Higgins Lake Property Owners Association
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To Protect, Preserve and Enhance the Quality of Higgins Lake and Its Surrounding Watershed

In this edition:

Thank you for supporting the important programs on Higgins Lake

Photo by Ric Blamer

President's Message

Frigid days and nights have once again become the norm here at Higgins Lake. It was reported by our unscientific, unofficial, resident scientist, Herb Weatherly, that January 8th was "She is Frozen Day". The cold won't stop us from reflecting on all the HLPOA accomplishments for the betterment of Higgins Lake and from striving for more in 2022.

Many thanks to all who have already added your support to HLPOA by renewing your memberships, and to those who have made additional contributions. If you've not had the opportunity to do so yet, please take the time now. HLPOA depends almost solely on membership dues to budget for our programs and projects "for the betterment of Higgins Lake and the surrounding watershed".

Many of our plans and projects are presented in this newsletter. Hope you enjoy it and find a way to help us with your time, treasures, and talents. Read on to see why we are considered to be the premier lake association in Michigan!

Charlene Cornell, President HLPOA

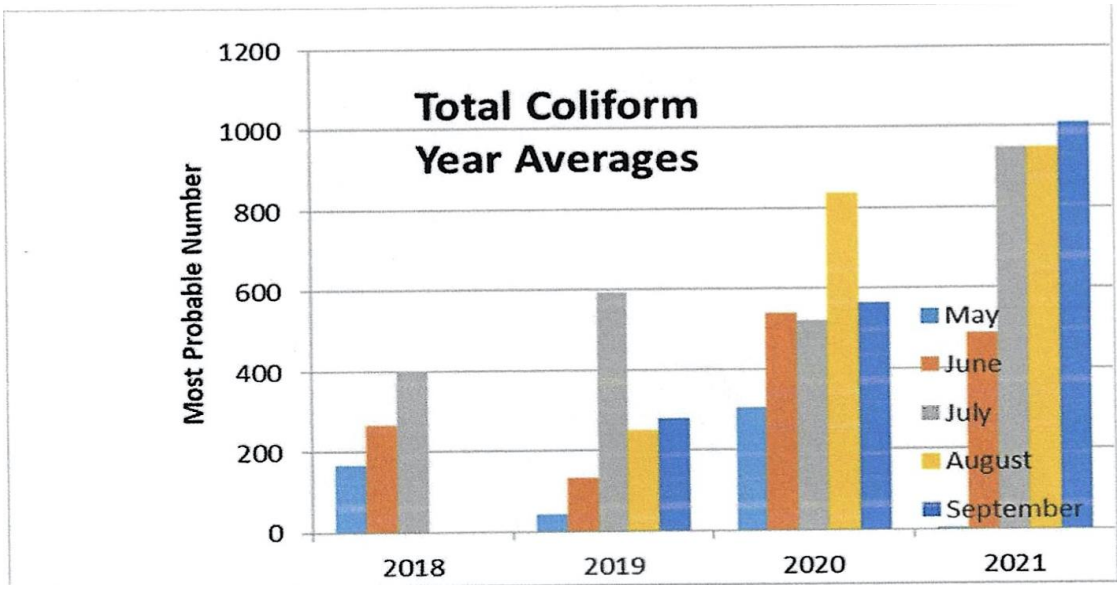
Dedicated to Preserving the Quality and Beauty of Higgins Lake.

Higgins Lake Is in Trouble

The Roscommon Area Public High School Chemistry students have for the past four years analyzed the chemical and bacterial concentrations of the near shore waters of Higgins Lake. They have been led by their Chemistry teacher Chuck Schepke and supervised by professional EPA certified water scientists, while working at Roscommon's Raven Laboratory. Their data and summary graphics are published on the www.hlpoa.org website under the Environmental Committee/Water Quality tab, Life is About Testing the Waters.

The bar graph on page 2 is based on their data, and shows the rapidly increasing trend of near shore waters becoming more contaminated by bacteria, some of which are pathogenic, in each of the past four years. This graph is an accurate reflection of the rapidly increasing favorable environment for bacterial growth in the near shore waters of Higgins Lake.

There is little question that the implementation of a sewer system around the lake would reduce the future growth of the nutrients contributing to this problem in the lake, and would help reverse this very troubling public health trend.



