
SAVE THE LAKE
ANNUAL FUNDRAISER
SUNDAY, JULY 13 3PM
PAW PAW LAKE YACHT CLUB
PAW PAW LAKE FOUNDATION

Who is Paw Paw Lake Foundation?

Paw Paw Lake Foundation has been incorporated as a 501 (c)(3) since July, 1995

- Your donation is tax deductible as described in Section 501(3)C of the Internal Revenue Code; EIN#36-4035293.
- PPLF Board is comprised of 17 volunteer local lake residents from both Coloma and Watervliet. Five board members have served 30+ years.

Our Mission:

CLEAN LAKE WATER.

- Paw Paw Lake Foundation is dedicated to the preservation, protection, and improvement of the Paw Paw Lake, and its ecosystem and watershed, for our children and to protect our property values.

The Paw Paw Lake Foundation (PPLF) is not the only organization which impacts Paw Paw Lake.

PPLA - Paw Paw Lake Association

SAD – Special Assessment District

MSLA Conference – Michigan Lakes & Streams Conference

PPL Working Group

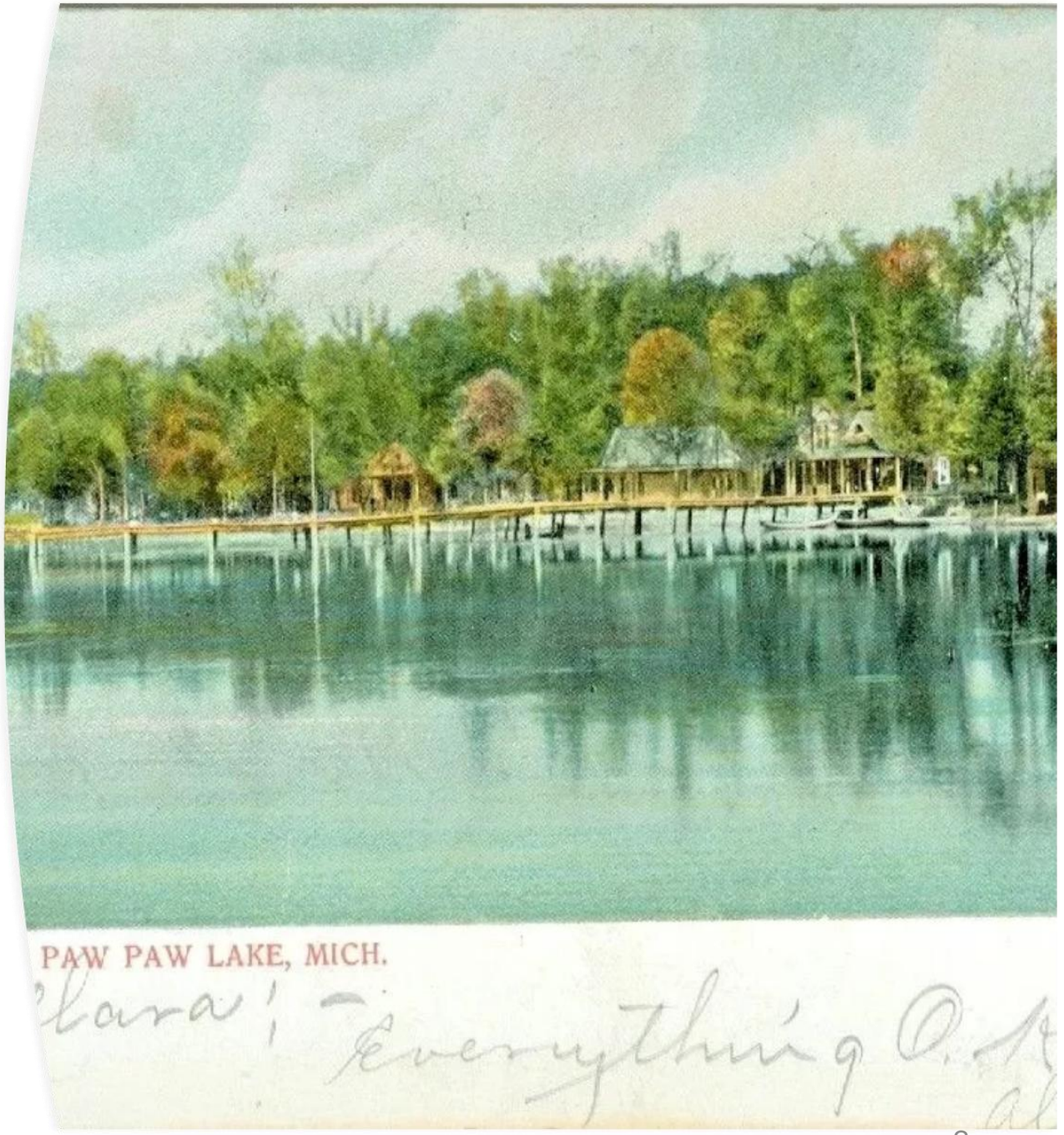
USFW – US Fish and Wildlife

DU – Ducks Unlimited

Drain Commission of Berrien County

EGLE – Environmental Great Lakes and Energy

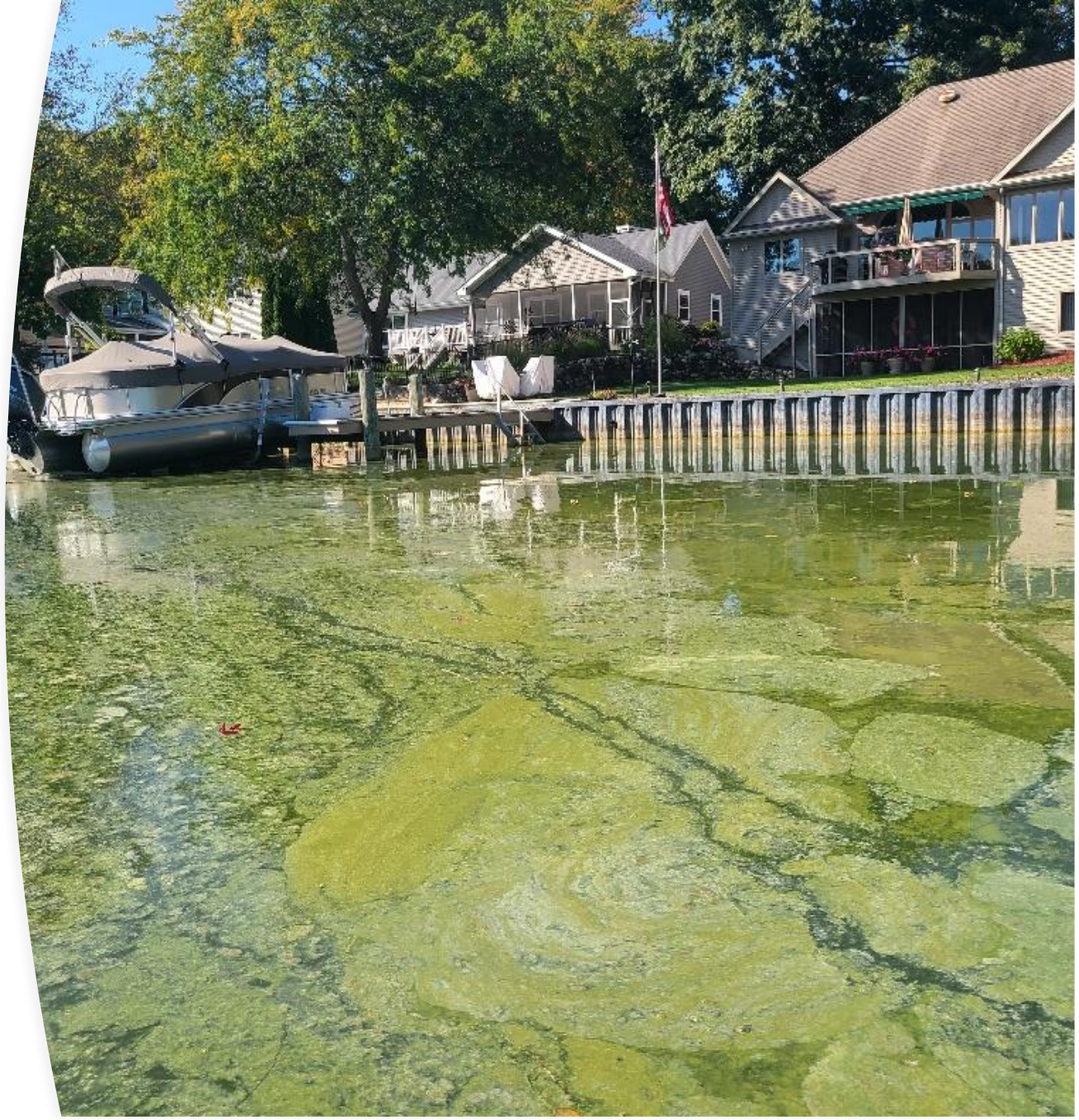
Spicer Group



Water Quality Cause For Alarm

Paw Paw Lake has reached Eutrophic Conditions

- Eutrophic lakes are high in nutrients and contain large populations of aquatic plants, and algae. The lake substrate is typically soft and mucky.
- The aquatic plants and algae often grow to nuisance levels, and create low oxygen conditions.
- The results in a release of phosphorus from the sediments, which can fuel algae blooms.



Where Does Over Abundance Of Nutrients Originate?

- **Agricultural Fertilizers**
  - Farm Run Off Entering The Lake Thru Our Tributaries
- **Lawn Fertilizers**
  - Seasonal Run Off Washing Fertilizer Into The Lake
- **Decaying Weeds On The Lake Bottom**
  - The Result Of Continuous Herbicide Treatments To Aquatic Weeds That Inhabit Paw Paw Lake.

What has the Paw Paw Lake Foundation accomplished lately?

