAKE WEED CONTROL
SPECIAL ASSESSMENT DISTRICT, 2020

Submitted to the Silver Creek Township Board of Trustees

For their Meeting on September 11, 2019

By:

Indian Lake Improvement Association (ILIA, Inc.)

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BACKGROUND:

In April, 2006, the Silver Creek Township Board of Trustees approved the initial request from the Indian Lake Improvement Association for the formation of a Special Assessment District for purposes of control of weed growth in Indian Lake, Dowagiac, Michigan. In 2010, the SCT Board approved a revised SAD to provide for a pilot study of an aeration process for weed control, and again in 2012 approved a revision for aeration of the entire lake in light of the outstandingly positive results of the pilot study on weed control and overall health of Indian Lake. Since then, Indian Lake has undergone a remarkable reversal of the aging process and has been reclassified from being a eutrophic lake to being a mesotrophic lake.

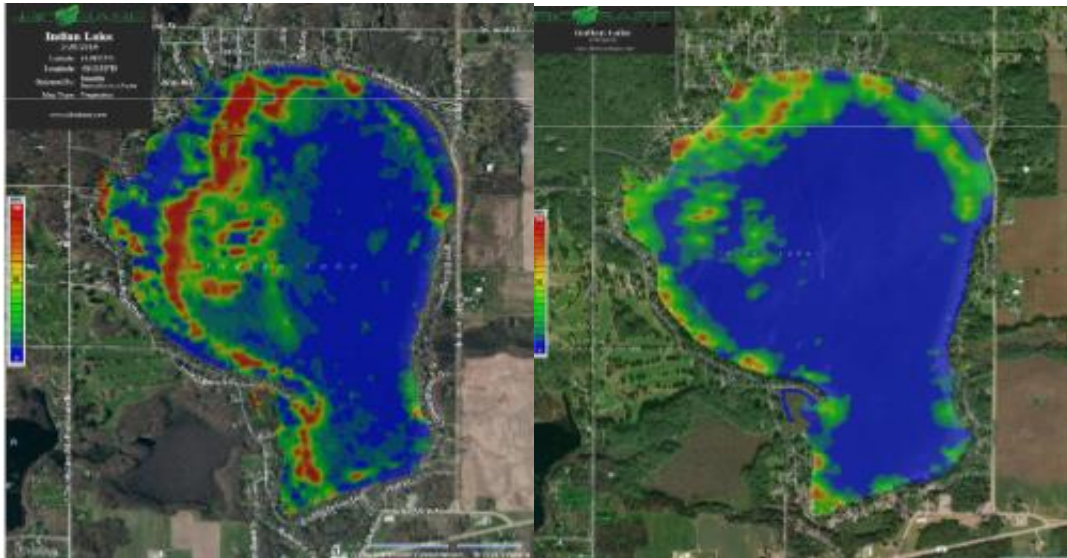
DATA RESULTS OVER TIME OF CONDITIONS OF INDIAN LAKE:

In 2010 the Indian lake waterfront residents directed the ILIA to find a lake restoration strategy that would result in a healthier lake and accomplish five specific objectives: reduction of nuisance and invasive weeds, increased levels of dissolved oxygen in top to bottom lake water, improved water clarity, resolution of our algae problems, and reduction of muck at the lake bottom, particularly in shallow areas of the lake. The aeration process was begun in 2010 as a pilot study, with full lake aeration being installed in 2012. As a result, the following measures of lake improvement achievement associated with these goals are:

