Black Lake Preservation Society

2025 ANNUAL PROGRESS REPORT

July 2025

In This Edition

Reminder: The BLPS will host a meeting at the Onaway State Park Pavilion from 9-12 on the morning of Saturday, August 23. During this meeting, we will cover much of the content of this status report, including detailed findings and time for discussion. Please join us if your schedule allows!

What's To Worry About When the Lake Looks So Good?
Rusty Gowland (President, BLPS)

The BLPS has three guiding principles that are listed on our website and we try to add focus to each of them whenever we have the opportunity. The first is that the best time to protect a lake is when it is healthy, because there are few practical ways to restore a lake once it becomes impaired. This principle is at the center of our 2025 status report. Our lake truly is healthy, but as Lauren Dey of the Watershed Council says in her article below "[Black Lake's] health is becoming increasingly vulnerable". Our relationship with Kieser & Associates and our work with The Tip of the Mitt Watershed Council on our Watershed Management Plan has taught us new ways to monitor water quality to avoid many of the issues that neighboring lakes have experienced.

The key insight is that it's the combination of dreissenids, or invasive mussels (e.g. zebra mussels), with a dose of phosphorous leaching from older septic systems in the fall that may be at the root of many issues that concern us. Whether your primary concern is HABs, weed expansion, changes to the sandy lake bottom, or fish populations, phosphorous in the presence of invasive mussels must be monitored and managed carefully. This is not to suggest that the goal is to eliminate phosphorous; it is, after all, the base of the food chain. It is a delicate balancing act, because like many things, too much of a good thing at the wrong time can be a very bad thing. We are learning that the way that phosphorous levels have historically been tracked may not provide the full picture, given our experience with zebra mussels. And we will need to learn more about how we will be impacted by the recent discovery of the invasive Asian Clam in Black Lake even as we continue our best efforts to keep Quagga Mussels away.

Our work with Kieser & Associates has revealed that significant loads of phosphorous from our (aging) septic systems "pulse" into the lake late in the summer and as late as December after most of our lake's past measurement activities have been completed. Effluent from septic systems concentrates near the shoreline and may be mixed into the lake by fall winds and currents. However, most of our historical measures have only been taken mid-summer in deep parts of the lake. Some of our phosphorous flows down the Lower Black Lake toward Lake Huron and some of it is stored in the sediment on the

- Available **phosphorous** and **nitrogen** naturally combine to form **algae;**
- **Invasive mussels** filter out "**good algae**" (e.g. green), leave behind the bad (e.g. green blue, a.k.a. **cyanobacteria**), and deposit their **waste on the lake bottom;**
- **Zooplankton** population is reduced due to the depletion **of good algae;**
- newly hatched **fish survival** is reduced due to the depletion of **zooplankton;**
- **Invasive mussel** population fluctuates based on the availability of **algae**, **predation**, availability of elements required to form their shells (e.g. **calcium**), **expiration**, and introduction of **new, invasive mussels;**
- **water clarity** increases from depletion of **algae** by **invasive mussels;**
- **weed expansion** results from increased **water clarity** and **nutrient waste** on the lake bottom deposited there by **invasive mussels;**
- **phosphorous** leaching from **(aging) septic systems** pulses in the fall thru early winter;
- late season depleted **algae** community allows room in the ecosystem for toxic **cyanobacteria** to use the **phosphorous** to generate **HABs** ;
- increased **decaying organic matter** on the lake bottom depletes **dissolved oxygen**, especially below the **thermocline** and can lead to a **crusty lake bottom** in the shallows and a **mucky lake bottom** beyond the drop-off;
- low **dissolved oxygen** below the **thermocline** can cause the release of **phosphorous** from lake bottom sediments, further fueling **HABs.**

Biomass Dynamics in Inland Lakes With Invasive Mussels
*(**bold** items are measured input variables. **Bold red** items are undesirable outcomes)*

lake bottom where we have never looked before. Zebra mussels have made our lake clear and inviting, but they transfer phosphorous to the lake bottom (i.e. the "benthic" layer). This, along with the added sunlight provided by increased water clarity, promotes weed expansion. One day, our lake bottom could become saturated with phosphorous as it has in nearby lakes and those lakes have experienced more frequent and intense HABs blooms, a crusty or mucky lake bottom, weed expansion and harm to fish habitat.

Kieser & Associates has also put us in touch with the research of Dr. Mark Luttenton of the Grand Value State University's Annis Water Resources Institute. You will get a chance to hear Mark speak about his deep understanding of Michigan lakes and nutrient pollution in the presence of invasive mussels at this year's BLPS Summer Presentation at the Onaway State Park on August 23 at 9:00 am. He'll share with our community how the combination of invasive mussels and cyanobacteria (naturally occurring in all lakes) has led to toxic algae blooms (HABS) and other forms of degradation of lakes just like ours. He instructs lakes in our region that they may be entering a period of change that we have not yet been aware of. His suggestions for how we can look at water quality measurement differently may help us to avoid the same fates as neighboring lakes.
The model that defines and predicts freshwater lake water quality in our region is dizzyingly complicated with so many interrelated variables to monitor, but also so much at risk. We are grateful for the guidance of our team members from Kieser & Associates, Tip of the Mitt Watershed Council, EGLE, GVSU, Huron Pines Conservancy, Michigan Lakes & Streams Association, among others.

> ***"The key insight is that it's the combination of invasive mussels with a dose of phosphorous leaching from older septic systems in the fall that may be at the root of many issues that concern us."***

I hope that you'll spend some time with this status report and attend our summer meeting on August 23. This, along with visiting our website and Facebook page, is the best way for you to better understand these variables of water quality and our ongoing efforts to affect them using our findings. Our Watershed Management Plan (WMP) project is our opportunity to gain access to state and federal resources to implement programs that can affect desired change and outcomes. We all know that an informed community is essential to providing effective care for our lake, our marine life, our health and our lakeside lifestyle. Hope to see you on August 23 when we will share with you and invite your questions about what we know, what we don't know and what we may hope to achieve with the WMP!

Data Now Confirm the Impact of Septic Systems on Black Lake
Mark Kieser (Principal, Kieser & Associates)

With BLPS support, Kieser & Associates (K&A) has now completed two years of shallow groundwater monitoring along select areas of Black Lake's shoreline. The purpose of this sampling has been to examine whether septic system drain fields are contributing dissolved phosphorus to nearshore waters. Recurrent, late season blue-green algal blooms have been noted in nearshore waters of Black Lake over the past five years after most seasonal residency has ended (September-November). Groundwater sampling results clearly suggest that for older septic systems with drain fields within 50-100 feet of the lakeshore, high levels of soluble phosphorus and *E. coli* bacteria (reflecting human waste inputs) are reaching the lake. Phosphorus is the stimulant for the harmful

blue-green algal blooms. Last-season groundwater phosphorus levels are 200 times higher than those measured in the lake. The detected presence of *E. coli* at levels above state health standards suggests bathers may be exposed to harmful viral pathogens associated with human waste.

