



Preventing Damaging State Legislation

If you ever need a reminder on how important your vote is to the health of Michigan's natural resources, just look at what has transpired the last few months in Lansing. We have seen an onslaught of truly disastrous legislation that was recently introduced and could prove devastating to our environment should it get enacted. The Watershed Council is extremely concerned about the bills described below and felt it was important to bring them to our members' attention. We are opposed to these bills and will continue to work to prevent their passage.

Undermining Michigan's Large Quantity Water Withdrawal Regulations

House Bill 5638 allows the State's biggest water users to withdraw large volumes of water with minimal oversight by greenlighting large new water withdrawals by default. The bill would only allow the Michigan Department of Environmental Quality (MDEQ) to deny withdrawal requests two years after the water has been pumped – long after the damage has been done. In addition, any data submitted in the process would be exempt from public transparency through a Freedom of Information Act exemption included in the bill.

Anti-Michigan Department of Environmental Quality Oversight Bills

Senate Bills 652 and 653 are irresponsible bills that would essentially defer critical decisions about the protection of Michigan's natural resources and public health to unelected, unaccountable individuals who have a financial stake in the very industries they would be charged with regulating.

Senate Bill 652 creates an environmental rules review committee authorized to oversee MDEQ rulemaking, amend MDEQ draft rules, and offer final approval or denial of all environmental rules proposed by the MDEQ. The Committee would be stacked with representatives from polluting industries. Senate Bill 653 establishes a permit appeals panel with the authority to unilaterally overturn, amend, or approve any permitting decisions made by MDEQ.

Weakening Michigan's Ballast Water Regulations

Since the 1800s, more than 180 nonnative species have invaded the Great Lakes from around the world, costing us billions of dollars, and in some cases, irreparably damaging the Great Lakes ecosystem. Ship ballast is the primary pathway for the introduction and spread of aquatic invasive species, which cause tremendous damage by feeding on and out-competing native species, fouling beaches, degrading fisheries, clogging water intake pipes and other infrastructure, disrupting food chains, and contaminating drinking water.

House Bill 5095 removes Michigan's current protections and replaces them with weaker U.S. Coast Guard standards, which are not enough to protect the Great Lakes and Michigan waters from aquatic invaders.

No Stricter Than Federal Bill

House Bill 4205 would prevent the State from promulgating administrative rules that are more stringent than the federal government unless the State can prove by clear and convincing evidence the need for the rule. This would result in weaker protections for the Great Lakes and massive litigation costs each time the State attempted to undertake rulemaking.

The Great Lakes and our inland waterways are breathtaking and unique natural resources. Be sure to contact your elected officials about each of the bills above to ensure the health of Michigan's environment and economy. With elections coming up, this is also a critical reminder that your vote can, and does, dramatically impact our natural resources.

For more information, contact our policy director, Jennifer McKay at jenniferm@watershedcouncil.org.



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Reflections From Our Executive Director

There has been quite a bit of conversation and speculation on the potential impacts from the recently adopted tax overhaul and its effect on how nonprofit organizations will raise money. I suspect most of you know that Congress increased the standard deduction, the amount every American can claim without itemizing on their federal taxes. The question nonprofit boards of directors across the country are asking is, “Will Americans still contribute as generously to organizations if they lose the tax incentive to donate?”



Gail Gruenwald
Executive Director

The biggest effect could be for donors who contribute between \$1,000 and \$10,000 a year and itemize those donations. If they choose not to itemize and take the new increased standard deduction instead, will nonprofit organizations feel the pinch? From our perspective, our members donate to the Watershed Council to support our work to protect Northern Michigan's waters. Each of your gifts make an impact. I believe that taxes are not the primary reason our members support our work. We will continue to make a difference and to remind our members of the value of our mission and the contributions you provide.

With this in mind, it may be good to highlight two types of giving that will not change with the new tax law. First, donating appreciated securities could still reap tax benefits for donors. Also, a significant opportunity to support the Watershed Council comes from gifts made directly from rollovers from individual retirement accounts (IRA). In December 2015, Congress passed a law allowing you to give up to \$100,000 to charity directly from your IRA when you are over 70 1/2 years old without counting the distribution as taxable income. This type of charitable gift is called a Qualified Charitable Distribution (QCD) and did not change with the recent tax bill.

As always, we appreciate all of your support and use your gifts wisely. Thank you so much for your partnership in protecting our precious waters!

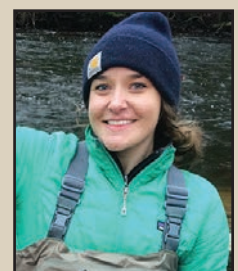


Welcome to the Staff



The Watershed Council is happy to welcome **Dave Edwards**, our new monitoring and research director. Dave develops and implements water quality protection projects including our volunteer monitoring programs, aquatic plant surveys, shore surveys, habitat assessments, and other fieldwork. Dave enjoys understanding the biological, chemical, and physical responses in the surrounding environment due to direct human impact and precipitation events from global climate change. He is a graduate of the University of Wisconsin – Oshkosh and completed graduate work at Bowling Green State University in Ohio. He has spent many summers working and studying at the University of Michigan Biological station. In his free time, Dave enjoys watching the Packers, fishing, running, hiking, and cycling throughout Northern Michigan. Welcome to the team, Dave!

