

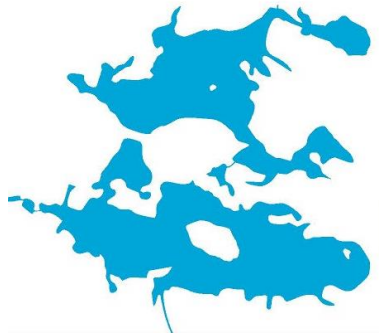
## Contact Us

Lake LeAnn Property Owners Association

Phone: (517) 688-9704

Email: LakeleannPOA@gmail.com

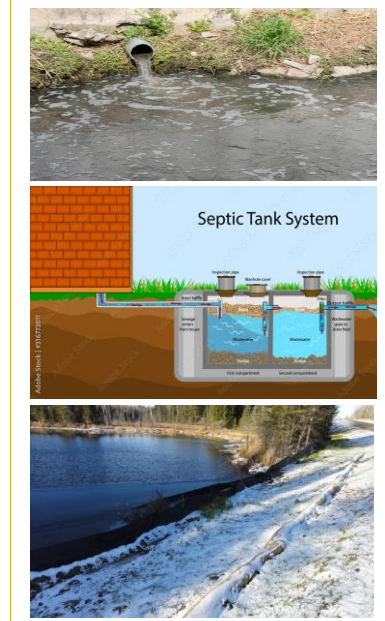
Website: LakeLeann.org



# Love Our Lakes

**ALWAYS USE BEST  
MANAGEMENT PRACTICES**

# Best Management Practices for Improved Water Quality



**Lake LeAnn Property  
Owners Association**

FEBRUARY 2023

***(Best Management Practices (BMPs) are land management practices that treat, prevent, or reduce water pollution)***

## **Purpose**

*Improving water quality after 50+ years of residential development, chemical lake treatments, burning leaves and septic systems is a difficult task that requires a multi-pronged approach, in order to reverse the eutrophication (excessive nutrients) in our lakes.*

***All Members must do their part by using the on-shore Best Management Practices outlined in this brochure whenever possible.***

*Please review this brochure thoroughly and implement these practices whenever possible.*

## **Contents**

General Background Information

Water Quality On-Shore BMPs Summary

Natural Plantings Alternative Shoreline BMPs

2022 DNR Boating Recommendations

Laminar Flow Aeration and Bio-Augmentation

Critical Source Area Mitigation

## **GENERAL BACKGROUND INFORMATION**

- **In 2020 our members approved the installation of the Laminar Flow Aeration System (LFA) which has been in use on our lakes starting in 2021 from April 1st to November 30<sup>th</sup> each season. Six land-based aeration compressor systems feed over 25 miles of sunken airlines, supplying air to 102 diffusers under our lakes.**
- **In 2021 we installed several areas of natural native plantings to help absorb nutrients as an alternative shoreline protection and as demonstration areas for our members.**
- **In addition to the new LFA system our Lake Control Committee and Water Quality Sub-Committee members have been working to address some of the other sources affecting our water quality including the Critical Source Areas (CSAs). These inlet drains increase the nutrients and sediments in our lakes from surrounding areas.**
- **Besides the above measures our Board has worked on improving our Rules and Regulations in order to complement our efforts to improve Water Quality.**
- **This brochure outlines numerous other Best Management Practices (BMPs) which members should utilize to help improve our water quality.**

# Water Quality Best Management Practices (BMPs)

*(Best Management Practices (BMPs) are land management practices that treat, prevent, or reduce water pollution)*

---

## YOU CAN HELP IMPROVE OUR WATER QUALITY!

---

(REMEMBER)

(Only 1 lb. of phosphorous, 7 lbs. of nitrogen, and 40 lbs. of carbon are required for a 500 lbs. batch of wet algae to bloom on our lakes.)