Why Test Groundwater?

Shallow groundwater along the shoreline discharges in nearshore waters around the lake. Contamination in groundwater therefore moves to the lake. Measured groundwater impacts from drain field discharges have been consistently observed to be heaviest in September-December following seasonal cottage occupancy in the summer. By May of each following year, the 4-6 months of continuously-flowing shallow groundwater appears to flush out septic system discharge-impacted groundwater, only to build up again with seasonal use. These seasonal discharge patterns of high phosphorus from drain fields also coincide with some of the lowest seasonal tributary flows annually experienced in the fall of each year. These low flows also have very low phosphorus concentrations, demonstrating that these are exceptionally clean streams with limited watershed pollution and indicating these are currently not potent sources of phosphorus during late-season harmful algal blooms. These high-quality stream conditions stand in stark contrast to confirmed late-season septic system discharges to the lake.

What will become of these Results?

Such findings will be a prominent feature of K&A technical contributions (on behalf of the BLPS) to be shared with Tip of the Mitt Watershed Council for developing the forthcoming Black Lake watershed management plan (WMP). K&A is developing a technical report that will be included in the final WMP to describe these conditions. Importantly, K&A will also denote a range of conventional and innovative solutions that could be considered by riparian property owners to uniquely address their site-specific septic system conditions. Many of these innovative ideas will ultimately require funding and pilot studies to assess their benefits to Black Lake water quality.
In the near-term, additional K&A shoreline sampling is planned for August-September of 2025. K&A will collect shallow groundwater conditions along the lakeshore at another 10 residences where septic systems may be of concern. Resident participation is voluntary. Additional sampling will help forecast the magnitude of the overall problem on the lake.

Are Septic Systems a Threat to Future Black Lake Water Quality?

The simple answer is yes…the threat and/or occurrence of harmful algal blooms in Black Lake will not go away with these ongoing nearshore phosphorus contributions. Importantly, septic system treatment performance only diminishes over time as does soil capacity to adsorb and hold phosphorus from drain fields. High levels of phosphorus observed in the shallow groundwater next to the lake speaks to this decreased soil holding capacity. Therefore, future efforts to reduce septic system phosphorus contributions to the lake should be a priority. The sad tale of Higgins Lake…septic systems, ecological disruptions with invasive zebra mussels and quagga mussels that are accelerating the decline of that lake, portend an undesired future for Black Lake (see article from Dr. Mark Luttenton below for more information on Higgins Lake).

Not Just Monitoring…

This potentially diminished future for Black Lake has drawn the immediate attention of the BLPS; not just for continued data collection, but data collection to drive action. K&A is therefore

examining the need for refined monitoring that leads to effective, implementable actions to avoid a Higgins Lake future.

Future work on septic system corrections will be more than just informational; it will target, test and ultimately implement a range of options to mitigate the immediate concerns of phosphorus and bacterial contributions to the lake. More frequent pumping of holding tanks and replacement are the standard fare for addressing these challenges. These have either limited benefit or represent the most expensive alternative. But off-lake consolidation of multiple aging systems into one new cluster system, addition of innovative treatment add-ons to existing septic tanks, potential (buried) treatment barriers along the lake shore, even deep-rooted native plants along the shoreline to take up phosphorus before reaching the lake are but some of the options that K&A will propose for consideration and testing. The scope for these far-reaching efforts is now being discussed with the BLPS and grant support from the state will be pursued.

The future of Black Lake is bright… if one stays the course. K&A is honored to be bringing our water resources expertise to the Black Lake community in support of the BLPS on this journey.

Community Participation In Our Septic Studies
Steve Speth (BLPS Septic Studies Leader)

The BLPS is continuing to improve precision in measures of the impact of (aging) septic systems on HABs and on our lake's overall health. Sampling and measurement began in 2024 and continues with the help of many BLPS members. Increased precision and reliability of our data is needed for our Watershed Management Plan report in order that public funds may be made available to supplement our efforts to address our issues. Gathering this additional data will require more involvement from our members as the required data all comes from private property.

Sampling in September through December of 2024 showed increasing phosphorus and bacterial concentrations at the lake's edge following summer cottage usage. Sampling again in May of 2025 showed no soluble phosphorus and limited bacteria near the lake indicating filtering and retention is occurring in the drain fields when cottages are not in use.

This pattern appears to repeat itself based on sampling over the past 2 years and it is likely why we see algal blooms after the peak of cottage usage, given time for effluent to flow toward the lake. More sampling is required to increase the validity of the WMP data that we will report. Therefore, as part of our ongoing monitoring, we will be seeking 10 sites to measure phosphorus flow from septic drain fields to the lake. Ideal properties for monitoring would have most of the following traits:

- Full-time summer use
- Systems are 30+ years old
- Drain fields approximately 100 feet from the lake
- No seawalls
- Gentle slope to the lake
- Sandy beach or minimal rocks

Our consultant, Kieser & Associates, will place shallow well monitoring equipment in the ground in several spots between the drain field and the lake. We would like to take ground water samples immediately and again in December and May of 2026. Installation of equipment and taking of samples will require about 2-3 hours. The wells are unobtrusive and temporary and will be removed at the end of the monitoring period. It is important that the sampling begin this summer. The BLPS is covering all costs and be assured that results will only be shared with the property owner. Our goal is to gain a sample size that can provide a sound estimate of the total phosphorous load from our septic systems on the lake given size, usage level and age of the systems in place. Several owners have already volunteered their property for sampling. Letters to other property owners that we think have qualifying properties were mailed in June. If you received a letter, please consider helping this important project to help keep our lake healthy.