The Watershed Council also welcomes **Macy Doster**, our 2018 Huron Pines AmeriCorps member. Macy grew up in Midland, MI, and spent many hours enjoying the outdoors and camping, which sparked her passion for nature. In April 2017, she graduated from Grand Valley State University with a B.S. degree in Natural Resources Management. In her free time, Macy loves to hike, fish, and camp with friends and family. Welcome, Macy!



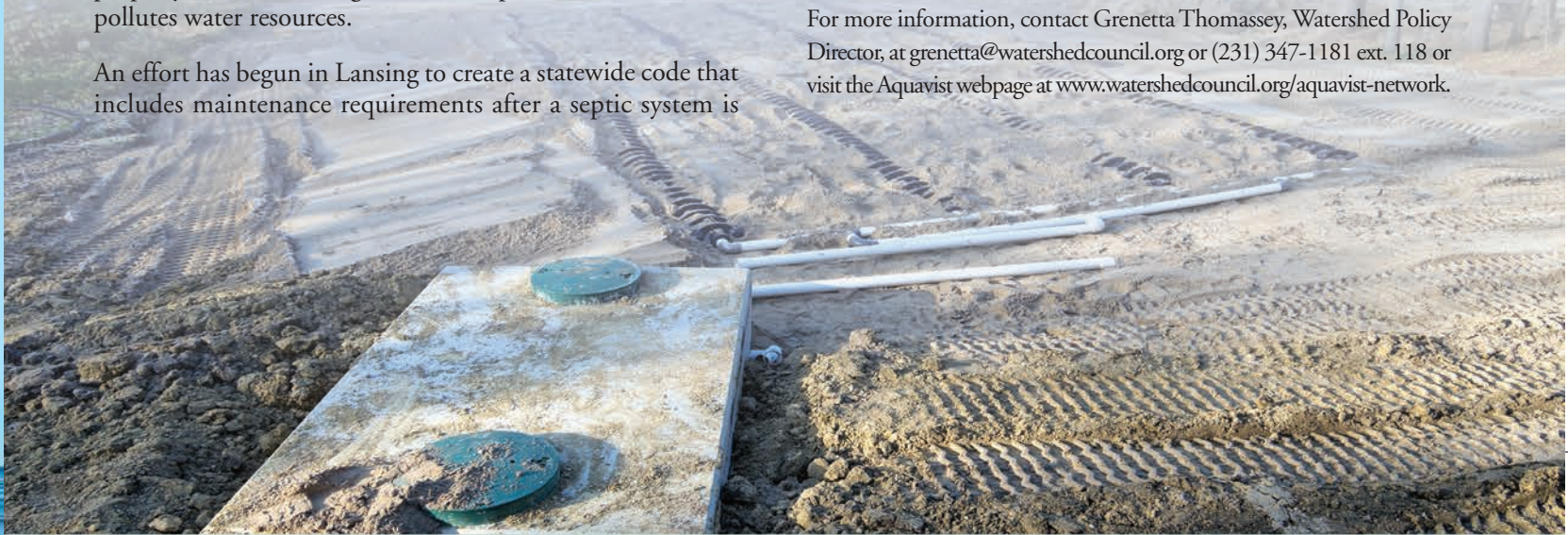
AQUAVIST NETWORK

The Watershed Council has been working for the past two years on the important topic of septic system oversight, locally and statewide. Michigan has over 40 local health department districts that have sanitary codes that address how a septic system is sited, designed, and installed. However, once these septic systems are installed, there is no legal requirement to ever look at them again. This is in direct contrast to what every other state in the nation does. Whether to pump and keep the system maintained or not is certainly a right of any property owner until neglect causes a public health threat or pollutes water resources.

An effort has begun in Lansing to create a statewide code that includes maintenance requirements after a septic system is

installed. New legislation has been introduced and we are reviewing it. We hope to see minimum statewide standards set for installation of new systems that allow local agencies to be more stringent, if needed, given geographical concerns. Importantly, we also want to address maintenance requirements for systems that currently exist and for new systems after they are installed. Finally, we also want to see funding solutions explored that helps local governments and citizens address failing systems. Watch for future updates as this process unfolds!

For more information, contact Grenetta Thomassey, Watershed Policy Director, at grenetta@watershedcouncil.org or (231) 347-1181 ext. 118 or visit the Aquavist webpage at www.watershedcouncil.org/aquavist-network.



Diverting Great Lakes Water

In January, the City of Racine, Wisconsin, submitted an application to the Wisconsin Department of Natural Resources to divert Great Lakes water on behalf of the Village of Mount Pleasant, WI. The request is being made under the requirements of the Great Lakes Compact. The request is to divert 7 million gallons of water per day from Lake Michigan. The majority of the water would be for Foxconn Technology Group, the world's largest contract electronics manufacturer whose notable products include iPad, iPhone, iPod, as well as PlayStation and Xbox gaming systems.



