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THE MICHIGAN RIPARIAN

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PROMOTING WATER QUALITY 50 PROTECTING RIPARIAN RIGHTS

Riparian (ri-'pair-ee-en) adj. Relating to or living or located on the bank of a natural watercourse, such as a river, or of a lake or a tidewater.

DEVOTED TO THE MANAGEMENT AND WISE USE OF MICHIGAN'S LAKES AND STREAMS Published Quarterly

Photo Credit - Dale Fisher Photography

Pleasant LAKE

Pleasant Lake is a 205 acre spring fed lake located in Washtenaw County. Pleasant Lake is approximately 1 ¼ miles long and has a maximum depth of 36 feet. It spans over 18,000 feet of shoreline and has a drainage basin of 692 acres and waters drain to the Huron River Watershed. It is an all sports lake with excellent fishing for bluegills, large and smallmouth bass, perch and crappie.

THE MICHIGAN RIPARIAN
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FROM THE PUBLISHER

The Michigan Riparian Magazine

This year marks *The Michigan Riparian Magazine's* 50th year! The story about its start and evolvement as a first-class publication will be shared with our readers in the upcoming summer and fall issues. It is a fascinating glimpse into the early history of the magazine, as well as that of Michigan Lake and Stream Associations, Inc. The special commemorative magazine will feature some of the earliest front covers and topics of the day. (Pictures of some of the early covers are found in this issue, too!)

The Michigan Riparian is the only quarterly publication devoted exclusively to protecting the property rights of inland lakefront property owners and the water resources of Michigan. Spanning the last 50 years, *The Michigan Riparian* has featured over 100 Michigan inland lakes, rivers and watersheds. We have covered everything from famous residents, victorious legal battles, the challenges of invasive species, and personal stories of those who share their love of the lakes.

If you are missing an issue for your collection or see a cover that piques your interest in this issue (page 18) or in the coming summer or fall issues, please contact us; and we would be happy to send you copy from our special archive collection. Please email: info@mi-riparian.org or call 989-831-5100. All copies are $3.00 per issue plus $2.00 shipping.

Speaking of history, on page 25 "Back to the Future: A Perspective on History and Events That Shaped Michigan's Lakes and Streams", is a fascinating look at how glaciers, lumbering, and time have impacted our waters.

Ever considered modifying your lakefront home or cottage for another purpose? Turn to page 34 and Cliff Bloom will give you the facts that can protect you from potential pitfalls.

The damage caused by invasive species is real and can be a source of great financial loss and an environmental disaster. There are steps that can be taken to reduce the risk. Read page 13 to learn more.

If you have ever wondered about water quality indicators, see the article on page 21, "A Healthy Lake Food Chain Base: Macro invertebrates and Zooplankton".

The cover story about Pleasant Lake in Washtenaw County is one of perseverance, cooperation, and determination to protect and maintain a healthy lake and preserve property rights for its residents. The story of Pleasant Lake is informative and inspiring.

Summer is coming, and it is more than welcome! It makes us smile as we anticipate the memories we will make this summer with family and friends on the lake. If you would like to share your stories with us, please send them to info@mi-riparian.org.

-publisher, Sharon Wagner

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00 Contents

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If you or your organization wishes to reprint an article from the *Michigan Riparian Magazine*, please contact us at (989) 831-5100 or info@mi-riparian.org. If approved, we will notify you by email or letter. When permission is granted, the following language must appear just before or after the reprint:

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Photo Credit - Dale Fisher Photography

Pleasant Lake is located in Freedom Township, Michigan in Washtenaw County. Freedom Township is located in the southwest quadrant of Washtenaw County. It is about 8 miles southwest of Ann Arbor.

Pleasant LAKE

by Lon Nordeen, a retired business executive, resident of Pleasant Lake and VP of the PLPOA

Overview and Early History

There are several Pleasant Lakes in Michigan, and the one located near the center of Freedom Township in southwestern Washtenaw County might be one of the least known. Originally named Lake Pleasant, maps of Michigan created later in the 1870's changed the name to Pleasant Lake. This hidden gem is surrounded by over 150 homes and cottages, most of which are year-round residences, as well as farms, a store and tavern.

This kettle lake, the product of retreating glacier action, is about one and a quarter miles long, a half mile wide, and encompasses 205 acres. The water sources for the lake are springs, streams and also wetlands which make up most of the eastern end of the lake.

(Continued on page 6)

Pleasant LAKE

(Continued from page 5)

Water exits the lake at the west end through a drain system which runs into Mill Creek and then into the Huron River. The deepest parts of the lake are 35 feet and the mean depth is 10.4 feet.

Native American Indians lived around Lake Pleasant evidenced by arrowheads and other artifacts. The first survey map of this area was created in 1819 by Joseph Francis. The sale of land in Freedom Township in the Michigan Territory began in 1831. By 1834, most of the land in the region and around the lake had been sold to settlers from New York and New England, many of whom were of English and German descent.

A small number of log homes were erected around Lake Pleasant. The basic layout of the lake area had been established with Pleasant Lake Trail (Road) running from Ann Arbor west along the north shore, Schneider Road on the east along the wetlands, Reno Road on the west, and, later, Hieber Road on the south. From the lake, it is about 12 miles northeast to the Ann Arbor city line. Eight miles to the southwest is the Village of Manchester, and 12 miles northwest is the Village of Chelsea.

Many birds inhabit Pleasant Lake

Freedom Center or Fredonia, a hamlet located on the north side of the lake at a crossroads of trails, included a collection of homes and commercial buildings to support farmers and travelers. In 1833, there was a meeting at the home of Henry M. Griffin near the corner of Lima Center and Pleasant Lake Road; and the settlers voted to petition the legislature to establish Freedom Township within the Michigan Territory. In April, 1834, the first meeting of Freedom Township took place in the same house.

Over the next 150 years, an expanding number of cottages, homes, a subdivision, a small number of commercial stores, a restaurant and bar, a gas pumping station, and an elementary school were developed around the lake. Many farms surrounded Pleasant Lake and gave the area its rural character. Writings and observations from those whose families that lived around Pleasant Lake for generations, recall it as a healthy environment; and the lake water was clear, but often weedy. Area residents fished the lake for food and used it for sport; and, in the winter, lake ice was harvested and stored to supply ice boxes.

What once was lakefront land dotted by small cottages, farms, and a few commercial stores and taverns, gradually gave way to more and more year-round homes and even the Pleasant Shore subdivision which developed along the north shore of the lake. Pleasant Lake is a local destination for swimming, boating or fishing in the summer and ice fishing and skating in the winter. It is also home for a wide variety of birds, including flocks of geese, swans, heron, and even eagles. Many lake lots remain in the family for decades and few properties come up for sale.

1843 Map of Washtenaw County showing Pleasant Lake

While Pleasant Lake remained clean, a natural gas pumping station was built near the west end of the lake in the 1940's, and it used lake water for cooling--thus some parts of the lake never froze. Some residents recall swimming in this discharge area and enjoying its warm water (the gas plant has changed its system, and the temperature difference of water discharged back into the lake is now much lower). Pleasant Lake has been affected by runoff, lawn fertilizer, leaky septic systems, farming operations and, later, the arrival of invasive species such as Eurasian Milfoil, spread via goose droppings and visiting boats.

Pleasant Lake Property Owners Association (PLPOA)

Pleasant Lake has been fortunate to have a high level of resident support for water conservation. In the 1960's, a group of concerned citizen volunteers formed the Pleasant Lake Property Owners Association (PLPOA), a private membership association, dedicated to preserving the lake quality, enhancing recreational activities, and maintaining property values.

In 1974, PLPOA volunteers started participating in the Michigan Lake Self Help program. Volunteers at Pleasant Lake conducted Secchi Disk water clarity readings and collected Chlorophyll samples and had them analyzed by the Michigan Department of Natural Resources. This program evolved into the Cooperative Lakes Monitoring Program (CLMP) which brought together the Michigan Lake and Stream Associations, volunteers and hundreds of Michigan lakes and DEQ for ongoing and consistent monitoring of the conditions in Michigan lakes. Regular volunteer lake testing and training efforts continue to this day.

The PLPOA distributes newsletter updates, has an annual potluck meeting (once attended by more than 100 residents) and hosts an annual 4th of July boat parade with prizes for the best decorated boats. By the 1980's, increasing weeds and environmental concerns prompted the PLPOA to focus on ways to address a variety of potential threats to Pleasant Lake. The discussions at those PLPOA meetings were similar to the issues and discussions of today--boating safety, heavy weed growth, the danger of zebra mussels, and new invasive species. Nearby gravel mining also posed a potential threat due to lake water and well levels. Several natural gas and oil pipelines run underground near the lake which could cause environmental problems and become a danger to residents.

Pleasant Lake Water Quality Study

In 1983 the PLPOA commissioned and funded a major study to document the surface and subsurface conditions of Pleasant Lake. In 1984 and 1985, Dr. Wally Fusilier of Dexter created a detailed study of the conditions of Pleasant Lake. This study confirmed the presence of invasive Eurasian Milfoil as well as nearly 50 acres of dense weed beds, increasing levels of organic material and high levels of phosphorus and nitrogen in the sediment and sporadic algae blooms. For more than a decade after the Fusilier report, the PLPOA and local residents consulted with the DEQ, the Michigan Lake and Stream Associations, other lake associations and contractors on ways to reduce the weeds in Pleasant Lake. Some lake residents "managed" the weeds near their property by pulling, cutting and using herbicides, but there was no coordinated lake-wide effort.