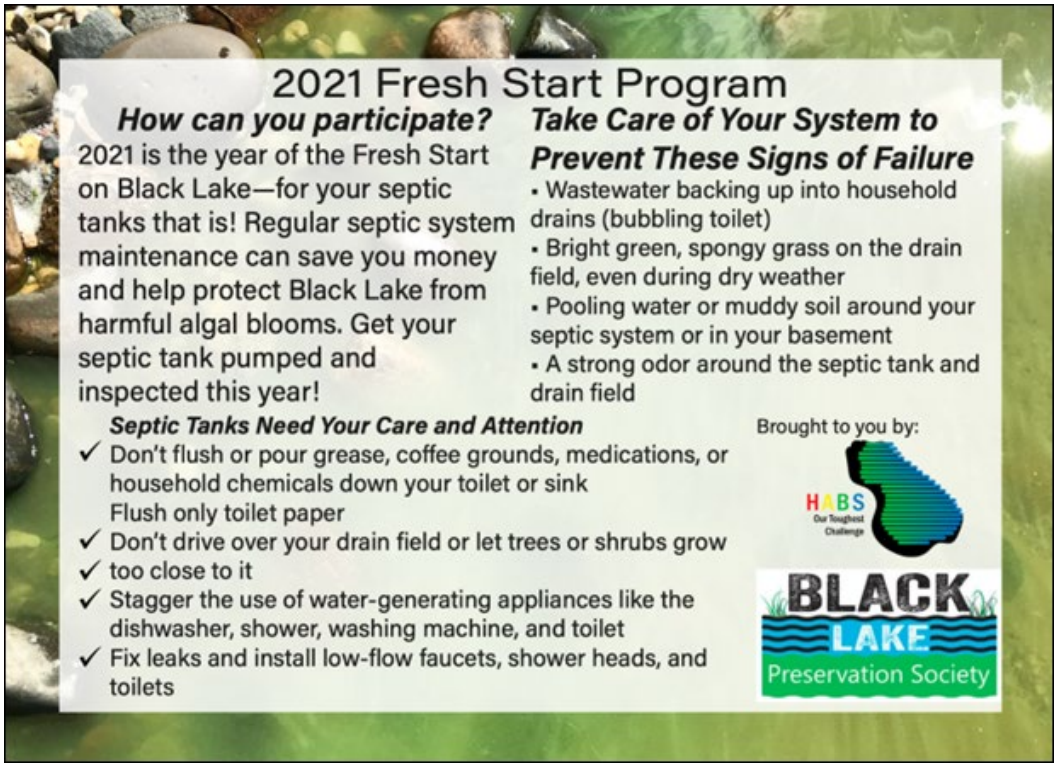
Tank Capacity (gallons)	Number of People					
	1	2	3	4	5	6
500	5.8	2.6	1.5	1.0	0.7	0.4
750	9.1	4.2	2.6	1.8	1.3	1.0
900	11.0	5.2	3.3	2.3	1.7	1.3
1000	12.4	5.9	3.7	2.6	2.0	1.5
1250	15.6	7.5	4.8	3.4	2.6	2.0
1500	18.9	9.1	5.9	4.2	3.3	2.6
1750	22.1	10.7	6.9	5.0	3.9	3.1
2000	25.4	12.4	8.0	5.9	4.5	3.7
2250	28.6	14.0	9.1	6.7	5.2	4.2
2500	31.9	15.6	10.2	7.5	5.9	4.8

Source: Pennsylvania State University Cooperative Extension Service

The chart above shows how often you should pump your septic tank (numbers in the colored cells are years). Pump more frequently if you use a washing machine more than twice per day, regularly use a garbage disposal, host large events or often have three or more overnight guests.

"We believe that the BLPS "Fresh Start" program conducted in the summer of 2020 contributed to the absence of verified HABs blooms in 2021 and 2022"

Whether you participate or not, please consider being mindful of your pump-out schedule. We believe that the BLPS "Fresh Start" program conducted in the summer of 2020 contributed to the absence of verified HABs blooms in 2021 and 2022. As part of this program, volunteers sent mailings and visited each home around the lake to encourage a 2020 pump-out and to adhere to a recommended frequency of pump-out going forward. Older systems warrant more frequent pump-out. We think this helped avoid blooms for at least two years and we hope to continue this impactful practice. Feel free to contact Steve Speth if you have any questions or if you would like to volunteer by texting to (248) 673 3833 or email at pwrwgn6@att.net.



An Update on Harmful Algae Blooms (HABs)
Bev HAAS (BLPS HABS Program Leader)

By now, we have all heard a lot about HABs, but we may not be aware of how they can impact the health of our families and pets. Cyanobacteria, also known as blue green "algae", is really bacteria that thrives on photosynthesis. It occurs naturally in all lakes, rivers and ponds. Some cyanobacteria can produce toxins, called cyanotoxins, which can harm the liver and nervous systems of people and animals. Unfortunately, Black Lake's cyanobacteria has in its DNA the ability to produce the cyanotoxin called microsystin. In fact, we had one measure of 2,913 ppb reported by the state health department that was 364 times the EPA safe swimming level of microsystin; 8 ppb of microsystin are thought to be harmful to a human and .8 ppb to dogs.

HABs became a global focus of water quality studies after an alarming series of blooms in Lake Erie shut down the area's drinking water supply in 2011. The common wisdom from that time was that the blooms occurred in highly "productive" water bodies (meaning very high nutrients from agriculture, industry and urban activities) in the heat of the summer during still, sunny days. Our blooms have occurred in the fall on cool days and our lake has historically shown very low levels of nutrients.

What we have learned is that zebra mussels filter out much of the algae that comes from the primarily natural levels of nutrients that are sourced from our watershed (i.e. tributaries), our atmosphere and our shorelines. Algae communities are reduced in size by the end of the growing season and the dry season. This is the same time that phosphorous from the seasonal use of septic systems arrives at the lake's edge. As fall winds mix this phosphorous in the lake, all it needs is a calm, sunny day to create toxic blooms. Managing down the pulsing from our septic systems reduces this risk.

> ***"...an increased susceptibility of oligotrophic lakes to cyanobacterial bloom formation is based on the presence of cyanobacteria that have adapted sufficiently to low [iron] environments and are able to multiply rapidly when pulses of P are made available to the ecosystem."***
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> Source: Sorichetti, R. J., Creed, I. F. & Trick, C. G. (2014). Evidence for iron-regulated cyanobacterial predominance in oligotrophic lakes. Freshwater biology, 59(4), 679-691

These blooms can even occur on very cold fall days. On November 16, 2024 at 9:30 am, while on a walk along the east side of the lake along County Road 489 and at the Onaway State Park, two seasonal residents spotted two different areas of what appeared to be spilled green paint on the lake. The average temperature on that day was 45.5 degrees, it was clear and sunny and the wind was 8mph from the SSE. They recognized the bloom because they had seen a confirmed toxic bloom before on September 11, 2020 on Silver Beach Road.

The two reported the bloom and sent photos to the BLPS and to EGLE. While they did not have access to unexpired Abraxis test strips, they wore protective gloves and collected mason jar samples from various areas of the bloom and stored them in a refrigerator. Keiser & Associates later received the samples and sent them to a lab that confirmed the presence of cyanobacteria.

We have had enough confirmed toxic blooms that EGLE and the health department have advised us that they don't have the capacity to test every report from every lake in our region, because many lakes are now reporting and blooms tend to occur concurrently when conditions are right. Therefore, we need to be self-sufficient in 1) conducting rapid tests of suspicious blooms, 2) assuming that any positive cyanobacteria bloom is toxic, 3) notifying EGLE and 4) advising the community of the risk. We are hopeful that, as part of the Watershed Management Plan, a community-wide method of reporting and confirming blooms will be put in motion. In the interim, Kieser & Associates has supplied the BLPS with rapid test kits and you may want to add Rusty Gowland to your phone contacts to report a suspected bloom at 410-530-9087. Please take a photo and send it along as well. We will do our best to get a rapid confirmation, issue an alert on our Facebook page, notify EGLE and take a water sample for measurement of toxicity with the help of Kieser & Associates.