- **Three generous donors allowed PPLF to purchase the #1 contributor to Agricultural runoff into Paw Paw Lake (77 Acre Farm).**

- **PPLF successfully petitioned the township and state to create the Paw Paw Lake Conservancy. The 77 Acre Conservancy is now tax exempt.**

- **PPLF is under contract to purchase the adjoining blueberry farm property and combine with the 77 Acre Conservancy.**

What has the Paw Paw Lake Foundation accomplished lately? (cont.)

- **Established partnerships with USFWS & Ducks Unlimited; providing access to experience, planning and funding.**
  - Ducks Unlimited (Kali Rush) is a seasoned grant writer who is working with PPLF to submit proposals with the intent to purchase additional farmland along the Branch and Derby Drains.

- **USFWS (Gib King) and his team seeded the conservancy Winter 2025 with wildflowers and grasses.**
  - Wildflowers enhance soil health, prevent erosion, improve water quality and capture carbon.
  - Their root systems, along with those of other grassland plants, extend deep into the soil, storing water and nutrients and holding on to carbon that would otherwise be released into the air.

TWO LEVEL DRAIN

- **Two-level drains (or flood shelves) improve runoff by forming flood benches that reduce erosion and trap sediment.**
- **Naturally occurring or constructed, they involve reshaping streambanks and vegetation to create benches just above normal water levels but below the surrounding land.**
- **Flood shelves create stable, plant-rich habitats that filter stormwater and reinforce streambanks – resulting in a healthier ecosystem and cleaner, clearer water flowing into Paw Paw Lake.**

EXCAVATION OF SEDIMENT POND

Completed maintenance on the Settling Pond located at the NE of M-140 and Hagar Shore Rd.

- This project facilitated the removal of a significant amount of detritus material. It also will reduce the water flow speed and give sediment from the Branch and Derby Drain a place to settle in the future.

- Special thanks to the SAD who contributed 50% of the cost, and Trident for carrying out this project.