First Pleasant Lake Special Assessment District

During 2001, a significant infestation of Eurasian Milfoil was identified in Pleasant Lake. The Milfoil was 'taking over' and, if

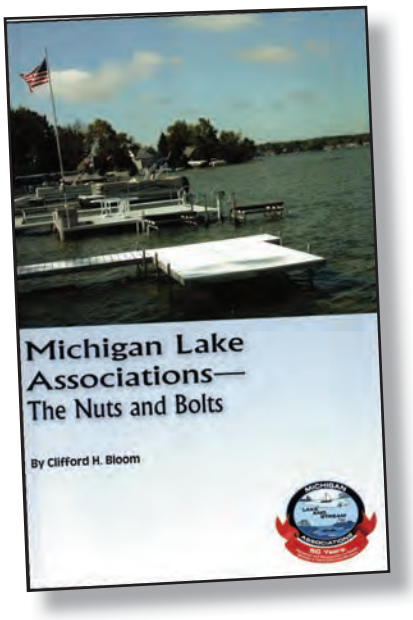
(Continued on page 9)

Weeds on Dock

Annual Pleasant Lake July 4th Boat Parade

Sunset on Pleasant Lake

Two Books Written by Clifford H. Bloom and Published by ML&SA to Benefit Lakefront Property Owners In Michigan!



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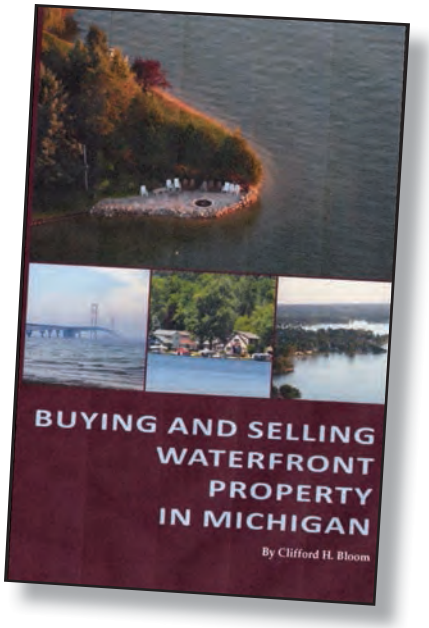

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 (Continued from page 7)

left untreated, threatened to significantly disrupt the lake ecology by displacing native plants. Various methods of eliminating the Milfoil were investigated: applying herbicides, weed harvesting, and planting Milfoil weevils in the lake that would eat the milfoil plants. Each method had benefits and drawbacks. The lake residents were surveyed and the Milfoil weevil solution was chosen. A Special Assessment District was formed in 2002, working through the Freedom Township Board and using Public Act 188, to pay for planting the weevils. Each resident with lake frontage or lake access was assessed an annual fee. Weevils were distributed into the lake in 2002 and 2003. A follow-up lake survey showed some reduction in invasive weeds. Pleasant Lake residents' opinions of the results of this effort are mixed; some felt it was successful and others felt there was no long-term change.

Gravel mining near Pleasant Lake has long been a concern due to potential pollution of wells and lake level impact. In 2005, a nearby gravel mining company proposed development of a 125-foot-deep mine that potentially could threaten Pleasant Lake and its associated wetlands. Concerned residents created Citizens Respecting Our Waters, Inc. (CROW) to draw attention to this issue. This group and other organizations rallied support and encouraged the addition of special wells to monitor water levels.

Eurasian Milfoil was still in Pleasant Lake; and, over time, it hybridized with native Milfoil. Some years the hybrid Milfoil and dense native weeds became a significant nuisance to recreation. In August, 2011, several Pleasant Lake residents attended the regular PLPOA Board meeting, stated their concern about the large amount of weeds in the lake, and requested action to improve boating and recreation.

A Lake Management Committee was formed and contacted experts to identify options. The PLPOA Board heard presentations from other lake associations, herbicide applicators plus consulting firms and learned about the pros and cons of lake management techniques. Dr. Jo Latimore, Outreach Specialist from the Michigan

Photo Credit - Peter DeLoof and Sara Bassett took images of Pleasant Lake from their plane to support the weed mapping effort

State University Department of Fisheries and Wildlife, gave presentations discussing lake issues to residents who attended the 2012 and 2014 PLPOA Annual Meetings. Dr. Kendra Spense Cheruvelil, an Associate Professor of Limnology from Michigan State University, briefed lake residents in 2013 on how the lake is influenced by surrounding geography and development.

The PLPOA Lake Management Committee learned that an in-depth lake analysis (similar to the 1984 study) was needed to assess the condition of Pleasant Lake before a lake management program could be initiated. The committee also confirmed that such a study costs more than $5,000.00. PLPOA secured the required funding through two successful fundraising events, ran an evaluation study and hired a consulting firm. The 2013 Pleasant Lake analysis conducted by Aquest, Inc found:

- **Twenty-one different types of aquatic weeds were identified. This number is above average for lakes in the vicinity and showed diverse plant ecology.**
- **Eurasian Milfoil Hybrid, Wild Celery, and five varieties of narrow and broad leaf Pondweeds made up the most significant quantity of weeds in Pleasant Lake, and they were broadly distributed. One of the Pondweeds was a hybrid and was a concern because of its dominance.**
- **Eurasian Milfoil, Wild Celery and Pondweeds were classed as Tier 1, indicating that either because of their invasiveness or quantity present, these weeds needed some type of control or the healthy balance of weed species would be at risk.**
- **The overall 'weediness' of Pleasant Lake was above average.**

Pleasant Lake Resident Survey

At the October 8, 2013, Freedom Township Board meeting, members of the PLPOA presented the results of the Pleasant Lake weed analysis, management opinion, cost estimate and requested township support for a Lake Management Program. The PLPOA surveyed Pleasant Lake residents to confirm their intent. With the support of both a majority of lake residents and the Freedom Township Board, the Washtenaw County Water Resources Commissioners Office then started the process of establishing a Special Assessment District to fund the lake management activity through Public Act 185.

Continued on page 10

Pleasant LAKE

(Continued from page 9)

The five-year Pleasant Lake Management Program funded by a Special Tax Assessment District was initiated in the summer of 2014. This program is being managed by a team which includes PLPOA, the Washtenaw County Water Resources Commissioners Office and contractors. The first herbicide treatment of Pleasant Lake was performed on June 25, 2014. Residents were notified in advance and again on the day of treatment. The weed density was significantly reduced, allowing for improved boating, swimming and fishing in Pleasant Lake. General resident response to the treatment was very favorable.

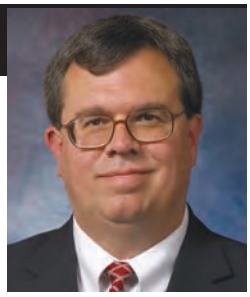
The PLPOA conducted Aquatic Plant training and mapping sessions in 2013 and supported a LakeScan analysis in 2013 and 2014 (this information is posted on the Freedom Township website). PLPOA is committed to conducting an annual lake analysis and identifying the correct lake management efforts needed to preserve lake quality. In 2014, Aquest, Inc. reported: *"Pleasant Lake is considered to be an unusually undisturbed aquatic ecosystem and supports a wide range of mostly desirable aquatic plant species. It is absolutely critical that the production of invasive species be precisely targeted for suppression in Pleasant Lake to protect the inherent stability of the aquatic ecosystem. The treatment strategy used to meet the objectives of the 2014 aquatic plant management program resulted in selective suppression of invasive ebrid milfoil in Pleasant Lake".*

Future challenges

Additional challenges are now emerging, such as the proposed installation of a 42-inch natural gas pipeline along Reno Road near the lake. In addition, there is still a serious threat of invasive species such as zebra mussels, Story Stonewort, algae blooms, and other weed problems. Pleasant Lake will require continued support by its residents, visitors, and other interested parties in order to preserve and protect the lake, support boating and recreation and maintain future property values.

As past evidence has shown, the concerned residents of Pleasant Lake and its associated state and local governing bodies and allied associations are committed to identifying impending issues and acting accordingly to preserve the bio-diversity and quality of Pleasant Lake. Our goal is to ensure that future lake residents enjoy their 4th of July boat parade in a lake even cleaner than today.

Passing the Buck – Poor Rural Roads Around Lakes



By: Clifford H. Bloom, Esq.
Bloom Sluggett Morgan, PC
Grand Rapids, Michigan
www.bsmlawpc.com

In Michigan, most public roads accessing inland lakes and rivers are under the jurisdiction of the local county road commission. And, quite often, those roads are not in great shape.

The following is a story repeated almost daily throughout Michigan. A resident of a township lake is tired of the condition of the public road next to her house. She complains to an official of the county road commission. That official indicates that there is nothing the county road commission can do due to a lack of funding and suggests that the property owner contact her local township official, thus implying that the condition of local public roads is the responsibility of the township. Sound familiar? Unfortunately, that is an all too common example of a county road commission employee being less than candid with a local resident.

It is fairly common for townships to contribute money to the local road commission for better maintenance of or improvements to a particular county road within that township.

In Michigan, townships do not own public roads or have any legal responsibility for the snowplowing, maintenance, paving, upgrading or repair of such roads. Apart from federal or state roads, the county road commission of the county where the road is located has the legal responsibility for all aspects of those county roads. Over 80 years ago, Michigan enacted the McNitt Act which required that all township roads be transferred to the local county road commission. With a few very rare exceptions, there are no township roads in Michigan.

Furthermore, MCL 224.21(2) requires county road commissions to keep all roads within their jurisdiction "in reasonable repair" and "reasonably safe and convenient for public travel". Unfortunately, citizens are generally without a legal remedy regarding the condition of such roads, as Michigan courts have ruled that citizens, property owners and local municipalities generally cannot sue to enforce MCL 224.21(2) (i.e. they do not have "standing"). See *Canton Township v. Wayne County Road Commission*, 141 Mich App 322 (1985).

It is fairly common for townships to contribute money to the local road commission for better maintenance of or improvements to a particular county road within that township. Such contributions can partially pay for paving a gravel road, applying salt brine to a gravel road to minimize dust or adding gravel to a gravel public road. However, those are voluntary contributions by the township involved, and are not mandatory.

