

# Current Reflections

Summer 2019



## VOLUNTEERS: Stepping Up Since The Beginning

Paddling, boating, wading, collecting, restoring...and picking up dead birds - Watershed Council volunteers are up for it all! For 40 years, volunteers have helped collect data and carry out many projects that further our mission. The Watershed Council is fortunate to have dozens of volunteers out in the field assisting with data collection and protection efforts. This article shines a spotlight on four of our current volunteers.

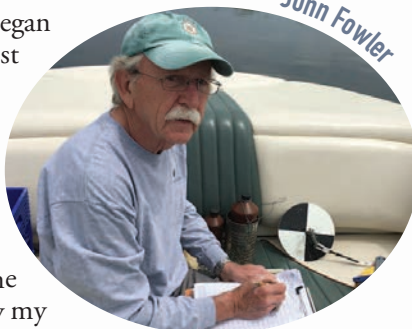
Kathy Germain



Volunteer Stream Monitoring began as Adopt-a-Stream in 1988, and it became what it is today in 2005. Kathy Germain joined the program in 2006 by taking a macroinvertebrate identification course offered by the Watershed Council. Since then, Kathy has shined as an expert identifier, and taken her classroom of students at North Central Michigan College in Petoskey to sample local streams annually. Now that she's newly

retired after over 40 years of teaching science, she'll continue to volunteer as an expert identifier. "I intend to keep doing it until I'm 100. I'm hooked on it. I love it. You never know what's going to be in each collection jar. It's like unwrapping a package." Kathy's attitude about volunteering is this: "Don't be afraid to jump in - literally, into your waders. Get in the river. The data you collect is important and you may find a new passion."

Volunteer Lake Monitoring began in 1986. One of the longest serving volunteers is John Fowler from Pickerel Lake. John takes his boat out on Pickerel Lake to collect weekly water samples. While his beginnings as a volunteer are something to laugh about, he says he "got conned into it by my brother-in-law and neighbors," his



John Fowler

commitment and contribution are no joke. Throughout John's many years of volunteering, he has observed Pickerel Lake doesn't change much from year to year, but he finds the changes that occur throughout the year to be very interesting. One change that John looks for is the growth of purple loosestrife, an invasive plant. Understanding the ecosystem around Pickerel Lake is important to John, who's had an interest in biology since college.

Volunteer Botulism Monitoring began in 2011.

Over the years, volunteers have logged enough miles to equal a trip from the Mackinac Bridge to Washington, D.C. - 800 miles of monitoring! One of the longest serving botulism monitors is Tec Cummings of Harbor Springs. Since 2011, Tec has walked the same 2.5 mile stretch of Lake Michigan for 3 months in the fall each year, totaling 225 miles. On his most intense day, he found and buried 35 dead birds! The youngest of his siblings, Tec was sent to the beach a lot as a kid when everyone left the house, so for him, walking the beach comes naturally. Styling himself as a Handy Man "with a capital 'h,'" Tec's interest in botulism monitoring is literally "for the birds," or his love of them anyway. "I love birds and I love the beach," he says. It certainly helps. Watershed Council volunteers are part of a much larger lake-wide effort to estimate bird mortality and predict changes in the Great Lakes.



Tec Cummings

The Watershed Action Volunteer Experience (WAVE) is our newest volunteer program, at only one year old. According to Nancy Cunningham, "If you have any love for the outdoors, this is a wonderful way to keep our Earth healthy." Nancy is the leader of the Friends of the Boyne River team and is a member of the Lake Charlevoix Association team. Both teams are creating educational signage. As a retired teacher, this aligns with Nancy's interests to "spread information." Nancy's father was a "pre-EPA environmentalist" who questioned General Motors' chromate contamination in the Flint River in the 1950s and her mother kept a victory garden during WWII. Now as a master gardener herself, Nancy volunteers with the same passion as her parents. Not only is she on two WAVE teams, she also coordinates invasive species control for Friends of the Boyne River and has been a volunteer stream monitor since 2008.



Nancy Cunningham

When asked what their favorite part of volunteering is, the most common answer was "the people you meet." We agree! Thank you volunteers for your time, talents, passion, humbleness, and generosity for 40 years.



426 Bay Street, Petoskey, MI 49770  
(231) 347-1181 • (231) 347-5928 fax

[www.watershedcouncil.org](http://www.watershedcouncil.org)

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## Reflections From Our Executive Director

July is here and the celebration of the Watershed Council's 40th anniversary is in full swing! The Watershed Council has worked to protect Northern Michigan's precious waters since 1979. As you will read in this newsletter, our critical work continues and is just as important to our region now as it was then. While public support of protecting our waters has increased over the past four decades, the challenges we face are extremely difficult and require our committed attention.



**Gail Gruenwald**  
Executive Director

A significant focus of this newsletter is the efforts of our volunteers. We have dozens of volunteers that devote hundreds of hours annually to expand upon the scope and geography of our work. We couldn't possibly monitor and collect all the data without our volunteers. They make the science happen across our service area under the direction of our qualified staff. We have relied on our volunteer network throughout our history. The long term trends that we track are essential to making wise decisions about our waters. Volunteers make this happen!

Of course, in addition to our essential volunteers, we have relied on our generous members for 40 years. As a membership organization, our members not only help support us financially but help to guide the organization. We are a grassroots organization and our members provide the soil that has allowed us to grow and thrive.

We look forward to 40 more years of effective, results-oriented programming. Thank you to all our volunteers and members for making this work possible! Please join us for our 40th celebration or any of our summer events.

## New Grants!

Tip of the Mitt Watershed Council is excited to announce our recent awards from the Michigan Department of Natural Resources (MDNR) Aquatic Habitat Grants Program! The Program provides support for projects that help to protect and restore aquatic habitats throughout Michigan.

- Natural Shoreline Principles and Practices in Action: Contractor Training and Public Demonstration on Lake Charlevoix

The Watershed Council will restore approximately 200 linear feet of degraded shoreline at East Jordan's Tourist Park on Lake Charlevoix in association with the Michigan Natural Shoreline Partnership's contractor training program. The project will serve as a hands-on demonstration of applying bioengineering practices on a high-energy lake system. The project will take place in 2020.

- Improving Aquatic Connectivity within the Crooked River Watershed

The Watershed Council will improve two road/stream crossings within the Crooked River Watershed with channel-spanning structures. The larger of the two crossings is at Banwell Road over Berry Creek, a tributary to Pickerel Lake. The existing culverts will be replaced with a channel-spanning timber bridge. The second site is at Snider Road and crosses over a tributary to the Crooked River. Additional funding for this project was received in 2018 through the U.S. Fish and Wildlife Service's National Fish Habitat Partnership program. Construction will take place in 2020.



# Department of Environmental Quality Restructured

Michigan's Governor Gretchen Whitmer signed an executive order that restructured the Department of Environmental Quality as the Department of Environment, Great Lakes, and Energy (EGLE) (pronounced "eagle"). Governor Whitmer's executive order also establishes three new offices within EGLE:

- Office of the Clean Water Public Advocate to accept and investigate complaints and concerns related to drinking water quality.
- Office of the Environmental Justice Public Advocate who will accept and investigate complaints and concerns related to environmental justice in Michigan.
- Interagency Environmental Justice Response Team consisting of directors of major departments within Michigan government, to assist in developing, implementing, and regularly updating a statewide environmental justice plan.