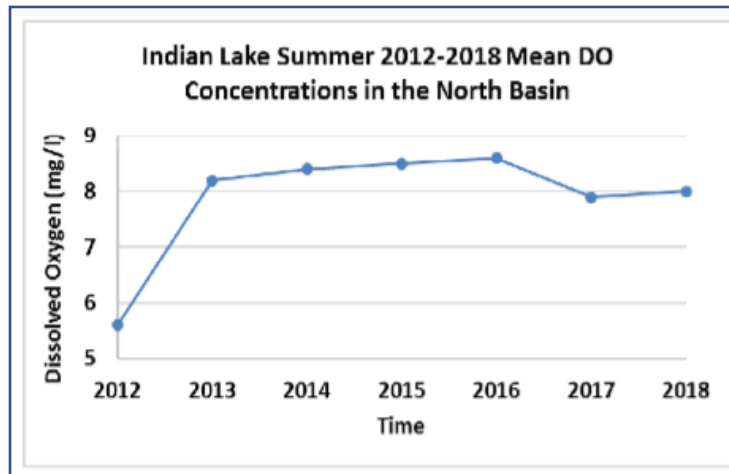
GOAL 1: Reduction of nuisance rooted submersed aquatic vegetation such as milfoil and pondweed.

2014

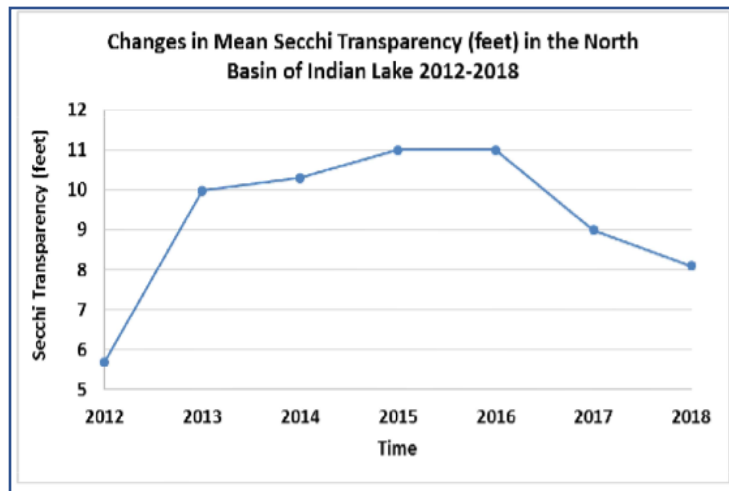
2018



GOAL 2: Increase in top to bottom dissolved oxygen concentrations.

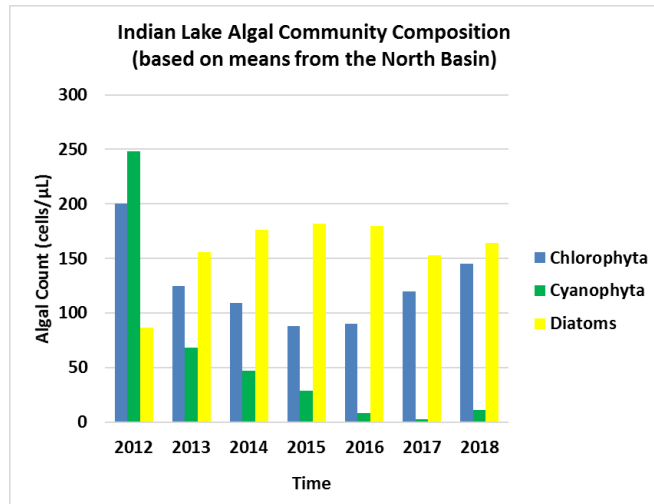


GOAL 3: Increase in water clarity.



In 2017 and 2018, having experienced heavier than normal rainfall and (particularly in 2018) warmer temperatures of air and water, the lake experienced heavier than typical algae growth in late July and August. This form of algae growth caused water clarity to degrade. Again, this began to happen in 2019. To resolve this, a natural biome treatment was added around the aerators to foster biological control of algae blooms. This process proved highly effective.

