



Protecting your
environment today
for tomorrow.

Chippewa Lake

Community Update 28 April 2023

BreAnne Grabill, Environmental Scientist

Senior Regional Manager

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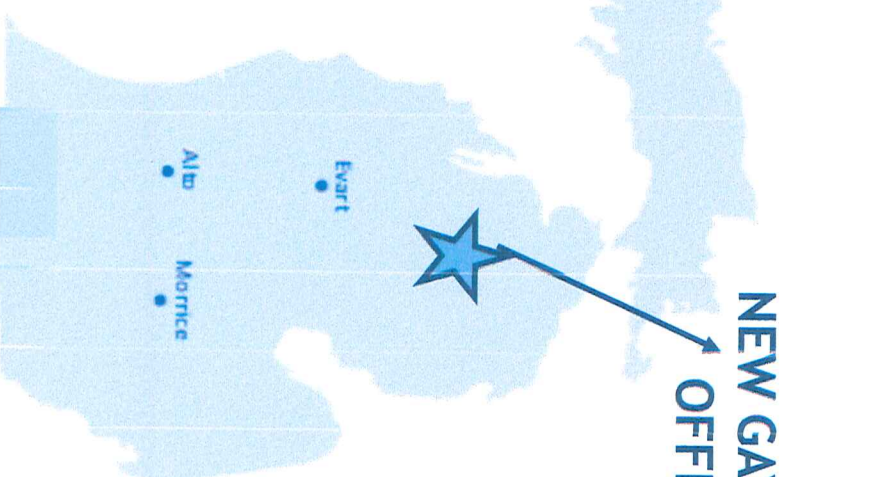
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PLM Lake & Land Management Corp.

- Bre Grabill, Environmental Scientist
- Studied at Michigan State University with a focus in Limnology
- Senior Regional Manager- North, 21 years
- Focus on community outreach/education and working with municipalities, POAs, and individuals to form comprehensive programs with an ecological focus
- Casey Shoaff, Environmental Biologist - Cornerstone University
- Regional Manager- Evart

MICHIGAN LOCATIONS

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10785 Bennett Dr. Morrice, MI 48857-8760	1169 N Motawa St. Sturgis, MI 49091	Fax (616) 891-0371
		Toll-free (800) 382-4434



**NEW GAYLORD
OFFICE**

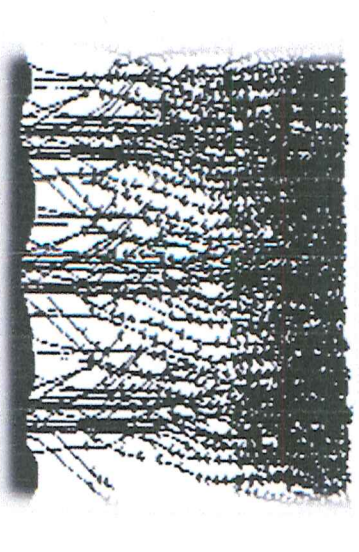
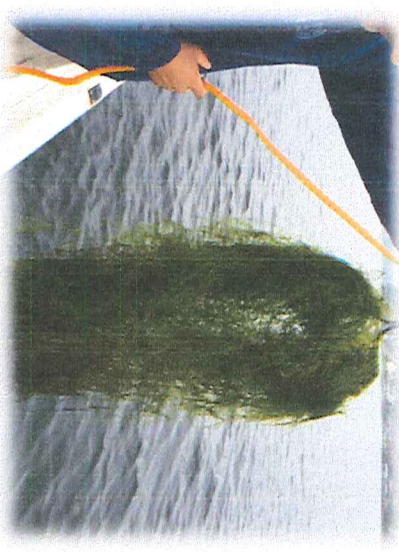




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- Integrated Pest Management (IPM) Approach
 - Emphasize spending more effort evaluating the problem, so that exactly the right control can be applied at just the right time to control the pest.
 - Minimize management costs and minimizes the use of chemicals.
 - Essential for long term success.
 - Multi-faceted approach to review numerous control avenues.
 - Allows for cost-benefit analysis as well as checks and balances over program.
- Plant Management
 - Submersed nonnative plant management
 - Eurasian watermilfoil (EWM), Curlyleaf pondweed (CLP), Starry stonewort (SSW)
 - Emergent nonnative plant management
 - Purple Loosestrife (PL)
- Algae management
 - Advanced monitoring in place, reports of growing visual impacts.
 - Water Clarity, Harmful Algal Blooms (HABs)



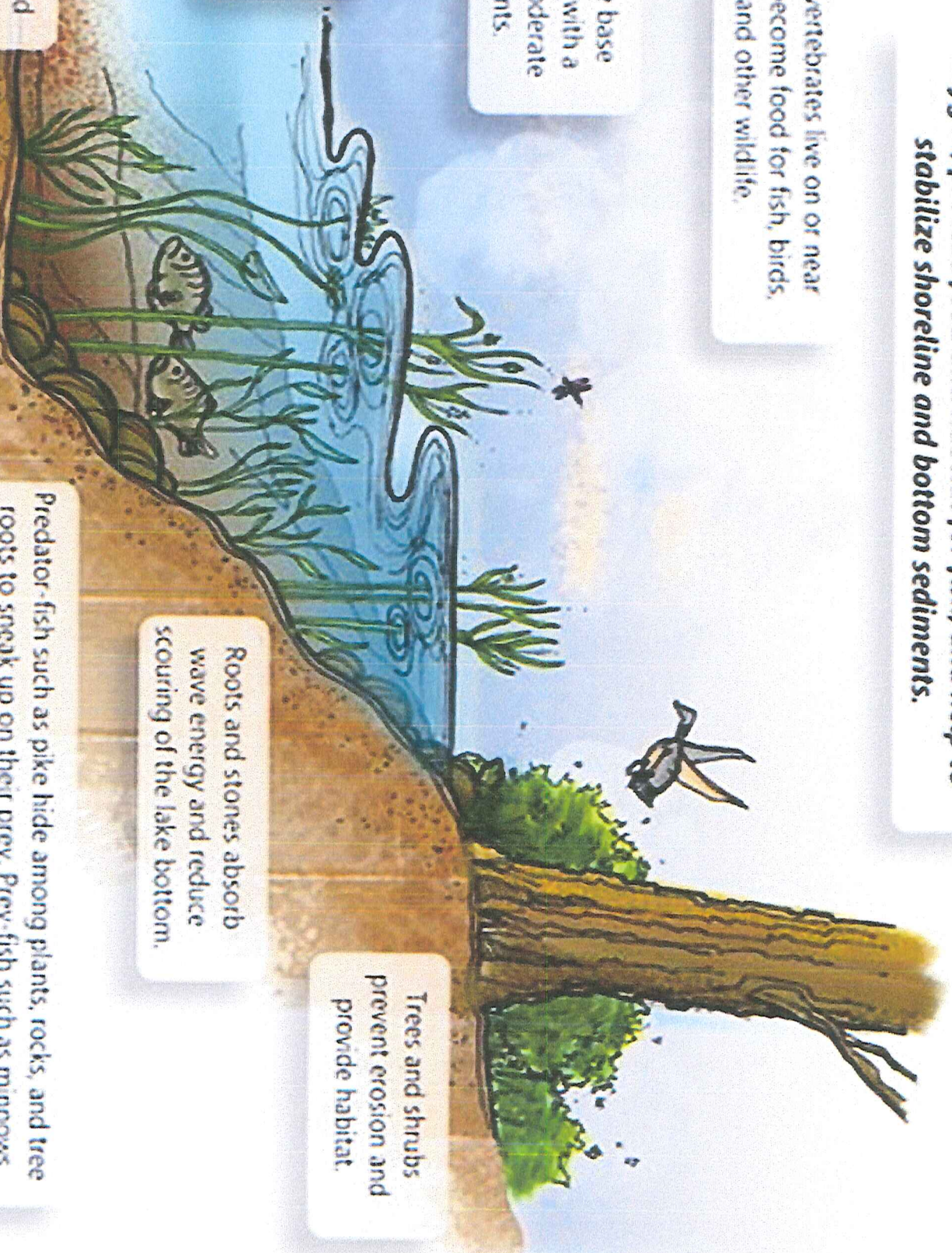
Aquatic plants are part of a healthy lake. They produce oxygen, provide food and habitat for fish, and help to stabilize shoreline and bottom sediments.