EGLE also assumes many activities of the Michigan Agency for Energy through the creation of the new Office of Climate and Energy. The Office of Climate and Energy was created to coordinate activities related to climate response and to make recommendations regarding the mitigation of climate impact, among other functions. The Office of the Great Lakes moved from the Department of Natural Resources into EGLE.

EGLE will also house the Michigan PFAS Action Response Team, MPART, which was created by former Governor Rick Snyder, to address PFAS contamination throughout the State. MPART will now fall within the Department rather than being run from the Governor's office.



MICHIGAN DEPARTMENT OF  
ENVIRONMENT, GREAT LAKES, AND ENERGY



**July 16, 2019**

**6:00 p.m. – 8:30 p.m.**

**Grand Unity Event Center**

**1106 Charlevoix, Ave  
Petoskey, MI 49770**

**RESERVE YOUR TICKETS TODAY!**

## 40TH ANNIVERSARY Annual Meeting and Gala Fundraiser

2019 marks the Watershed Council's 40th anniversary of protecting what you love here in Northern Michigan. We are excited to celebrate this milestone with our members who have made it possible. Join us for our 40th Anniversary Annual Meeting and Gala Fundraiser on July 16. The Gala will be at the Grand Unity Event Center in Petoskey from 6:00 p.m. - 8:30 p.m. Tickets are \$50 each and will include specialty drinks, heavy hors d'oeuvres, live music, a silent auction, commemorative wine glasses, a brief membership meeting, and more! Join us for the festivities, mingle with friends, and enjoy the view of Lake Michigan. No special dress code. **Call us at (231) 347-1181 to purchase tickets and reserve your spot.** You won't want to miss out on this exclusive gala celebrating the Watershed Council's 40 years of protecting what you love!



## COLLECTION EVENTS

Bring your unwanted and unused over-the-counter and prescription medications, including controlled substances, to one of the following collection events for proper disposal.

### PETOSKEY

**Thursday, October 17, 2019**

**7:00 a.m. – 4:00 p.m.**

**McLaren Northern Michigan,  
Petoskey Campus  
Hospital Circle Drive  
off Mitchell Street**

### CHEBOYGAN

**Thursday, October 24, 2019**

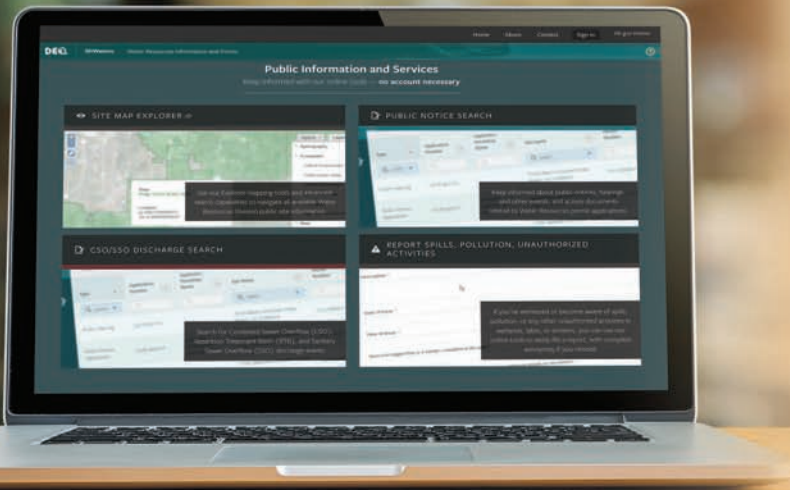
**9:00 a.m. – 1:00 p.m.**

**McLaren Northern Michigan,  
Cheboygan Campus  
Entrance North of the Emergency  
Department**

Both events will also be accepting sharps, cell phones, shoes, eyeglasses, and hearing aids for proper disposal/recycling.

# How Can MiWaters Benefit Your Search for Information?

Article submitted by: Brian Marshall, EGLE  
MarshallB6@Michigan.gov • (989) 370-0462



MiWaters provides several options for you to connect with the Department of Environment, Great Lakes, and Energy's (EGLE) Water Resources Division (WRD) to gather permit information, report a spill, or search for information on activity in your area.

MiWaters, pronounced "My Waters," is an online electronic database that provides helpful tools for the WRD to connect our regulatory system with the public electronically. MiWaters was also developed to allow Michigan to fulfill federal electronic reporting requirements, with a focus on permitting and compliance to establish a streamlined electronic permitting process. From the home page, the public user can access the WRD's permitting programs, including public notice and public hearing listings, search active or past permit records, access permit applications, and report complaints (e.g., placing fill in wetlands), spills, or pollution events (e.g., petroleum products in water). Here is what you need to get started:

## Searching Public Notices and Public Hearings

The public notice search allows the user to narrow search results with filters for county, applicant name, or program area (e.g., Resource, Aquatic Nuisance Control, National Pollution Discharge Elimination System (NPDES), etc.). Once a notice or listing is selected, one can then review the details of the notice, including downloading the application documents to review, view details, and submit comments.

## Search for Existing Records with Site Explorer

Another great resource in MiWaters is Site Explorer. Site Explorer is an interactive mapping tool for searching the State for sites of interest. By clicking on a site, public users can see information about the regulated entity's activities at that location, such as inspections reports, applications, permits, or enforcement actions. Site Explorer also has different layers that can be added to the map, such as wetlands, conservation easements, Great Lakes bottomland conveyances, and much more.

## Reporting Spills, Pollution, and Unauthorized Activities

Users can also report spills, leaks, or discharges to surface waters, such as unusual discolored water, oil sheens, and unusual amounts of dead fish. MiWaters can also be used for reporting general complaints regarding unauthorized activities in a wetland, lake, stream, sand dune, or Great Lakes coastal area, such as dredging, filling, and placement of a structure without permits. The uniqueness of reporting spills and complaints is that the public user can write exactly what was observed, put in the location of the complaint, and add photos. Once submitted, the information goes directly to the local staff representative to review and respond.

For more information on MiWaters, visit the MiWaters home page, or contact the appropriate EGLE office if you have questions that couldn't be answered by the online help menu. The MiWaters home page can be accessed by following this link: <https://miwaters.deq.state.mi.us/miwaters/external/home>.

*Save the Date*  
**September 5, 2019**



## Understanding the Pipeline Permitting Process in Michigan

Multiple federal and state agencies and commissions are involved in permitting and overseeing siting, construction, operation, and maintenance of pipeline infrastructure. This webinar hosted by Watershed Council staff will help describe the various pipeline permitting processes in Michigan and the role citizens can play.

Look for more information to come on [www.watershedcouncil.org](http://www.watershedcouncil.org).

## VOLUNTEER LAKE MONITORING- 2018 Review

### Background

Since 1986, Tip of the Mitt Watershed Council's Volunteer Lake Monitors (VLM) have ventured out on the inland lakes of the region to collect invaluable data that help to conserve and protect important resources of Northern Michigan. Objectives of this monitoring effort are to identify, characterize, and document baseline data and any changes to lake ecosystems. Most importantly, through identifying and documenting trends and changes, volunteers gain hands-on experience protecting Northern Michigan's lakes. Each spring, volunteers participate in a half-day training prior to collecting data for the season. During the summer months, volunteers venture out to their monitoring station once a week. Larger lakes, such as Charlevoix, Burt, and Mullett, have multiple monitoring volunteers and stations. The following section summarizes monitoring parameters and overall 2018 program results.