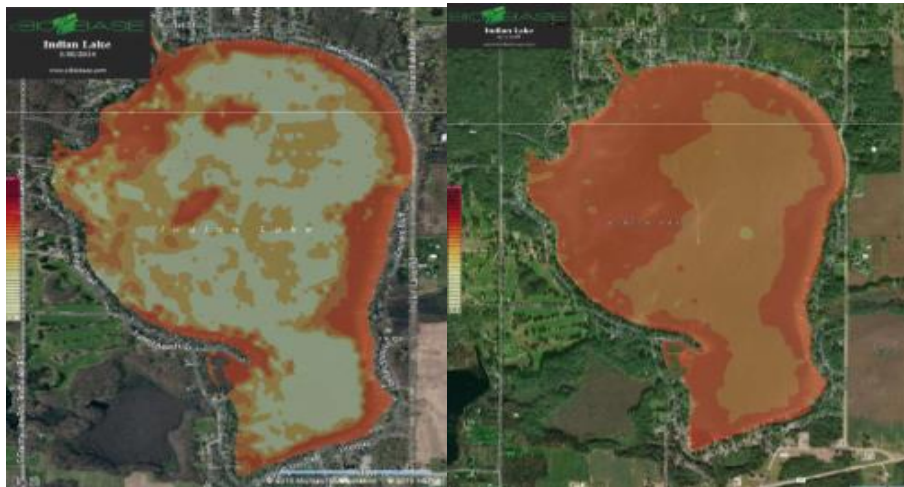
GOAL 4: Reduction of blue-green algae such as *Mycrosystis* sp.



GOAL 5: Reduction of muck accumulation in problem (shallow) areas.

2014

2018



Darker colors indicate a “hardening” of the lake bottom. This is a pictorial presentation of the muck removed from the Indian lake bottom. Muck is a major source of nutrients that feed weeds.

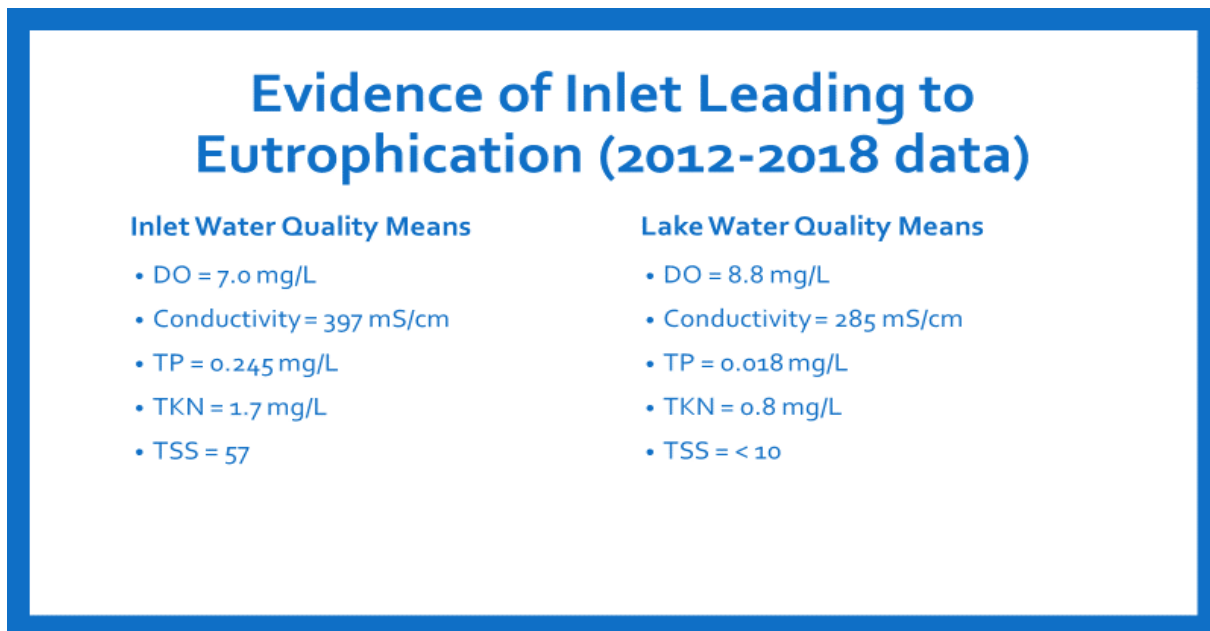
SUMMARY:

Use of laminar flow aeration in Indian Lake has been the major driver of improvement of the lake's health. Weed growth in the lake that was at one time preventing full recreation activities in the lake has been reversed. Indeed, Indian Lake is very close to the preferred 35% weed coverage of lake bottom, which is also a recommended measure for maintaining a healthy fishery. The higher dissolved oxygen levels also assist maintenance of the fishery. Use of bio-augmentation with the aeration process has helped keep control of algae blooms that were at one time near or at toxic levels in the lake.

CONTINUING CHALLENGES:

This past spring was a time of very heavy rainfall. Lake levels have been quite high throughout the area, and this was true for Indian Lake in June and July. Our water level has dropped off to near normal depths at this time.

With the rainfall, Indian Lake experienced even higher runoff into the lake from the watershed through the Mann Drain. Prior to this year's record rainfall, evidence collected in the lake and in the drain shows a disparity of nutrient levels. Thus, water flowing into the lake from the Mann Drain is negatively impacting the health of Indian Lake. Below are means of data collected prior to removal of the nutrient filters from the drain in August, 2018:



Currently, the ILIA is working with the Michigan Department of EGLE to gather data from the inlet and compare it to that gathered in the lake. While there has been no total compilation of these data to date, preliminary data reports the nutrient levels in the drain water are higher than those reported in this chart. Hopefully, the collection of these data this summer will be instructive in arriving at a reasonable resolution of the flow of nutrients into Indian Lake through the Mann Drain.

As they say, pictures are worth a thousand words. The below photos show the degradation of the lake bottom near the drain. These photos were taken in 2017 prior to the removal of the nutrient filters from the drain, and in 2019, one year after the filters were removed. It cannot be any clearer that the nutrient flow from the drain has a deleterious impact on Indian Lake. If this remains unchecked for too long, what we see near the drain in 2019 will continue further into the lake.



Lake bottom by Mann Drain October, 2017



Lake bottom by Mann Drain August, 2019

THE ILIA PLAN FOR THE INDIAN LAKE WEEDCONTROL SAD FOR 2020:

In preparation for the coming year, the ILIA presents this plan for implementation of the Indian Lake weed control SAD for the year 2020:

1. Continuation of the holistic, multi-faceted approach to aquatic vegetation control and overall health of Indian lake with funds from the SAD, including laminar flow aeration with bioaugmentation as needed, spot chemical treatment of invasive and non-native weed growth if necessary, and weed harvesting as needed.
2. Continued limnology studies of Indian Lake, including measures necessary to fulfill requirements from the EGLE regarding aeration and total treatments of the lake to preserve and improve water qualities necessary for a full recreation lake.
3. Further research on and application of best management practices for achieving the goals set forth by lake residents in 2010.
4. Nutrient runoff into the lake, first through the Mann Drain and then other potential sources, will remain a priority focus. This will include further cooperation with the EGLE to resolve the drain issue presented in this document.

As we all know, from time to time new challenges are presented in lake management processes. If such occur in 2020, SAD funds will be reallocated to address such issues.

BUDGET:

Attached, please find the proposed, tentative budget for use of Indian Lake Weed Control Special Assessment District funds for SCT FY 2021. This covers operation of lake weed control services for the summer of 2020. Presentation of this plan and the associated budget is made at this time to fulfill the terms of the agreement between SCT and the ILIA.

Given our limnology report for 2019 will be presented to the ILIA in January, 2020, some adjustments to this proposed budget will be made and forwarded to SCT for purposes of your annual budget process in February and March, 2020.

At its Annual Meeting on August 17, 2019, the membership of the ILIA voted to accept the recommendation from the ILIA Board and hold the SAD assessment amount at its current rate of \$5.85 per frontage foot. The total amount of the special assessment will remain at its current level.