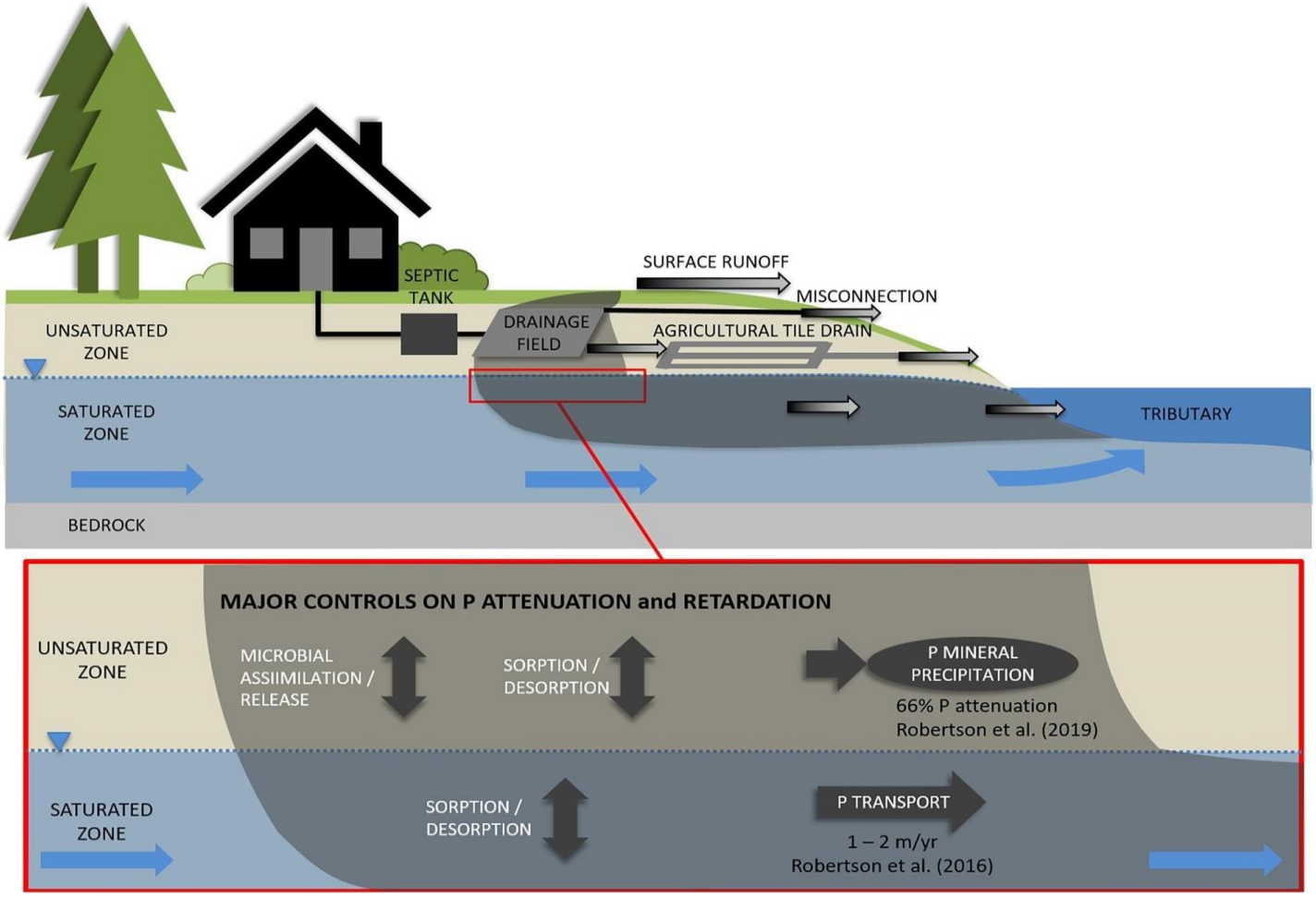
Our Septic Systems and the Fate of Phosphorus

With all of the discussion lately about the area-wide sewer system and concerns about Higgins Lake water quality, let's take a deeper dive into how phosphorus from individual septic systems could reach Higgins Lake. Phosphorus can come from fertilizers and animal waste, including human waste. Since 2012, Michigan law under Public Act No. 299 restricts the use of fertilizers containing phosphate for lawns. Hopefully, homeowners are diligent about not using fertilizer with phosphate, and we can focus our concern on the other potential phosphorus source, septic systems.