### Secchi Disc

The Secchi disc was invented in 1865 by Pietro Angelo Secchi, an Italian Jesuit priest active in oceanography, meteorology, physics, and astronomy. The disc is black and white with an alternating pattern, and is used to measure water clarity. The disc is lowered into the water and the depth at which the disc is no longer visible is recorded. Water clarity, principally determined by the concentration of algae and/or suspended sediment in the water column, is a simple and valuable measurement to assess water quality. Throughout the summer, different algae bloom at different times, causing clarity to vary greatly throughout the season. Secchi disc depths range from just a few feet in small inland lakes to over 60 feet in the Great Lakes! Of particular interest for lakes in our region is the continued presence of zebra and quagga mussels. These mussels are incredible filter feeders and can dramatically reduce algae in the water column. The use of a Secchi disc allows us to monitor the mussels' impact on water clarity and identify potential changes in lakes.

Water clarity data for some lakes in our service area extend back to the 1980s, providing a long-term view of water quality conditions and trends. Seasonal averages are used for trend assessments because water clarity can vary greatly, depending on magnitude of algal blooms, weather events, and other factors. Data from Lake Charlevoix demonstrate the changes that have occurred over time in a number of the region's lakes. Secchi disc depths in Lake Charlevoix have increased from approximately 10 feet in 1987 to over 18 feet in 2018 (Figure 1). This trend of increasing water transparency is also fairly well pronounced in Black, Burt, Douglas, Elk, Michigan, Mullett, Pickerel, Skegemog, and Walloon Lakes. What do all these lakes have in common that might be causing such changes? Invasive zebra mussels.

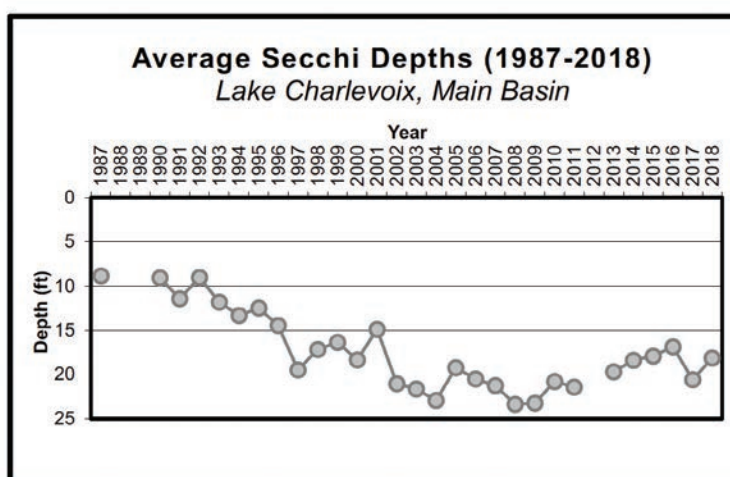


Figure 1. Average Secchi depths for the main basin on Lake Charlevoix collected by volunteers.



Zebra mussels are now found in all of the region's largest lakes, as well as many smaller lakes. In addition, invasive quagga mussels, a close relative of zebra mussels, are found in the Great Lakes and a few inland lakes including Crooked and Mullett. Via filter feeding, zebra and quagga mussels remove enormous quantities of phytoplankton (free floating algae) from the water column, greatly increasing water clarity. Contrary to popular belief, the invasive mussels are not cleaning the water, but filtering out the base of the food chain. This loss of primary productivity alters the entire food web. As a result, zooplankton, which primarily eat algae, lose their food source, thereby reducing their population. This affects small fish and invertebrates that eat the zooplankton, which can ultimately lead to reduction in top predator fish populations like trout and walleye.

## Chlorophyll-*a*

Chlorophyll-*a* is a pigment found in all green plants, including algae. Water samples collected by volunteers are analyzed for chlorophyll-*a* to estimate the density of phytoplankton in the water column. Higher chlorophyll-*a* concentrations indicate greater phytoplankton densities, which reduce water clarity.

Since algae and small phytoplankton in the water column are consumed by filter-feeding invasive mussels, lakes harboring large numbers of these mussels could show a loss of primary productivity evidenced in the chlorophyll-*a* data. Reduced chlorophyll-*a* has indeed been observed across many of our lakes throughout the summer season. An example of this chlorophyll-*a* trend has been documented by volunteers on Walloon Lake (Figure 2). Other lakes that clearly show a similar trend include: Black, Burt, Charlevoix, Michigan, Mullett, and Paradise.

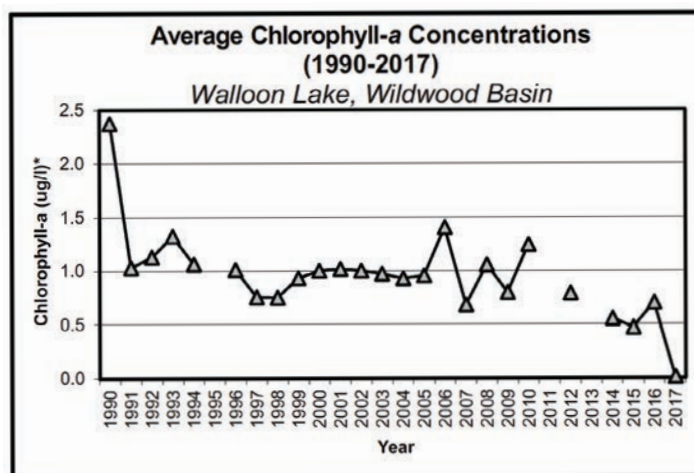


Figure 2. Chlorophyll-*a* data for Wildwood Basin on Walloon Lake collected by volunteers.

In some lakes where invasive mussels have been present for many years, data present what may be described as a chlorophyll-*a* rebound. For example, volunteer monitoring data from Black Lake show that after years of decline, chlorophyll-*a* reached a low in 2008, after which concentrations have progressed in the upward direction. Although it is not definitively known if the cause of such a rebound is that mussel populations have reached a tipping point and declined, the upward trend is promising for the lake ecosystem. Environmental conditions such as temperature

and nutrient inputs can also play a significant role in chlorophyll-*a* levels. Continued monitoring efforts by volunteers and Watershed Council staff will hopefully reveal if invasive mussels could indeed be reaching an equilibrium in certain lakes in our region.

## Trophic Status Index

Trophic Status Index (TSI) is a tool developed to rank the biological productivity of a lake. A TSI value can be used to describe plant and animal productivity. Nutrient availability, water volume, and water residence time of a lake are just a few of the factors determining some of this productivity. TSI values range from 0 to 100. Lower values (0-38) indicate an oligotrophic or low productivity system, medium values (39-49) indicate a mesotrophic or moderately productive system, and higher values (50+) indicate a eutrophic or highly productive system. Lakes with greater water clarity and lower phytoplankton densities score on the low end of the scale, while lakes with greater turbidity and more phytoplankton score on the high end.

Oligotrophic lakes are characteristically deep, clear, nutrient-poor, and have abundant dissolved oxygen. Burt Lake and Lake Charlevoix are examples of oligotrophic lakes in Northern Michigan. Burt Lake has seen a decrease in TSI value over time, transitioning from a mesotrophic status to more oligotrophic (Figure 3). Eutrophic lakes are generally shallow and nutrient-rich.