You cannot tell if an algal bloom is harmful just by looking at it. We need to use our rapid test strips to make a reliable determination. Be aware of possible HABs anytime during the summer/fall. A toxic bloom can be confused with duckweed, filamentous green algae, pollen, oil sheens, iron seeps and insect exuviates. Blooms can change in size, severity and location within the same day. Blooms may also disappear but form again weeks later.

> ***"...we need to be self-sufficient in 1) conducting rapid tests of suspicious blooms, 2) assuming that any positive cyanobacteria bloom is toxic, 3) notifying EGLE and 4) advising the community of the risk."***

If you would like to be part of a network of contacts around the lake that are prepared to verify a bloom with a test strip and take a sample for measure of toxicity, please let Rusty know at the number provided above. The bloom could rapidly dissipate with changes to wind and weather, so it is important to have several contacts around the lake that can get there quickly to verify and gather a test sample of a bloom.

If you prefer, you can contact the Michigan Department of Environment, Great Lakes and Energy (EGLE) yourself by calling 800.662.9278 or emailing them at AlgaeBloom@Michigan.gov. We encourage you to also contact the BLPS so we can conduct rapid testing and confirmation. After reporting a suspicious bloom, stay out of the water and do not let children or pets play in or near the bloom. Thanks to all those that volunteer to help when a bloom is spotted!

Black Lake Trophic State Analysis

Marie Solum (BLPS Water Quality Monitoring Leader, Michigan Geological Survey & Geology Faculty at Grand Valley State University)

Since 2023 Black Lake has been enrolled in the Cooperative Lakes Monitoring Program (CLPM). Black Lake joined this state-wide program consisting of a network of trained volunteer water quality monitors created through Michigan Executive Order #2003-15 to assist the Department of Environment, Great Lakes and Energy (EGLE) in collecting and sharing standardized water quality data for use in water resources management and protection programs. There are over 300 Michigan lakes in the program with over 350 volunteers. The BLPS is proud to have added Black Lake to this important, long-running program which will give us annual data to recognize changes, establish long-term trends in the lake and contribute to our understanding of the complex model that determines harmful algal bloom events, weed expansion, fish habitat and survival, changes to our shallow water sandy lake bottom and other water quality issues. The data collected is published on the MiCorps website (micorps.net) for open use and is relied on and used by EGLE and the DNR for their assessments, surveys and decision-making purposes. The open data can also be used by other scientists, researchers, lawyers, decision makers, educators and the public.

Results

2024 was our second summer of sampling total phosphorus, water clarity, chlorophyll-a, dissolved oxygen and temperature on individual schedules from May through Labor Day weekend. Lakes are categorized into trophic states depending upon several factors that contribute to an understanding of how productive a lake is. Lakes can fall into 3 basic categories: oligotrophic (low productivity), mesotrophic (moderate productivity) and eutrophic (high productivity).

The results of the 2024 sampling indicate that Black Lake falls in between the categories of an oligotrophic and mesotropic lake, leaning slightly more toward oligotrophic. Oligotrophic lakes are generally deep and clear with little aquatic or algae growth with low nutrient levels. They maintain sufficient dissolved oxygen in the cool, deep-bottom waters during late summer to support cold water fish. Mesotrophic lakes are mid-range lakes falling between the categories of oligotrophic and eutrophic with mid-range amounts of nutrients. Eutrophic lakes are highly productive, generally shallow, turbid with abundant plant growth. In deep eutrophic lakes, the cool bottom waters contain little to no dissolved oxygen. Eutrophic lakes can only support warm water fish like bass and pike. It should be noted that Black Lake was rated as an oligotrophic lake following the 2023 summer sampling. Black Lake has a lower trophic status (i.e., less productive) than the average of all Michigan lakes in the CLMP program.

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Spring 2024 sampling detected phosphorus levels at 12 parts per billion (ppb). The summer sampling detected low phosphorus levels at below 5 ppb (a measure of 3 ppb falls into a “non-detect” category). These levels were higher than in 2023 at 4 in the spring and less than/equal to 3 ppb in the summer. Chlorophyll-a is sampled as a proxy for total algae of the lake. Levels of Chlorophyll-a were also low with a median level of 1.4 ppb (2023’s sampling had a median level of 1.8 ppb). Currently, we have no way of measuring the effect of zebra mussel filtration and waste

deposits on these numbers, but the waning of phosphorous and algae through the season is an indication.

In spring after ice-out, Black Lake is generally uniform throughout the water column in terms of temperature and dissolved oxygen levels. Oxygen is mixed through the water column when "lake turnover" occurs. Nutrients that may be stored in the bottom waters are also be mixed during this time. In the summer months, the lake begins to stratify into temperature zones. The thermocline is the area where the temperature declines rapidly and this will generally lower as the summer goes on. In fall, the lake turns over again, mixing dissolved oxygen as well as nutrients throughout the water column. If there is available phosphorus stored in the bottom waters, it may be mixed at this time, triggering a harmful algal bloom event.

Our 2024 CLMP sampling indicated that the thermocline was approximately 40 feet deep at the last sampling in early September (a relatively small portion of the lake is deeper than 40 feet). When dissolved oxygen levels approach 0 mg/L below the thermocline, stored phosphorus in the bottom waters may be released and made available to be redistributed throughout the water column when the lake turns over. Black Lake displays a normal stratification pattern; the lake maintains some dissolved oxygen in the bottom waters through the middle of summer, but in late summer the lake has stratified and the bottom waters are nearly devoid of oxygen at less than 1.0 mg/L. We expect that this causes a release of phosphorous from the lake bottom sediments that would be distributed through the water column when the lake turns over in the fall, though the impact is limited because of the relatively low volume of water in the low oxygen zone below the thermocline. We are now in our third summer of CLMP sampling. At present, there is too little data to assess long-term trends. At least eight years of consistent monitoring are needed to develop a strong data baseline, following CLMP protocols.

Our volunteer lake and stream water team members sample from May through September. Please contact Marie Solum if you are interested in volunteering to help with water quality sampling at mariegoblue@yahoo.com

Trophic State Designation in the Age of Dreissenids: A Case Study
Mark Luttenton (R.B. Annis Water Resources Institute, Grand Valley State University)

The use of trophic status to characterize lake conditions has a long history. Generally, trophic status is assigned based on a combination of phosphorus concentration, transparency and Chlorophyll a concentration. These parameters have been considered to collectively represent the amount of production occurring in a lake. However, several changes have occurred since these three parameters were determined to reflect trophic conditions, specifically the introduction of dreissenid mussels (i.e. zebra mussels). Because dreissenids redirect organic material and nutrients to the benthos (the lake bottom), standard trophic status metrics may not provide a holistic measure of lake trophic status. As noted in the North American Lake Management Society's "Defining Trophic State" production, the accumulation of biological matter (i.e. biomass) is the best indicator of the problems a lake may face.