To some extent, most county road commissioners may be immune to public protest or lobbying regarding the condition of their roads. In most counties, board members of the county road commission are appointed by the county board of commissioners, and the county commissioners often try to claim that they have "no control" over road commissioners. Of course, that is not entirely true because road commissioners are generally appointed by the county commission and since they usually want to be reappointed, road commissioners often do take seriously any complaint by county commissioners. In those counties where road commissioners are elected, local voters can replace them.

It is unfortunate that employees and officials of many county road commissions throughout Michigan are not entirely honest with local residents about which local government has the legal responsibility for maintaining and upgrading local county roads. Falsely indicating or implying that townships have such responsibility only adds to the public's general cynicism regarding government.

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Dear Fellow Riparians,

I think it would be a good idea for this issue of the Riparian that I review just what the Michigan Waterfront Alliance is all about.

Who are we?

The Michigan Waterfront Alliance (MWA) is a nonprofit corporation formed to protect, preserve and promote the wise use of inland waters in Michigan. Membership currently includes over 32 lake associations and 155 individual members throughout Michigan.

Karoub Associates is our lobbying firm, one of Lansing's oldest and largest. It has a diverse client base and nine full-time lobbyists. Karoub has represented MWA interests in Lansing since 2012

Our Legislative agenda includes the following:

1. Inventory the waters of Michigan where invasive species exists.
2. Acquire and categorize available information of all attempts to control or eradicate the plant and determine the success of control efforts.
3. Identify actions to be taken by the state and designate funding to pay for the control costs.
4. Pressure the state Executive and Legislative branches to provide enhanced funding levels to the Michigan Department of Environmental Quality and the Michigan Department of Natural Resources, particularly in the areas of aquatic invasive species management and Public Act 451 regulatory enforcement.
5. Provide for boat washing facilities and inclusion of sanitary hook-up, where available, at all public access sites.
6. Creation of a State of Michigan inland lakes focused sustainable aquatic invasive species management funding mechanism. Funding mechanism must include at least a partial redistribution of cost of AIS management from lakefront homeowners to the boating and lake user public.
7. Confront and seek a revision of Michigan Waterways Commission policy of continued expansion of public boat launch facilities which exponentially increases the risk for the introduction of new aquatic invasive species and overcrowding of inland lakes leading to the risk of exceeding their carrying capacities.

Additional concerns include, but are not limited to, Swimmer's Itch, Implementation of Public Act 56 (road end legislation), promoting septic system upgrades, lowering phosphate run-off, encouraging DNR and Fisheries Department to factor the economic and recreational value added to Michigan's residents by lake level control dams or legal lake levels into their recommendations, lake and stream pollution including noise pollution, wetlands protection and being involved in various riparian legal cases.

Sincerely,

Bob Frye, MWA President

Mapping the Risk of Aquatic Invasive Species in Michigan

By: Alisha Davidson, PhD

Greetings! As a new staff member of the Michigan Lake and Stream Associations (ML&SA) working as the Research and Development Coordinator, I'll introduce myself and also present some recent research from my work at Wayne State University. Before joining ML&SA in November 2014, I was a Cooperative Institute for Limnology and Ecosystems Research post doctoral associate at Wayne State University. I worked in Dr. Donna Kashian's lab, where the focus is on disturbance, climate change and contaminants on aquatic communities. These "disturbances" include invasive species, which is where I fit in. I had previously completed my PhD at the University of Tasmania (Australia), evaluating the risk and impacts of aquatic invasive species (AIS) on economic, societal, and environmental values to better inform policy and management.

As a Michigan native, my plan was to return to the Great Lakes after completing my PhD in Australia, and apply what I had learned here. Several months after moving back to Michigan, I was lucky to soon find myself part of a team (along with Drs. Donna Kashian and Abigail Fusaro) that received a Great Lakes Restoration Initiative (GLRI) grant to map the risk of AIS in Michigan. Specifically, we aimed to identify species that could survive the cold Great Lakes winters and would also cause negative impacts like the zebra mussel and round goby have done. By trying to identify these species early, before they arrived here, we hoped to help management agencies prevent their arrival or, if prevention wasn't possible, detect them early (Figure 1). Detecting a species early and responding quickly to remove it (known as "early detection and rapid response") is often the only situation where AIS can be feasibly eradicated. As many of us have unfortunately experienced with species like Eurasian milfoil, once something is here and well established, it is nearly impossible to eliminate. Also, while early detection and rapid response does take time and money, it is much more cost-effective than having to control something year after year.

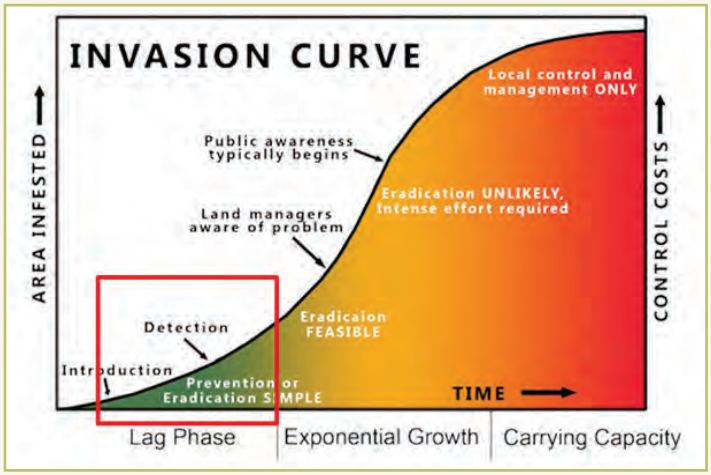

Figure 1. The typical "invasion curve" that shows the relationship between time, area infested and control costs. Early detection and rapid response aims to detect species early (red square), before area infested and control costs increase dramatically.

Figure 2. The species detected and eradicated in Wayne County, "parrot feather". This plant is commonly sold in aquarium and water garden stores but can escape into the wild through intentional release or flooding events.

Due to the importance of early detection and rapid response, we wanted to identify not only *which* AIS may arrive, but also identify the areas *where* they are most likely to arrive so that state agencies could better monitor those areas. While state agencies like the Michigan Department of Natural Resources (DNR) and Department of Environmental Quality (DEQ) don't have the resources to treat established species on all infested Michigan lakes, they are trying to catch new species early to prevent long-lasting impacts to lakes and additional control costs to lake groups. For example, the DNR detected a new invasive species known as "parrot feather" in a Wayne County pond in the fall of 2013 (Figure 2). At the time, the species was not known in Michigan, so they took swift action to remove it before it spread. After several rounds of treatment and ongoing monitoring, they have declared this population eradicated. However, aquatic plants like these are still being introduced in various ways, so their detection and removal requires ongoing surveillance.

Our project had several main components. First, we identified AIS from other parts of the world that could arrive, survive and thrive in Michigan. Second, we analyzed the means by which a species may be transported and introduced to Michigan (these means are known as "vectors") and mapped the strength of these vectors around Michigan. Finally, we paid extra attention to one of the most common vectors in Michigan: recreational boating. When boaters don't follow the "clean, drain and dry" approach, recreational boating can spread AIS, particular aquatic plants. These components are described in better detail, below.

After doing an extensive search of available research and talking to other experts, we identified 67 potential AIS. Most of these were fish (27), but the list also included plants (8), as well as mussels,

(Continued on page 15)

ASK THE EXPERTS

If you have a question about water related issues, riparian rights, and/or lakes and streams, etc., let us know by email or snail mail.

Email: info@mi-riparian.org
Mail: The Michigan Riparian
300 N. State St., Suite A,
Stanton, MI 48888

Question: Our neighbor is going to treat the lake along their shoreline with chemicals to kill the aquatic nuisance plants. Our property juts out into the water from their property line. Do they have a right to put the chemicals down along our shore line where our property juts out into the water in that corner of the lake??

Answer: They have a right to apply aquatic herbicides to the aquatic vegetation near their shoreline if they and/or the company they have hired to do the treatment are holding a valid permit from the Michigan Department of Environmental Quality Aquatic Nuisance Control Program office.

In addition, the State of Michigan requires that individuals working in the commercial herbicide applications business must have completed stringent training and certification. You might want to ask your neighbor to see their DEQ permit. In applying the aquatic herbicides, they must be very careful not to affect native aquatic vegetation. If they do not have a permit, please report them to the local DEQ field office. To learn more about the DEQ Aquatic Nuisance Control Program visit http://www.michigan.gov/deq/0,4561,7-135-3313_3681_3710-337060--,00.html.

Scott Brown, ML&SA Executive Director

* * * * * *

Our experts include our riparian attorney, a biologist, a limnologist, an engineer, a college professor and a state agency official. They look forward to responding to your question.

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Mapping the Risk of Aquatic Invasive Species in Michigan

(Continued from page 13)

crabs and crayfish. The plant species included several that ML&SA members may be familiar with: water hyacinth, Indian hygrophila, parrot feather, water lettuce, water soldier and European frogbit. These aquatic plants have impacts similar to Eurasian milfoil and starry stonewort: they can crowd out native plants and wildlife, as well as impede boating and swimming. For more information on these species, please visit the Midwest Invasive Species Information Network (misin.msu.edu).

Once we had information on each species, we then looked at the vectors by which they may arrive to Michigan. These vectors included: the discharge of ballast water from ocean-going ships, 'hitchhiking' (for example, on a boat or fishing equipment), unauthorized intentional release (for example, someone dumping a fish that had gotten too big for their aquarium, into a lake), escape from recreational culture (for example, heavy rain causes flooding from a backyard pond into the local stream), escape from an aquaculture facility and dispersal through natural waterways. We found data on the spatial intensity of all these vectors, and then mapped this data for Michigan.