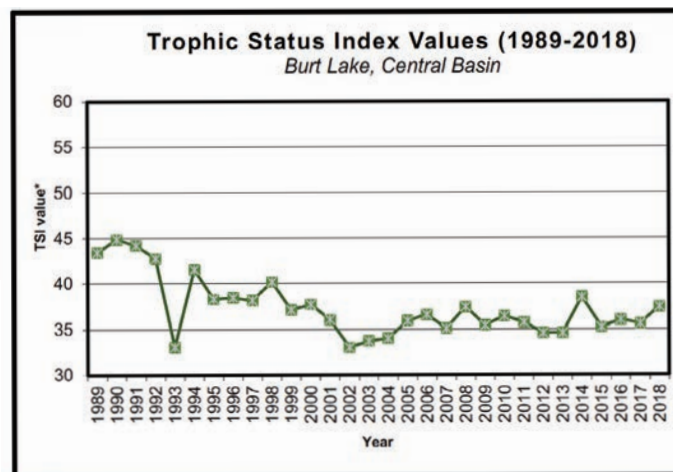


Figure 3. Trophic status index for central basin of Burt Lake calculated from data collected by volunteers.

Some lakes are naturally eutrophic depending upon variables such as age, elevation, depth, and soils. Nutrient and sediment pollution by humans can lead to the premature eutrophication of a lake, referred to as cultural eutrophication. Cultural eutrophication can lead to nuisance plant growth, problematic algal blooms, water quality degradation, and fish and invertebrate mortality.

The shallow and nutrient-rich Huffman Lake currently sits on the end of the eutrophic category (Figure 4). Data show that Huffman Lake ranked in the mesotrophic category throughout much of the 1990s. Even though there is a gap in our data of nearly ten years, the lake's TSI Score has been trending upwards over the years. This may be due to the watershed-to-lake ratio and the water volume of the Lake. Huffman Lake has a watershed-



to-lake ratio of 46:1. This means that roughly 46 acres of watershed surface area is drained for every 1 acre of Huffman Lake's surface area. This value does not consider water volume, but Huffman is one of the shallower lakes in the region.

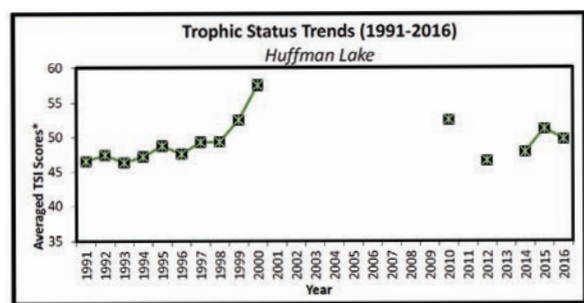


Figure 4. Trophic status index for Huffman Lake calculated from data collected by volunteers.

## 2018 Results and Discussion

Most of the lakes monitored in 2018 showed values in the mesotrophic category. In 2018, a total of 26 sites were monitored on 21 lakes by over 60 volunteers. Table 1 shows the compiled results for TSI scores and averaged Secchi disc depths for comparison with other lakes monitored in 2018.

The hundreds of hours spent each summer by our Volunteer Lake Monitors continues to provide long-term data that is used not only by the Watershed Council, but by lake associations, government agencies, and private entities to evaluate lake conditions and changes over time. The Watershed Council regularly supplies the Michigan Department of Natural Resources (MDNR), Michigan Department of Environment, Great Lakes, and Energy (EGLE), and various academic institutions with data collected by our volunteers. As resources to investigate water quality become increasingly scarce (usually in the form of state and federal budget cuts), volunteer monitoring programs continue to ensure that environmental changes in and around our lakes do not go undocumented. If you would like more information on any lakes listed (or not listed), or would like to become a Volunteer Lake Monitor, please contact our office at (231) 347-1181.

Table 1. 2018 data for all lakes in the Volunteer Lake Monitoring Program.

| Lake                   | Secchi Depth (ft) | TSI   | Chlorophyll <i>a</i> Content (mg/l) |
|------------------------|-------------------|-------|-------------------------------------|
| Benway                 | 10.63             | 43.16 | 0.11                                |
| Black                  | 12.30             | 41.08 | 0.27                                |
| Burt, Main             | 16.01             | 37.44 | 0.13                                |
| Burt, South            | 15.18             | 39.13 | 0.77                                |
| Charlevoix, Main-North | 18.09             | 35.87 | 0.96                                |
| Charlevoix, South arm  | 16.42             | 36.98 | 0.19                                |
| Charlevoix, East       | 17.69             | 36.23 | 1.22                                |
| Crooked                | 9.58              | 44.59 | 0.43                                |
| Douglas, Cheboygan     | 11.41             | 42.08 | 0.59                                |
| Douglas, Otsego        | 16.53             | 36.71 | 0.13                                |
| Elk Lake               | 16.00             | 37.98 | 0.15                                |
| French Farm            | --                | --    | 0.25                                |
| Intermediate           | --                | --    | 0.78                                |
| Larks                  | 8.92              | 45.63 | 0.69                                |
| Long                   | 19.83             | 34.57 | 0.36                                |
| Marion                 | 14.00             | 39.20 | 0.33                                |
| Mullett, Main          | 14.73             | 38.59 | 0.18                                |
| Mullett, Pigeon Bay    | 15.36             | 37.90 | 0.34                                |
| Nowland                | 10.30             | 43.59 | 3.40                                |
| Pickereel              | 9.50              | 44.86 | 0.62                                |
| Round                  | 8.75              | 46.21 | 1.03                                |
| Six Mile               | 7.30              | 48.75 | 1.13                                |
| Skegemog               | 12.56             | 41.07 | 0.46                                |
| Thayer                 | --                | --    | 1.77                                |
| Thumb (Louise)         | 18.67             | 35.06 | 0.15                                |
| Twin Lakes             | 15.57             | 37.64 | 0.64                                |
| Walloon, North Arm     | 8.06              | 48.08 | 0.48                                |
| Walloon, Wildwood      | 13.78             | 40.13 | 0.24                                |
| Walloon, Foot          | 13.41             | 40.62 | 0.36                                |





## 2018 VOLUNTEER STREAM MONITORING

Streams are the freshwater circulation system of Northern Michigan. Their primary function is to drain the landscape and carry rainwater, snowmelt, and groundwater into and out of the region's lakes. Our moving waters provide recreational opportunities to anglers, paddlers, and others, as well as habitat to a wide variety of wildlife. Fortunately, many Northern Michigan residents recognize the value of these streams. During spring and fall of each year, volunteer stream monitors perform biological monitoring by collecting aquatic insects and other macroinvertebrates to assess stream ecosystem health. Macroinvertebrates are the quintessential "canary in the coal mine," as they serve as key water quality indicators. Several macroinvertebrate orders, such as mayflies, stoneflies, and caddisflies, are highly sensitive to environmental change or pollution. A healthy variety of these pollution-sensitive macroinvertebrates portrays a healthy ecosystem with high water quality, while a stream with only pollution-tolerant aquatic worms and midges reveals an ecosystem that is likely suffering. Since 2005, our volunteer stream monitors have collected these biological data, which serve to document annual stream conditions and changes over time. Most noticeable trends point to changes occurring within the stream's watershed. In 2018, over 100 Volunteer Stream Monitors helped monitor 31 sites on 17 different rivers and creeks!

Although most Northern Michigan streams have excellent water quality, there are a few sites where diversity is low due to urban runoff and other nonpoint source pollutants.

In 2018, over  
100 Volunteer  
Stream Monitors  
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and creeks!