Higgins Lake may serve as a predictor for Black Lake, because it shares many trophic state and other characteristics with Black Lake (it is considered to be a high quality, oligotrophic system with very low phosphorus concentrations, very low Chlorophyll a concentration, a shallow, sandy ring

around the lake and good visibility). Higgins Lake is a deeper lake and is further along the development path than Black Lake, but it may offer lessons about how the BLPS may track water quality factors in the context of dreissenid populations.

Looking at factors such as the accumulation of organic sediments, declining DO in deep basins, significant plant biomass in certain areas and very large dreissenid populations, Higgins Lake appears to show signs of impairment. In addition, large concentrations of phosphorus are associated with the organic sediments and in the dreissenids themselves. Consequently, I hypothesize that dreissenids have, as in other systems, redirected phytoplankton, a traditional trophic status metric, to the bottom of the lake. Phosphorus is also being removed from the water column with the phytoplankton, resulting in good trophic index values. But we know that nutrients have been moving into the lake for a long time. Earlier studies completed by researchers from Michigan State and the USGS had shown that there are surprisingly high levels of nutrients in the groundwater. The Michigan State study was able to demonstrate that the high nutrient levels in the groundwater were linked to septic systems in the watershed. A subsequent evaluation of other reports concluded that septic systems were the primary source of nutrients, particularly phosphorus, that were reaching the lake. This seems consistent with Black Lake findings of late.

The addition of nutrients to a lake typically results in an increased amount of biological material and there are several lines of evidence that indicate that Higgins Lake is becoming more productive and supports more biological growth. These include significant algal production in shallow nearshore areas around the lake. In fact, there is so much algal growth that the once soft sand that many residents remember from the past is now a hard pavement due to the sand grains being “glued” together by the algal growth. Algae require two things to sustain this kind of growth: lots of sun and nutrients and it appears the primary source of nutrients is groundwater.

Another obvious change noted by long-time visitors is that there is much more weed growth now than in the past. Based on my data, some of the plant growth is extremely dense, achieving the same amount of growth (biomass) I have seen in much more eutrophic lakes systems. As these plants die, the dead plant material sinks to the bottom and much of it ends up in the deeper parts of the lake. Over time, the partially decomposed plant material accumulates, particularly in areas where decomposition is incomplete due to a reduction in dissolved oxygen. Unfortunately, this is what is currently happening in Higgins Lake. In the past 25 years, there has been a gradual accumulation of partially decomposed organic matter on the bottom of the lake. Today, organic matter accounts for up to 70% of the sediment in some locations. The accumulation of organic matter appears to be the cause of two other changes occurring in Higgins Lake. One is the emergence of blue-green algal blooms. The second is that the amount of oxygen at the bottom of the lake is decreasing as the microbes attempt to digest the organic material. The reduction in oxygen occurs in a layer of water that extends approximately 10 to 15 feet off the bottom. The concentration of oxygen in this layer has fallen below the level preferred by certain fish. Consequently, there is a large volume of the lake near the bottom that was once available to certain fish, which is no longer suitable habitat during summer.

Finally, the last indicator that Higgins Lake has become more productive are the dreissenid mussels themselves. They are now found throughout the lake and grow attached to most surfaces including aquatic plants. In one rocky area, we have estimated that there were 74 million dreissenids in a 14-acre area. The combination of plant and algae growth, blue-green algal blooms, accumulation of organic sediments and high densities of dreissenids, all indicate that Higgins Lake is becoming a

more productive lake even though the traditional trophic metrics suggest that Higgins is actually improving, becoming less productive.

For Higgins Lake, biomass is a better trophic state metric than the three traditional metrics. And in general, traditional trophic status metrics may not reflect actual conditions in lakes with dreissenid mussels.

The Ongoing Battle Against Invasive Species
Linda Sandvik (BLPS Invasive Species Management Leader)

The nature of invasive species protection is that it is an ongoing process and not a single or series of events. Black Lake and all of the other lakes around us have things we must do each and every year to minimize the spread of weeds, mussels and marine life that harm habitat and disrupt our whole ecosystem. The nature of invasive species protection is that it is an ongoing process and not a single or series of events.

Invasive Eurasian Water Milfoil (EWM) is one of the most destructive invasive species in our area. It is a fast growing, submerged weed that forms dense mats that crowd out native plants and makes boating and swimming difficult and unpleasant. Many of our neighboring lakes have EWM and most of them have formed a Special Assessment District (SAD) to tax all homes on the lake to cover the cost of keeping it in check. It becomes an ongoing investment with no end date.

Last summer, the BLPS discovered small amounts EWM in the northwest part of the lake, though we don't have results from genetic testing to determine if it is the invasive variety. We are monitoring the rate of expansion to determine what, if any, treatment is advised at this point.

Black Lake has unsuccessfully tried biological control of non-invasive EWM with weevils in the past. That means that if our EWM spreads aggressively, we will be left with options of mechanical, chemical, or benthic covering solutions. All of them come with drawbacks, challenges and high cost. The means from which these infestations spread is fragments of milfoil on boats and the path for expansion is facilitated by zebra mussels that clarify the water for more sunlight penetration and more available nutrients on the lake bottom of shallow areas.

EWM and other invasive, submergent weeds have more difficulty establishing where there is a healthy plant community in the lake. There is good plant biodiversity in our lake. Warmer temperatures, fertilizer runoff and septic leachate can provide more nutrients and promote faster weed growth. More aggressive weeds can enter our lake from fragments on visiting boats. Please help spread the word to help others understand the importance of CLEAN DRAIN DRY practices.

Marsh weeds are another focus of the BLPS, because they are extremely important to habitat for birds, reptiles and mammals. We were pleased to see that the stand of phragmites on Black River that Huron Pines has treated the last three years is under control. We elected not to spray last year and will continue to monitor it. On the northeast region of the lake there are scattered stands of phragmites, mostly native but one plant was tested and found to be invasive. This has been reported to Huron Pines.

Unfortunately, purple loosestrife seems to be exploding all around the area, on roadsides and along the water. We are collaborating with Huron Pines and MDOT to draw their attention to new, dense areas of growth of Purple Loosestrife along F05, heading north from M68. There is also a large but disseminated stand of purple loosestrife across from the DNR boat launch in the Black River just beyond the north end of the lake. Permits were obtained from the state to treat this area with Galerucella beetles for the third time in 2025 and we completed that work on June 21.

Biological control with these insects takes several years to establish a population. We are increasing the number of beetles to this site and are verifying the impact and cost effectiveness of past beetle plantings. These beetles exclusively eat purple loosestrife and will die out when there is not enough to sustain them. We saw strong evidence that the beetles we planted in prior years have established a sustained community and are feeding on the plants.