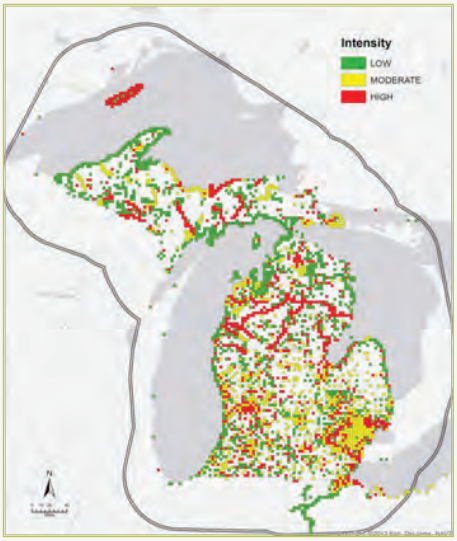

Figure 3. A map of the vector intensity related to the 67 potential AIS. For each 5 km grid cell, all vectors present were summed to show the relative pressure of AIS introduction. Areas in red represent high intensity, for example, areas with high boating or fishing activity.

Figure 3 shows the map that represents what we found. While the results are still preliminary, the map shows several areas (particularly rivers in the northern Lower Peninsula and Upper Peninsula) of high intensity where agencies may want to increase monitoring. Keep in mind the areas in red aren't necessarily where things will be introduced, but rather areas *where* things may be more *likely* to be introduced.

Finally, we wanted to take a more in-depth look at the recreational boating vector in Michigan. To do this, we surveyed over 1,000 boaters during the 2012 and 2013 boating season. We asked the boaters two types of questions: what they did (related to cleaning their boat, draining the water and letting it dry) and where they went (what water bodies they visited). We then mapped the boater trips and scored them according to the boater's cleaning behaviors. For example, a boater that did not remove aquatic weeds from the boat or trailer got a higher score than someone who did because not removing aquatic weeds is more likely to result in AIS spread. So, the higher the score, the more likely a boater was to introduce or spread AIS. We then summed the scores for each water body, to determine which water bodies were receiving boaters that didn't perform the necessary cleaning activities, and thus were more likely to get new AIS. Based on these scores, we identified about 60 high-scoring water bodies, and contacted associated lake groups to share our results. I presented these findings to any high-scoring lake group that was interested, and I also shared ways the lake residents and users can reduce the chance of getting new AIS.

Steps you can take to reduce AIS

There are several steps lake groups can take to reduce the risk of receiving new AIS, particularly aquatic plants. First, when trailering your boat between different lakes, always clean the boat and trailer, drain the water from all live wells or bilge tanks, and allow the boat to dry for at least five days (or if that is not possible, wash it with hot or high pressure water – a self-serve car wash works great). Second, the Cooperative Lakes Monitoring Program is a great program that helps lake groups monitor the health of their lake. In particular, they have an "Exotic Aquatic Plant Watch" program that helps monitor plant populations. By understanding what is normally there, and what is not, lake users can be the important "eyes and ears" that identify new invasive plants before they have a chance to spread. **Anyone interested in participating in this program can attend a training session at the ML&SA conference May 1 & 2 – see the ML&SA website for details.**

Another opportunity is to participate in the Clean Boats, Clean Waters Program. This program trains volunteers how to demonstrate boat and related equipment inspection and cleaning procedures for boaters using their lake. For information on this program, please contact Beth Clawson at clawsonb@msu.edu. Finally, one of the most simple and effective actions is to report any plant or animal that may be new to your lake. While the state agencies do the best they can, they cannot be everywhere at once. Don't worry about being wrong – it is better to be wrong than wait and have a whole new plant problem to deal with. To report something (and to check identification features that can help you check what it may be), go to **misin.msu.edu.**

It is with excitement that I look forward to applying my experience to my work with the ML&SA. I will be undertaking a variety of projects – including grant writing, conference and seminar organization and developing new educational material – in order to help MLS&A better protect and preserve Michigan's inland lakes and streams. If you have any questions for me, or have an idea for a project that might further ML&SA's aims, please get in touch at alishad@mlswa.org. Have a great spring!

MICHIGAN LAKE & STREAM ASSOCIATIONS, INC.
ML&SA NEWSLETTER

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Stanton, MI 48888
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E-mail info@mlswa.org, sbrown@mlswa.org
Web sites www.MyMLSA.org, www.micorps.net
William Scott Brown, Executive Director

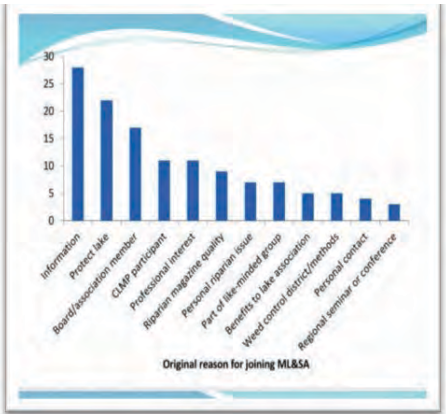
ML&SA Welcomes
Dr. Alisha Dahlstrom Davidson
as New Research and Development Coordinator

By Scott Brown | ML&SA Executive Director

Michigan Lake and Stream Associations is proud to announce that Dr. Alisha Dahlstrom Davidson of Grand Rapids has joined ML&SA as our first ever Research and Development Coordinator. Alisha will focus on developing and implementing new inland lake and stream conservation and stewardship initiatives. Alisha holds a Bachelor of Science from the University of California Santa Barbara and a Ph.D. from the University of Tasmania in Australia. She has significant experience with outreach, education and research programs related to aquatic invasive species (AIS) prevention and monitoring. In addition to her experience as an outreach coordinator for Sea Grant, working with the maritime industry to implement ballast water best management practices, she has done considerable outreach and education with Michigan lake groups as part of the Great Lakes Restoration Initiative (GLRI) project. Members of Michigan Lake and Stream Associations may contact Alisha at e-mail alishad@mlswa.org. Welcome Alisha!

ML&SA Conducts Membership Survey

By Scott Brown
ML&SA Executive Director



On behalf of Michigan Lake and Stream Associations and the Michigan Lakes and Streams Foundation (the Publisher of *The Michigan Riparian Magazine*), a hearty thank you to those of you who devoted the time and effort to participate in our recent on-line membership survey. Your observations, comments and suggestions will help inform and guide our collective efforts over the next year as we seek to improve our programs and work to enhance the overall value of your membership in our lake and stream stewardship and riparian rights focused organizations. We continue to welcome your ideas and comments regarding any facet of our organizations, our programs or our publications. Please direct your comments and suggestions regarding Michigan Lake and Stream Associations to *info@mlswa.org*; you may direct your comments and suggestions pertaining to *The Michigan Riparian Magazine* to info@mi-riparian.org. We also encourage you to visit our organizational websites found at www.mymlsa.org and www.mi-riparian.org .

To view a detailed summary of the results of our recent membership survey, point your browser toward http://www.mymlsa.org/wp-content/uploads/2015/03/SurveyResultsPPT.pdf

MDNR's Least Wanted
Aquatic Invasive Plants

Michigan Natural Features Inventory

Michigan Department of Natural Resources and Michigan Natural Features Inventory are collaborating on the implementation of an Early Detection Rapid Response Program, which seeks to locate and eradicate occurrences of the following species:

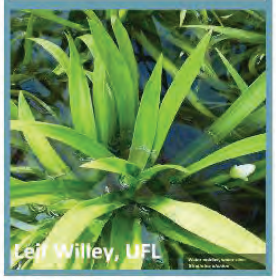
Be on the lookout for these invasive species!

Flowering Rush
Butomus umbellatus

Water Chestnut
Trapa natans

Parrot Feather Water-milfoil
Myriophyllum aquaticum

Water Soldier
Stratiotes aloides



Water Lettuce
Pistia stratiotes

Water Hyacinth
Eichhornia crassipes

European Frog-bit
Hydrocharis morsus-ranae

Brazilian water-weed
Egeria densa

<u>If you have seen any of these aquatic invaders, note their location and contact:</u>

Michigan DNR Wildlife Division Invasive Species Program
Phone: (517) 641- 4903 ext. 260
www.mi.gov/invasivespecies

Questions about other aquatic invasive plants? Contact the DEQ Aquatic Nuisance Control Program at 517-284-5593, www.mi.gov/anc

CELEBRATING 50

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See the summer 2015 issue of *The Michigan Riparian* for the special commemorative 50th Anniversary Edition.

A Healthy Lake Food Chain Base:
Macroinvertebrates & Zooplankton

Jennifer L. Jermalowicz-Jones, Ph.D. Candidate
and Nicholas J. Gressick, MS
Restorative Lake Sciences

Introduction

Freshwater macroinvertebrates (otherwise known as "aquatic bugs") may be found in almost every lake, as even the most impacted lake contains some representatives of this diverse and ecologically important group of organisms. Benthic (bottom-dwelling) macroinvertebrates are key components of lake food webs both in terms of total biomass and in the important ecological role that they play in the processing of energy (lake metabolism). Others are important predators, graze alga on rocks and logs, and are important food sources for fish. The removal of macroinvertebrates has been shown to negatively impact fish populations and total species richness of an entire lake or stream food web (Lenat and Barbour 1994). In the food webs of lakes, benthic macroinvertebrates have an intermediate position between primary producers (such as algae) and higher trophic levels (such as fish) on the other side. Hence, they play an essential role in key ecosystem processes (food chain dynamics, productivity, nutrient cycling and decomposition).