Insects and other invertebrates live on or near aquatic plants, and become food for fish, birds, amphibians and other wildlife.

Plants and algae are the base of the food chain. Lakes with a healthy fishery have a moderate density of aquatic plants.

Aquatic plants provide habitat for fish and other aquatic life.

Aquatic plants help to hold sediments in place and improve water clarity.



Trees and shrubs prevent erosion and provide habitat.

Roots and stones absorb wave energy and reduce scouring of the lake bottom.

Predator-fish such as pike hide among plants, rocks, and tree roots to sneak up on their prey. Prey-fish such as minnows and small sunfish use aquatic plants to hide from predators.



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Algae Management

- **Why monitor Algae?**
- An over abundance of algae is an indicator that there is an excess amount of nutrients within the water column/lake, causing the waterbody to become overly productive.
- Algae are very beneficial in a lake ecosystem and can be thought of as the base of the food chain. Therefore, some algae is required.
- However, when an algae reaches the point of hindering the use of the lake, control measures are available:
 - Actions should be taken within the watershed to promote a healthy lake ecosystem and decrease nutrient loading, etc. However, no immediate change will be seen with these actions but play a critical role in protecting the lake for future generations.
 - Phosphorus Mitigation Options
 - Direct control options – treatments, etc.
- 3 types of algae to be familiar with:
 - **Filamentous, Planktonic, Macroalgae**
- **Macroalgae** includes three types, Chara, Starry stonewort and Nitella.
 - Chara
 - Grows like a plant on the bottom (carpet), is a natural water filter and is excellent for fish bedding
 - This is a #1 species in Chippewa Lake and should continue to be protected!
 - Chara is one most dominate “plants” in Chippewa Lake
 - Starry stonewort- the enemy of Chara and Chippewa Lake



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Algae

- **Planktonic algae**
 - Microscopic, often referred to as "water bloom".
Typically Blue-green algae species
 - In large number, the algae can cause water to appear green, brown, yellow, or even red.
 - Can form toxins (not always)
 - Dealing with the source is often preferred over treatment.
- **Filamentous algae, commonly called "pond scum"**
 - Typically green algae or diatoms
 - Form raft-like masses over the water surface.
 - Vulnerable to winds and currents
 - Filamentous algae can grow attached to the lake bottom, weeds and docks. Frequently detach from the lake bottom and form floating mats.





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Goals of Aquatic Plant Management

Control Exotic Species

Promote a Balanced and Diverse Native Plant Community

Improve Fisheries

Maintain Property and Recreational Values

Native Plant Species

Fundamental component of aquatic ecosystems

Perform important functions:

Stabilizing sediments; support aquatic insects; maintaining oxygen; provide forage and refuge areas for fish

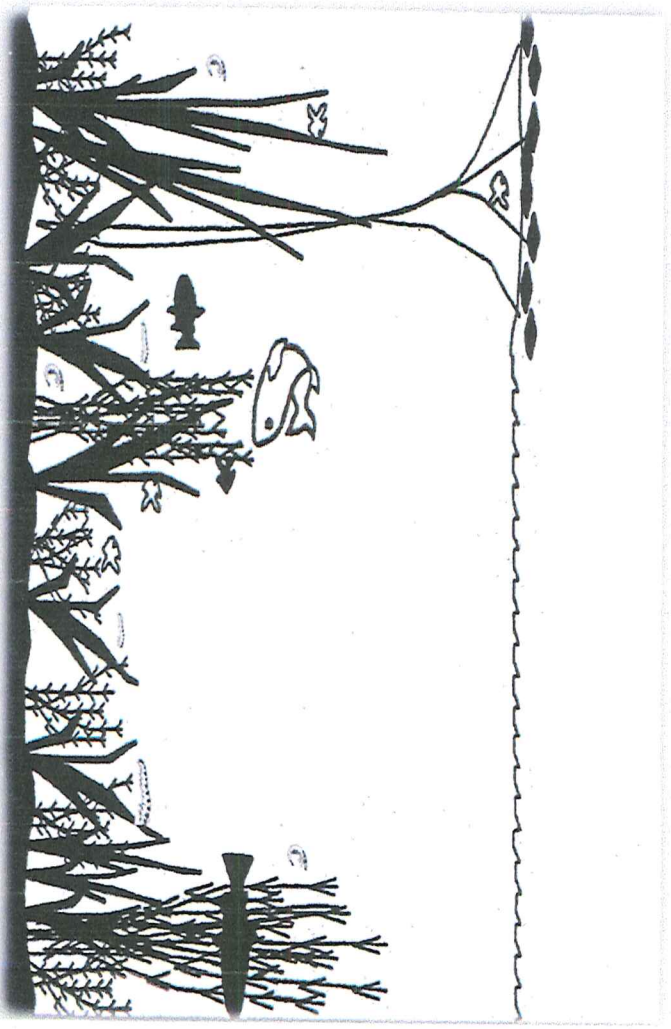
Diverse fishery including both cool and warm water species.