We are by now familiar with how destructive invasive mussels are to our lake's ecosystem and the fact that there is not much that we can do to manage the problem once they take root. The Asian Clam has just been confirmed to reside in Black Lake. They are filter feeders like zebra mussels and eat phytoplankton and algae, key to the main food source for young fish, zooplankton. Like the zebra mussel, they deposit nitrogen and phosphorus at the lake bottom and contribute to water clarity that adds to weed expansion. They live in sandy or gravelly lake bottoms and contribute to algae forming just under the surface and lead to a crusty texture to the sand. The clams can spread quickly because they have two reproductive cycles and can lay up to 70,000 eggs a year.

So far, we have succeeded in keeping Quagga mussels out of Black Lake, though they are in many surrounding lakes and present an ongoing threat to us. Unlike zebra mussels, they actively feed through the year (vs spring through fall) and they can survive at any depth in our lake (vs 12 feet or less for zebra mussels). Quagga mussels in our lake would further stress fish survival by consuming more of the algae required by zooplankton.

Finally, the invasive Round Goby, long suspected to be in our lake, has been confirmed to be here. They are, however, not entirely considered to be a nuisance by our neighbors in Mullet Lake that have had them for a while. They come from the same habitat as zebra mussels and they are known to eat them. They are also a primary food source and contribute to the growth of bass, walleye, perch and pike. The nuisance factors are that they eat sturgeon eggs and they accumulate toxins from eating zebra mussels and other filter feeders. The concentrated toxins are then consumed by their predators.

Our Role In Monitoring the Lake Level
Brian Beran (BLPS Lake Level Management Leader)

We may not like it, but the result of our lake level management efforts resulted in a determination that neither the dam operator nor the county can be held responsible for maintaining the county circuit court legal lake level that has been in place since 1962; they can only determine the head pond level. So, as water is delivered down the Lower Black River, the dam must spill all of it above 610.5 feet above sea level during the winter. They must do this through a combination of opening the wicket gates that deliver water to the hydro-electric turbines and, if the water is arriving too fast to manage it with that method, they would need to open the spill gate that dumps water more rapidly by circumventing the hydro-electric plant. In the summer, the head pond is to be held at 612.0 feet above sea level, and the wicket gates and spill gates must be closed at times to ensure that it doesn't fall below that during dry periods.

This is not yet an approved protocol, but we believe that it is inevitable that it will be adopted. Therefore, the BLPS "gatekeeper" role is to make sure the spill gate is being used when necessary, especially during the spring thaw. We have several volunteers that gather data and pictures periodically, and you may consider helping us. The need is through the winter if you live in or visit the area and is most important through the spring. A photo of the pond depth meter and a photo of the spill run is what is needed.

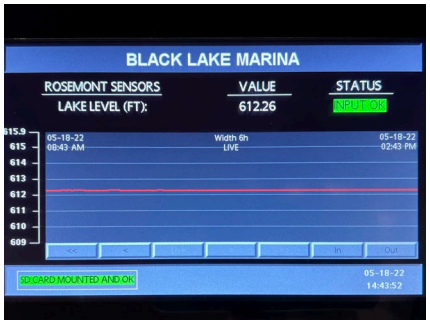
The following text is from the spring portion of the Interim Protocol:

Headpond at 610.5 *+/- 0.25 until flows decrease to 700cfs post flood peak (for at least 12 hours).*

Headpond at 611.6 *+/- 0.25 for flows between 500cfs – 700cfs for at least 12 hours (correlates to Black Lake levels of approximately 612.0 – 612.3).*

Headpond at 612.0 *+/- 0.25 when flows are 500cfs or less for at least 12 hours (correlated to Black Lake level of 612.3 and less) – and declare Adverse Conditions.*

If the spring melt discharge has not subsided to 700cfs before May 1st, BRLP, DNR and EGLE will consult on a plan to balance high lake levels with expectations of riverfront owners/users.



There is a new owner of the dam this year, and we don't know yet how easy or difficult it will be to work with them. We have no data at this point to suggest that they will not adhere to the rules that apply to them, but we don't have a lot of data to support that idea either.

If you would like to help out with lake level readings, let Brian Beran know at 248.821.4060.

Water Protection Action: the Black Lake Watershed Management Plan (WMP)
Lauren Dey (Tip of the Mitt Watershed Council)

Black Lake is one of Northern Michigan's most treasured natural resources. It's an ecological haven, a recreational destination, and an economic driver for surrounding communities. However, its health is becoming increasingly vulnerable. Over the past several years, the lake has experienced a troubling rise in harmful algal blooms (HABs), often driven by cyanobacteria. These blooms are more than just a seasonal nuisance; they pose serious threats to water quality, public health, aquatic life, and the overall ecological balance of the lake.

Alongside HABs, the growing presence of invasive species, excess nutrient loading, eroding shorelines, and the cumulative impacts of development all signal a broader decline in the watershed's condition. These challenges are deeply interconnected and require more than isolated fixes: they demand a coordinated, long-term strategy. That's where a Watershed Management Plan (WMP) becomes not just helpful, but essential.

Alongside HABs, the growing presence of invasive species, excess nutrient loading, eroding shorelines, and the cumulative impacts of development all signal a broader decline in the watershed's condition.

A WMP is a strategic planning tool that helps communities protect and restore water resources by targeting nonpoint source pollution; pollution that comes not from a pipe, but from the land. This includes runoff from roads and lawns, sediment from eroding banks, and nutrients from failing or aging septic systems. Unlike regulated point sources, nonpoint source pollution is addressed through voluntary actions, public education, restoration work and investments in landscape-level improvements.
Recent research into the HABs in Black Lake has identified malfunctioning septic systems as a likely and significant contributor. These systems can leak phosphorus, which is a key nutrient that fuels late-season algal blooms, into the lake. As summer progresses and invasive mussels filter out beneficial green algae, the remaining phosphorus load, including that from septic systems, can trigger toxic cyanobacteria blooms that degrade water quality and threaten ecological health.

The WMP will play a critical role in formally recognizing septic systems as a known pollutant source. More importantly, it will outline tangible, science-based next steps for reducing nutrient inputs from these systems. These may include public outreach, incentivized inspections, encouragement for more frequent pump-outs, upgrades or adaptations for aging septic systems, and long-term monitoring to track progress and effectiveness.

Beyond septic system issues, the WMP is also taking a comprehensive look at other contributing factors to HABs and declining water quality, such as shoreline erosion, invasive species, and nutrient accumulation on the lakebed. By laying out a clear, data-driven framework for action, the plan will allow the community to implement focused projects with strong coordination and support.

Once approved by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), the WMP will unlock access to Clean Water Act Section 319 funding, a key source of federal dollars administered by the state to support on-the-ground implementation. These funds can help launch impactful projects like shoreline stabilization, septic system outreach, buffer restoration, and habitat improvement. Thus, addressing not only the symptoms of declining water quality, but their root causes.