## Water Quality Best Management Practices (BMPs)

**FERTILIZER & SOIL TESTS;** External use of chemical fertilizers contributes significantly to the nutrient loading (nitrogen & phosphorous) in our Lakes. Before any use of fertilizers, we recommend that members **purchase a soil test kit** (\$15 - \$25) to determine if there are deficiencies in the soil. The lake contains high levels of nutrients and watering lawns with lake water will supply nitrogen and phosphorous to lawns. **We strongly encourage all members to “Skip the Fertilizer” if at all possible, or at a minimal reduce the number of applications required.** If fertilizers are absolutely required as determined by test kits, only apply fertilizers or supplements that do not contain phosphorous. Use weed control or pesticides prudently if needed. Always maintain at least a 20-foot buffer zone to the water edge.

**LEAF BURNING & ASHES;** The ash from burning leaves is a **high source of phosphorous (nutrients)**. Phosphorus promotes growth of lawns and lake weeds. If the wind is blowing toward the lake, leaf burning will cause phosphorous (nutrients) to be directly deposited into the lake. Leaf burning will also leave higher levels of nutrients on the lawns, which will filter into the lake through run-off when it rains or as you water your lawns. Please be prudent if burning leaves is necessary.

**RAKING LAKEFRONTS;** Our Lakes are lowered by the Drain Commissioner every fall. Please take advantage of the lower water levels to aggressively rake your beachfront to remove decaying leaves, and other debris. The decaying process of these items depletes the lake and fish of dissolved oxygen and can cause an increase in the temperature of the lake water. Raking leaves and debris from your waterfront discourages nuisance weed growth.

**LEAF DISPOSAL;** After raking, leaves must be removed from the property so that nutrients from the decaying leaves do not wash into the lake.

## Water Quality Best Management Practices (BMPs)

*(Best Management Practices (BMPs) are land management practices that treat, prevent, or reduce water pollution)*

---

**YOU CAN HELP IMPROVE OUR WATER QUALITY!**

---



## Water Quality Best Management Practices (BMPs) (Continued)

**ANIMAL & BIRD WASTE;** Members should clean up pet waste immediately from their yard and never feed geese. Waste from pets, birds and other animals can contain aerobic bacteria that consumes oxygen in the process of decomposition. Pet, bird and animal waste if washed into the lake can also deplete dissolved oxygen from our lake. Please pick-up pet, bird and animal waste often.

**LAWN CLIPPINGS;** Minimize lawn clippings when mowing your lawn. Lawn clipping can carry fertilizer into the lake with them and also decay in the lake. Please collect and dispose of lawn clippings whenever possible.

**SOIL EROSION PREVENTION;** Minimize soil erosion during any landscape projects or construction work by installing erosion barrier (black fabric) at the lakeshore. Soil erosion can increase the suspended solids in the lake, which causes the water to become cloudy. Cloudy, turbid water absorbs the sun's rays and gets warmer. Water temperatures greater than 68 degrees will foster weed growth.

**Waste Water Discharge;** Do not directly or indirectly discharge any liquids or substances which may be harmful to the water quality of the lake. Such discharges should be directed into the property owner's septic field/tank.

# Water Quality Best Management Practices (BMPs)

*(Best Management Practices (BMPs) are land management practices that treat, prevent, or reduce water pollution)*

---

## YOU CAN HELP IMPROVE OUR WATER QUALITY!

---

(REMEMBER)

**(Only 1 lb. of phosphorous, 7 lbs. of nitrogen, and 40 lbs. of carbon is required for a 500 lbs. batch of wet algae to bloom on our lakes.)**



## Water Quality (BMPs) (Continued)

**STORM DRAINS;** There are numerous storm drains and artesian wells that feed into our lake. Never put anything into a storm drain. This includes waste water and any type of soaps or chemicals. Doing so will diminish the quality of the lake water and could pollute areas of the lake.

**NEW FIREPITS;** All fire or bonfire receptacles/enclosures installed after April 1, 2022 must be located a minimum of 20-feet from the shoreline. Members having existing fire/bonfire receptacles/enclosures within 20-feet from the shoreline are encouraged to move them in compliance with the 20-foot rule if possible.