STORM DRAIN PROJECT

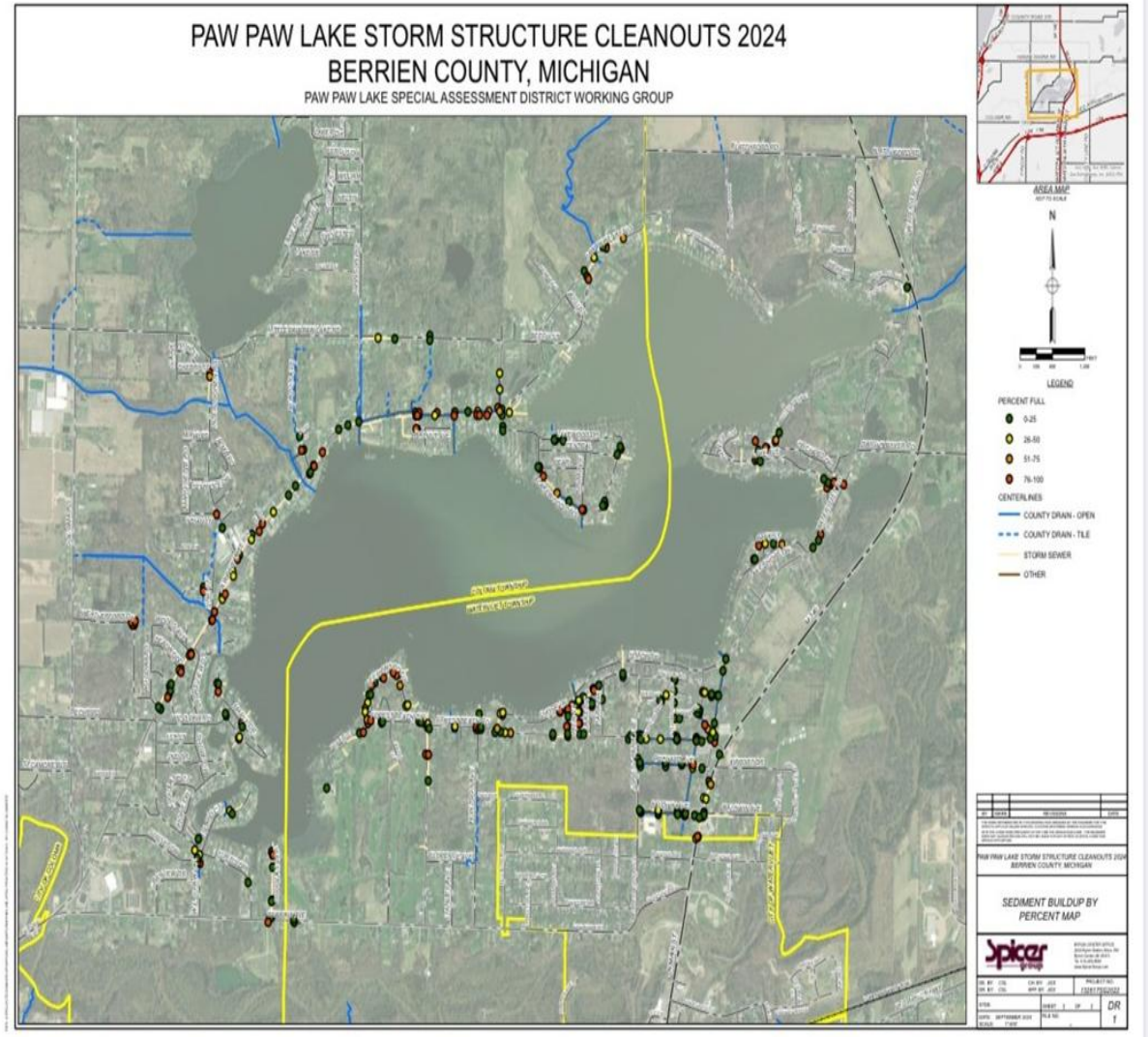
2022 PPLF and SAD funded a project to document and clean out all storm water catch basins around Paw Paw Lake.

- 2022 pilot program cleaned out 494 total structures.
- Total 225 to 250 cubic yards of material.
- 850 to 950 pounds of phosphorus, and about 150 to 175 pounds of metals.

Fall 2024 The catch basin cleanout program was completed.

- Cleaned out 218 structures,
- Total 11 cubic yards of material
- 26 pounds of phosphorus and 4.5 pounds of metals removed

Source: Ehrland Bosworth Spicer Group 2025



STORM DRAIN PROJECT; IMAGES

B&Z cleaning out catch basin.

During cleanout.

After cleanout.

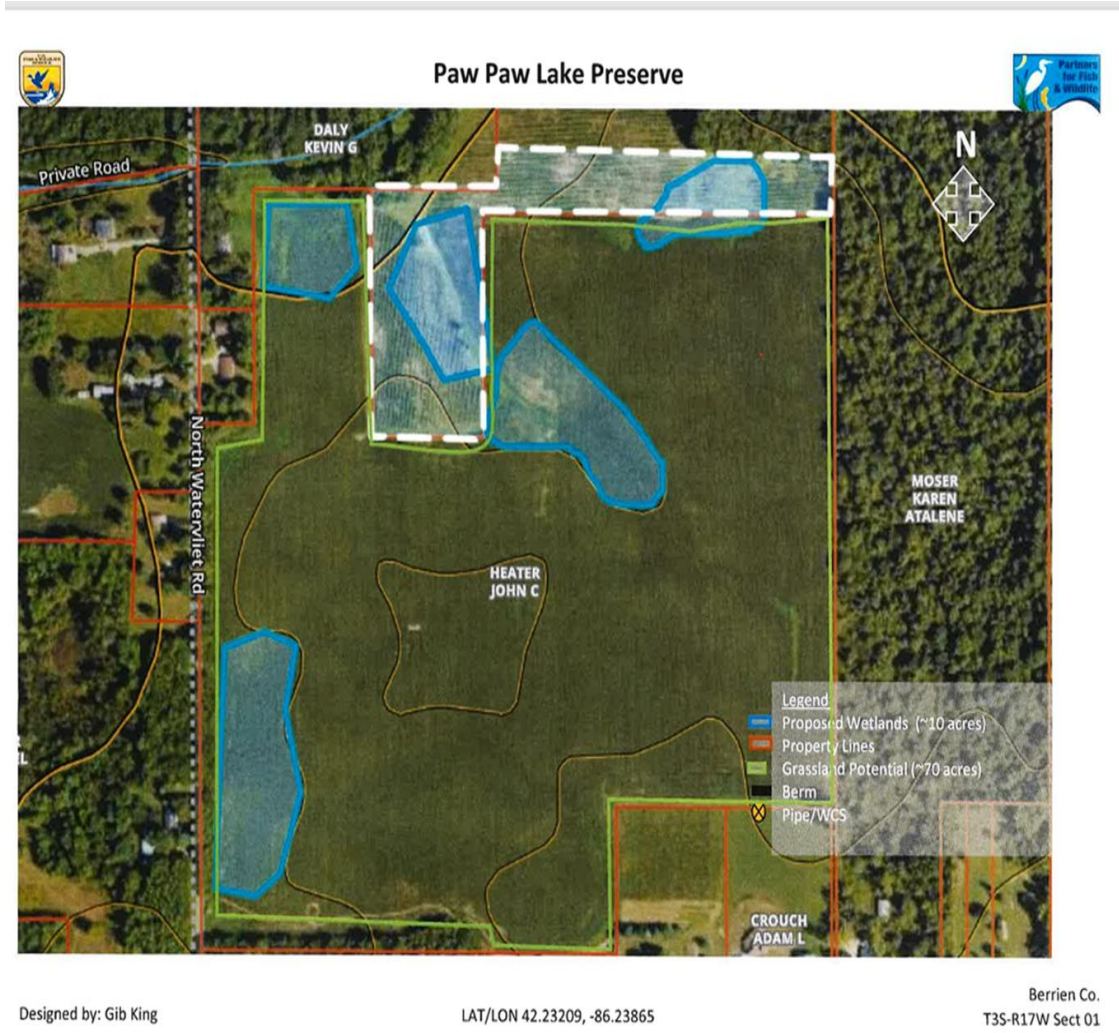
Cleaned out structure.

Cleaned out structure.

What is the Paw Paw Lake Foundation currently working on? (cont.)