Overall health of the lake's fishery is directly tied to many factors including:

Plant coverage; Water quality; Algae densities

Managing nonnative plants, while maintaining native plants will promote a healthy fish community.

Through proper management, a fishery can be maintained and restored.

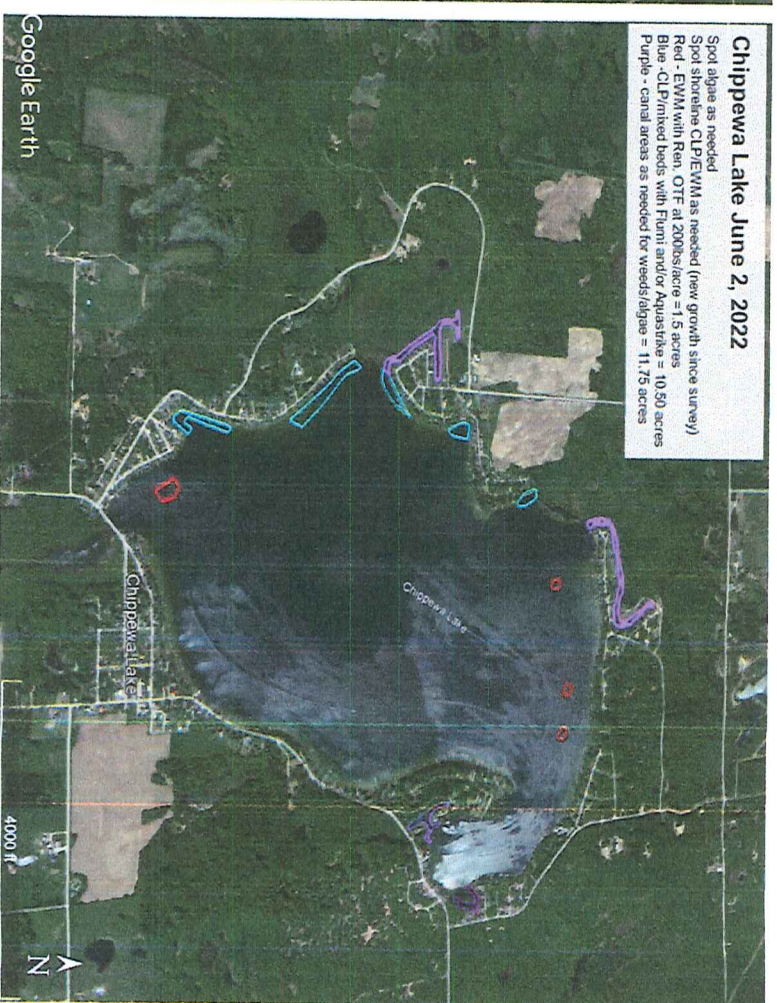
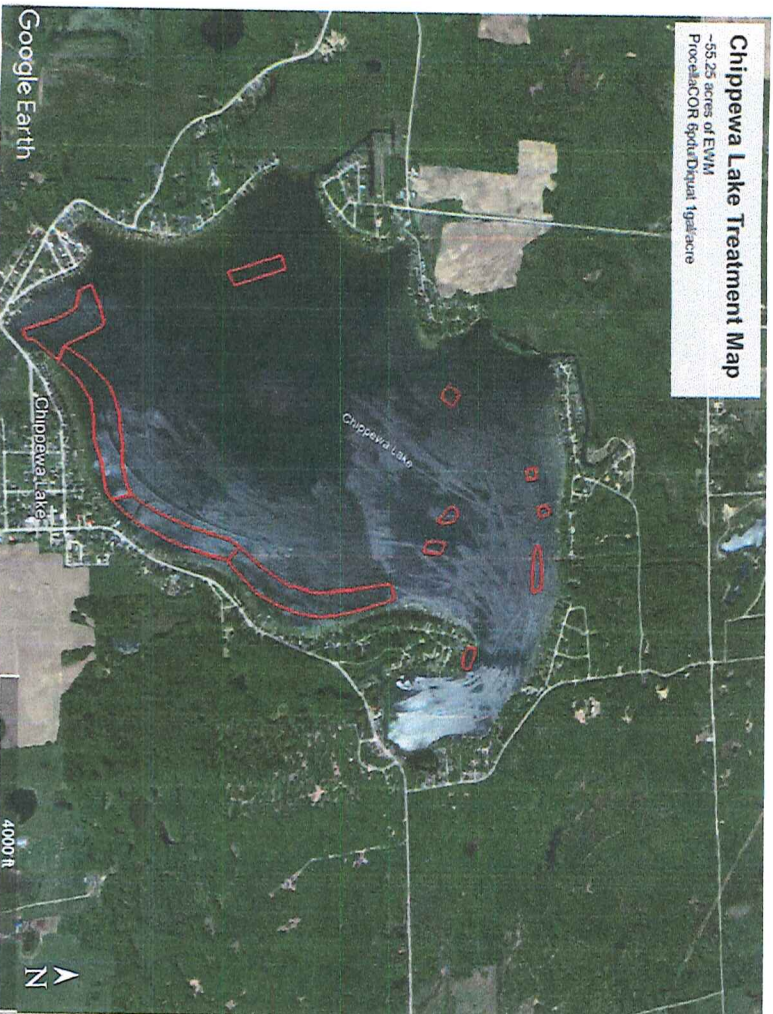




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Chippewa Lake Survey Program

- Numerous surveys each summer including:
 - Annual AVAS Surveys
 - Map with 71 segments
 - Pre/post treatment surveys
 - Includes GPS mapped areas for applicator