Biological data are assessed using three different measurements of diversity:

- 1) Total Taxa = total number of macroinvertebrate families found at a site
- 2) EPT taxa = number of families in the three pollution-sensitive insect orders (Ephemeroptera-mayflies, Plecoptera-stoneflies, and Trichoptera-caddisflies)
- 3) Sensitive Taxa = number of the most sensitive macroinvertebrate families

Although not every site is monitored each year, taxa scores for each site are averaged using data from all monitoring events as shown in Table 1.

Many rivers and streams in Northern Michigan rank among the best in the State for water quality. Notable rivers such as the Jordan, Pigeon, Maple, Cedar, and Sturgeon all host diverse and sensitive macroinvertebrate populations. Should these rivers begin to undergo impacts from large-scale degradation, our "canaries in the coal mine"- stoneflies, caddisflies, and mayflies - will begin to disappear. Tracking macroinvertebrate communities on a biannual basis allows us to keep our finger on the pulse of the rivers and streams included in the Volunteer Stream Monitoring Program.

Alternatively, many of our urbanized streams have low diversity and host only pollution-tolerant organisms. These streams could support sensitive organisms, but development-related impacts suppress the population and degrade water quality. Stormwater outfalls discharge large quantities of warm, pollutant-laden water during rain storms. Eroding banks yield sediment that smothers the vital interstitial spaces of cobble and gravel. Banks devoid of vegetation reduce habitat diversity and allow the water to warm on hot days. Fortunately, there are methods to mitigate these impacts. For example, rain gardens and other stormwater treatment methods keep untreated stormwater out of streams, and restoration projects can restore habitat. Many other solutions exist and by monitoring the stream, we can track improvements in water quality. Many of these projects are already underway, as the Watershed Council and other conservation organizations work to protect and improve our waters.



Table 1. Average Taxa Values for Volunteer Stream Monitoring Program Sites in 2018

| Stream Name     | Site Location           | Total Taxa Average | EPT Taxa Average | Sensitive Taxa Average | First Year Monitored | Number of Years Monitored |
|-----------------|-------------------------|--------------------|------------------|------------------------|----------------------|---------------------------|
| Black River     | Barber Bridge           | 34                 | 10               | 7                      | 2018                 | 1                         |
| Black River     | Tin Shanty Road         | 25                 | 12               | 8                      | 2018                 | 1                         |
| Boyne River     | Dam Rd                  | 16                 | 9                | 5                      | 2007                 | 12                        |
| Boyne River     | Dobleski Rd             | 16                 | 9                | 5                      | 2005                 | 14                        |
| Boyne River     | Mouth, Boyne City       | 14                 | 8                | 4                      | 2005                 | 14                        |
| Boyne River     | North Branch Preserve   | 17                 | 9                | 5                      | 2007                 | 11                        |
| Cedar River     | Cedar River Rd          | 17                 | 7                | 5                      | 2017                 | 2                         |
| Cedar River     | Schuss Mountain Rd      | 23                 | 11               | 6                      | 2017                 | 2                         |
| Eastport Creek  | Farrell Rd              | 21                 | 9                | 4                      | 2005                 | 12                        |
| Eastport Creek  | M88, Eastport           | 17                 | 5                | 2                      | 2005                 | 12                        |
| Horton Creek    | Boyne City Rd           | 19                 | 10               | 6                      | 2005                 | 14                        |
| Horton Creek    | Church Rd               | 15                 | 5                | 1                      | 2005                 | 14                        |
| Jordan River    | Penny Bridge            | 21                 | 12               | 8                      | 2011                 | 5                         |
| Jordan River    | Webster Bridge Rd       | 20                 | 11               | 7                      | 2007                 | 9                         |
| Lancaster Creek | Ingleside Road          | 15                 | 3                | 7                      | 2018                 | 1                         |
| Maple River     | Robinson Rd             | 22                 | 10               | 5                      | 2011                 | 6                         |
| Maple River     | US-31 Highway           | 20                 | 14               | 8                      | 2018                 | 1                         |
| Milligan Creek  | M68                     | 20                 | 10               | 7                      | 2008                 | 10                        |
| Milligan Creek  | Waveland Rd             | 19                 | 10               | 7                      | 2008                 | 11                        |
| Minnehaha Creek | Maxwell Rd              | 16                 | 9                | 5                      | 2017                 | 2                         |
| Minnehaha Creek | Pickerel Lake Rd        | 15                 | 9                | 4                      | 2017                 | 2                         |
| Mullett Creek   | Straits Highway         | 22                 | 8                | 4                      | 2017                 | 2                         |
| Pigeon River    | Sturgeon Valley Rd.     | 22                 | 10               | 6                      | 2011                 | 8                         |
| Pigeon River    | Webb Rd                 | 21                 | 11               | 7                      | 2011                 | 8                         |
| Russian Creek   | NCMC at mouth           | 15                 | 4                | 2                      | 2008                 | 10                        |
| Schoofs Creek   | Williams Rd             | 15                 | 7                | 3                      | 2017                 | 2                         |
| Stover Creek    | Brookside Cemetery      | 17                 | 6                | 3                      | 2005                 | 14                        |
| Stover Creek    | Mouth, Irish Boat       | 12                 | 3                | 0                      | 2005                 | 14                        |
| Sturgeon River  | West Branch-Old 27 Park | 26                 | 13               | 9                      | 2009                 | 9                         |
| Sturgeon River  | Wolverine, Webb Rd      | 21                 | 11               | 8                      | 2011                 | 8                         |
| Tannery Creek   | Mouth, Bike Path        | 11                 | 5                | 1                      | 2007                 | 12                        |

# Stream Reports for 2018

A water quality grade is assigned to each monitoring site using a weighted numeric scoring system based on total taxa, EPT taxa, and sensitive taxa indices. A poor grade does not necessarily indicate poor water quality, but rather the presence of a pollution-tolerant macroinvertebrate community. In some streams, such as Schoof's or Horton Creek, the slow flowing nature of the stream does not provide the habitat necessary to support sensitive species. The important aspect is comparing biological data over many years. From year to year, macroinvertebrate grades can vary and sometimes can't be explained by water quality or habitat changes. The timing of seasons or hatches could be the culprit. A lowered grade one year is less concerning if the overall average is still high and the stream returns to its typical grade. The following site specific letter grades are for only the 2018 monitoring season. The average grade for all monitoring years is located within the site description and associated map below (Figure 1).