- **PPLF and USFWS are planning the construction of swales, ponds, and wetlands on the 77 Acre Conservancy to capture and recharge water, and send it *clean* into Paw Paw Lake; Fall 2025.**
  - USFWS is contributing 50% of the cost.

- **Closing on the Eisen Blueberry Farm soon.**



Phosphorus mitigation strategies for Paw Paw Lake

Algae/Phosphorus reduction in Paw Paw Lake

- **Phosphorus in the water column (and bottom sediment) provide fuel for Algae blooms in our lake.**
- **While most are not harmful, some can contain harmful bacteria.**
- **We need to reduce Phosphorus in both the water column and bottom sediment**
- **We want NON-CHEMICAL treatments which will provide the desired results**
- **What options do we have???**

Biochar deployment in Paw Paw Lake for Algae reduction

- **Biochar is an ALL NATURAL compound developed for sequestering Phosphorus in a lake's water column.**
- **Eden Lakes Timberchar is the only EPA-approved, organic, specially modified and enhanced Biochar on the market capable of removing and storing nutrients like phosphorus and nitrogen**
- **Timberchar has been used in over 100 lakes world wide and in a number of Michigan inland lakes for reduction of P in the water column**
  - **Lake Columbia (840 ac.) – Jackson County, MI**
  - **Woodland Lake (260 ac.) – Brighton, MI**
  - **Silver Lake (600 ac.) - Oceana County, MI**

Figure 3. A localized blue-green algal bloom on Silver Lake (July 13, 2024).

Biochar deployment in Paw Paw Lake for Algae reduction

- Requires the Timberchar bags to be deployed on all piers around the lake for maximum efficacy.
- We will need to deploy 1900 bags around the shoreline for maximum effect
- Bags are placed in the lake in May and removed in October (Per EGLE requirements)
- Approx. 1/3 of the bags are replaced each year
- Expect to see good results in year 2. Potential benefit could begin in the first year.
- Recommending a 3-year program

Figure 3. A localized blue-green algal bloom on Silver Lake (July 13, 2024).

Lake Columbia has had success by deploying Biochar

- **Lake Columbia Timberchar bags ready for deployment**

Lake Columbia Watershed / Water Quality 2024 Year End Report

3. We have seen a significant reduction in phosphorus after one season of TimberChar® bags on our docks. These are wonderful results. Exact impact to the water column over three reporting periods is available in the report, but on average we have seen the phosphorus levels cut in half after only one season. We went from an average 0.028 mg/L (milligrams per liter) in the spring, to an average 0.014 mg/L, in the fall. Per RLS and Eden Lakes, this is a wonderful result, better than they have seen on other lakes using this technology.

What does it cost?

- **First year cost is $200,000.**
- **Permit application is in process for 2026 deployment**

Figure 3. A localized blue-green algal bloom on Silver Lake (July 13, 2024).

Hypolimnetic Oxygenation
-Nano bubbles-

NOT AERATION

- **Paw Paw Lake has very little dissolved oxygen below about 20 feed of depth**
- **Oxygen is critical for reduction in bottom sediment (muck) and reduction on Phosphorus**
- **We need to oxygenate the lower levels of the lake**
- **Today there are new effective systems to do this**
- **We are proposing a technology FAR DIFFERENT than the failed aeration experiment conducted several years ago**

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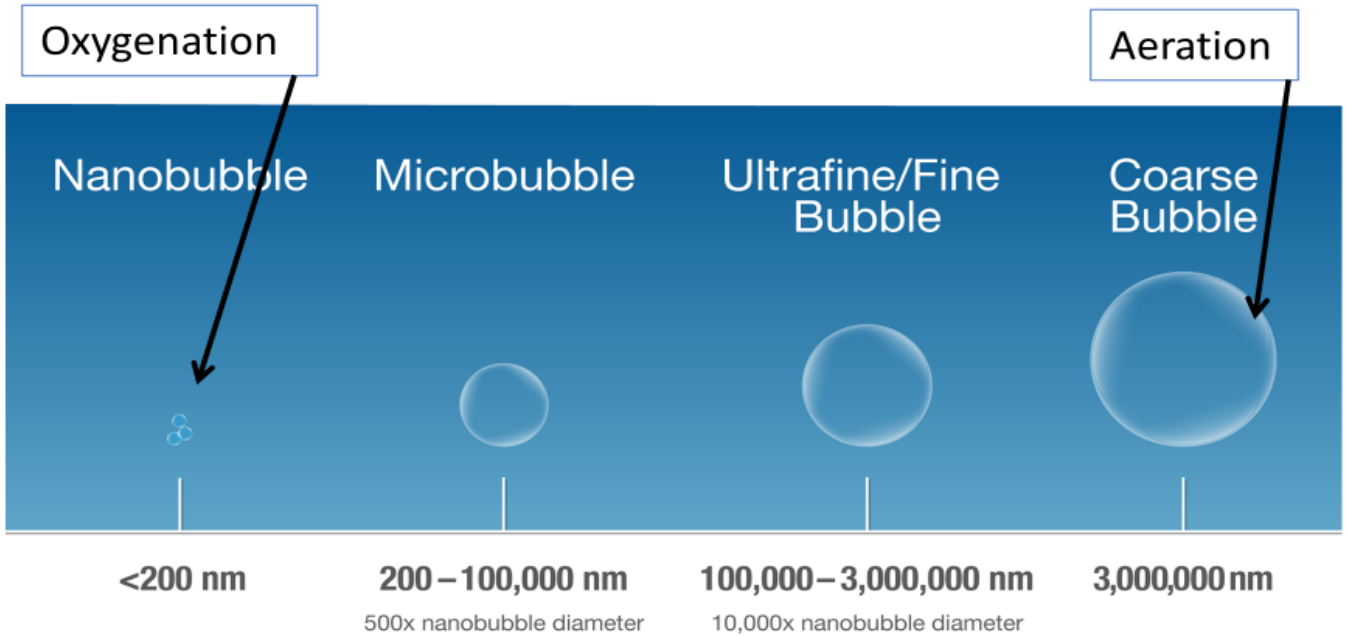
Hypolimnetic Oxygenation -Nano bubbles-