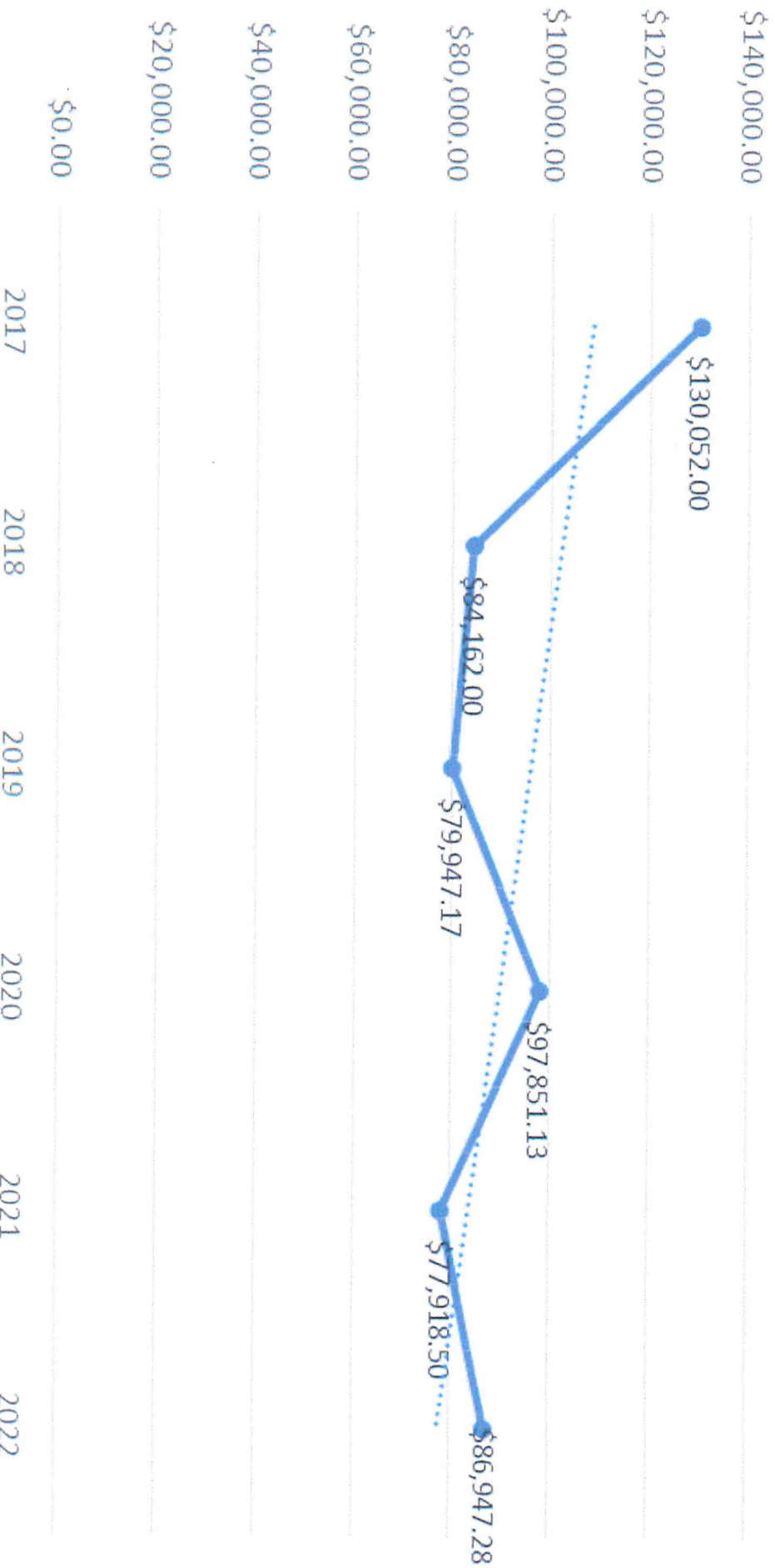


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Chippewa Lake

A look back at the cost of treatment annually

Cost of EWM/SSW Management

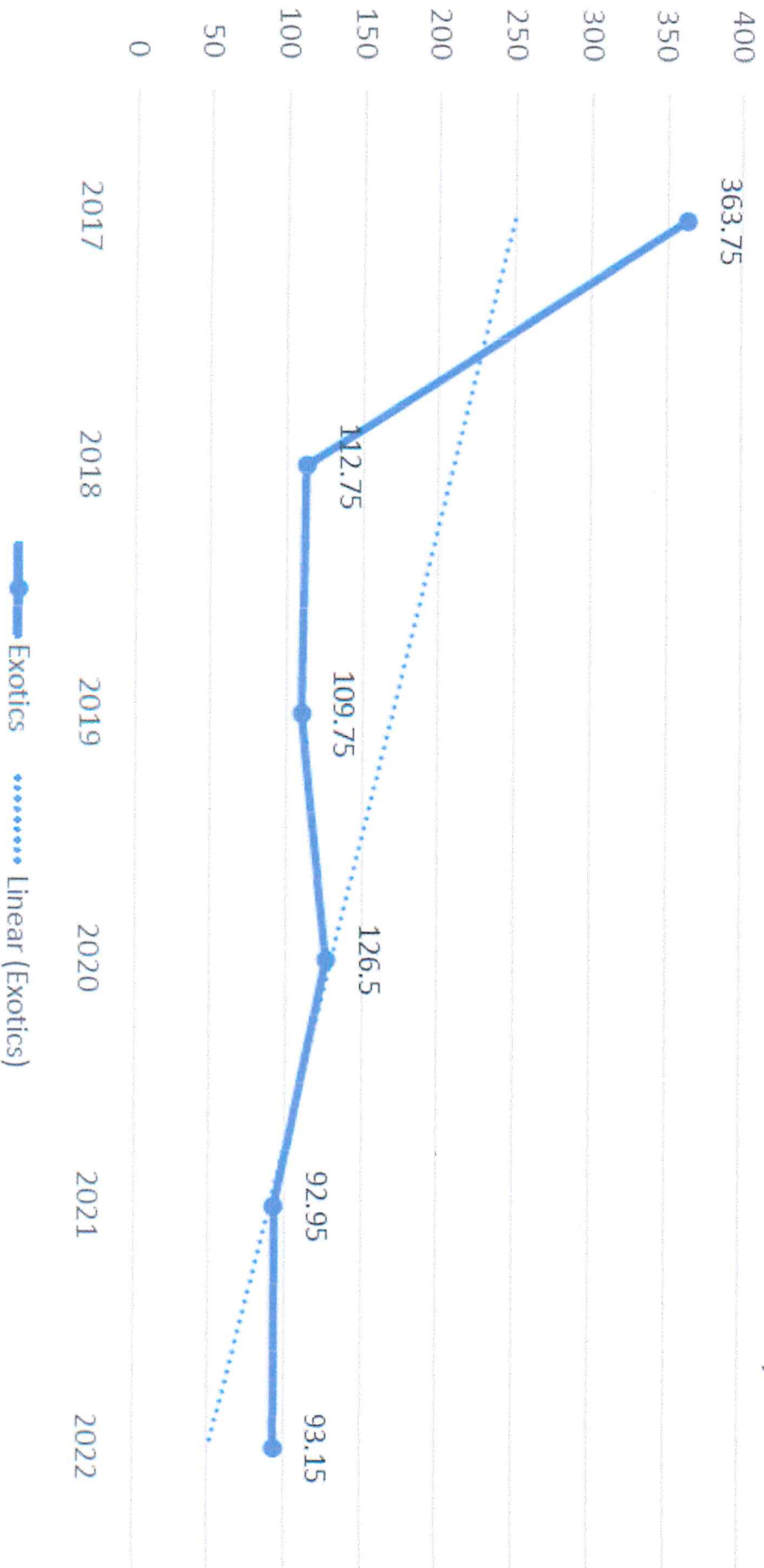




Chippewa Lake

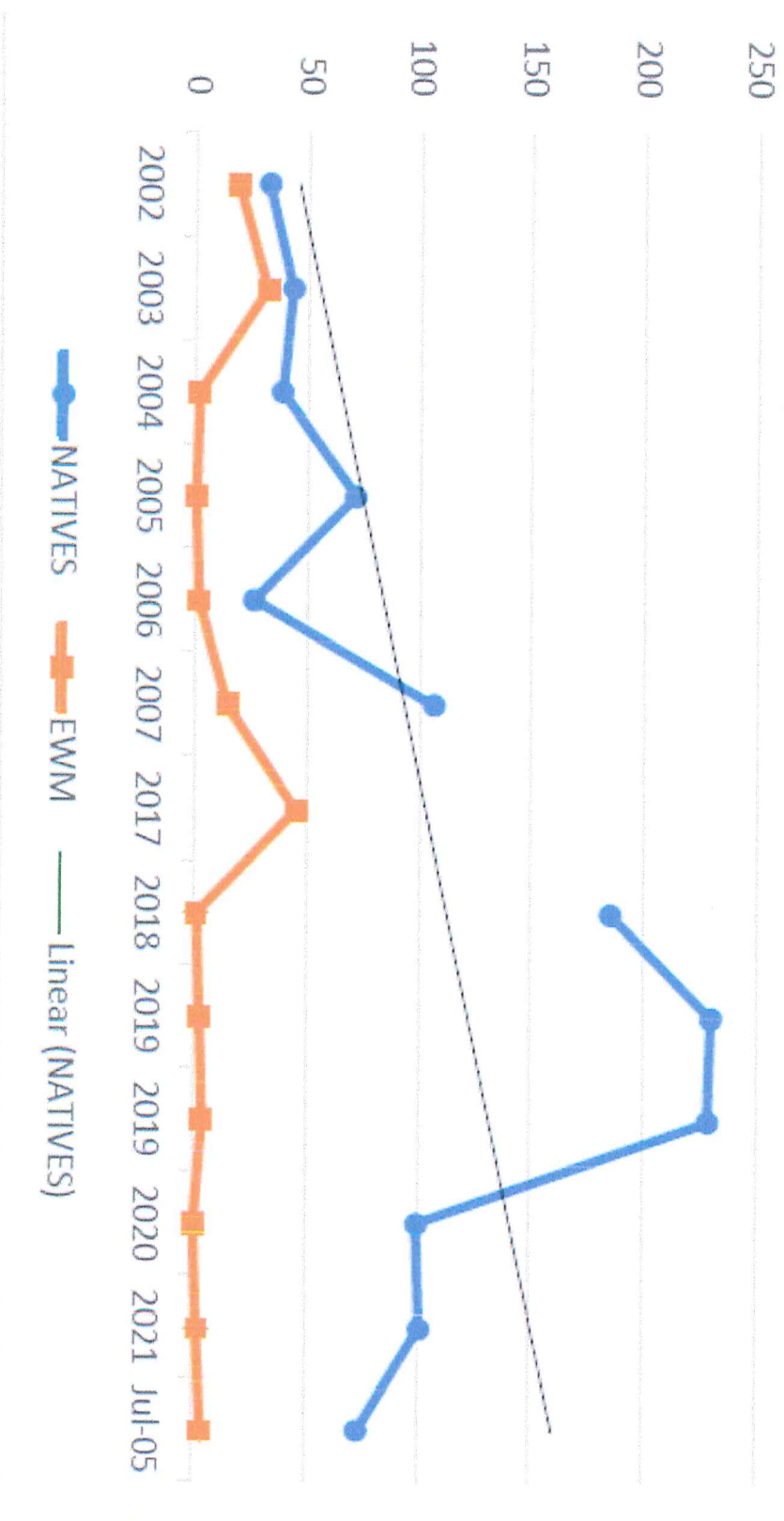
A look back at the acreage treated annually

Acres of Nonnative Plants Treated Annually





Chippewa Lake Cumulative Plant Coverage



This graph shows the cumulative coverage of EWM and Native plants from 2002-2022. The overall decline in the presence of EWM from the start of the management program shows the success of the program and that the population is currently being maintained at very low levels. Post EWM control, the natives in the lake exploded, but in recent years have tumbled off some, likely a reflection of natural competition, seasonal weather patterns, lake activity among other factors. Continuing to monitor these trends are important to understand the overall health lake.



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2022 Treatments

- ~93 acres of EWM & CLP treated
- EWM treatment utilizes a new technology for EWM control, ProcellaCOR
 - ProcellaCOR has a reduced risk EPA rating, uses a new mechanism of plant absorption and designed as a selective herbicide for EWM control
- Came in under budget!
- Algae is an ongoing battle, we utilize SeClear G (which helps remove Phosphorus as well) to combat algae whenever possible. Working very well in the channels as well.
- Native plants
 - Robust on the lake! Many come in towards middle/end of the growing season. These plants are vital for the lake but can cause recreational issues!
- We presurvey the lake to determine what/where needs treatments.
- Pre-post to try to communicate in advance of treatment plans.
- The entire lake is often NOT posted/treated!
 - Restrictions only apply where signs are.
 - Swimming restriction reality.
 - Have to post one day, but labels don't carry the restriction.