With Higgins Lake water being low in nutrients, and in phosphorus in particular, any addition of phosphorus can encourage the growth of algae. Algal blooms could degrade the character of our lake from crystal clear waters to a murky, slimy mess under certain conditions. Because phosphorus is so important to the water quality of Higgins Lake, let's look at how phosphorus can get from a septic tank into the lake.

According to the University of Florida, the largest input of phosphorus in a household is from toilets (59%) followed by bath and sinks (37 %) and garbage disposals (4%). Fluids from these fixtures enter the septic tank where approximately 20-30% of the phosphorus settles into the solids in the tank (UF 2021). The liquids from the tank enter the drain field where it percolates towards the groundwater (Figure 1). In this figure, the groundwater eventually reaches a surface water, similar to how groundwater feeds into Higgins Lake.

As the liquid flows through an acidic soil, the phosphorus comes in contact with iron and aluminum cations where it binds. The good news is that Higgins Lake is surrounded by mostly graycalm soils, which are acidic 2 feet to 5 feet deep within the area of a septic drainfield. In some acidic soils, up to 90% of the phosphorus can bind to the soil. The bad news is that our soils are very sandy allowing rapid movement of liquid and less time for this binding reaction. Though most soils are able to absorb phosphorus for years, the amount of iron and aluminum in the soil is likely finite so that over decades, less absorption of phosphorus is likely possible in the drainfield compared to when the drainfield was first installed. As drainfields age, the absorption of phosphorus can decline to the point where phosphorus may easily move from the septic effluent to the groundwater. Evidence of this is seen in algae blooms on inland lakes where sewers are not used (US EPA 2002).



Schematic of wastewater flow from home through onsite septic system to surface water. (Oldfield et al. 2020)

The absorption of phosphorus into the soil may also be reversible depending on conditions. Phosphorus can move with the groundwater flow in sandy soil, up to 3 feet to 6 feet/yr (Robertson et al., 1998) so that phosphorus from older septic systems is more likely over time to reach any surface water that is fed by the groundwater receiving drainfield effluent. Because of this movement of phosphorus, a septic system setback of up to approximately 1,000 feet from surface water is recommended in some sensitive areas in the country. The sanitary code used by the Central Michigan District Health Department requires a minimum 50 feet setbacks for septic tanks and drainfields from Higgins Lake. In a hypothetical of phosphorus movement of 3 feet/year and a 50 feet drainfield setback, phosphorus could be reaching the lake in approximately 17 years. Many of our septic systems are much older than 17 years. The graycalm soil series that surrounds Higgins Lake is rated as severe in the Roscommon County Soil Survey for septic tanks. A severe rating indicates that if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Some residents have expressed disbelief that their septic system could have any impact on the lake, especially if their well water is fine. One way to judge how well a septic system may be working is to test nearby wells for contamination by bacteria and nitrates. Phosphorus and nitrates are nutrients that occur in septic system effluent. Steve King of the Central Michigan District Health Department presented data in October 2021 that showed approximately 10 % of wells sampled have nitrates above the State and Federal drinking water limits. Mr. King indicated that while septic systems work well to treat bacteria and viruses, they do not do a good job on nutrients, including phosphorus.

The complexity of groundwater flow can make it challenging to determine from which septic system the phosphorus may be coming. The vulnerability of a well to septic contamination depends on a lot of factors, including the depth of the well, depth and direction of groundwater flow, and where the well is tapping into the groundwater in relation to where a septic drain field effluent flows to groundwater. Many wells are drilled through one or more confining layers (e. g., clay) to reach

groundwater that is less likely to be impacted by surface water or shallow subsurface flows, like from a septic system. It is good to know if your well delivers clean water, but it may not give you a clear picture of the function of your or your neighbor's septic systems and potential phosphorus impacts to the lake.

Over the decades, with increasing population surrounding Higgins Lake and the legacy of using on-site septic systems in challenging soils, we should be looking towards the future for ways to reduce the potential impact of the thousands of septic systems in the Higgins Lake watershed.