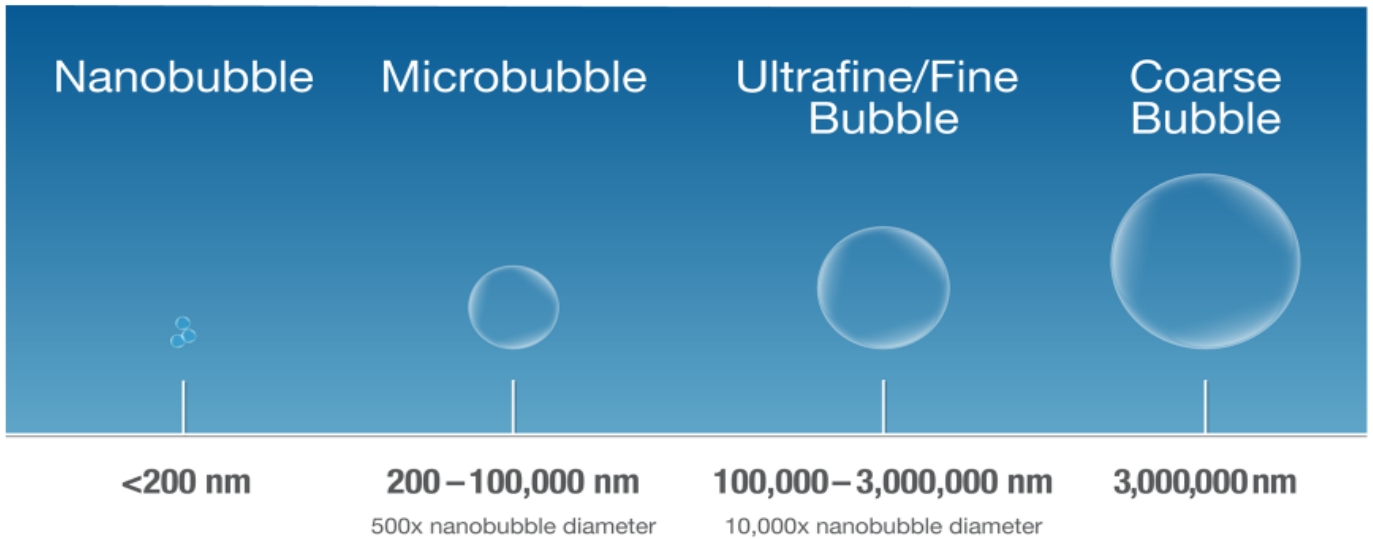
- **Today's best systems use bubbles so small, they are not detectable by the human eye, yet are far more effective at oxygenating the sub surface water**
- **Benefits include a decrease internal nutrient loading, decrease soluble metals (i.e., manganese, iron and mercury), reduce cyanobacteria blooms, and increase cold-water fish and zooplankton habitat.**



An average human hair is ~80um in diameter

Hypolimnetic Oxygenation -Nano bubbles-

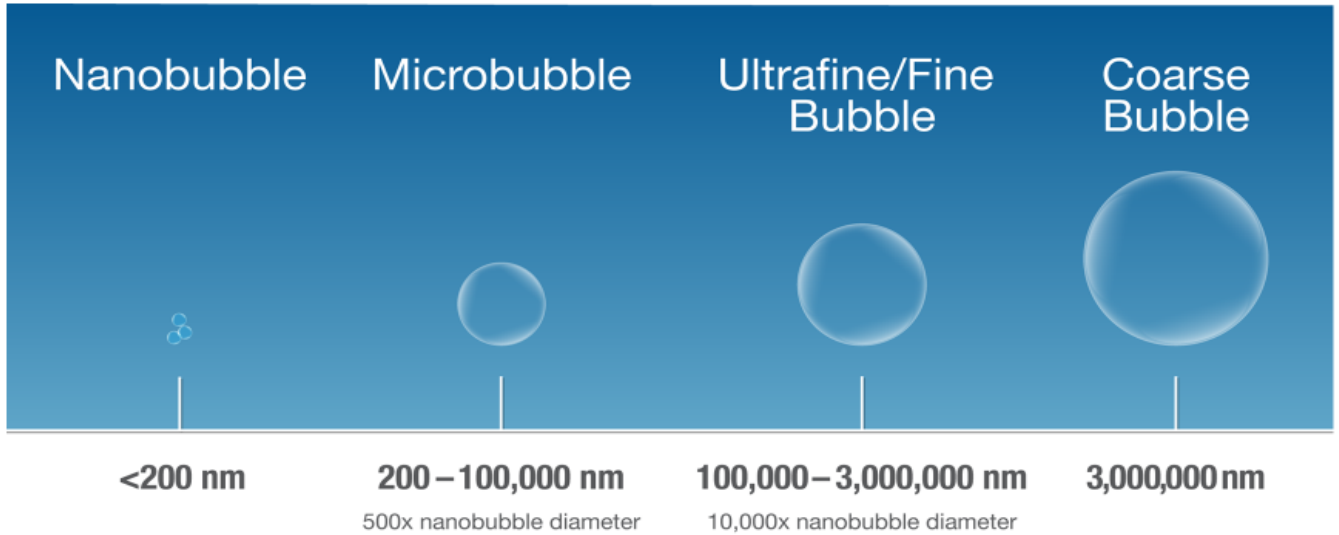
- We are proposing a pilot of 1 Hypolimnetic oxygenation system to be deployed in the north bay of the lake.
- We have identified the on-shore location for the equipment and are discussing the best sub surface location for the diffuser with Progressive.
- The permit application has begun and we are gathering the data necessary for issuance of the EGLE permit.
- We will rent the system in order to reduce capital costs while assessing efficacy.



Hypolimnetic Oxygenation
-Nano bubbles-

What does it cost??

- **Permit process - $28,000**
- **System rental for 1-year trial – approx. $55,000 Including installation**
- **Continuation of pilot program in year 2 is dependant on efficacy**



Additional future projects under consideration requiring funding

- Purchase of additional farms along the branch and derby drains to reduce Agricultural runoff into Paw Paw Lake
- Dredging Lake of Dead Weeds
- Revegetate the Branch & Derby Drain Banks
- N/E side M140 & Hagar existing sediment basin.
- S/W side M140 & Hagar

Waterfowl Contribute Phosphorus and Nitrogen to the Lake's Environment

- Annual droppings from 20 geese living on PPL can support 50,000 pounds of Algae.
  - PPLF has purchased lasers used to disperse geese.

- Feces from Seagulls contain bacteria like Escherichia coli and Enterococcus which can lead to higher levels of these bacteria in the water, potentially making it unsafe for swimming and other recreational activities

Also consider this for your lake front

Each riparian owner can also make their own impact on the lake which can make a considerable difference.

- EGLE has become much more restrictive on granting permits for seawalls.

- Consider implementing natural shorelines as opposed to new seawalls.

- Also consider implementing best management practices such as:
  - Planting vegetative buffers.
  - Refrain from mowing along shorelines.
  - Refrain from using fertilizers.

SAVE THE LAKE

BE PART OF THE SOLUTION

Please consider contributing generously to Paw Paw Lake Foundation to help fund these important projects. Your donations are tax deduction.

QUESTIONS?

Paw Paw Lake Foundation Fundraiser

Goal is to raise $200,000 today

- It will buy Biochar buoys for everyone on the lake.
  - Install in spring of 2026.
  - Permits have already been submitted to EGLE.