Figure 1 - Water Scorpion

Indicators of Water Quality

Several characteristics of benthic macroinvertebrates make them useful bio-indicators of lake water quality including that many are sensitive to changes in physical, chemical, and biological conditions of a lake, many complete their life cycle in a single year, their life cycles and ecological requirements are generally well known, they are stationary organisms and cannot readily escape pollution or other negative environmental conditions, and they are easily collected. Their ubiquitous nature and varied ecological roles in lakes make them very useful as indicators of water quality. As benthic macroinvertebrates respond sensitively not only to pollution, but also to a number of other human impacts (hydrological, climatological, morphological, navigational, recreational, and others), they could potentially be used for a holistic indication system for lake ecosystem health (Solimini et al., 2006). The midge larvae family Chironomidae can be found in both high and low quality water (Lenat and Barbour 1994). The mayfly, Hexagenia limbata, has been shown to be linked with good water quality. For example, ten different macroinvertebrate taxa were found in Maple Lake (Van Buren County, Michigan) sediments during a 2012-2013 study and ten different macroinvertebrate taxa were found in Crystal Lake (Montcalm County, Michigan) sediments during a 2014 study. Each of the taxa from both lakes may be grouped into good or fair water quality categories and thus are useful but not the only environmental indicators (Restorative Lake Sciences data).

Types and Roles of Aquatic Bugs

Some common lake macroinvertebrates include the Diptera (true flies), Coleoptera (beetles), Odonata (damselflies and dragonflies), Ephemeroptera (mayflies), Hemiptera (true bugs), Megaloptera (hellgrammites), Trichoptera (caddisflies), Plecoptera (stoneflies), Crustacea (freshwater shrimp, crayfish, isopods), Gastropoda (snails), Bivalvia (clams and mussels), Oligochaeta (earthworms), Hirudinea (leeches), Turbellaria (planarians). Predatory insects include the true bugs (order Hemiptera), and the Damsel and Dragonfly larvae (order Odonata). Water scorpions (Figure 1) generally exist in backwater areas of lakes and consume many other macroinvertebrate species by use of a needle-like mouthpart that ingests nutrients from prey. Water striders (Figure 2 on page 23) use the water tension to float on the surface of the water due to their long hydrophobic legs. As adults, dragonflies are known to kill and eat mosquitoes, which make them extra important for controlling biting insects near lakes. Fincke et al., (1997) showed that predation by Odonates

(Continued on page 22)

A Healthy Lake Food Chain Base:

Macroinvertebrates & Zooplankton

(Continued from page 21)

reduced mosquito infestations of even smaller water bodies including water-filled tree holes. The Damsel and Dragonflies both consume mosquito larvae (Shaalan and Canyon 2009).

Impacts from Invasive Species

Native lake macroinvertebrate communities can and have been impacted by exotic and invasive species. A study by Stewart and Haynes (1994) examined changes in the benthic macroinvertebrate community of southwestern Lake Ontario following the invasion of zebra and quagga mussels (Dreissena spp.). They found that invasive mussels had replaced a species of freshwater shrimp as the dominant species. Additionally, they noted that additional macroinvertebrates actually increased in the ten-year study, although some species were considered more pollution-tolerant than others. This increase was thought to have been due to an increase in invasive mussel colonies increasing additional habitat for other macroinvertebrates.

The closely-related Chinese mystery snail (Bellamya chinensis) is a large invasive gastropod that achieves high densities in waters across North America and the Great Lakes Region. Solomon et al., (2010) surveyed many lakes in Wisconsin to describe the patterns and determinants of Chinese mystery snail distributions to assess the likelihood of effects on native snail communities in the invaded systems. The Chinese mystery snail was widespread among surveyed lakes and its occurrence was correlated with indicators of lake productivity and anthropogenic dispersal vectors (boat landings, distance to population centers, shoreline housing density). Some native snail species tended not to occur at sites where the Chinese mystery snail was abundant; however, the study found that this exotic snail did not appear to have strong impacts on native snail assemblages.

Many aquatic macroinvertebrates can be directly affected by changes in aquatic plant density and quality (Carpenter and Lodge 1986). While the majority of these are native species, numerous invasive species have been impacting lakes in the Great Lakes Region. Eurasian Watermilfoil (Myriophyllum spicatum) has also been shown to negatively influence both fish and macroinvertebrate communities (Lilliea and Buddb 1992). Keast (1984) showed that the colonization of Eurasian Watermilfoil in an Ontario Lake decreased not only fish usage of the area, but also decreased usage of isopods, chironomids, trichopteran larvae, and ephemeropteran nymphs. Chilton (1990) studied three different aquatic plant species; Wild Celery (Vallisneria americana), Eurasian Watermilfoil (Myriophyllum spicatum), and Coontail (Ceratophyllum demersum) and their relationships to macroinvertebrate populations in Lake

Figure 2 - Water Strider

Onalaska, Wisconsin. He found that the distribution of several taxa was significantly affected by plant species present. Hyalella azteca (overall the most abundant species) and Enallagma spp. (the most abundant predator) were consistently most numerous in Coontail samples and least abundant in Wild Celery samples. Generally, macroinvertebrate community composition differed significantly among plant species throughout the summer and between native and exotic species. Exotic and invasive species can have an effect on aquatic macroinvertebrates as well as vertebrates.

Aquatic Bugs and Nutrient Loading

In addition to exotic and invasive macroinvertebrate species, macroinvertebrate assemblages can be affected by land-use. Stewart et al., (2000) showed that macroinvertebrates were negatively affected by surrounding land-use. They also noted these land-use practices are important to restoration and management of lakes. Schreiber et al., (2003) stated that disturbance and anthropogenic land use changes are usually considered to be key factors facilitating biological invasions. In addition, lake ecological health has been measured by many states by eutrophication status and total maximum daily load indices. While this is considered sufficient by many, the need to supplement with biotic indexes is paramount, including surveys of the aquatic macroinvertebrates (Beck and Hatch 2009). Lake health should include measurements regarding eutrophication and nutrient status, but also include biotic measurements involving macroinvertebrates and vertebrates to acquire a complete status of a lake's health.

Literature Cited:

Beck, M.W. and L.K. Hatcha. 2009. A review of research on the development of lake indices of biotic integrity. Environmental Reviews: 17(NA): 21-44.

Carpenter, S.R. and D.M. Lodge. 1986. Effects of submersed macrophytes on ecosystem processes. Aquatic Botany: Vol. 26, 1986, Pages 341–370

Chilton, E.W. 1990. Macroinvertebrate communities associated with three aquatic macrophytes (Ceratophyllum demersum, Myriophyllum spicatum, and Vallisneria americana) in Lake Onalaska, Wisconsin. Journal of Freshwater Ecology: Volume 5, Issue 4, pages 455-466.

Fincke, O.M., Yanoviak, S.P. and R.D. Hanschu. 1997. Predation by odonates depresses mosquito abundance in water-filled tree holes in Panama. Oecologia: Vol. 112, Issue 2.

Keast, A. 1984. The introduced aquatic macrophyte, Myriophyllum spicatum, as habitat for fish and their invertebrate prey. Canadian Journal of Zoology: 62(7): 1289-1303,

Lenat, D.R. and M.T. Barbour. 1994. Using benthic macroinvertebrate community structure for rapid, cost-effective, water quality monitoring: rapid bioassessment. Biological monitoring of aquatic systems. Lewis Publishers, Boca Raton, Florida: 187-215.

Lilliea, R.A. and J. Buddb. 1992. Habitat architecture of Myriophyllum spicatum L. as an index to habitat quality for fish and macroinvertebrates. Journal of Freshwater Ecology: Vol. 7, Issue 2.

Schreiber, E.S.G., Quinn, G.P. and P.S. Lake. 2003. Distribution of an alien aquatic snail in relation to flow variability, human activities and water quality. Freshwater Biology: Vol 48:6, pages 951-961.

Shaalan, E.A., and D.V. Canyon. 2009. Aquatic insect predators and mosquito control. Tropical Biomedicine, 26 (3). pp. 223-261.

Solimini, A.G., Free, G., Donohue, I., Irvine, K., Pusch, M., Rossaro, B., Sandin, L., and A.C. Cardoso. 2006. Using benthic macroinvertebrates to assess ecological status of lakes current knowledge and way forward to support WFD implementation. Institute for Environment and Sustainability.

Solomon, C.T., Olden, J.D., Johnson, P.T.J., Dillon, R.T. Jr., and M.J. Vander Zanden. 2010. Distribution and community-level effects of the Chinese mystery snail (Bellamya chinensis) in northern Wisconsin lakes. Biological Invasions: Vol. 12, Issue 6, pp 1591-1605

Stewart, T.W. and J.M. Haynes. 1994. Benthic macroinvertebrate communities of southwestern Lake Ontario following invasion of Dreissena. Journal of Great Lakes Research, Vol 20:2. 479-493.

Stewart, P.M., Butcher, J.T. and T.O. Swinford. 2000. Land use, habitat, and water quality effects on macroinvertebrate communities in three watersheds of a Lake Michigan associated marsh system. Aquatic Ecosystem Health & Management: Vol. 3:1.

Back to the Future:
A Perspective on History and Events That Shaped Michigan's Lakes and Streams

By: Tony Groves
Water Resources Group, Progressive AE

This article provides an overview of historical events that transformed Michigan's lakes and streams. It is not intended to be a comprehensive account of history, but rather focuses on past events and activities that directly impacted Michigan's lakes and streams. It is hoped this article will provide the reader a perspective of Michigan history and the rapid pace at which change can occur.

The Glaciers: In The Beginning

The Great Lakes and the inland lakes and streams of Michigan are a product of glacial activity that ended about 10,000 years ago. In all, Michigan experienced four distinct glacial advances and retreats. At times, the glacial ice mass was well over a mile thick and so massive that it depressed the earth's crust. Lands in Canada were depressed to a level that the Great Lakes drained north and were lowered several hundred feet below present day levels. Conversely, as the glaciers retreated and the land rebounded, water began to drain back to the lakes and the water levels rose dramatically. These major fluctuations in the levels of the Great Lakes occurred in a relatively brief period that ended only about 3,000 years ago.