The plan will clearly define problems, propose actionable solutions, estimate project costs, and identify key partners, making it easier to secure funding from EGLE and a wide range of other public and private sources. In other watersheds, WMPs have proven to be effective tools when applying for additional competitive grants.

However, the real strength of a WMP lies not just in its content, but in the collaboration it fosters. A well-supported plan shows funders and stakeholders that the community is serious, informed, and ready to act. When lake associations, municipalities, nonprofits, and residents unite behind a shared vision, they create the momentum needed for long-term, meaningful change. This kind of unified approach ensures projects are not merely reactive, but part of a broader, forward-thinking strategy.

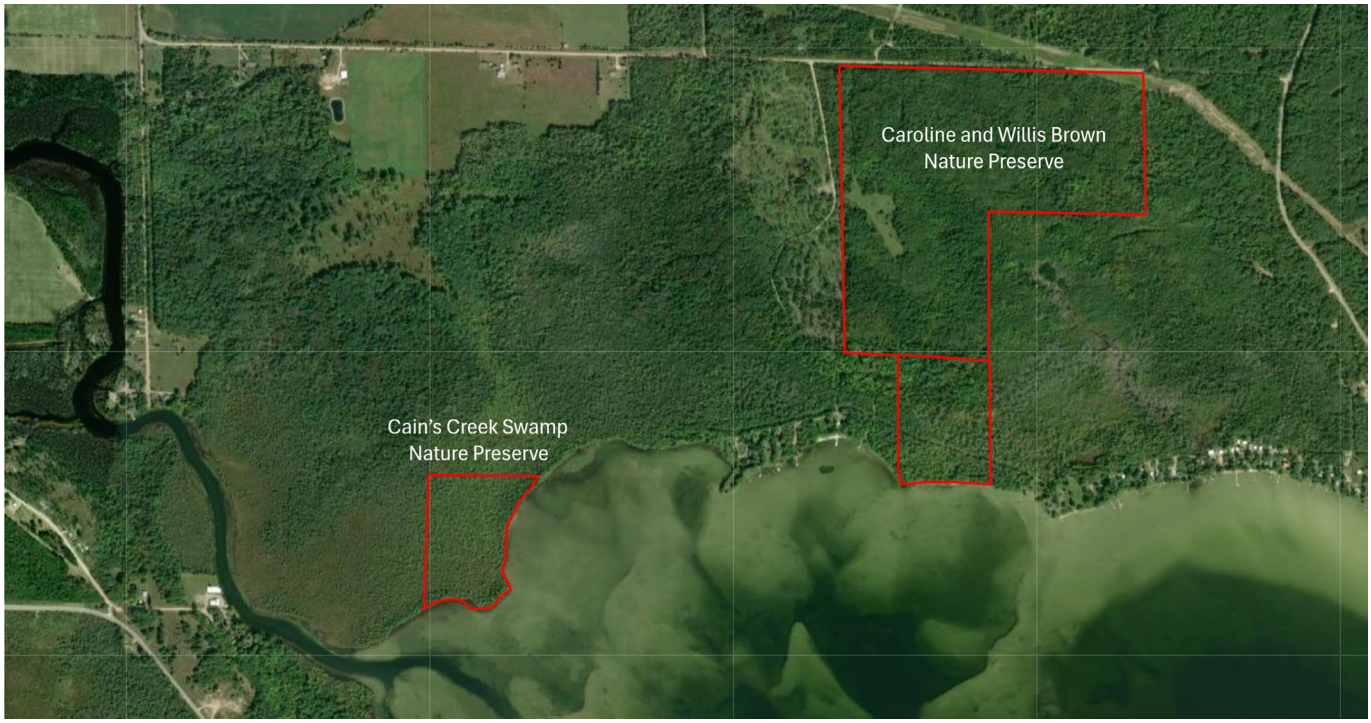
As the Black Lake Watershed Management Plan nears completion, now is the time to get involved. Lending your voice, staying informed, and offering support will help build the momentum needed to drive real, lasting improvements. With strong community backing, the WMP can serve as a powerful guide to restore water quality, address harmful algal blooms, and protect Black Lake's natural beauty and ecological value for generations to come.

Land Protection Update for Black Lake
Anne Fleming (Little Traverse Conservancy)

Brand New Addition to Nature Preserve

Little Traverse Conservancy is thrilled to announce the recent protection of 120 acres (see map) that has been added to the Caroline and Willis Brown Nature Preserve! The original 23-acre preserve was protected in 2020 and includes nearly 900 feet of frontage on Black Lake. This addition will allow for better access to the nature preserve while offering wildlife habitat, wetlands and water quality protection, and scenic protection.

The Cain's Creek Swamp Nature Preserve is the Conservancy's other nature preserve on the lake Protected in 2007, this 25-acre preserve includes 2,300 feet on Black Lake. You can see the locations of the preserves on an interactive map found at www.landtrust.org/explore.



Voluntary Tools for Landowners - What are my options?

One of the most direct ways we can impact the future and quality of Black Lake is to ensure that some of the watershed remains in a natural state. Yet it may seem daunting to imagine how to balance change and progress with conservation.

Fortunately, there are time-tested and creative land protection tools available, subject to land protection criteria. Since 1972, the Little Traverse Conservancy has been working in the northern lower and eastern upper peninsulas with conservation-minded landowners to meet their conservation goals. Often, people are surprised to learn about the flexible ways these voluntary tools can work for them and, in some cases, even provide important financial and legacy planning opportunities.