- Further testing and development for Oxygenation/Nano Bubbles.

- Additional projects deemed necessary.

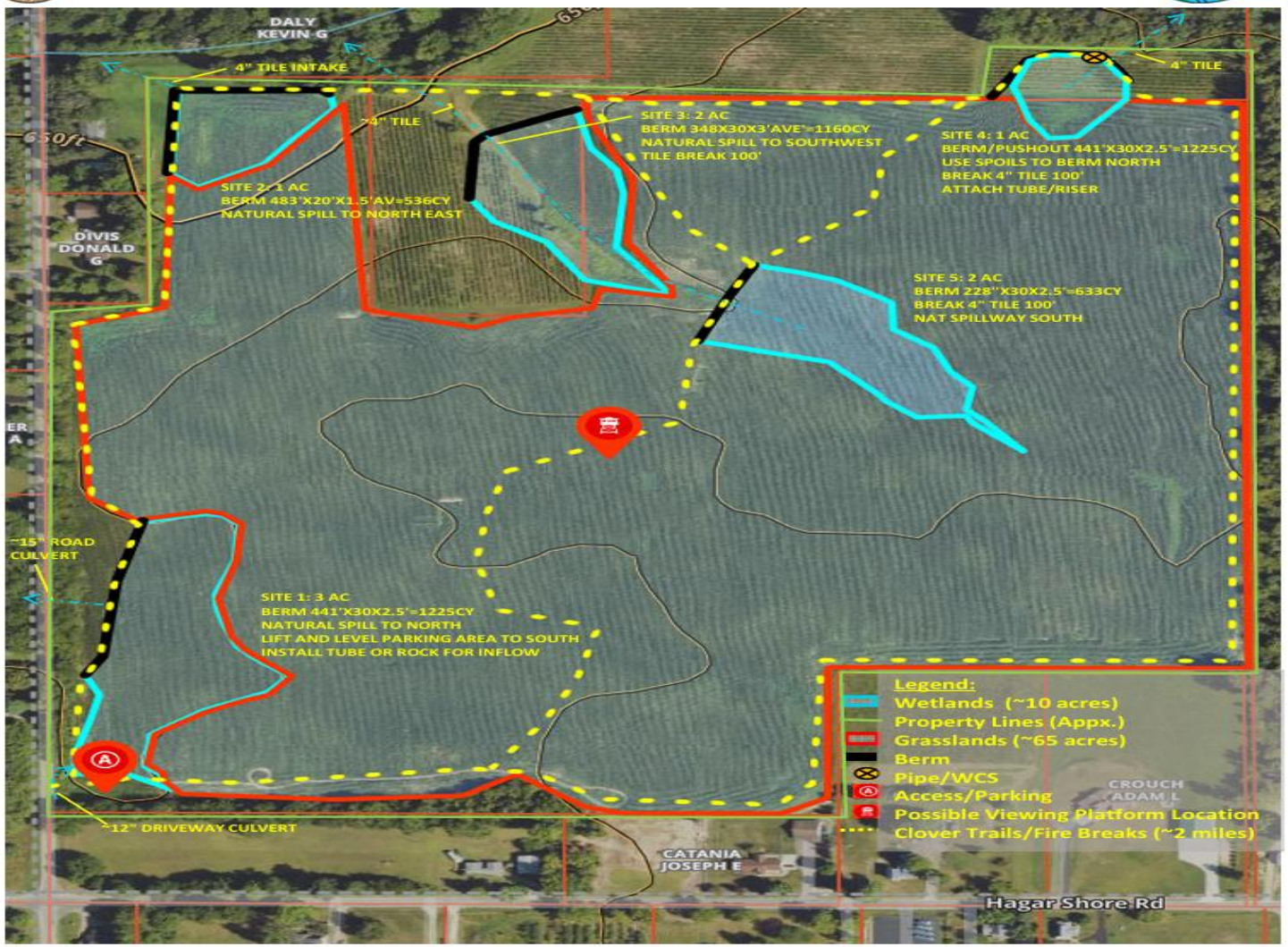
2025 PPLF Fundraising Goal : $300,000

$200,000 for Biochar, $60,000 for Nano-Oxygenation

Donations Needed			Already Committed		Today's Ask	
Committment Level	Donors	Total	Committed	Total	Needed	Total
$25,000	2	$50,000	1	$25,000	1	$25,000
$20,000	3	$60,000	2	$40,000	1	$20,000
$15,000	5	$75,000	0	$0	5	$75,000
$10,000	5	$50,000	1	$10,000	4	$40,000
$5,000	10	$50,000	4	$20,000	6	$30,000
$1,000	15	$15,000	5	$5,000	10	$10,000
Total	40	$300,000	13	$100,000	27	$200,000