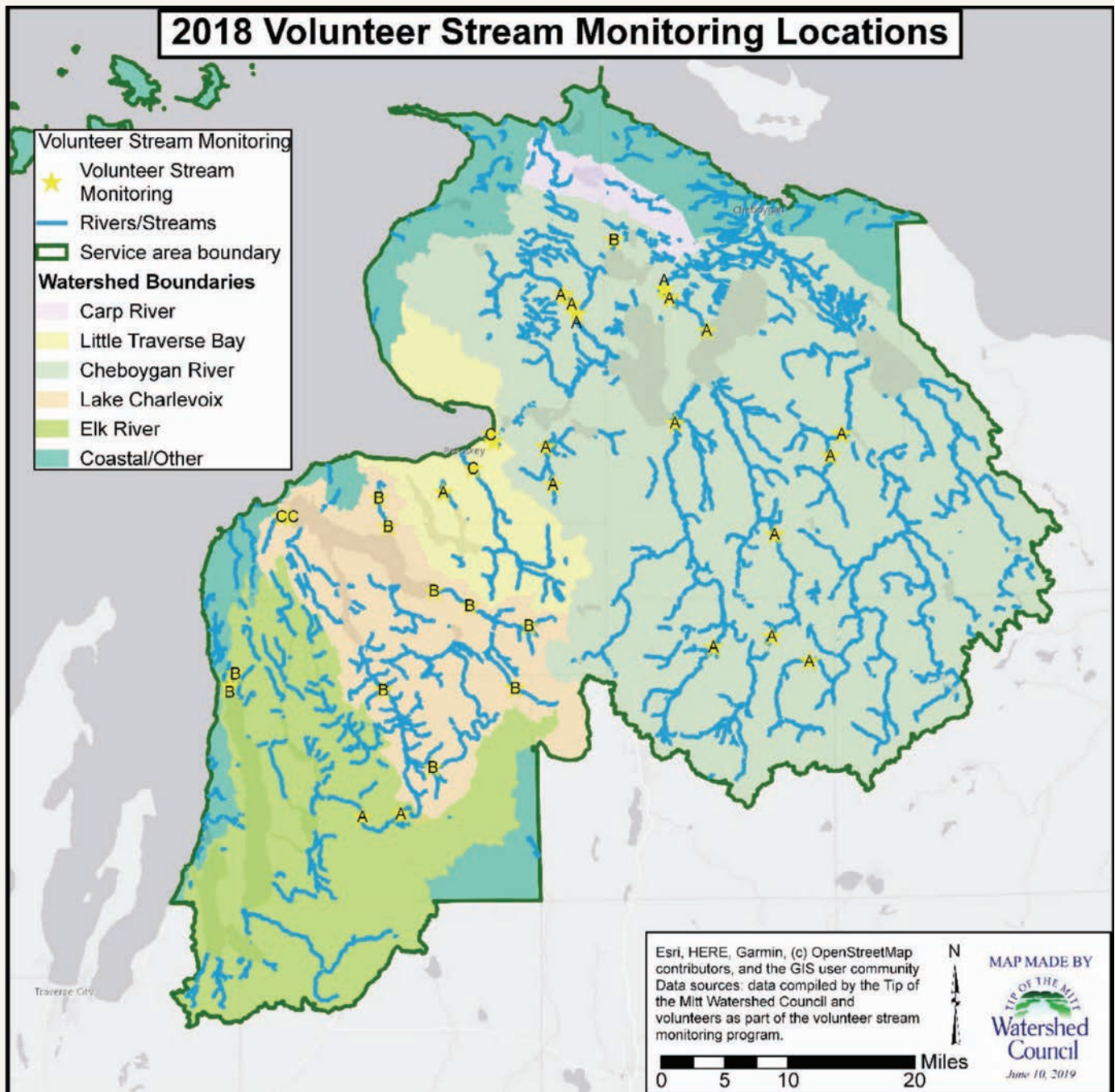
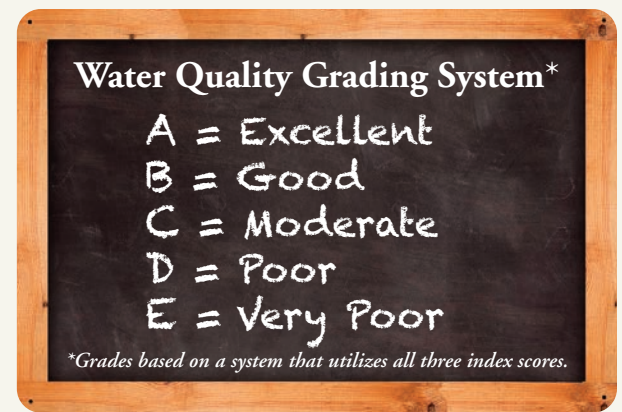


Figure 1: Volunteer Monitoring Sites for 2018 with stream water quality grades.





### Black River

The Black River was added to the monitoring program in 2018 as part of a water quality monitoring program implemented on Black Lake tributaries. The Upper Black River is considered one of Michigan's finest brook trout fisheries, and is protected and enhanced by the Upper Black River Council. It was monitored at two headwater sites in 2018 near the Pigeon River State Forest. One of its dams forms Black Lake. The site at Tin Shanty Road in the Pigeon River State Forest had the highest number of taxa of any site in 2018!



### Boyne River

Flowing from Thumb Lake to Elmira, west into Lake Charlevoix, the Boyne River has been monitored since 2005. This year, the Boyne River received a 'B' rating. In 2018, four sites along the Boyne were monitored. The lowest score was at Old City Park in downtown Boyne City, which received a 'C' rating, however the overall grade for all monitoring years is still an 'A.' Friends of the Boyne River has been devoted to monitoring this prestigious Blue Ribbon trout stream for many years.



### Cedar River

The Cedar River is a tributary to the Intermediate River in Bellaire, one of the many waterbodies on the Elk River Chain of Lakes in Antrim County. It is a blue ribbon trout stream, holding mainly brown and brook trout. The majority of the River is forested, and downstream it has been dammed into Blaire Lake before reaching the Village of Bellaire.



### Eastport Creek

Eastport Creek is a tributary to Torch Lake, flowing in at the north end of the Lake, near US-31 and M-88. Since 2005, the Stream's upper reaches at Farrell Road and further downstream at M-88 have been monitored, and collectively have shown a 'B' grade. The Farrell Road location continues to show relatively high diversity, while the M-88 site has shown lower diversity. Sediment and stormwater runoff from residential development could be a cause for the decreased diversity in the lower reaches of the Watershed.



### Horton Creek

Horton Creek is back to its typical 'B' rating, which it has received every year since 2005, except last year when it received an 'A' because of more total taxa, EPT taxa, and sensitive taxa. The upstream site near Church Road is characterized as slow-moving with wetland margins. This habitat likely contributes to the reduced diversity at this site. Meanwhile, the Boyne City Road site continues to maintain high diversity. Stream flow is much faster at this site than at Church Road and also contains a greater diversity of substrate material.



### Jordan River

The Jordan River is an incredibly diverse system and continues to show a high water quality rating, however this is the first year it has received a 'B' rating because of a decrease in total taxa, EPT taxa, and sensitive taxa. The Friends of the Jordan River are working hard to keep monitoring efforts moving forward to identify any potential threats to this unique system. Sites monitored in 2018 included Pinney Bridge and Webster Bridge Roads.



### Lancaster Creek

Lancaster Creek is a tributary of Douglas Lake and the outlet for Lancaster Lake. The Creek is mostly forested and crosses two nature preserves. 2018 was the first year of monitoring at Lancaster Creek, also known as Bessey Creek.



### Maple River

The Maple River drains a large area that includes the Village of Pellston, the Pleasantview Swamp, and Larks, Douglas, and Munro Lakes. Diversity remained high in 2018 with another 'A' rating, similar to the first year of monitoring in 2011. The largely undeveloped Maple River Watershed clearly contributes to the River's high diversity. Road/stream crossing improvements in the Watershed may also contribute to a better score.



As a tributary of the Black River near the Village of Tower, Milligan Creek has typically shown great diversity and water quality. In 2018, two sites were monitored along M-68 and Waveland Road. One unique feature of Milligan is the substrate at Waveland Road. It is solid rock, or bedrock, at that location.



### Minnehaha Creek

The Minnehaha Creek is a coldwater tributary of Crooked Lake. In late 2018, Tip of the Mitt Watershed Council completed a second road/stream crossing improvement project as part of our Improving Aquatic Connectivity in the Crooked River Watershed project. Volunteers monitor at Maxwell and Pickerel Lake Roads to help assess biological improvements as a result of these road/stream crossing projects.