The glaciers that covered Michigan plowed and sculpted the land creating the hills, valleys, soils, and water features that exist today. With the final retreat of the glaciers, Michigan was left with over 26,000 inland lakes and ponds greater than an acre, nearly 42,000 miles of rivers and streams, and over 4,000 miles of Great Lakes shoreline. Many inland lakes are "kettle lakes" that were created when large blocks of ice were shed from retreating glaciers. In some parts of Michigan, such as the area from Oakland to Jackson Counties, thousands of kettle lakes exist. Houghton Lake, the largest lake in the state, is a kettle lake. Along the west shore of Michigan, a number of lakes were formed as a result of the fluctuating water levels in the glacial Great Lakes. As water levels fluctuated up and down, sand bars formed along many of the coastal river mouths creating natural impoundments. Lakes formed in this manner include Crystal Lake, Hamlin Lake, Pentwater Lake, Silver Lake, Spring Lake, and Lake Macatawa. At the north end of the Lower Peninsula, Burt, Mullett and Black Lakes sit in depressions scoured by receding glaciers.

Michigan is traversed by numerous rivers and streams, with rivers in the Lower Peninsula tending to flow in an east or west direction, and the rivers in the Upper Peninsula flowing to the north or south. Many lakes in Michigan were artificially created via construction of dams on natural waterways. Some examples include the Dead River Storage Basin in Marquette County, Kent, Ford and Belleville Lakes on the Huron River and the Hardy and Croton Dam Ponds on the Muskegon River.

Lake Baikal in Russia (top) is estimated to be 25 to 30 million years old, and the Grand Canyon in Arizona (bottom) has been millions of years in the making. At a mere 10,000 years old, Michigan lakes and streams are in their infancy.

(Continued on page 26)

Back to the Future

(Continued from page 25)

Pre-Settlement Times: Calm Before the Storm

Prior to European settlement, Michigan was inhabited by native peoples, lakes and streams were used primarily for fishing and travel, and the canoe was the primary mode of transportation. Michigan's vast forests provided prime habitat and fertile hunting grounds for deer, elk, fox, mink, and beaver. French fur trappers established trading

posts throughout the region to exploit this valuable resource, and British occupation soon followed. To this point, man's impact on the region's lakes and streams was minimal. Lakes were pristine, the great forests remained intact, rivers and streams flowed unimpeded, and indigenous fish were abundant. The Great Lakes supported native whitefish, lake trout, muskellunge, and sturgeon. Arctic grayling thrived in many of the northern rivers and streams.

Arctic grayling

Lake Surgeon

Photo Credit:
Michigan DNR (above), Virgil Beck (below)

The Michigan Survey

Shortly before Michigan attained statehood in 1837, a survey of the region was commissioned by the Surveyor General of the United States. An east-west base line and a north-south meridian line were established from which all additional measurements were to be based.

The survey was an extraordinary undertaking. Surveyors traveled on foot and carried their supplies on long journeys through the wilderness. A noted Michigan historian described the work of the surveyor:

> The task of the surveyor was to run a line exactly straight in a given direction and to measure that line in units of one mile. He required two chainmen to measure the line and an axeman worked with a compass set on a tripod...Surveyors were required to mark all trees along the line and to carefully record the crossing of streams, ravines, and hills, the character of the soil, timber, and minerals, and a description of each township that they surveyed.
>
> *From: Michigan: A History of the Wolverine State (Dunbar 1975)*

With the survey complete, tracts of land throughout the state could be described and geographically referenced. A basis now existed for future land divisions, claims, and sales, and land offices were established throughout the state to record and document the process. As civilization continued to encroach and the population increased, Michigan's landscape began a major transformation.

Did you know…

1 acre = 43,560 square feet

40 acres = quarter-quarter section

160 acres = quarter section

640 acres = 1 section or 1 square mile

Typical township:
36 sections = 36 square miles
The standardized system of measurement used today that is based on a township having 36 square miles was mandated by the federal ***Land Ordinance of 1785****. Michigan has 83 counties and 1,242 townships.*

It has been estimated that over 50% of Michigan's original wetlands have been destroyed. In fact, the federal ***Swamp Land Act of 1850*** *allowed title of federal swamplands to be transferred to private parties that agreed to drain the land for agricultural and other "productive" purposes.*

In 1862, the ***Homestead Act*** *was signed by President Abraham Lincoln. Under this act, an individual could lay claim to 160 acres of surveyed government land and ultimately be granted title to the land provided they grew crops, constructed a small dwelling and lived on the land for 5 years. Title could also be acquired after 6 months if the claimant paid the government $1.25 per acre.*

Some of the more prominent lakes in Michigan are named after some the state's early surveyors and geologists: Douglass ***Houghton****, William* ***Burt****, Sylvester* ***Higgins****, and John* ***Mullett*** *to name a few.*

Copies of the original survey maps of Michigan are available on the Michigan Department of Natural Resources General Land Office web site.

The Lumber Boom: The Inexhaustible Resource

Lumbering had a profound impact on the land and waters of Michigan. At the onset of the lumbering era, Michigan's forests were thought to be inexhaustible. Much of the state was heavily forested, and the northern portion of the Lower Peninsula in particular contained vast stands of white pine, prized because it grew straight and tall.

Michigan's lumber trade quickly became big business. Log runners (also called timber cruisers) were sent into the forests to scout and lay claim to select tracts of lumber. Temporary lumber camps were constructed and, once an area was logged, new camps were rapidly built. Laws were passed to ensure loggers had equal rights to the rivers where log runs became commonplace. The ends of logs were required to be stamped with distinct log marks to identify ownership, and the log marks had to be recorded in the county in which the logs were to be manufactured into lumber.

In the early logging days, most work was done during the winter months and logs were hauled with horse-drawn sleds on ice-covered roads to the banks of rivers. Initially, due to the difficulties involved in hauling logs, tree cutting was limited to areas close to rivers. Logs were typically stored along river banks until spring and rolled into the river and floated downstream to sawmills. During spring river runs, rivers were completely strewn with logs. If flow was inadequate to transport logs, dams would be built to impound water and then breached to create sufficient flow to float logs downstream. White pine was heavily favored for harvest because, unlike hardwoods that would sink, pine was buoyant. During this era, a primary use of many Michigan lakes and streams was to convey timber.

Various innovations in the harvesting techniques were developed to meet the ever-increasing demand for Michigan lumber. One innovation was the "Big Wheel," a specially designed log hauler that could carry logs across open land or dirt roads. The Big Wheels allowed trees to be cut further from the rivers and extended the logging season year-round, since they did not require icy conditions to operate efficiently. Another innovation was narrow-gauge railways. Rail lines were quickly lain and small steam engines were used to haul logs even greater distances. Once an area was cleared of trees, new tracks were laid elsewhere. Now, clear-cutting was largely unimpeded, and hardwoods could be economically harvested. Hardwoods were used in shipbuilding, furniture manufacturing, and as fuel for copper and iron smelting in the Upper Peninsula. In some areas, it was now possible to transport logs directly to main-line railroads and to avoid the time, labor, and expense of the river run entirely.

Concurrent with innovations in harvesting operations came innovations at the sawmills. The use of mechanized circular saws and band saws increased efficiency at the mills. By the late 1800s, Michigan was the king of lumber output, with the Saginaw River and Muskegon River watersheds in particular producing hundreds of millions of board-feet annually. With the nation's burgeoning population, demand for Michigan lumber was limitless. It is conservatively estimated that during the lumbering heyday, between 1840 and 1900, 160 billion board-feet of lumber were harvested in Michigan. However, by the early 1900s, Michigan's forests were essentially depleted and lumber production declined rapidly. In just a few decades, the logging industry in Michigan went from boom to bust; the "inexhaustible" resource had been depleted.

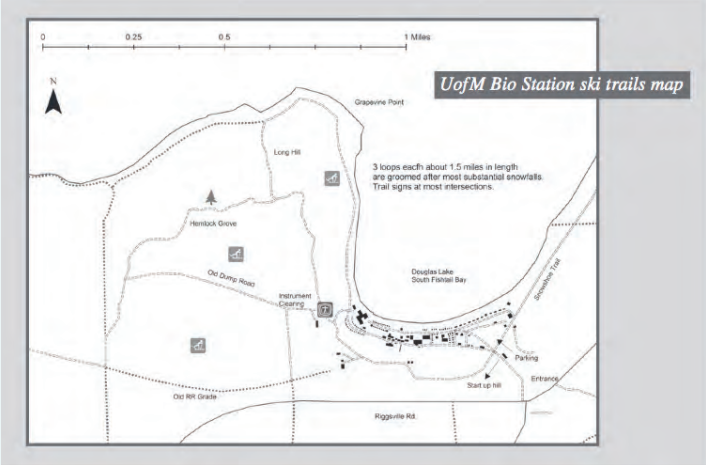
(Continued on page 32)

Lake Happenings

Send us your lake association newsletter or special announcements electronically. We love hearing from your lake. We will continue to use and spread the interesting and informative things happening on your lake in The Michigan Riparian. Please send your lake association newsletter to: swagner@mlswa.org.

Take Advantage of the "Bug Camp"

Burt Lake Preservation Association
Excerpt from A Look at The Lake newsletter,
February, 2015
by Alicia Farmer, University of Michigan Biological Station



If you have children or grandchildren in college, they should consider taking spring and/or summer classes at the Biological Station. Our classes are open to any college student (not just U-M) and our credits transfer easily to other institutions. Prospective students should visit our website (lsa.umich.edu/umbs/students/courses) to learn more.

We wanted to remind our neighbors to the south to take advantage of the University of Michigan Biological Station (UMBS) classes, events and property. You are welcome to use miles of trails, including the Gorge about a mile west of East Burt Lake Road.