References:

Oldfield, L. Rakhimbekova, S., Roy J. and Robison C. , (2020) Estimation of Phosphorus Loads from Septic Systems to tributaries in the Canadian Lake Erie Basin, Journal of Great Lakes Research, Vol. 46 Issue 6, Pages 1559-1569.
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U. of Florida Extension Service, Onsite Sewage Treatment and Disposal Systems: Phosphorus. https://edis.ifas.ufl.edu/publication/ss551. Accessed 12/23/21Onsite Wastewater Treatment Manual, USEPA February, 2002, EPA/625/R-00/008. https://www.epa.gov/septic/onsite-wastewater-treatment-and-disposal -systems Accessed 12/23/21.

Update on Higgins Lake Sewer Project

The proposed sewer project is moving forward. The Gerrish Lyon Utility Authority (GLUA) held meetings throughout the winter months. The next GLUA meeting is February 7, 2022, 9:00 am at the Gerrish Township Hall, 2997 East Higgins Lake Drive, Roscommon, MI 48653.

Township residents who desire to have a say in the project and want the project to proceed can do so by signing a petition in favor of the project. Downloadable petitions in support of the proposed GLUA sewer project for each township are available on the HLPOA website under http://hlpoa.org/presidents-corner/

AMVETS Marina Litigation Favorably Resolved by Court Order

Litigation over a controversial marina operation, pending since 2016, has finally and favorably been resolved by order of the 34th Circuit Court.

In 2016, AMVETS Lodge located at the northwest corner of the lake (106 Thorpe Avenue) applied to the Michigan Department of Environmental, Great Lakes and Energy (EGLE) for a marina permit. Despite the strong written objections by HLPOA and local property owners the permit was granted. The permit allowed AMVETS to seasonally place a dock 5 foot wide, 457 feet long, and moor 36 watercraft.

The AMVETS property is in Lyon Township and is zoned R-1 residential. Lyon Township was requested to enforce its R-1 single family zoning ordinance and prevent the marina operation. The Township declined to do so.

An administrative appeal was filed by Attorney William Carey challenging the issuance of the permit. The administrative appeal was dismissed on procedural grounds. A lawsuit was then filed by Carey in Circuit Court which eventually led to a mediation order. However, the mediation process failed when AMVETS was only willing to commit not to expand beyond 26 watercraft.

With litigation in progress, AMVETS planned to expand to the full capacity allowed by the permit.

After careful consideration and the advice of counsel, the HLPOA Board stood firm and voted at its March 15, 2021 meeting to proceed to trial in the Roscommon County Circuit Court against AMVETS in an attempt to stop the operation and expansion of the permit sanctioned marina.

In preparation for trial, Carey, and HLPOA co-counsel Dane Carey of Kuhn Rogers (Traverse City), took the deposition of the manager of AMVETS Lodge. Her

testimony devastated major portions of the AMVETS defense to the HLPOA lawsuit. Then, shortly before trial, the Trial Court threw out many of the arguments AMVETS intended to rely upon at trial.

As a direct result of the deposition testimony and the Court ruling, the AMVETS were forced to concede to a much smaller marina operation. The AMVETS has agreed to limit the marina to 20 boats in 2022; 15 boats in 2023; and 10 boats forevermore thereafter. By conceding to this position, **AMVETS also gave up the right of an appeal**.

In the end, a marina once authorized for up to 36 watercraft, will now be limited to 10. But for the financial support provided by HLPOA membership, coupled with the resolute position of the HLPOA Board of Directors regarding a final outcome, the litigation would have failed to contain the AMVETS marina operating plan. A job well done.

Second Restorative Lake Science Study

Three years ago, Restorative Lake Sciences (RLS) was hired by HLPOA to create a baseline study of Higgins Lake. The study was motivated primarily by concerns over aquatic invasive species (AIS) like Eurasian Milfoil and especially Starry Stonewort which had recently been discovered in the lake by EGLE. That study is available on the HLPOA web site and was reported on by Dr. Jessica Jermalowicz Jones at the 2020 Annual Meeting.

The HLPOA board recently approved an update to the baseline RLS study to be conducted in August 2022. The primary concerns once again are tracking the presence of Eurasian Milfoil and Starry Stonewort and surveying for any new AIS in the lake. RLS will be checking for any of the plants on the EGLE watch list that have been confirmed in the wild in Michigan.