Keeping all New Firepits away from the shoreline will provide a buffer zone to protect our lake from any ashes or run-off, which causes phosphorous nutrient loading into the Lake.

**ALL FIREPITS:** Regardless of the distance from the shoreline, any open fire or bonfire receptacle/enclosure located on any lakefront property must be in a self-contained fireproof receptacle or enclosure made of brick, stone, masonry, steel or earthen base where the ash can be confined, collected, and disposed of properly when cooled. Ashes that leach into the Lake causes nutrients loading (phosphorous) to flow into the lake. Doing so directly contributes to the growth of algae blooms.

**GREY WATER DISCHARGE;** Do not discharge any washing machine wastewater directly into the lake. Doing so will increase nutrients and contribute to algae blooms.

# Water Quality Best Management Practices (BMPs)

*(Best Management Practices (BMPs) are land management practices that treat, prevent, or reduce water pollution)*

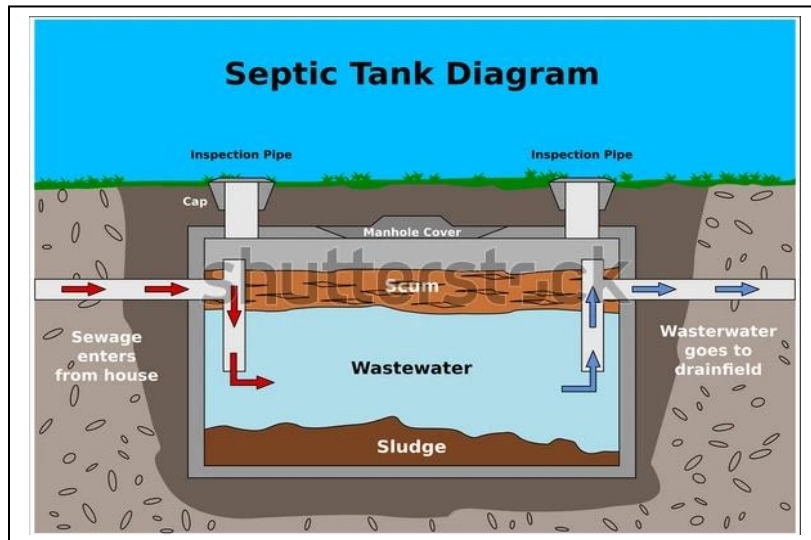
---

## YOU CAN HELP IMPROVE OUR WATER QUALITY!

---

(REMEMBER)

(Only 1 lb. of phosphorous, 7 lbs. of nitrogen, and 40 lbs. of carbon is required for a 500 lbs. batch of wet algae to bloom on our lakes.)



## Water Quality (BMPs) (Continued) ABOUT SEPTIC SYSTEMS

1. **Generally, you can plan to have the tank pumped approximately every 3 to 5 years.** Just like changing the oil in your car, preventive septic system maintenance will extend the life of your system for a small cost compared to the cost of replacing the system.
2. Malfunctioning septic systems release bacteria, viruses, and chemicals toxic to local waterways.
3. When these pollutants are released into the ground, they eventually enter streams, rivers, and lakes.
4. The frequency of pumping the septic tank depends on the tank size, number of people in the household, habits of water use as well as the amount of solids accumulated in the tank.
5. Spring is a great time to service your septic system.
6. If your drain field is more than 25 to 30 years old, the natural bio mats that forms in the bottom of the trenches or beds can thicken and reduce the ability of the drain field to properly discharge wastewater into the ground.
7. If your septic system is more than 25 to 30 years old, start planning for an upgrade. It is likely your system is close to its useful lifespan.
8. **The best way to extend the life of your system is through proper maintenance.**

## ALTERNATIVE SHORELINE (BMPs)

### Natural Native Plantings to Protect Shorelines and Improve Water Quality



Homeowners and lake stewards can help keep their lakes healthy by using ecological principles to assess, design, construct and maintain natural shorelines. This publication explains why lakeshore property owners should consider natural shorelines and ways they can incorporate sound bioengineering practices into the landscape.