Burt Lake Preservation Association is located at Indian River, Cheboygan County. Their website is www.blpa.org.

Love My Lake

Wouldn't you love to see your lake featured here? In word and picture, send us your story to info@mi-riparian.org. (Send pictures in jpeg or 300 dpi.)

Hamlin Lake, Mason County

Source: www.hamlinlake.com

Photo by ToddAndBradReed.com

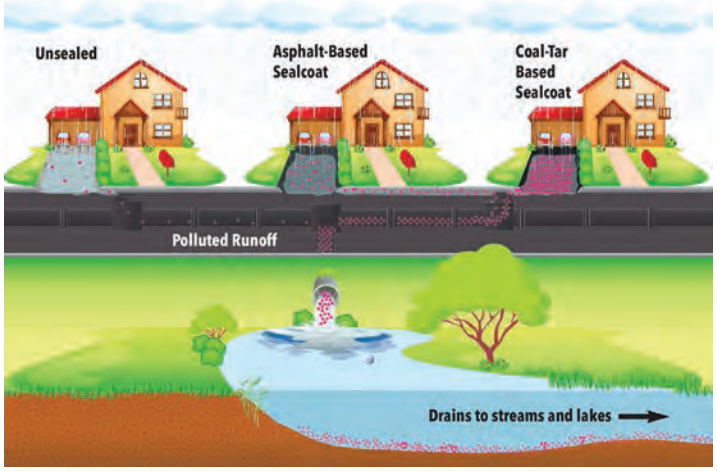
Hamlin Lake is located in Mason County, in northwest Michigan, just four miles north of Ludington, Michigan. If you're looking for a fun, inexpensive family vacation, then Hamlin Lake is where you want to be. It offers terrific summer recreation, including swimming, boating, tubing, and fishing. At more than 12 miles long and 5,000 acres large, there's more than enough space for everyone without feeling crowded. Hamlin Lake touches Manistee National Forest on the north, towering dunes in the west and miles of undeveloped wilderness all around. This man-made lake originated during the logging hey-day when lumbermen dammed the Big Sable River to make an enormous holding pond for trees felled upstream.

Hamlin Lake Dam, located just inside Ludington State Park, marks a unique historical spot and a great spot for catching salmon in the fall. The sandy shoreline of Hamlin Lake Beach is popular with swimmers and sunbathers. It features picnic lawns, concession stands, and restrooms. From here you can begin your walk on a hiking path, or rent a canoe and take a leisurely glide on marked paths that meander along the state park's shoreline.

Whether you traverse the bayous or head for deeper waters, Hamlin Lake offers a smorgasbord of fish. Tiger muskie, northern pike, large and small mouth bass, perch, crappie, bluegill and over 600,000 walleye, planted several years ago, promise a superb catch. The fishing doesn't cool down in winter either. Tip-ups and shanties dot the ice as fishermen pull in delicious panfish and walleye.

Coal-Tar Sealants Contaminating Our Waters with PAHs

By Jennifer McKay
Policy Specialist
Tip of the Mitt Watershed Council



What's the difference? The amount of PAHs in stormwater runoff from driveways sealed with coal-tar sealants can be 65 times higher than stormwater from unsealed parking lots. Illustration by Tip of the Mitt Watershed Council

Thinking of sealcoating your driveway or parking lot of your home or business? If so, please consider the impact coal-tar sealcoating may have on water quality and human health. Studies have identified coal-tar-based sealcoat – a product used to maintain and protect driveway and parking lot pavement – as a major source of polycyclic aromatic hydrocarbon (PAH) contamination in streams and lakes.

Polycyclic aromatic hydrocarbons, or PAHs, are chemicals that occur naturally in coal, crude oil, and gasoline, and are also present in products made from fossil fuels, such as coal-tar pitch, creosote, and asphalt. PAHs are of concern because of their harmful impacts on humans and the environment. They are persistent organic compounds, and several PAHs are known to be or are probable human carcinogens and toxic to aquatic life.

When fish are exposed to PAHs, they exhibit chronic problems, including fin erosion, liver abnormalities, cataracts, skin tumors, and immune system impairments. Benthic macroinvertebrates and other aquatic organisms that are exposed to PAHs are susceptible to a number of detrimental effects, including inhibited reproduction, delayed emergence, and mortality.

Alarmingly, PAH concentrations have been increasing in urban lakes in recent decades. Coal-tar based sealcoat is a primary reason for this increase. In fact, coal-tar-based pavement sealant is the largest source of PAHs found in 40 urban lakes studied by the U.S. Geological Survey.

Sealcoat comes in two basic varieties: coal-tar-based and asphalt-based. Coal-tar sealcoat contains coal-tar pitch, which is composed of at least 50 percent PAHs. Therefore, pavement sealants that contain coal-tar have extremely high levels of PAHs compared to other PAH sources. Coal-tar-based sealcoat typically contains from 50,000 to 100,000 milligrams per kilogram PAHs. This is about 1,000 times higher than PAH concentrations in asphalt-based sealcoat products.

Over time, sunlight and vehicle traffic wear down sealcoat. Small particles of sealcoat are transported from parking lots and driveways to streams and lakes by stormwater runoff. One study found that the amount of PAHs in stormwater runoff from parking lots sealed with coal-tar sealants was 65 times higher than stormwater from unsealed parking lots.

The PAHs in coal-tar stick to particles rather than remain dissolved in water and, therefore, will be found mostly in the sediments at the bottom of streams, ponds, and lakes. Although bacteria in waters or sunlight can break down some of these chemicals, others are quite persistent and will accumulate over time. Aquatic animals living in the sediments can take them up into their bodies and fish become exposed when they eat the PAH-contaminated prey.

Because of the environmental and human health concerns, states and cities across the nation have taken action to address PAHs from coat-tar sealant, many banning the sale and use of pavement sealants containing coal-tar. Several other states, including Michigan, Illinois, and New York, are also considering bans.

You can help prevent the further contamination of PAHs in our lakes and rivers by supporting a state ban in Michigan and making sure you are not using any coal-tar sealants. There are other pavement options, such as pervious concrete, permeable asphalt, and paver systems that do not require sealants. These types of pavements also allow stormwater to naturally infiltrate, resulting in decreased runoff.

If you do choose to use a sealcoat, choose alternatives to coal-tar-based sealants, such as asphalt-based sealants or latex sealants. You can determine whether a product contains coal-tar by reading the label. If you are hiring a contractor to perform the job, make sure you specify a product without coal-tar and ask to see the ingredient list of the product they are using. If you are doing the work yourself, look for the Chemical Abstracts Service (CAS) number 65996-93-2 on the product Material Safety Data Sheet (MSDS). The words "coal-tar," "refined coal-tar," "refined tar," "refined coal-tar pitch," or other similar terms may be listed on the container or MSDS.

Back to the Future

(Continued from page 27)

Detroit Publishing Co.

michigan.gov

US Forest Service

A board-foot is equal to a piece of wood 1 foot long, 1 foot wide and 1 inch thick. A rough estimate used in the logging era was "five logs to the thousand" or 200 board-feet of lumber to the log. Using this rough estimate, the 160 billion board-feet of lumber harvested during Michigan's lumbering heyday equates to some 800,000,000 logs.

Unfortunately, during the logging era, there was no regard for the environmental impacts of logging. Logs choked miles of river marring stream banks and, as land was clear-cut and lay barren, erosion became widespread. During this time period, Michigan was swept by a series of uncontrolled wild fires that scorched the land and caused even more erosion. Sediment fouled streams smothering fish-spawning areas often warming the waters making them unsuitable for certain fish species. In short order, arctic grayling were extirpated from the region and, despite repeated attempts, programs to reintroduce the fish failed. Logging permanently altered the stream habitat in which grayling thrived. Active erosion is still evident on many of Michigan's rivers today. For example, on the Muskegon River, stream banks at old log rollways continue to erode massive quantities of sand that accumulate in the lower stretches of the river. The removal of the forest canopy along river corridors not only increased water temperatures, but it removed a key source of woody structure that provided essential fish habitat.

Not only rivers, but many of Michigan's lakes bore the brunt of logging activity. Saw mills were commonly cited on lakes and mill wastes were typically discarded directly into the lakes. In a fishery report on Otsego Lake completed in 1950, a Department of Natural Resources fishery biologist noted that "large quantities of timber wastes were thrown into the lake near the mills. Submerged deadheads, slabs, and chips exist in considerable abundance yet to the day." Sediment cores from many lakes show a clear demarcation that coincides with the rampant erosion from the logging era.

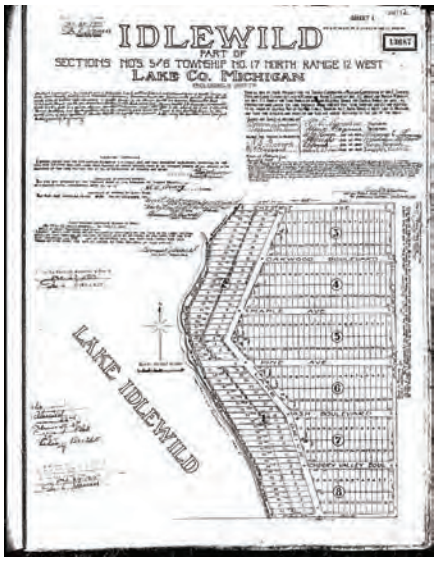
It is hard to picture the landscape in the post-lumbering era. The great forests were gone, lakes and streams were strewn with debris, and much of the state was a vast wasteland.

Natural Park Service

Michigan's Water Wonderland: The Allure of the Shoreline

As the logging era waned, additional sources of revenue were needed to help fill the economic void left by the demise of the logging industry. The network of railways across the state needed to adapt to the declining logging market. To attract customers, rail companies began to advertise Michigan's lakes and streams as vacation and leisure destinations. Railways were especially important in the development of resort communities in the northern portion of the state. Passenger lines were developed to bring outdoorsman to fish, hunt, and experience the beauty of the great north country. Fishing camps, lodges and resorts were established on lakes and streams to lure visitors.