This study like the original baseline study will be expensive, about $19,000. The baseline study defined 2,564 aquatic vegetation assessment sites of 100 by 300 feet or 1,756 acres of lake bottom. These sites were investigated visually and with rake tosses to identify vegetation. A similar effort will be required for the update.

The study will be paid for partly with your annual dues and special gifts to the environmental fund. We already have commitments for over half of the total and we appreciate your support. Special gifts should be mailed to HLPOA, P.O. Box 55, Roscommon MI 48653 and please mark for the Environmental Fund.

The Massive (Micro) Plastic Problem

THE BIG PLASTIC PROBLEM

The First synthetic plastics were invented in the early 1900s but it wasn't until after World War II that they started to become ubiquitous in modern society. Cheap and versatile, plastic began to be mass-produced to make necessary military resources during wartime. After the war, a strong marketing campaign by the plastic industry was launched to convince Americans that plastics were modern and wonderful, and that disposable products were convenient, not cheap and junky. Since then, we have entered the Age of Plastic, and plastics are used in nearly every product on the market. Globally, we are currently producing 380 million metric tons of plastic each year, much of which will stick around indefinitely and find its way to the ocean. Of course, not all plastic is bad. Plastic is used in computers and medical equipment, and is often necessary for sanitary reasons. But over 50% of the plastics produced are single-use, and only 9% of all plastics are recycled, resulting in the accumulation of plastic waste in landfills and plastics released into the environment as litter. It's estimated that there are 51 trillion pieces of plastic in the ocean (that's 500 times more than the number of stars in the sky), many of which are very small. These microplastics, plastic smaller than 5mm, are an emergent environmental concern in aquatic ecosystems.

WHAT ARE MICROPLASTICS AND WHY ARE THEY BAD FOR LAKES AND STREAMS?

Microplastics can easily be transported long distances and into freshwater ecosystems due to their small size, light density, and durability. Microplastics present a myriad of detrimental effects on aquatic ecosystems. For example, they leach harmful chemicals and bioaccumulate in food webs. Ingestion of microplastics can cause animals to have a false sense of satiation, which may result in malnutrition and potentially rupture internal organs. Additionally, plastics absorb and transport harmful substances, such as perfluoroalkyl substances (PFAS), antibiotics, and other persistent organic pollutants, that have been linked to birth abnormalities and diseases in a wide range of species. Plastics may also be passed through food webs and eventually consumed by humans. In fact, one study conducted by the University of Newcastle in Australia showed that humans consume roughly a credit card worth of plastic per week.

Microplastics may also affect small organisms, such as bacteria, algae, fungi, and protists, that form the base of the food web and carry out many important ecosystem functions. For example, one study found that plastic debris increased the transport of microbes associated with harmful algal blooms. Another study found that microbial biofilms growing on microplastics were more likely to undergo gene exchange, leading to antibiotic resistance in freshwater pathogens which could have public health implications. However, to date, very little is known about how plastics may disrupt the important ecosystem functions that aquatic microorganisms carry out.

WHERE DO MICROPLASTICS COME FROM?

Microplastics are released into waterways from an array of sources such as the washing of synthetic clothing, industrial discharge, dust from cities, wear and tear of automobile tires, and the breakdown of larger plastics into smaller fragments. Microplastic fragments can be classified as either primary or secondary microplastics. Primary microplastics are produced as small fragments, smaller than 5 mm, for use to production of plastic products or self-care products such as facial cleansers and toothpastes. Secondary microplastics are created when larger macroplastics are degraded or fragmented into small particles.

One type of microplastic of particular concern are microfibers. These are small plastic fibers that shear off of synthetic clothing and been found to make up a majority of microparticles found in some studies of natural waterways. Synthetic clothing made from materials such as polyester and nylon that is tossed around in a laundry machine can promote the spread of microfibers. Each load of laundry can shed anywhere from a few thousand to millions of microfibers. This wastewater flows through community sewers to local wastewater treatment plant, and some studies show that wastewater treatment plants are an important source of microplastic pollution. Although wastewater treatment plants are not designed to remove microplastics, they remove approximately 95-99% of microplastics through the treatment process. However, the 1-5% can be significant point sources of microplastics, especially from large wastewater treatment facilities, discharging millions of microplastics per day into receiving streams.