### Mullett Creek

Mullett Creek is a tributary of Mullett Lake originating near Riggsville Road and the University of Michigan Biological Station on Douglas Lake. The Straits Highway site was monitored in 2018 and revealed similar diversity to past years with an 'A' rating. Mullett Creek contains fast flow and cool water in its upper reaches.



### Pigeon River

The Pigeon River begins just northeast of Gaylord and flows north into Mullett Lake. Monitoring sites were added in 2011 after dam failures occurred along the Pigeon River. First monitoring efforts revealed low diversity. However, subsequent sampling years have revealed strong community metrics from EPT and sensitive family diversity. Usually in the 'A' category, the Pigeon sites along Sturgeon Valley and Webb Roads revealed similar diversity in 2018. The Pigeon River tied with Bessey Creek for the most sensitive macroinvertebrate families found.



### Stover Creek

Stover Creek flows north and east, eventually entering into the west end of Lake Charlevoix. Stover was the very first system added to our Volunteer Stream Monitoring program in 2005, and usually receives a low 'C' grade. Its lower Watershed is predominantly urban and several road/stream crossings are impacting stream flow and temperature. The Watershed Council will pursue funding to support Stover Creek improvements with the long-term goal of improving stream diversity. One metric to keep an eye on is the number of sensitive taxa we find in the coming years.



### Russian Creek

Russian Creek begins near North Central Michigan College (NCMC) and runs along the college's natural area until flowing into the Bear River. The Creek is monitored by a NCMC biology students, who practice their identification skills through place-based learning.



### Sturgeon River

Sturgeon River is a fast flowing river with headwaters in Gaylord and a west branch near Huffman Lake. Eventually flowing into Burt Lake, the Sturgeon River is near the top for consistency and diversity metrics. The pristine forests and land cover in the upper Watershed contribute to its great diversity. The Sturgeon River typically receives an 'A' grade.



### Schoofs Creek

Schoofs Creek, a tributary to the north arm Basin of Walloon Lake, was added to the Volunteer Stream Monitoring program in 2017. The stream's slow water flow and low substrate diversity is not naturally supportive of high macroinvertebrate diversity. Slow water flow with a largely sediment-based substrate can lead to warmer waters and reduced dissolved oxygen levels. Agricultural influence could also play a role in the upstream reaches. The 'A' grade is a large departure from last year's 'D' grade which reflects finding a higher number of taxa. One notable change that could contribute to the 'A' grade was a decrease in nitrate-nitrogen (likely an indicator of fertilizer use) from 2013 to 2018.



### Tannery Creek

Tannery Creek empties into Little Traverse Bay from a valley just east of Petoskey. In 2018, volunteers monitored at Little Traverse Wheelway. Tannery Creek's average score is a 'C,' which is what it also received last year.

.....

Thank you to all of our Volunteer Stream Monitors! We cannot thank you enough as our monitoring efforts would not be possible without you! If you or someone you know would like additional information or are looking to volunteer, please contact us at (231) 347-1181.

## Join us for the 15th Bear River Cleanup



**August 3, 2019**

9 a.m. - 1 p.m.

Bear River Shelter  
Quaintance Ave.  
(Entrance across the  
road from City Hall)  
Petoskey, MI

2019 marks the 15th Bear River Cleanup! Join Watershed Council staff and community members as we clean up trash and debris from the Bear River and its surrounding area. This event is free to attend and all pre-registered volunteers will receive a complimentary t-shirt. Last year, 150 community volunteers collected multiple truckloads of trash and recyclables from the River. We need your help to make this year the biggest ever! Call (231) 347-1181 to register or register online at [www.watershedcouncil.org/bear-river-cleanup](http://www.watershedcouncil.org/bear-river-cleanup).



# New Boating and Fishing Law

If your leisure-time plans include boating or fishing, recent changes in Michigan's Natural Resources and Environmental Protection Act (NREPA) may affect you.

## What boaters need to know

In addition to the existing law requiring all aquatic plants be removed from boats and trailers before launching, the recent changes require the following prior to transporting any watercraft over land, both motorized and non-motorized:

- Remove all drain plugs from bilges, ballast tanks, and live wells.
- Drain all water from any live wells and bilges.
- Ensure the watercraft, trailer, and any conveyance used to transport the watercraft or trailer are free of aquatic organisms, including plants.

This means after trailering boats, and before getting on the road, boaters must pull plugs, drain water and remove plants and debris from all watercraft, trailers and other conveyances.

## What anglers need to know

- A person shall not release baitfish in any waters of this State. A person who collects fish shall not use the fish as bait or cut bait except in the inland lake, stream, or Great Lake where the fish was caught, or in a connecting waterway of the inland lake, stream, or Great Lake where the fish was caught if the fish could freely move between the original location of capture and the location of release.
- A person, who catches fish other than baitfish in a lake, stream, Great Lake, or connecting waterway shall only release the fish in the lake, stream, or Great Lake where the fish was caught, or in a connecting waterway of the lake, stream, or Great Lake where the fish was caught if the fish could freely move between the original location of capture and the location of release.

Whether purchased or collected, unused baitfish should be disposed of on land or in the trash – never in the water. Any baitfish an angler collects may be used only in the waters where it was originally collected. And remember when practicing catch-and-release fishing, return the fish to the water where it was caught.

Draining boats and cleaning trailers can limit the spread of zebra and quagga mussels, which are common in some inland lakes. A more recent invader, the tiny New Zealand mudsnail, can hitchhike from river to river when mud or debris is left on kayaks, canoes, and gear.

Moving fish from one body of water to another can spread fish viruses and parasites, such as viral hemorrhagic septicemia virus (VHSV) and *Heterosporis*, and can affect many different fish species. Fish diseases also can be spread to new locations when water carrying parasites or infection is transferred via bilges, live wells, or ballast tanks.

For more information on the new boating and fishing laws, visit the Laws section at [Michigan.gov/invasives](http://Michigan.gov/invasives).

## Here are some simple rules of thumb to help boaters and anglers navigate these laws:

- **CLEAN** boats, trailers, and equipment.
- **DRAIN** live wells, bilges, and all water – pull all drain plugs.
- **DRY** boats and equipment.
- **DISPOSE** of unwanted bait in the trash.





# Welcome New Interns!

This summer, the Watershed Council is lucky to have three amazing interns – Alex Rocco, Caleb Short, and Garrett Greer. In order to get to know them a little better, we asked them a few questions about their interests and hobbies.

## Q: What school do you attend and what is your area of study?

Alex: I attend Jacksonville State University in Alabama as a graduate biology student studying crayfish ecology. I have a B.S. in wildlife and fisheries science, with a concentration in fisheries from Tennessee Tech University.

Caleb: I attend the University of Michigan-Flint and my major is in wildlife biology.

Garrett: I am currently attending Lake Superior State University where my major is political science (law) with a focus on environmental policy.

## Q: What interests you about water resources protection?

Alex: I am especially interested in aquatic invasive species and their effects on humans, infrastructure, and local ecology.

Caleb: I am able to apply knowledge in practical situations in my home state along with seeing the impact of everyone's actions in and around the Great Lakes.

Garrett: Freshwater, next to the air we breathe, is the most critical resource on this planet. It is up to us to be the best stewards possible so that future generations can enjoy and use our amazing freshwater resources like so many before them. Protecting it is critical in a world that is waging war on the quality of our water.