In the post-depression years following World War II, as the auto industry grew and the economy improved, Michigan residents became much more mobile. Waterfront property was being quickly platted and marketed for sale. Lake plats typically contained lots that were quite small, but probably adequate for the times as most development consisted of modest seasonal cottages. Unfortunately, the early platting process set the stage for the congested shoreline development patterns that exist today.



Much of the early land development occurred in the absence of environmental regulations, and wetland areas were often drained, filled and developed. There was no understanding or consideration of the value of wetlands for the removal of pollutants, storage of flood waters, and fish and wildlife habitat. In an engineering evaluation of Houghton Lake prepared by the Michigan Department of Conservation in 1954, it was noted:

Observations during past years indicate that considerable development has taken place around Houghton Lake and that low marshy areas, previously considered undesirable, have been developed into lots and sold. Large marsh areas were developed and very shallow fills placed over these areas to prepare cottage sites for sale. As the years have gone by, the recreational public has observed Houghton Lake during the latter part of summer and purchased lots when lake levels were low. After construction of cottages on these lots, at elevations very little above the ground surface, trouble developed from high water levels flooding out the land immediately around the cottages themselves. (Source: Michigan Department of Conservation.)

As demand for waterfront property grew and waterfront real estate increased in value, artificial canals and channels were often constructed to create more lakefront property.

During this period, the shorelines of many lakes were altered dramatically from their natural configurations and, as development

intensified, additional stresses were placed on lakes. It was not uncommon to see shoreline areas cleared and stripped of vegetation. In the process, the pollution filtration and erosion protection functions of natural shorelines were lost. With development came increased runoff as roads, roof tops, and other impermeable surfaces prevented the infiltration of rain waters. Fertilizers, pesticides, and other pollutants could now drain unfiltered in lakes and National Park Service streams. With the absence of natural cover, seawalls were often constructed to control erosion. However, the seawalls themselves caused problems. Seawalls create unnatural barriers to the migration of frogs, turtles and other wildlife in and out of the water and prevented the natural dissipation of wave energy often creating additional scour and erosion problems.

In the 1960s, as public awareness and scientific knowledge regarding environmental impacts increased, the Michigan legislature began consideration of a number of environmental initiatives. In 1966 Michigan passed the Inland Lake Improvement Act and, by the late 1970s, several groundbreaking environmental laws were enacted. The dredging and filling of wetlands, canal and channel construction, earth-moving activities near lakes and streams, and development along designated sections of rivers all became regulated. Recognizing the role of phosphorus in stimulating aquatic plant growth, Michigan placed limits on the amount of phosphorus allowed in laundry detergents and, more recently, limited the phosphorus content in dishwater detergents and lawn fertilizers.

An Historical Perspective

Despite its relatively brief history, change in Michigan has occurred very quickly. Lakes and streams created just a few thousand years ago and settled just a few hundred years ago have undergone tremendous change.

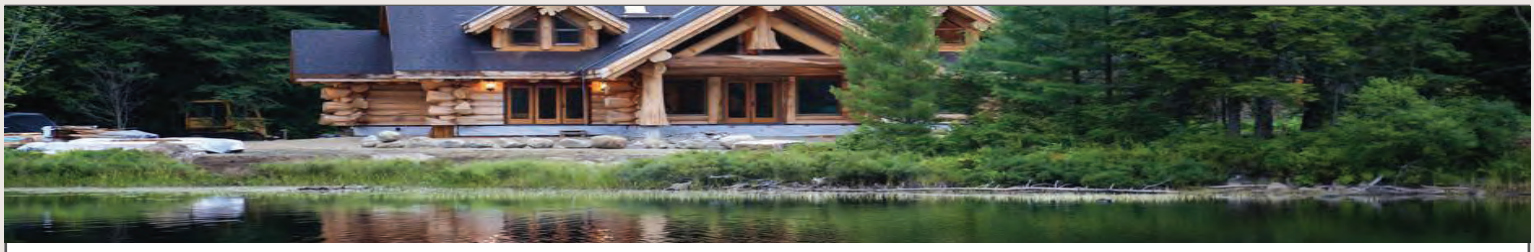
It is interesting to note that many of the adverse environmental impacts associated with the settling and development of Michigan were predicated on the mistaken belief that Michigan's natural resources were inexhaustible. The concept of the sustainable use of resources was completely foreign. An important lesson learned from the environmental devastation of the lumber era was the need for sound forest conservation practices.

On many lakes today, shoreline areas are completely developed and small cottages and boats have given way to big houses and big boats. In some lakes, natural shoreline areas have been replaced almost entirely with seawalls, and shoreline vegetation is nearly non-existent. A recent nationwide study conducted by the U.S. Environmental Protection Agency found that the loss of natural shoreline habitat is the greatest threat to Michigan's lakes. Nationwide, lakes with poor shoreline habitat were three times more likely to be in poor biological condition.

Throughout Michigan's history there are numerous examples of environmental upheavals due to lack of regulation. Great Lakes whitefish stocks collapsed due to overfishing, unregulated sewage and industrial discharges fouled rivers and streams, and millions of acres of wetlands were drained. While there is a natural inclination to disdain regulation, it has become an important and essential component of sound environmental management and economic vitality in Michigan. Michigan's water-based tourist and recreation industry is one of the state's key economic engines.

At the time of pre-settlement, the lakes and streams of Michigan were in a state of equilibrium. Since the passing of the logging era and the developmental pressures that followed, lakes and streams have likely reached a new equilibrium, an altered state. While it may not possible to completely turn back the hands of time and restore lakes and streams to their pre-development state, we can learn from history. Many opportunities and challenges lie ahead. Hopefully, a greater awareness of the past will provide a foundation for better decision-making in the future.

Despite its relatively brief history, change in Michigan has occurred very quickly



HOW CAN I USE MY LAKEFRONT COTTAGE OR HOUSE?

By: Clifford H. Bloom, Esq.
Bloom Sluggett Morgan, PC | Grand Rapids, Michigan | www.bsmlawpc.com

Have you ever wondered how you can legally use your lakefront or waterfront cottage? That is, can you legally have an apartment above the pole barn, install an elderly relative's apartment as an entirely separate part of the house, or allow your brother-in-law to dock his boat for the whole summer at your dock? The simple answer is, "it depends".

Most waterfront properties in Michigan are located in a township, city, village or county with zoning regulations in effect. Where a local zoning ordinance exists, most waterfront properties are zoned for single family residential use or the equivalent. The uses or activities that can lawfully occur in a single-family zoning district are typically spelled out in the zoning ordinance involved. If the municipality in which your lakefront property is located does not have any zoning regulations, as the owner of a lakefront property, you would generally be free to engage in many uses and activities not typically allowed in a single-family residential zone where zoning is present, including developing multi-family housing. Where there is no zoning in place, a property owner is typically constrained only by state environmental laws and building codes, although, on rare occasion, deed restrictions (or the equivalent) might also apply.

For most zoning ordinances in Michigan, a single-family zoning district generally only allows that which is implied by its name – single-family uses only. The following uses and activities are generally not allowed in a single-family zoning district:

- Multi-family housing.
- Duplexes.
- Commercial, business or industrial uses.
- Apartments for relatives, elderly adults, etc.
- Dockage for boats or watercraft not owned by the owner or occupant of the property involved.

Almost all zoning ordinances in Michigan prohibit the creation of apartments within waterfront dwellings that are rented or leased out to non-family members. However, an increasing number of zoning ordinances do allow limited apartments, independent living areas and similar facilities within a single family residence or cottage for members of the family who are handicapped, elderly or in need of substantial care. Where allowed by the local zoning ordinance, such uses are sometimes allowed "as a right", and in other situations, they require a special zoning approval.

Most zoning ordinances prohibit pole barns or other detached accessory buildings from having bunk house setups, apartments or similar facilities. However, some zoning ordinances do allow those uses under limited circumstances.

Where a waterfront property has dockage, most zoning ordinances do not allow a dock or waterfront property in a single-family zoning district to be used for multi-family uses. That is, typically, only boats and watercraft belonging to the owners of the waterfront lot or parcel involved can moor, anchor or keep a boat or watercraft overnight or seasonally at the dock or waterfront. Generally, that means that friends and relatives who do not reside in the cottage or dwelling on the waterfront property cannot keep a boat or watercraft overnight or seasonally at the waterfront property or the dock thereon. That would constitute a prohibited multi-family use or activity. Other municipalities would typically consider such use to be a prohibited marina.

Some multi-family uses and activities may be "grandparented" from zoning regulations under certain circumstances. That is, if the use or activity lawfully commenced before the applicable zoning regulations went into effect and has continued to exist ever since, such use or activity has a vested right to continue as being a lawful non-conforming use. However, should such uses or activities cease, they cannot be recommenced thereafter. Furthermore, lawful nonconforming uses cannot be expanded, substantially altered or increased in intensity, size or area.

Some municipalities also have non-zoning ordinances that regulate docks, boat hoists, the number of boats and similar waterfront activities and uses.

On occasion, a property or neighborhood may be subject to recorded private contracts often referred to as "deed restrictions" or "restricted covenants". However, such restrictions are relatively rare and probably apply to less than 5% of the waterfront properties in Michigan. Such property restrictions apply regardless of the local zoning regulations. Where such restrictions exist, the waterfront property owner must comply with both the applicable zoning regulations and the deed restrictions/restrictive covenants.

In Michigan, a waterfront property owner's common law riparian rights are typically broad. However, such rights are subject to restriction and reasonable regulation by municipal zoning and non-zoning ordinances and regulations, as well as deed restrictions/restrictive covenants.

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