#### WHAT IS BIOENGINEERING?

Bioengineering, often called softshore engineering or lakescaping, is a method of using native plants, biodegradable products and other natural materials to provide a stable shoreline. The goal is to protect the property from waves and erosion, while improving ecological features and the integrity of the shoreline. Bioengineering methods are often used when creating a natural shoreline – which acts as a living buffer that changes throughout the seasons and years.

#### WHY CONSIDER A NATURAL SHORELINE?

The primary purpose of a buffer at the shoreline is to protect the property from erosion. Erosion may result in loss of shoreline property and increased sediment in the water – leading to poor water quality. Seawalls and natural shorelines are two types of buffers.

Seawalls are in use all over Michigan. A seawall is any hard-surfaced wall installed along the shore to block the waves from reaching the land. The walls are typically parallel to the shore with a vertical surface facing the water. They are made out of many

(Source; Natural Shorelines for Inland Lakes produced by the Michigan Sea Grant and the Michigan Department of Environmental Quality)

(See LLPOA Website under “more tab – Native Plantings for the remainder of this article)

## ALTERNATIVE SHORELINE (BMPs)

### Natural Shoreline Protection Native Plantings

(Source; Natural Shorelines for Inland Lakes produced by the Michigan Sea Grant and the Michigan Department of Environmental Quality)



#### WHAT ARE NATIVE PLANTS?

Native plants are grasses, flowers, shrubs and trees that are indigenous to a particular area. A few reasons to use native plants:

- Native plants provide food and habitat for birds and other wildlife, and they help maintain natural biodiversity.
- Since they are adapted to living in their native territory, native plants require minimal maintenance and watering once established. Many are perennial.
- Native trees and shrubs can be hardier than non-indigenous varieties. They offer shade and help lower air and water temperatures.
- Native plants attract birds, which prey upon insects, decreasing the need for pesticides.

#### ALONG YOUR SHORELINE

Planting is a relatively easy, affordable and attractive way of incorporating bioengineering into lakeshore design. Native plant species, which are well adapted to local climate and soil conditions, are particularly good options for landscaping. The use of native plants can have significant positive benefits for the lake and the shoreline. For example, plants that overhang and create shade improve water quality for fish, waterfowl and other aquatic life by providing food close to the water's edge. A vegetated buffer along the shore can also help absorb the extra nutrients (like those from fertilizers) and pollutants in surface runoff as the water drains to the lake.

Plants in the water and along the shore like lily pads and cattails (called emergent and floating vegetation) help limit the amount of erosion by absorbing wave energy as waves come into the shore. Native plants like sedges and rushes (grass-like plants along the shore) often have extensive root systems that help anchor the soil in place and stabilize the shoreline better than non-native plants like turf grasses (lawn). Maintaining native vegetation sustains natural biodiversity, and may help keep out nuisance species like the invasive purple loosestrife (*Lythrum salicaria*) and phragmites (*Phragmites australis*).

## NEW 2022 DNR RECOMMENDATIONS (REGARDING WAKE BOATS & EFFECTS ON WATER QUALITY)



## NEW 2022 DNR RECOMMENDATIONS (REGARDING WAKE BOATS & EFFECTS ON WATER QUALITY)

In a report\* issued in September 2022 (just after the issue was considered at the last LLPOA Annual meeting) the Michigan Department of Natural Resources (DNR) summarized the state of knowledge about the impact of wake boats on inland lakes, and put forth recommendations to minimize the effects of wake boats on natural resources. This information is excerpted below. (please see the LLPOA Website to view the full report for additional information and scientific citations).