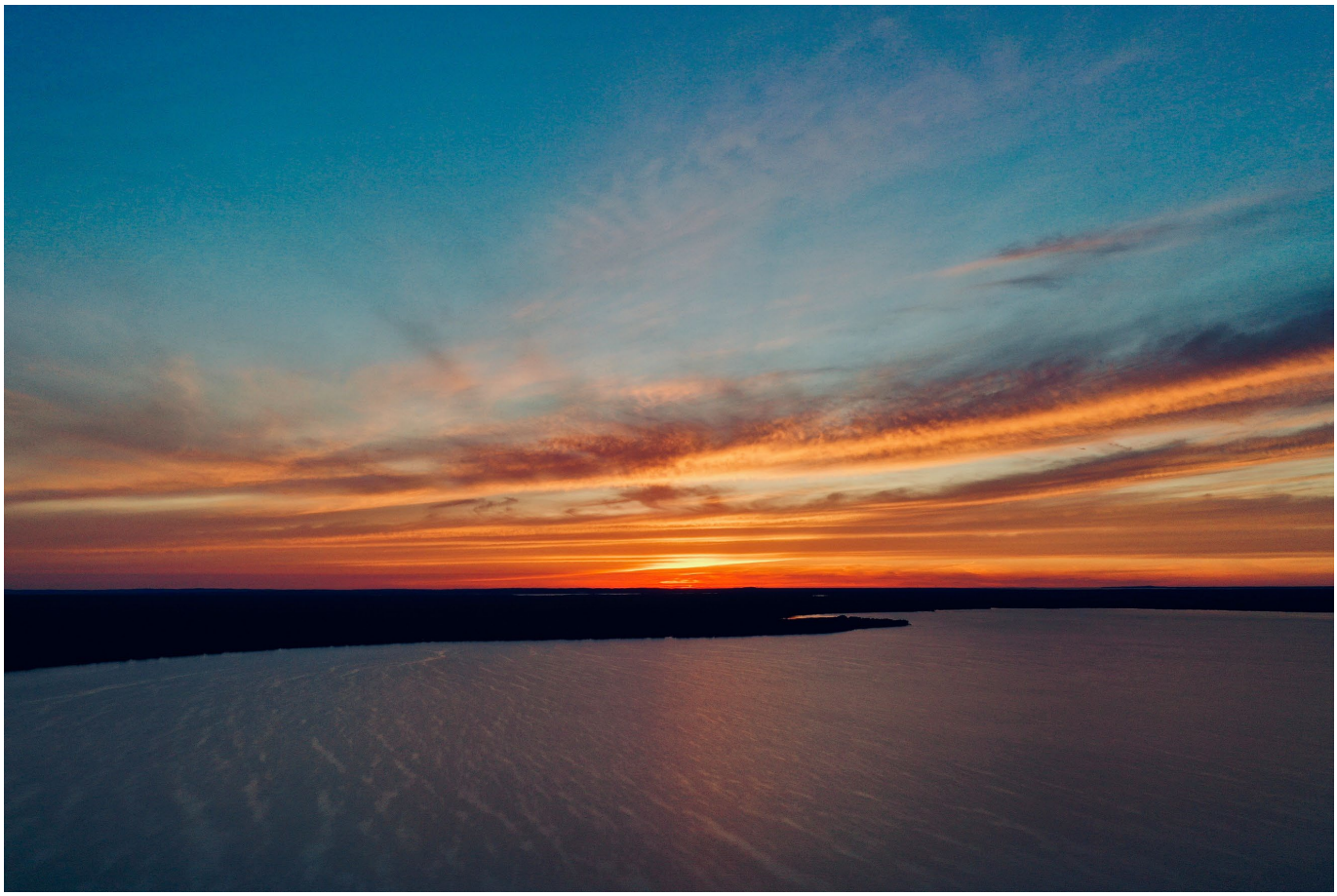
The primary tools of land conservation have remained largely the same for decades. They include:

Protect land permanently as a nature preserve or reserve. Land can either be sold or donated to the Conservancy to become a nature preserve or working forest reserve (working forest reserves are lands where forest management is allowed). Preserves and reserves are open to the public, and some are improved with parking areas and trails. At this time, there are the two nature preserves described above on Black Lake, protecting a total of 168 acres. Land in the watershed is as valuable for protection as actual shoreline.

Protect the land that you own with a conservation easement while retaining private ownership. Conservation easements are individually tailored to the goals of each landowner. If you want to own your land and manage it as a working farm or own your land and prevent future development, this could be a great option. The conservation easement remains with the land, regardless of who owns it in the future. Lands protected in this way are NOT open to the public. Several private landowners in the Black Lake primary and subwatersheds have used the conservation easement tool to protect their land.

To learn more, contact the Little Traverse Conservancy staff at 231.347.0991. More information is also available at www.landtrust.org.

NOTE: The Presque Isle County portion of the Black Lake watershed lies within the service area of Headwaters Land Conservancy at www.headwatersconservancy.org.



How can I support the Black Lake Preservation Society's efforts?

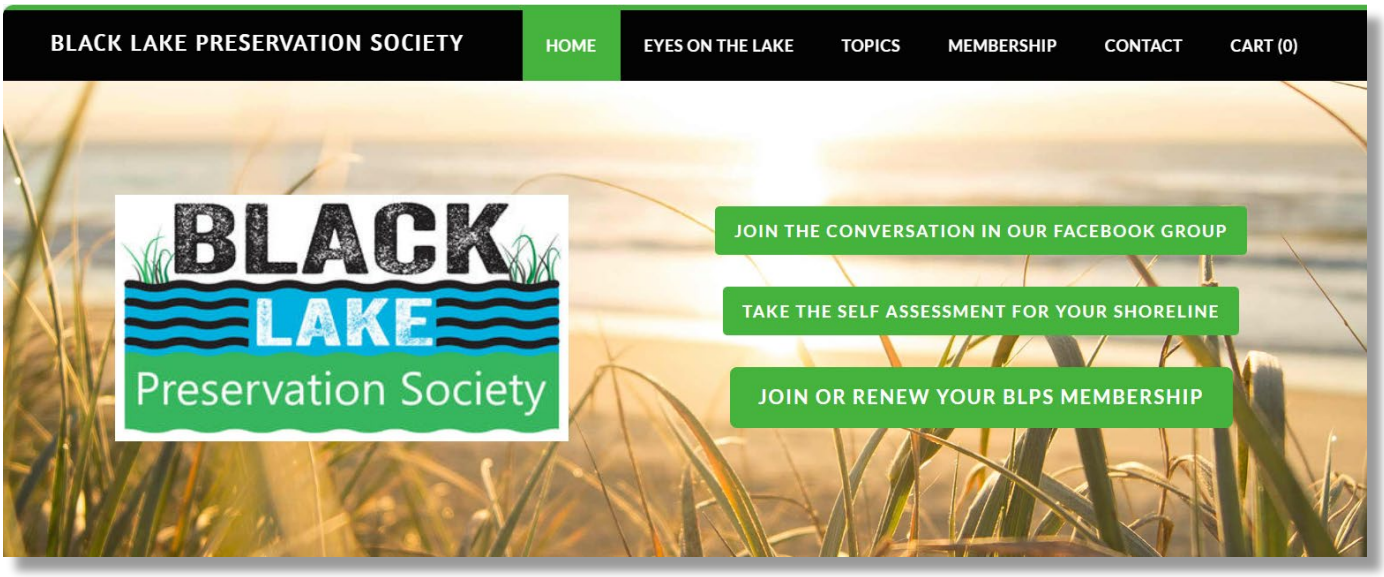
Black Lake Preservation Society activities and projects are funded by a combination of grants and the generosity of our membership. Membership for the year is still only $25. If you would like to include the BLPS in your charitable giving plans, we have been granted Federal Tax Exempt Status under IRS rule 501(c)(3), so your donations are tax-deductible.

There are two ways you can contribute in support of our efforts to preserve and protect Black Lake:

1) Go to our website (www.blacklakepreservationsociety.org) and choose the MEMBERSHIP menu option to pay online by credit card
2) Mail a check payable to **Black Lake Preservation Society** to:

BLPS
2014 N Saginaw Rd
Box 260
Midland MI 48640

Thanks for your support!



www.blacklakepreservationsociety.org