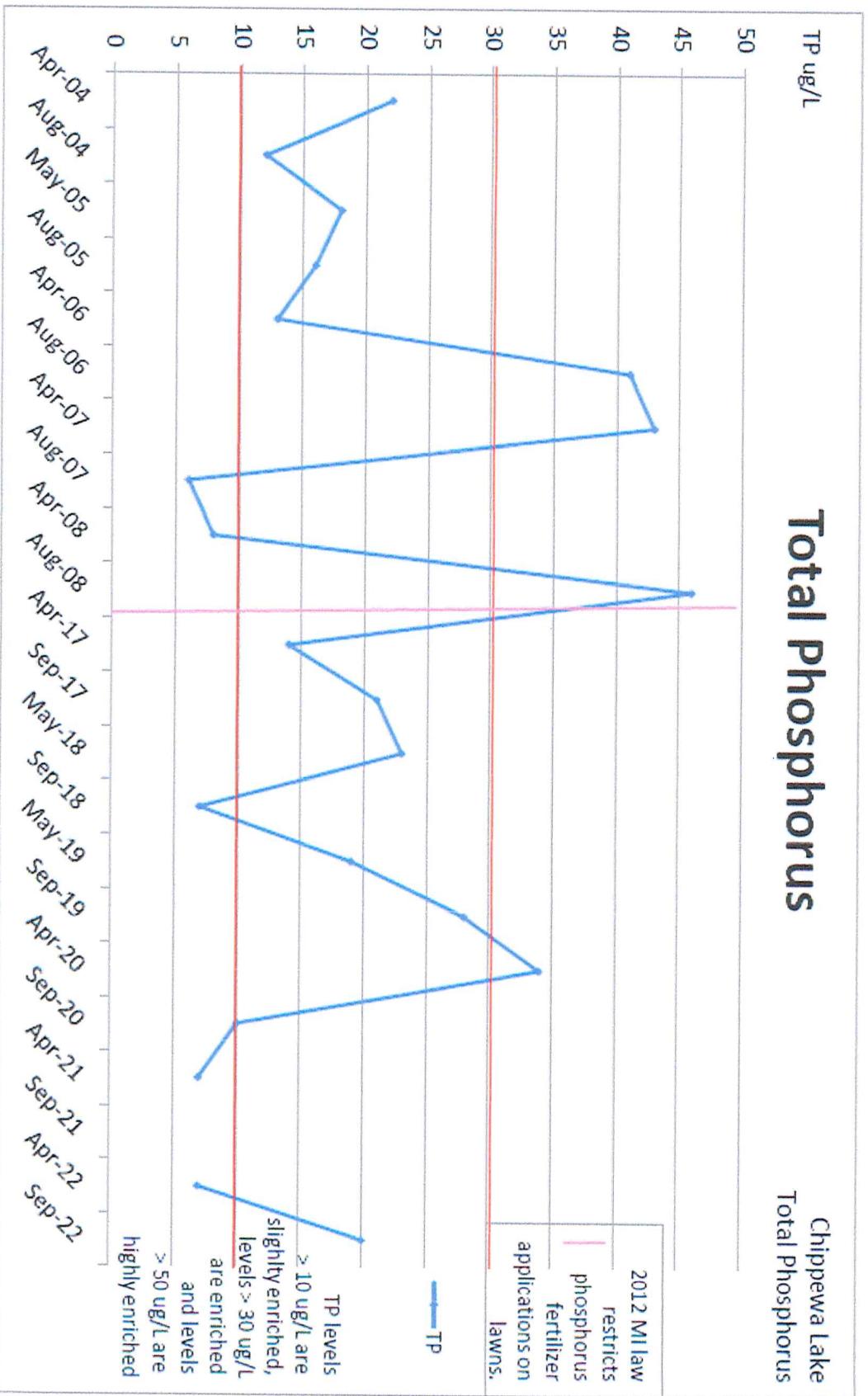
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Chippewa Lake Water Quality

- Chippewa Lake participates in PLM's water quality program
 - Test spring and end of summer for various parameters
 - Phosphorus, Nitrates, Alkalinity
 - Spring is surface (before lake is stratified)
 - End of summer is deep water sample – checks for internal loading
 - Temperature, Dissolved Oxygen, pH, Conductivity
 - Summer Ecoli testing



Total phosphorus measures the total amount of phosphorus in the water. Phosphorus is an important plant nutrient (i.e., fertilizer) and the nutrient most likely to limit algal growth. Phosphorus levels are not only related to internal loading of nutrients but also from external sources. Elevated phosphorus inputs to lakes caused by human activities are a major cause of cultural eutrophication. Readings above 10 µg/L are considered slightly enriched while readings over 30 µg/L are considered enriched.



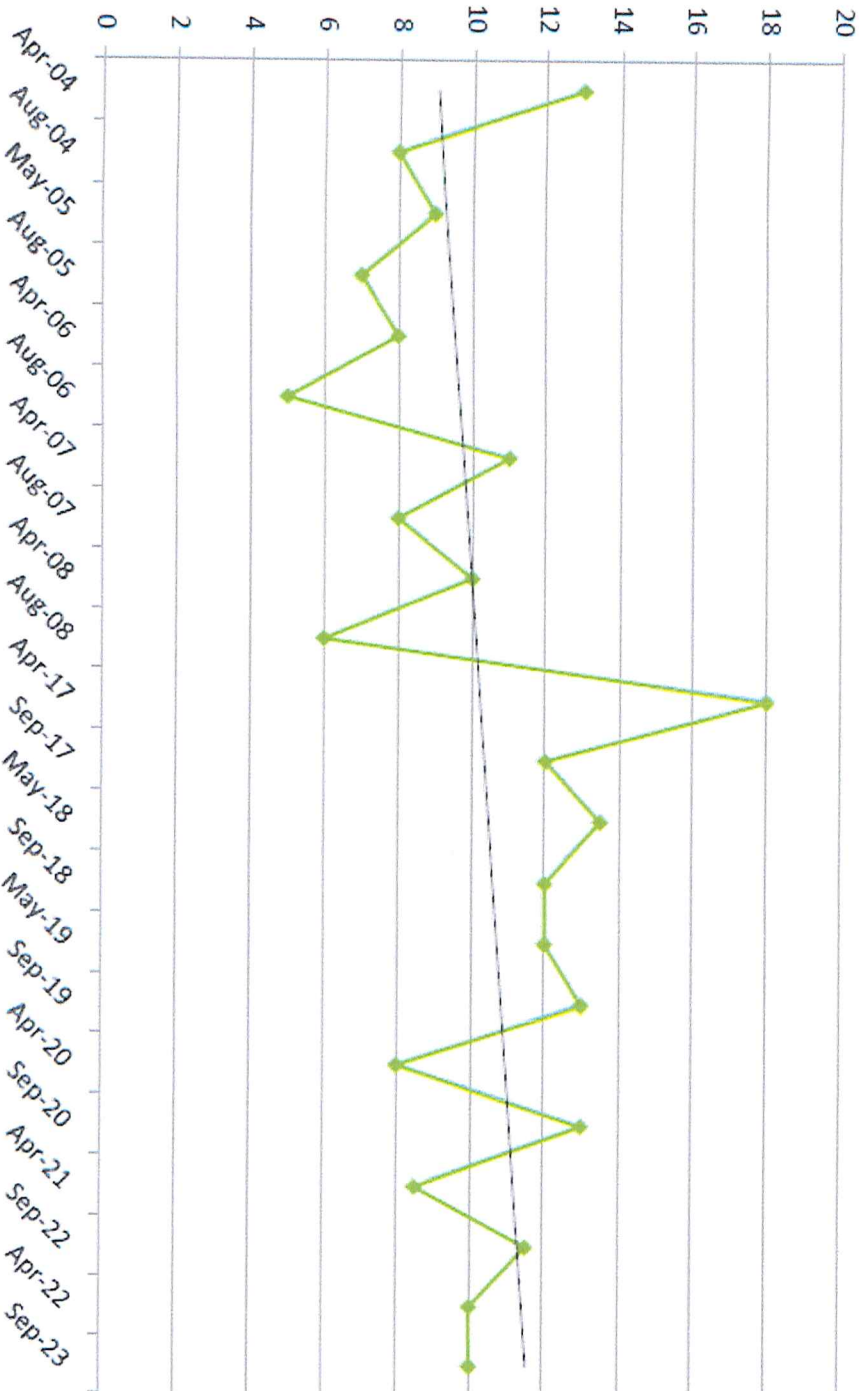
Historical data shows spikes but not a massive concern.