---

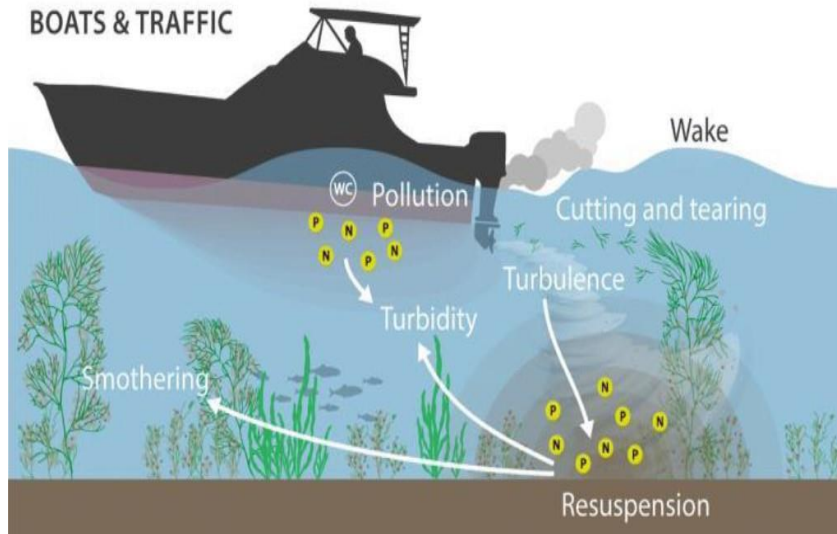
### DNR Recommendations

- 1. Boats operating in wake-surfing mode or wake-boarding mode (during which boat speed, wave shapers, and/or ballast are used to increase wave height), should operate at least 500 feet from docks or the shoreline, regardless of water depth.**
  - 2. Boats operating in wake-surfing or wake-boarding modes should operate in water at least 15 feet deep.**
- 

### DNR Basis for Recommendations

The basis for these recommendations is that the environmental effects of powerboating have been well documented. Waves from wake boats-powerboats that use ballast, wave shapers, and/or other hull designs to produce waves that are substantially larger and more powerful than those generated by the typical powerboat- can increase shoreline erosion, decrease water clarity and plant abundance and increase phosphorus in the water column.

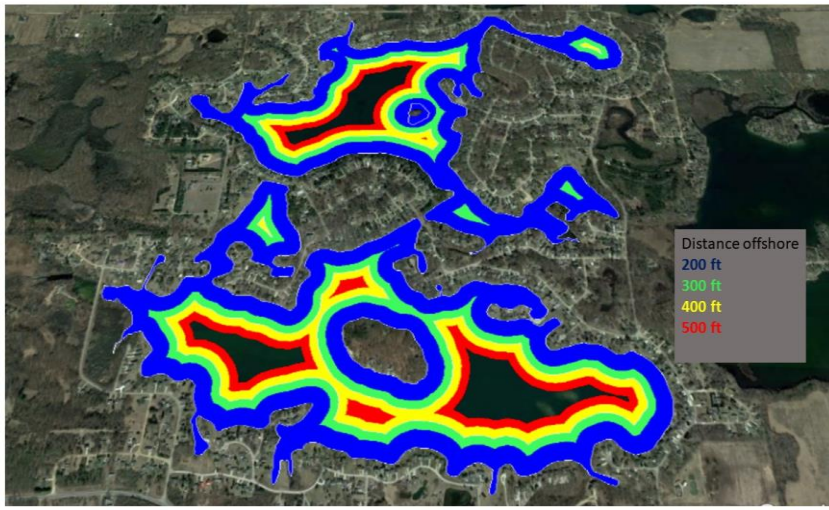
**Shoreline erosion can lead to degradation of fish habitat and water quality** due to physical disruption of rooted plants and resuspension of sediment and nutrients, and is a concern because it results in a loss of property and can damage infrastructure. In the past several years, permit applicants frequently have listed erosion from wake boats as part of their rationale for shoreline armoring. This reactive response of hardening shorelines, as opposed to proactively reducing the erosive forces at the shoreline caused by wake boats, will only lead to greater environmental degradation from armored shorelines due to wave reflection off these structures.