## Q: What do you hope to gain from this internship?

Alex: I hope to gain experience and skills working under biologists and help to further ensure the high quality of freshwater habitats in Northern Michigan.

Caleb: I am excited to gain experience working on and in the water as well as gain insight into possible future career paths.

Garrett: From this internship I want to gain direction and experience. I want to know what the leg work of policy-making is really like and hope to find out if water resource protection is my passion. I would also like to create a bigger network. The people that work at the Watershed Council are truly at the vanguard for the fight for nature and will be amazing allies in the future.

## Q: What do you plan to do after graduation?

Alex: After graduation, I would like to get a job as a freshwater biologist for a nonprofit or government.

Caleb: Grad school! I wish I could go to school forever, but I hope to find a career in research and conservation in wildlife biology. I'm certain that this summer will impact my future career decisions as well.

Garrett: After graduation I plan on working in the field wherever I can find footing. Whether that be with a nonprofit like the Watershed Council or a government job with the State, I want to protect the valuable resources we have left and serve any way possible.

## Q: What is your favorite thing to do outside?

Alex: When I'm outside for fun, I'm either preparing to go fishing or fishing. I fish for all species with lots of different tackle, but I especially like to fly fish for smallmouth bass and trout.

Caleb: Birding!

Garrett: My favorite things to do outside are hunting, trail riding, kayaking, and hiking. Just being outside is a treasure so anything that gets me out of the four walls and into nature is my favorite thing to do.

*2019 Summer Interns (left to right):  
Garrett Greer, Caleb Short, and Alex Rocco*



## Exclusive Watershed Council Notecards

These beautiful notecards were made exclusively for the Watershed Council by local Northern Michigan artist Lisa Loyd. These notecards are perfect for any occasion thanks to their colorful, water-related artwork and blank inside pages. All proceeds from the purchase of these notecards go towards the Watershed Council's resource protection programming. Each pack of notecards is \$12. To purchase, stop by the Watershed Council office, call (231) 347-1181, or order online at [www.watershedcouncil.org](http://www.watershedcouncil.org).





# HOT OFF THE PRESS!

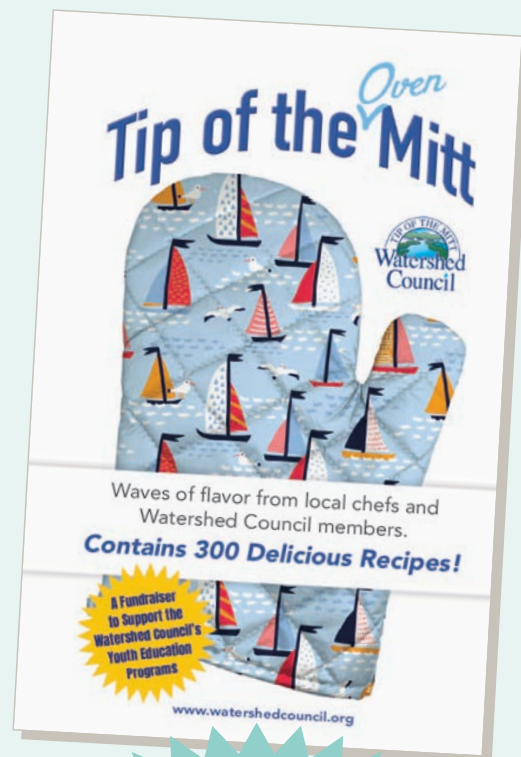
## Tip of the Oven Mitt: Waves of Flavor from Local Chefs and Watershed Council Members

Hot off the press! Over the past several months, the Watershed Council has been working with more than 100 area food and drink venues to put together this exclusive collection of 300 Northern Michigan recipes. **All proceeds from this cookbook go towards the Watershed Council's youth education programs.** Help us educate the next generation of watershed stewards while cooking up some delicious, local recipes. The cookbooks are \$25 each. Whether you purchase for yourself, give as a gift, or do both, this cookbook is sure to be treasured for many years. To purchase, stop by the Watershed Council office, call (231) 347-1181, or order online at [www.watershedcouncil.org](http://www.watershedcouncil.org). A \$5 shipping and handling fee per book is added to all online orders.

### A Special Thank You to All of Our Cookbook Contributors:

Alpine Chocolat Haus  
American Spoon Foods, Inc.  
B.C. Pizza Corporate  
Bar Harbor  
Beards Brewery  
Bellaire Bed & Breakfast  
Biere De Mac Brew Works  
Big Stone Bay Fishery, Inc.  
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Greenside Grille at Indian River Golf Club  
Grey Gables Restaurant and Catering  
Harvest Thyme Farm & Vineyards LLC  
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High Five Spirits  
Horton Creek Inn Bed & Breakfast  
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John Cross Fisheries  
Julienne Tomatoes  
Kilwins Quality Confections  
King Orchards  
Knot Just A Bar  
Lake Charlevoix Brewing/ Round Lake Group LLC  
Lake Street Market  
Lake Street Pub  
Libby's Cafe  
Mackinaw Trail Winery  
Maple Moon Sugarbush and Winery  
Michael's Tavern and Steakhouse  
Mim's Mediterranean Grill  
My Sister's Bake Shop  
Nauti Inn Barstro  
Nourish Northern Michigan  
Paper Station Bistro  
Pearl's New Orleans Kitchen  
Petoskey Cheese  
Petoskey Farms Vineyard & Winery  
Pier M33 On The Cheboygan  
Plath's Meats  
Polish Kitchen  
Pond Hill Farm  
Red Mesa Grill  
Resort Pike Cider and Winery



**\$25.00 each**

*Proceeds benefit  
our youth education  
programs!*

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Royal Farms Inc.  
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Tip of the Mitt Watershed Council  
Toonies Fish & Steak House  
Toski Sands Market and Wine Shop  
Vernales Restaurant  
Villager Pub  
Walloon Lake Winery  
Walloon Village General Store  
Whi-Ski Inn



# WHALE of a SALE

SATURDAY  
**JULY 20, 2019**

**RAIN OR SHINE! • NO EARLY SALES**

**IRISH BOAT SHOP STORAGE UNIT**  
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worth sharing.

When you're done  
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throw it out.

**Pass it on!**

## Thank You for Your Support

### Tribute Gifts

#### In Memory of...

Joanne A. Duff

*Philip English*

*Carol Jehle*

Joan Keller

*Bruce Davis and Heidi Hill*

William MacPhee

*Elizabeth and Stephen Layman*

Jeffrey Moore

Denise Rodgers

Jo Ann Skandalaris

Steven G. Pilon

*Jim and Shari Veller*

#### In Honor of...

Caroline Keson

*Raven Hill Discovery Center*

#### In Recognition of...

Michigan Paddle Events, LLC

Michigan Overboard

#overboardchallenge

### New Members

Dennis and Cynthia Colleran

Dorset Charitable Trust

Mr. and Mrs. Ron Fenech

Fred Kraft

Kevin and Marcia Meyer

Mary V. Ringwalt

Malinda Smyth and Thomas Wagner



03/16/2019 - 06/12/2019



**Saturday,  
August 17, 2019**

12:00 Noon - 4:00 p.m.

Bayfront Park, Petoskey, MI

**Free Admission.**

**Public Welcome.**

Join us for a family-friendly water festival at Bayfront Park with hands-on activities for kids and adults. Learn from Northern Michigan's environmental experts on wildlife, water quality, stewardship, and recreation. Learning stations feature the natural and cultural heritage of the region.