Secchi Disc

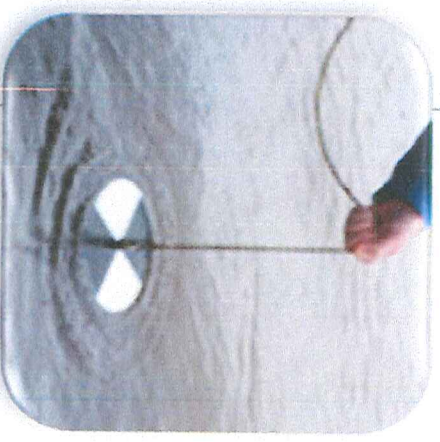
- Numbers can vary daily/weekly
- Variance since 2004, trendline shows historical increase

Secchi Disc

Chippewa Lake
Clarity



—◆— Secchi
— Linear (Secchi)





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Eutrophication

- Lakes naturally progress from oligotrophic to eutrophic, a process called eutrophication.
- Human activities dramatically speed this process by increasing input of nutrients (phosphorus and nitrogen) and sediment
- Prevention is far easier and less expensive than restoring lakes already damaged
 - Monitor phosphorus and nitrogen concentrations
 - Encourage BMP – Phosphorus free fertilizer, buffers, soil erosion, leaves, debris out of lake
 - Evaluate sources entering lake (Watershed study)

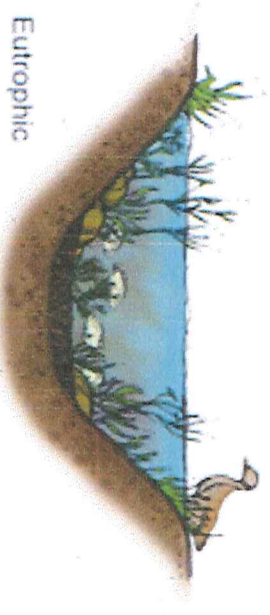


Photo curiosity Progressive AE



Trophic status

	Oligotrophic	Mesotrophic	Eutrophic	Hypereutrophic
Water Clarity	excellent	Good	fair-poor	very poor
Nutrients	low	Moderate	high	very high
Algae	few	Moderate	blooms likely	severe blooms probable
Plants	few	Moderate	abundant	few, in shallows
Fishery	cold water possible	cold water possible	warm water only	rough fish often dominate



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2023

The Recommended Management Schedule for 2023:

- A spring and fall vegetation survey (to evaluate conditions in the lake).
- Exotic plant management/treatment, as required
- Pre and post implementation surveys as required, in addition to a mid-summer survey
- Water quality monitoring throughout season
- Community Education/outreach activities
- Early Detection Rapid Response to any new infestation

2023 Tentative Treatment Schedule

Treatments will be occurring throughout the summer months. Please watch your shoreline for posting signs with specific restrictions. Please also note that you will see PLM on your lake many times this summer. We will not always be treating the lake, but performing many surveys, water quality testing, etc. Thank you for your understanding as we work to preserve and protect Chippewa Lake. The following **weeks of** have been tentatively set but may be adjusted as the season progresses due to many factors (permit restrictions, growth, weather, etc.) Always watch for posting signs.

May 15: Treatment Survey, Optional Algae Treatment

May 29: Weed & Algae Treatment

June 19: Treatment Survey

June 26: Weed & Algae Treatment

July 24: Treatment Survey

July 31: Weed & Algae Treatment

August 28: AVAS & Water Quality

September 4: Optional Weed & Algae Treatment

Chippewa Lake News

Newsletter Produced by PLM Lake & Land Management



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LAKE & LAND
MANAGEMENT CORP.

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NOTICE Chippewa Lake 2023 Treatment Program

The property owners in this area are planning to have the waters chemically treated to control lake weeds and/or algae. This notice is being circulated in accordance with Department of Environment, Great Lakes & Energy (EGLE) procedures. Due to the uncertainty of weather, the treatment schedule is approximate. Please watch your shoreline for the posting of the 8.5 x 11 inch, yellow or green signs. The signs will indicate the date of the treatment, the products used, and any restrictions on the use of treated water for swimming, watering lawns, etc. One or more treatments involving water restrictive products may be applied. Please be aware that only products approved by the State of Michigan and the Federal government are being used. We have experienced no adverse effects on people, fish, wildlife or domestic pets since applying these products. We anticipate using one or more of the products listed. Please read the restrictions. Again, the restrictions that apply to the products actually used in a particular treatment will be found on the signs posted on the day of treatment.

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Got Muck?

PLM M.D. (Thick Digestion) Pellets are a combination of natural beneficial bacteria, enzymes, and vitamins that stimulate the biological activity at your lake bottom. This stimulation allows the bacteria to feed on the organic sediment, therefore reducing the muck levels. PLM M.D. Pellets are easily applied by anyone once a month, when the water is above 55 degrees. 10lb., 30lb., and 50lb. bags are available.

For a beach area of 50' x 50' ~2lbs/treatment is required, treating monthly May ~ September. To place your order, please call our office at 800-382-4434 to arrange delivery!