Non-point sources of microplastic pollution that wash in from the watershed, are more difficult to pinpoint. Dust from urban areas has been shown to carry microplastics into the atmosphere and cycle it around the globe, similar to other major biogeochemical processes such as the water or carbon cycles. Tires can be worn down by heavy use and weathering, and can expel microplastics onto roadways. Rain or snowmelt can then transport

these microplastics into local waterways. There are many other potential sources of microplastic pollution, but because monitoring of this type of pollution is sparse, the relative importance of various sources is not well understood.

HOW DO YOU MEASURE MICROPLASTICS IN WATERWAYS?

A large net, called a neuston net, with a mesh size of 0.33 mm, is used to sample for microplastics in flowing waters. What's collected in the net is then sieved to remove the particles larger than 5 mm. The net collects everything the water carries, so the plastic needs to be isolated from the other materials (leaves, sticks, algae, other organic debris, sand, and sediment, etc.). This is done by digesting the organic material using wet peroxide oxidation, followed by density separation to isolate the plastic from sand and sediments (plastics float in salt water). The remaining microplastics are then identified and counted with a steromicroscope. The concentration and load of microplastics in the stream can be calculated by measuring the volume of water that flows through the net during the sampling period and the volume of water moving through the river. Using these methods, our lab group at Eastern Michigan University is measuring microplastics in local waterways to better understand the sources of microplastics and how plastics affect microbial communities and their function. Stay tuned! We will share some of our finding in the winter 2022 issue *The Michigan Riparian.*

Jennifer Troost (jtroost3@emich.edu) and Morgan Chaudry (mchaudry@emich.edu) are M.S. students in the Biology Department at Eastern Michigan University work with Dr. Kristi Judd.

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HLPOA Purchase Assists in Student Research of Micro-plastics in Higgins Lake

The HLPOA Environmental Committee presented the Roscommon Area Science Department the necessary microscope auxiliary equipment to allow photographs and microscopic dimensioning of very small objects. Items include a support piece for cell phone pictures, test tubes, microscope iPhone adapter and special eye pieces. This equipment is now being used by advanced chemistry and biology students to study the presence of microscopic plastic particles in the lake's waters. The microscopic analysis of Zebra mussel filtration of lake waters will be used to determine the presence or absence of micro-plastic contamination in our waters. Zebra mussels are filter feeders and have been shown to retain any micro-plastics in the water they process. The analysis technology involves collecting zebra mussels, aging the population, dissolving the organic materials, and then characterizing any micro plastics that may remain. The consequences of this type of plastics pollution are severe in phytoplankton populations and the growth and survival of young fishes in the lake that depend upon this food source.

Plan a Rain Garden to help prevent pollutants from entering Higgins Lake

Winter months are an excellent time to plan your gardening needs for the Spring. Start now to design your rain garden at Higgins Lake. These gardens can help filter rainwater from roads and impervious surfaces before it enters Higgins Lake.

During a heavy rain, water doesn't always have much time to soak into the ground. Water runoff can contain pollutants like gas, oil, pesticides, and more that can flow directly into the lake. Establishing a rain garden allows the water to soak into the ground and filter through the soil. Rain gardens are shallow depressions at ground level meant to hold water. They do not form a pond, but allow the water to filter through the soil. These gardens are usually filled with native plants. Plants with large root systems absorb water. Common native flowers and shrubs found in rain gardens include black-eyed Susan, New England aster, butterfly milkweed, fragrant sumac and New Jersey tea. These gardens also provide habitat for native birds, insects and animals. For more information on how to plan a Rain Garden go to: https://www.canr.msu.edu/home_gardening/uploads/files/Rain%20Gardens%20-%20shorelands2020-web.pdf

Wear a Life Jacket Did you receive a new kayak, paddleboard or other watercraft gift for the holidays? The perfect accompaniment to such a gift would be proper safety equipment especially a life jacket, plus a boating safety education class. Remember, water safety begins before you go out. Be prepared with the proper US Coast Guard approved life jacket. 86% of reported drownings occur when the person was not wearing a life jacket. Make sure your life jacket fits properly and is in good condition.