APPENDIX

Paw Paw Lake Preserve Proposed Layout

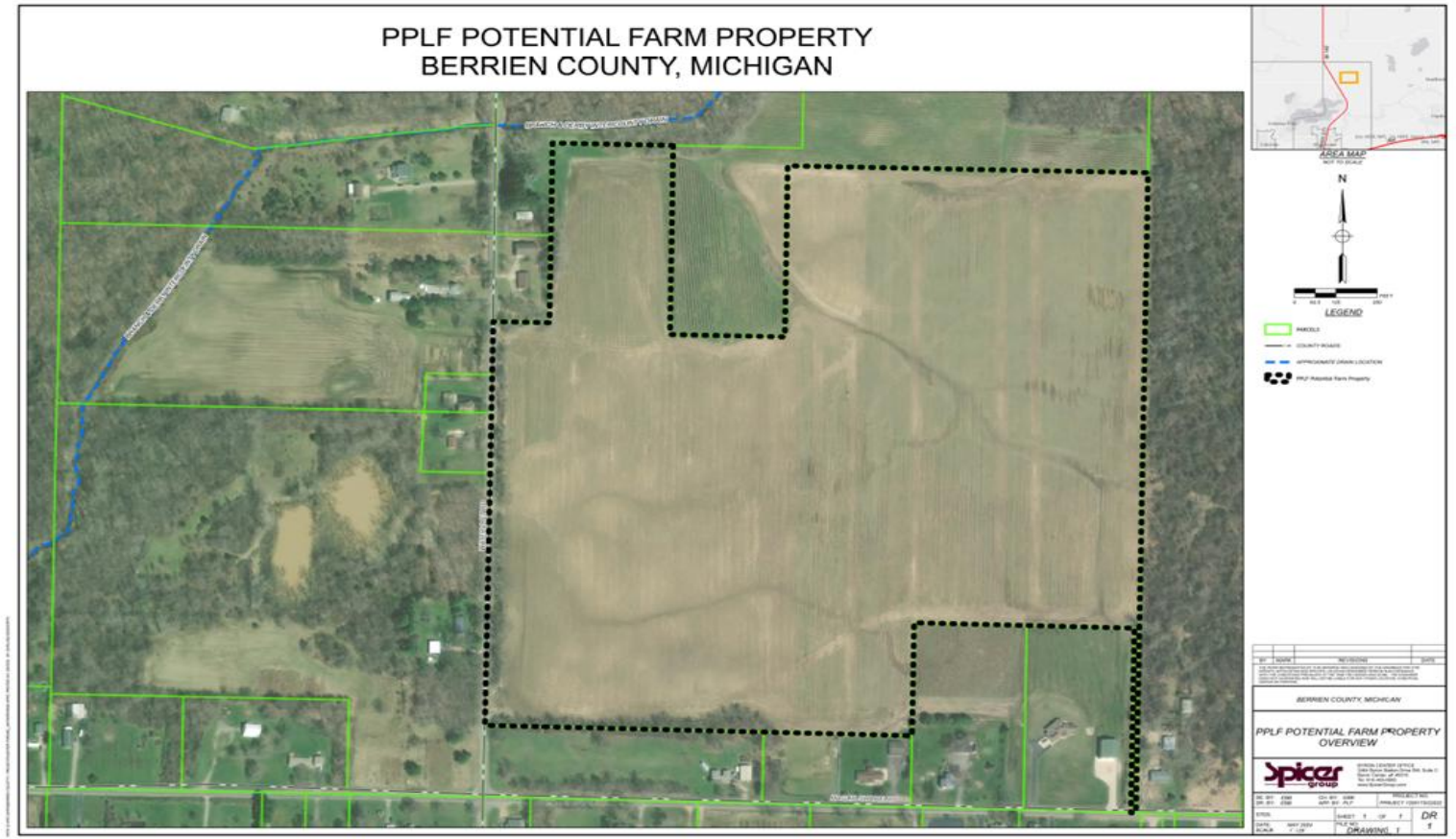


Designed by: Gib King, USFWS

LAT/LON 42.23209, -86.23865

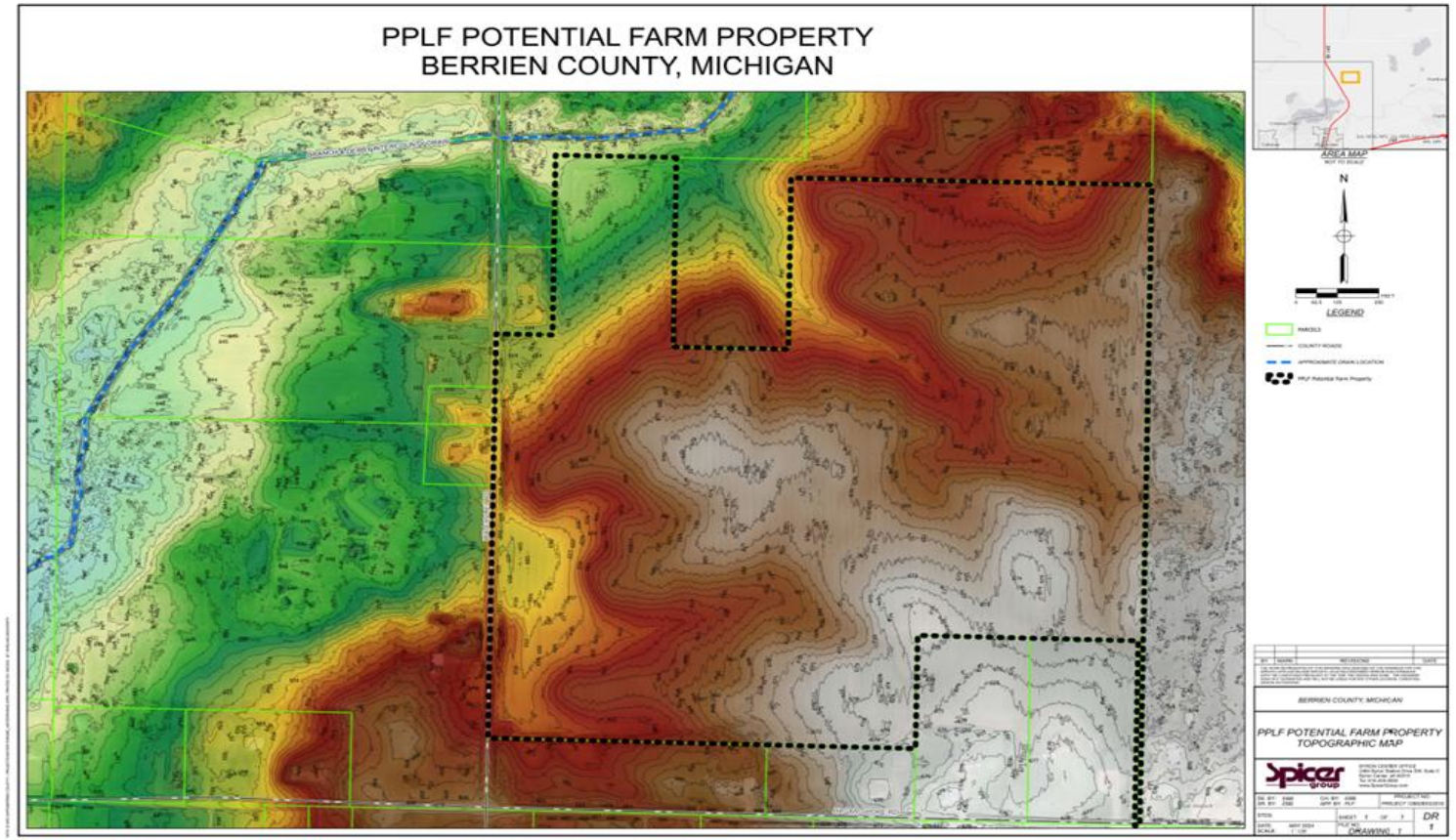
Berrien Co.
T3S-R17W Sect 01

FARMLAND EROSION CONTROL



Investigations of the Branch & Derby Intercounty Drain have found that a parcel near the intersection of Watervliet Road and Hagar Shore Road is currently a heavy contributor of sediment to the drain and ultimately to Paw Paw Lake itself. This approximately 77-acre parcel is currently being actively crop farmed, which is leading to nutrient-heavy and debris-laden runoff entering the Branch & Derby IC Drain during storm events. Rain event inspections have visually documented the large amount of sediment laden runoff that enters the drain from multiple locations, which has made this parcel of immediate interest to the Paw Paw Lake Foundation as a target for a drain / lake improvement project.