WATER

Navigate 1/2-1 D: Swimmable, bays and turf, 0 D: Incidental unless 220y; 220y and 220y unless 220y; 220y structures; Sculpin G2.4-d amine irrigation, bays and turf; 100ypp; Livestock water Restrictor/Triclopyr: 5 limited bays and turf, 0 1 grazer; 120 days or 0 or desirable; Fish consumption; Renovate OTF/Triclopyr Established bays and turf; grazer; 120 days or 0 or desirable; Non-cropland condition; Livestock water Fluorpyrazen-Benylfl Household use; Irrigation; 2.14 Days depending on assay indicator; 100y or less; Aqua Strike/Endothal (day); Annual consumption and irrigation of turf & on Tribune/Digout dibron suspension of treated water turf & ornamentals; 3 days Hydrothol 191/Dimeth K/D/pezzisium; salt of Household use; Irrigation; Chlorpyrifos; Propeller, Scl (day); Domestic water use Crop Irrigation; 5 days; Nautique/copper; carb Swimming or bathing; 1 d PLM Blue; Cyrene 50 copper sulfate; Curme 1 scChlar G; treated coy nasticler; M.D. pellet PLM Enzyme; enzyme; Euro-corb technology; NK For a complete listing site.

Site-specific recommendations with ProcollaCOR. Refer will, typically last 2-14 months.

The chemical used for Al U.S. Environmental Protection, Great Lakes and E other non-target organism as directed on the product ble effects on health and if for the above purpose.

Method of Application back park, and/or land vegetation and/or injection; broadcast.

Contractors, William Cor William Duchan, Heidi Duzen Grabbill, Chriss Kyle Heath, Jake Hunt, Pasha, Elijah Quam, Raquale Robbins, Eric Allison Schemmerhorn, Keith TerHoffert, Jeff To sel, Andrew Weinberg

HAB's What You Need to Know

During the summer months, many Michigan lakes experience noxious blue green algae blooms. Cyanobacteria (or a no-bac-terial), also known as blue-green algae, are a natural part of lakes, rivers, and ponds. Unfortunately, some species can produce toxins, called cyanotoxins that can make humans and animals sick. When conditions are right, these organisms can rapidly increase to form harmful algae blooms, or HABs. These blooms can last a few days, weeks or longer and are considered harmful because they may contain toxins. A bloom can start small and become very large in size and can give off a foul odor.

- What You Need to Know:
- Not all algal blooms contain toxins, but it is difficult to tell by looking at a bloom if it is harmful.
 - HABs can be a variety of colors such as blue, green, blue-green, brown, white, purple, or red.
 - A bloom can occur when the water temperature is warm, conditions are calm, and the water has a high level of nutrients, like phosphorus and nitrogen.
 - Blooms typically occur in Michigan from summer to fall. A bloom can last days to a few months. Blooms may disappear but then form again within the same season.
 - Typically, symptoms of illness from cyanotoxins appear within hours to days in humans. If symptoms do appear, the severity will depend on how long the exposure was, the type of cyanotoxin, and how the person was exposed.
 - While there have been no confirmed deaths of dogs in Michigan due to exposure to algal blooms, there have been a few dog deaths where exposure to algal blooms may have been a contributing factor, but no definitive cause could be determined.
 - If a HAB is suspected, do not swim, wade, or touch the water where algae are present. Humans and pets should be rinsed thoroughly in fresh water if there has been any contact with the water. Humans and pets should avoid the water entirely if there is a large algal bloom spread out across the lake, river, or pond, including water sports like boating.

AL Lake Resident's KEY TO SURVIVAL

PLM Lake & Land Management Corp. appreciates the opportunity to be a part of your lake management program. Your lake is a diverse ecosystem which requires the use of multiple management tools. In addition to the services we provide, we still need your help! You can directly improve your lake's frontage by taking a few small steps that can have widespread impacts on the entire lake. Everyone's actions play a role in the health of your lake and as you own property on the lake, you have a large investment in the overall health of the lake. Therefore, everyone needs to take action for the overall health of the lake. It is not just the land touching the lake that impacts the health of the lake, but all the land in the area that makes up the watershed. Everyone's actions on and off the lake play a role in the condition of the lake. Do your part and help get your neighbors involved in caring for the lake. The following suggestions are just a few actions that can be taken to help create a healthy lake and beach frontage.

Do not feed the ducks and geese. Remove dog, geese and duck droppings from lawns, docks, etc. Excess feces will increase nutrients within the lake. Please, do not sweep it into the lake!

Create a natural buffer close to the water's edge and remove grass/turf touching the water's edge. A natural setting will filter excess nutrients from entering the water and help decrease erosion. The greenbelt should consist of native plant varieties of shrubs, flowers or trees that do not shed their foliage into the water. Natural buffers are also an excellent way to deter geese from making a stop on your beach front. Geese do not like areas where they cannot see the predators coming towards them.

If you do fertilize make sure you are using Phosphorus free fertilizer. Talk with your neighbors and develop a phosphorus free program which uses no phosphates and slow release nitrogen. One pound of phosphorus may produce over 775 pounds of algae--"The slimy green stuff". If you must fertilize, apply nitrogen fertilizer when the grass is actively growing to minimize loss of nutrients to nearby waters. Begin fertilizing in the spring when temperatures are warm and discontinue before the grass ceases to grow in the fall. Avoid application of fertilizer prior to rainy days.

Perforate lawn periodically and seed and mulch exposed soil (to prevent erosion).

Remove aquatic plants, leaves/branches and other debris that washes up along the lakeshore so less decomposition occurs in or near the lake.

Always use silt fences when building a new home or doing any yard work that would cause erosion.

Keep all burn piles and debris piles away from lake. Do not burn near the water. The ash is concentrated nutrients!

Encourage the use of stone, brick and similar porous materials when building a landscape to minimize urban water collection.



STOP AQUATIC HITCHHIKERS!

Prevent the transport of nuisance species.
Clean all recreational equipment.
www.ProtectYourWaters.net

THANK YOU, QUESTIONS!

Reminders for as you leave today:

- Know your environment, what is around you, we can all be citizen scientists
- Ask questions, communicate
- Prevention is key! Early detection, rapid response
- Remember your heathy lakefront living practices, whether you are lake front or within the watershed-We can all do our part
- Let's work together to protect your Lake!



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HELP STOP AQUATIC HITCHHIKERS!

To avoid spreading aquatic invasive species

BEFORE launching ... BEFORE leaving:

- Remove aquatic plants and aquatic animals
- Drain lake or river water away from landing
- Dispose of unwanted live bait in the trash

It's the Law... Do not:

- Transport aquatic plants, zebra mussels, or other prohibited species on public roads
- Launch a watercraft or place a trailer in the water if it has aquatic plants, zebra mussels or other prohibited species attached
- Transport water from infested waters

Michigan Department of Natural Resources