What happened on Lake Mitchell?
A summary of 2019 RLS aquatic vegetation and water quality program

By: Dave Foley, Lake Mitchell Improvement Board

I have put together this summary of the annual report prepared by Dr. Jennifer Jermalowicz-Jones CEO of Restorative Lake Science. The full report can be found at www.lakemitchell.org.

Overall, Lake Mitchell is doing well. Water clarity, which in 2009 was less than 5 feet, now averages about 9 feet. Additionally, the lake has nutrients (phosphorus and nitrogen) which result in some algae and submersed aquatic plant growth in shallow soft bottomed areas. Overall nutrient levels are considered moderate with higher concentrations in the tributaries.

Status of native aquatic vegetation

Lake Mitchell has 26 native species of native aquatic plants. This hasn't changed over the years. This high biodiversity is likely a significant reason for the great fishery in the lake. The overall % cover of the lake by native plants is low relative to the lake size. These plants should be protected and not treated unless they become a nuisance in shallow coves or the Torenta Canal. In these cases, RLS may recommend harvesting.

The invasive Eurasian watermilfoil (EWM) has been a challenge to Lake Mitchell's ecosystem since the late 1980s. In 2019, approximately 53 acres of EWM were treated throughout the entire lake. (There are 2,580 acres in Lake Mitchell.) The Torenta Canal was not treated in 2019 as it was not needed. Approximately 28 acres were treated in Big Cove and 3.3 acres in Little Cove. Franke North and South Coves received 8.1 acres of treatment. Whereas only EWM was treated in the main lake, the coves were treated for both EWM and nuisance pondweeds. A new systemic herbicide product, ProcellaCOR® was successfully in used in Big Cove. (A systemic product kills the entire plant including the roots. A contact herbicide just kills the leaves and stems.)

The purple loosestrife beetle stocking is recommended in 2020 to increase control of the plant or spot-treatments with an aquatic herbicide for emergents.

Water quality parameters measured

Lake Mitchell is considered a eutrophic lake because it has more weed growth than most lakes in the shallows as well as ample phosphorus or nitrogen. It has good water clarity and moderate algal growth.

Phosphorus is the primary nutrient necessary for abundant algae and aquatic plant growth. Phosphorus concentrations are usually higher at increased depths due to higher release of phosphorus from lake sediments under low oxygen conditions. Phosphorus may also be released from sediments as pH increases. Fortunately, even though phosphorus levels in Lake Mitchell are moderate, the dissolved oxygen levels are good enough at the bottom to not cause release of phosphorus from the bottom. Phosphorus, during the sampling event in 2019, was about the same as it has been in 2011.

Alkalinity determines whether lakes are "hard water", having high concentrations of CaCO3, or "soft water." Total alkalinity may change on a daily basis due to the re-suspension of sedimentary deposits in water and respond to seasonal changes due to the cyclic turnover of the lake water. Lake Mitchell's alkalinity is quite low making it a soft water lake.

pH in most Michigan lakes ranges from 6.5 to 9.5 S.U.. Acidic lakes (pH less than 7) are rare in Michigan but are more common in the UP. Lake Mitchell's 8.3 S.U. pH is considered "neutral" on the pH scale.

Conductivity is a measure of the number of mineral ions in the water, especially those of salts and other dissolved inorganic substances. Conductivity generally increases as the amount of dissolved minerals and salts in a lake increases as water temperature rises. The conductivity values for Lake Mitchell are relatively low for a large inland shallow lake, ranging from 148-214 mS/cm during 2019 sampling. Severe water quality impairments do not occur until values exceed 800 and are toxic to wildlife at around 1000. Conductivity may be increasing due to more road salt applications during harsh winters.

Chlorophyll-a measures green plant pigment present in water often in the form of planktonic algae. High chlorophyll -a are indicative of nutrient enriched lakes. Chlorophyll-a readings of greater than 6 are found eutrophic lakes. Readings of less than 2.2 µg/L are found in nutrient poor lakes. Lake Mitchell recorded a 1.8 µg/L reading in mid-August.

Toxic blue-green algae vs tree pollen Blue green algae can be found in many lakes including Lake Mitchell. When it grows in high

abundance, it may produce a toxin that humans and animals should avoid contact with when swimming. Animals and humans should avoid surface water algal scums when present as they can be toxic.

Tree pollen which appears more yellow and may coat the lake surface in some areas, is not harmful and will soon dissipate.

Management recommendations for 2020

As in past years, detailed aquatic vegetation surveys will be done by GPS in late May or early June to locate invasive plants as well as nuisance species that may be causing imbalance or recreational issues. Along with the surveys, bottom scans will be conducted to determine changes in aquatic bio-volume and distribution of aquatic vegetation. Post-treatment surveys will be conducted and these may result in additional treatments. The Torenta Canal will be assessed for the need of a possible harvest and scheduled if necessary.

Detailed information on chemicals that will be used in 2020 treatments is available in the full RLS report that can be found on the LMIB website:(www.lakemitchell.org)

Water quality will continue to be monitored in the lake and tributaries. Lake Mitchell is a healthy lake with excellent aquatic plant diversity. Nutrients are at acceptable levels and there is a robust fishery indicated by the many fishing tournaments held on the lake. Temporary algal blooms occur during hot windless periods or after intense rainfall events. RLS will continue to monitor for any problematic algal blooms.