FARMLAND EROSION CONTROL CONTINUED



As a crop farmed parcel, this area is extremely vulnerable to wind and rain erosion especially in the late fall and early spring before crops are well-established and after they have been harvested. A project has been proposed for this parcel that will effectively minimize the amount of sediment leaving the site by strategically planting permanent vegetation that will act as barriers to slow down runoff from leaving the site and minimize the amount of sediment entering the drain. If a project were able to fully vegetate the property, it would minimize the amount of water leaving the site entirely, which means a smaller amount of water entering the Branch & Debry IC Drain, which reduces the amount of water potentially bringing nutrients or sediment runoff into Paw Paw Lake. Additionally, reducing or eliminating the amount of area that would require fertilizer would directly decrease the amount entering the lake through storm runoff.

M-140 BASIN

Built in 2016, the M-140 sediment basin is an inline detention basin built on the Branch & Derby Intercounty Drain near the intersection of M-140 and Hagar Shore Road. At approximately 210 feet long and 60 feet wide at the widest point, the basin's purpose is to capture sediment from stormwater moving through the Branch & Derby Intercounty Drain and prevent it from moving further downstream towards Paw Paw Lake.

The Paw Paw Lake Foundation has funded ongoing maintenance of this basin about every 3 years, which mainly focuses on removal of accumulated sediment. During the last maintenance project in 2023, over 500 cubic yards of accumulated sediment were removed from the basin. Basin maintenance is scheduled when the basin's sediment capacity is approximately 60-70% full, with the basin collecting between 20-40% of its capacity every year. Currently, the basin is at approximately 25% capacity, and another maintenance project will be proposed for 2025 or 2026.

PAW PAW LAKE MANAGEMENT
ALGAE

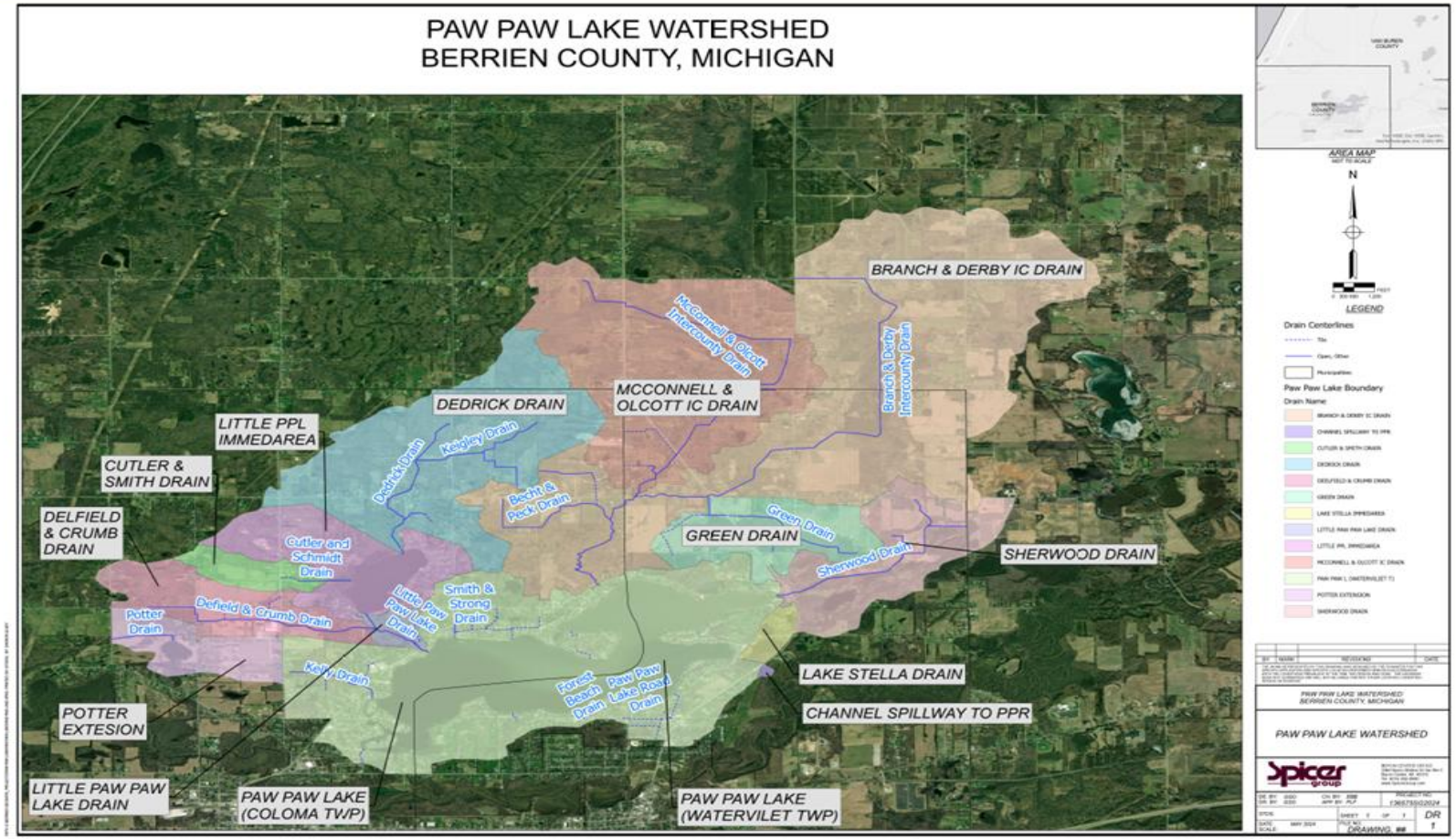




An obvious stated goal of the Paw Paw Lake Foundation is the improvement of water quality in Paw Paw Lake. For many residents, an aspect of this goal is to reduce the frequency and intensity of algae blooms in the lake. Many of the projects within the watershed have been targeted at reducing sediment loads into the lake which in turn will reduce the nutrients that feed these large blooms. These pictures show algae blooms occurring between 2021 and 2023.

While some progress has been made in reducing nutrients loads and improving the trophic state of that lake over the last 10 years, a continued effort must be made to allow for sustained improvement of the lake's trophic status through the reduction of nutrient levels, minimization of nuisance algae blooms, and vigilance in treatment and removal of invasive species within the lake.

PAW PAW LAKE WATERSHED



This map shows the Paw Paw Lake Watershed and the sub-watersheds and county drains within it. The Paw Paw Lake watershed has an area of approximately 16.1 square miles and includes Paw Paw Lake, Little Paw Paw Lake, Sherwood Lake, several county drains, and a few small natural watercourses. The Paw Paw Lake watershed is adjacent to the Paw Paw River watershed along much of its east and southern areas and is considered a "tributary" of the Paw Paw River.

PAW PAW LAKE MANAGEMENT
INVASIVE SPECIES