## NEW 2022 DNR RECOMMENDATIONS

(REGARDING WAKE BOATS & POTENTIAL IMPACT ON WATER QUALITY)



Lake LeAnn Shoreline Buffer Zones

**THE LLPOA DOES NOT CURRENTLY RESTRICT THE USE OF WAKE BOATS ON LAKE LEANN, HOWEVER MEMBERS SHOULD ALWAYS FOLLOW EGLE AND DNR GUIDELINES FOR SAFE BOATING WHENEVER POSSIBLE.**

**PLEASE REVIEW THE DNR 2022 RECOMMENDATIONS CLOSELY. SINCE NEITHER BASIN ON LAKE LEANN CAN SATISFY THE 500 FOOT REQUIREMENT AND DEPTH REQUIREMENTS RECOMMENDED BY THE DNR, WE ASK THAT MEMBERS UTILIZE THE WIDEST AND DEEPEST AREAS OF THE LAKES WHEN OPERATING A WAKE BOAT (IN WAKE MODE) IN ORDER TO MIMIMIZE ANY POTENTIAL IMPACT ON OUR SHORELINE. YOUR COOPERATION IS APPRECIATED. (See Shoreline Buffer Zones above)**

## NEW 2022 DNR RECOMMENDATIONS

(REGARDING WAKE BOATS & POTENTIAL IMPACT ON WATER QUALITY)

**Sediment resuspension decreases water clarity in lakes**, subsequently reducing the ability of fish to find food, the depth to which aquatic plants can grow, and the dissolved oxygen content within the water column (i.e., sediment resuspension is enemy of efforts to improve water quality). Wake boats have greater potential to exacerbate sediment resuspension through increased wave energy and propeller turbulence.

### Conclusion

The negative effects of a wake boat decline as the boat travels farther away from the shoreline. Increasing the minimum distance that boats are allowed to operate at greater-than-no-wake speed near docks and shoreline would allow more time for wave energy to dissipate and increase protection of nearshore areas.

**The recommendations are intended to provide guidelines under which the recreational opportunities that wake boats provide can be enjoyed in a manner that minimizes harm to the natural resources and property of Michigan citizens.**

\*STATE OF MICHIGAN DEPARTMENT OF NATURAL RESOURCES [www.michigan.gov/dnr/](http://www.michigan.gov/dnr/) FISHERIES REPORT 37 FR37 September 2022 (Wake boats: concerns and recommendations related to natural resource management in Michigan waters) James Francis, Joel Nohner, John Bauman, Brian Gunderman

## Laminar Flow Aeration with Bio-Augmentation

In 2020 our members approved the installation of the Ever Blue Laminar Flow Aeration System (LFA). The system runs from April 1st to November 30th each season. Our multi-pronged natural Lake Improvement Plan includes Laminar Flow Aeration, Bio-Augmentation and targeted weed control, which are all supplemented by the numerous Best Management (BMPs) outlined in this brochure. We must reduce external loading to maximize the benefits of the LFA system. Increased use of BMPs and reduction in CSA loading are both critical to water quality improvement.



## Critical Source Area (CSA) Mitigation UPDATE

1. In 2022 we worked with the Hillsdale County Conservation District to collect three sets of water samples from multiple upstream locations, in order to help us identify potential sources of our external nutrient loading.
2. Our neighboring property owners have fully cooperated and allowed access to their properties for water testing.
3. The neighboring property owners are establishing adequate buffer zones and minimizing their fertilizer use in accordance with BMPs for their respective industries.
4. Recently, MDOT and/or the Road Commission have worked on two of the drains in their right-of-way, which feed into South lake. These changes should reduce the sediment and nutrient loading this season coming from two of our Critical Source Areas.
5. In 2023 we continue to work with neighboring property owners and plan evaluating additional changes that may help address the remaining CSAs in the future.