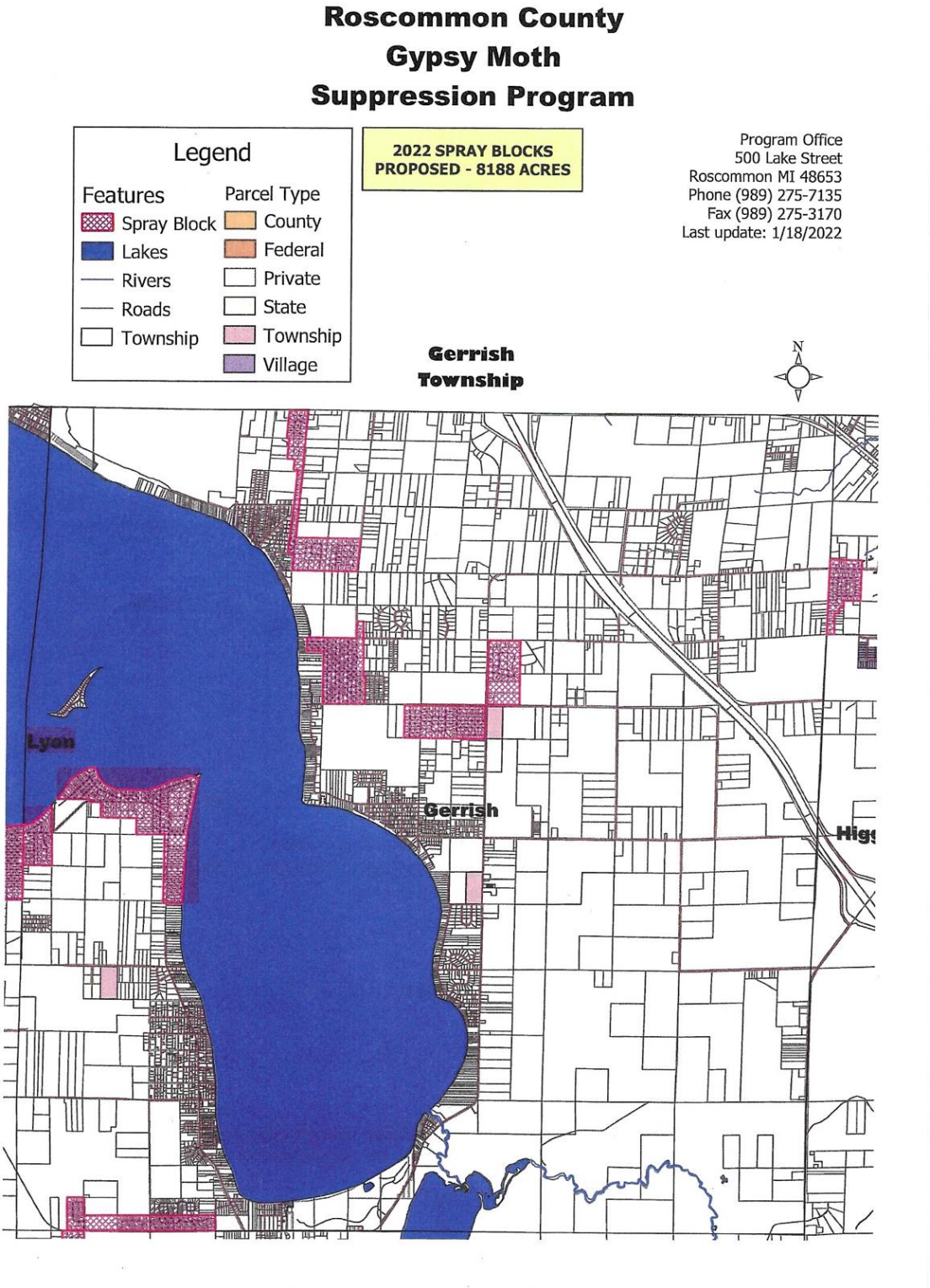
For more information about life jackets see: https://www.michigan.gov/dnr/0,4570,7-350-79119_79144_79641-37313--,00.html

Take a Safe Boating Class. The Coast Guard recommends that all boaters and paddlers take a boating safety course that meets the National Boating Education Standards prior to getting out on the water. Safe boating classes are available through various organizations including the US Coast Guard Auxiliary and other agencies. For more information https://www.michigan.gov/dnr/0,4570,7-350-79119_79144_79642---,00.html

For additional information about ice safety and tips search: https://www.canr.msu.edu/news/ice_safety_tips_selden18

Gypsy Moth Suppression Program

Here is the most recent information regarding the Gypsy Moth spray program in Roscommon County. Please check to see if your property is in the “Spray Block” area if you need spraying. Deadline to add acreage pursuant to guidelines is March 18, 2022.



Overview of 2022 Gypsy Moth (*Lymantria dispar*) Spray Block Creation

2022 Situation

- 2020 and 2021 populations highest in 20-30 years – across the North East US and Canada
  - 900,000 acres defoliated across Michigan in 2020
  - Over 1.2 million acres defoliated across Michigan in 2021
- Goal of Roscommon County Program is suppression, not eradication
  - Eradication not possible as the caterpillar is 'naturalized' to the eastern US

How decisions were made

- Current budget allows for aerial treatment of 8,814 acres
- Each Township allotted 801 acres
  - Protocols were followed on allocating the 801 acres
  - Not able to allocate full 801 acres in each township
- Protocols:
  - Density of egg masses found during surveys
  - Density of homes
  - Percent/density and species of tree cover
  - Proximity to state land and other areas that are never treated
  - Isolated trees generally have high egg mass density and may not be included in spray block when surrounding landscape lacks contiguous cover

In 2022 – Individuals may add acreage to the spray block map!

- Price is $39.71 per acre
- Minimum of 40 acres OR directly adjacent to existing spray blocks
  - If directly adjacent, no minimum acreage
- Partial parcel acreage will not be accepted; if a parcel is enrolled for spraying the entire parcel must be included
- Deadline to add acreage is March 18th due to permitting deadline
  - **All funds and information must be provided to the County by 3:00 PM, March 18th**
- Please communicate this accurately to your residents!

Roscommon County Gypsy Moth Suppression Program
500 Lake Street
Roscommon, MI 48653
989-275-7135
Julie Crick
crickjul@msu.edu
Program Website: http://www.roscommoncounty.net/218/Gypsy-Moth-Program
Follow us on Facebook for the latest updates: facebook.com/GypsyMothRoscommon

PLEASE RENEW YOUR MEMBERSHIP TO HLPOA TODAY! The primary source of funding for HLPOA activities is, by far, the annual membership of $100.00, due each year by January 31, along with the extra contributions many choose to make. Your contributions already received are gratefully acknowledged below. Please mail your check payable to HLPOA to the address at the top of this newsletter.

Thank you to our donors:

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In Memory of Bette Purdy:
Mary Kay Dent, Ron & Katherine Francek, Karen Haas, Barbara Lindley Family, Brad & Karen Lovell, Thomas Martin, Wanda Osburn, Scott & Roberta Timmerman

Special thank you to Sharon Caldwell for her recent help in preparing the directory advertising mailings.

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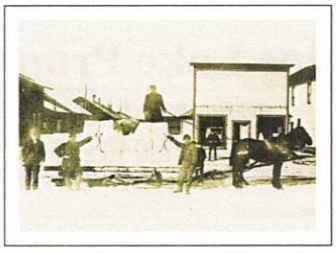
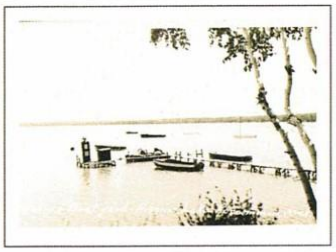
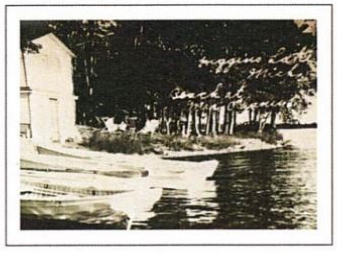
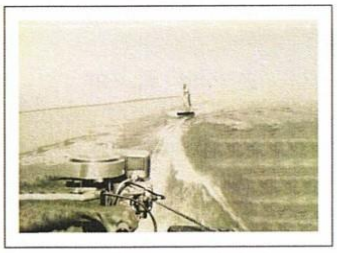
Winter 2022

HLPOA Vintage Notecard Fundraiser 2022







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11 matching envelopes included

Vintage Notecards - Each set includes a variety of 10 cards and 11 envelopes.

Exclusive offer to Higgins Lake Property Owners Association members.

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Email _____ Cell Phone _____

Number of sets_____@ $50.00 = _____

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Roscommon, MI 48653