The City of Racine is requesting to divert Great Lakes water on behalf of the Village of Mount Pleasant.

The Watershed Council has concerns with the application. First, the City of Racine is the applicant, rather than Mount Pleasant. This is troubling because cities within the Great Lakes Basin (Basin) with extra capacity do not qualify to request a diversion. Cities within the Basin are able to apply for additional capacity, not diversions. This is to protect the primary tenant of the Great Lakes Compact: a ban on diversions except in rare and unique instances. The City of Racine has the capacity to provide water to Foxconn without requesting larger withdrawal amounts, but it cannot provide the water without permission for a diversion since Mount Pleasant is outside the Basin. Second, the water delivered to Mount Pleasant will not be diverted for public consumption, as required by the Great Lakes Compact, but rather to a private, foreign corporation. Lastly, the application failed to provide specifics about how the water will be used, treated, or managed, or whether Foxconn will be exempt from certain permitting requirements.

Under the Compact, this diversion request does not require the review by all Great Lakes states and provinces. The Watershed Council will continue to monitor the application process to make sure the Compact remains an essential tool for protecting the waters of the Great Lakes.

Federal Policy Priorities

The health of the Great Lakes depends on all levels of government taking action to protect clean water. Federal policy provides a foundation with a set of standards to ensure the health of our waters. Below are the Watershed Council's federal policy priorities that we are working on with our many partners to protect the health and vitality of our Great Lakes ecosystem and economy. The Watershed Council's positions are listed in bold below.

Ensure Protection and Restoration of the Great Lakes

The Great Lakes Restoration Initiative (GLRI) is producing results and creating jobs by cleaning up contaminated sites, addressing threats from invasive species, preventing polluted runoff, restoring habitat for valuable fish and wildlife, and paving the way for economic development. In addition, base agency budgets for important Great Lakes programs must be maintained at federal agencies such as the U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and others to ensure continued progress toward restoration objectives and to serve as a foundation for long-term programs and initiatives.

- **Appropriate \$300 million for the GLRI in fiscal year 2019 to advance restoration and protection of our Great Lakes. \$300 million is currently in the 2018 budget.**
- **Maintain federal agency capacity to support long-term protection and management of the Great Lakes.**

Prevent Asian Carp from Reaching the Great Lakes

Asian carp pose a dire threat to the ecological health and economy of the Great Lakes Basin and they are knocking on our door. This past summer, a live silver carp was caught well above the electric barrier, just 9 miles from Lake Michigan.

- **Fully fund the Asian Carp Action Plan.**
- **Complete the Brandon Road Study by January 2019 and fully fund construction of new structural measures at Brandon Road Lock and Dam.**
- **Implement navigation protocols to dislodge entrained fish between barge tows.**

Maintain and Improve Ballast Water Protections

Invasive species such as round gobies, zebra and quagga mussels, sea lamprey, and ruffe have taken over the Great Lakes, not only at the expense of native species, but also at the expense of Great Lakes residents and businesses. Ship ballast is the primary pathway for the introduction and spread of aquatic invasive species.

- **Improve existing regulations by the Coast Guard and U.S. Environmental Protection Agency.**
- **Oppose measures that weaken Great Lakes ballast water protections, such as the Vessel Incidental Discharge Act (VIDA).**

Fix Our Nation's Failing Water Infrastructure

Communities across the Great Lakes region are grappling with crumbling drinking water and wastewater infrastructure. We face an urgent need to safeguard drinking water sources and modernize drinking water systems. Aging and inadequate sewer systems release sewage and stormwater into the Great Lakes each year, closing beaches and threatening public health.

- **At a minimum, double funding for the Clean Water and Drinking Water State Revolving Fund programs and the Water Infrastructure Finance and Innovation Act program (WIFIA).**
- **Encourage more green infrastructure projects.**
- **Promote policies and incentives that increase access to water infrastructure financing and ensure affordable water to all residents.**

Uphold the Clean Water Act

For more than 40 years, families and businesses across the country have counted on the Clean Water Act to protect the streams, rivers, and wetlands we rely on for our way of life. In recent years, many of these waters lack clear protection, and businesses and industries that depend on clean water face uncertainty and delay, which costs our economy every day.

- **Restore the Clean Water Rule to ensure protection for the streams and wetlands that form the foundation of our nation's water resources.**
- **Do not weaken or undermine fundamental environmental regulations.**



LAKE MONITORING



STREAM MONITORING



AVIAN BOTULISM MONITORING



Monitoring Programs Report

The dictionary definition of “monitor” conveys the basic premise of the Watershed Council’s water quality monitoring programs. We are tasked with ensuring Northern Michigan’s

mon-i-tor

Observe and check the progress or quality of (something) over a period of time; keep under systematic review.

waters remain clean, healthy, and continue to provide benefits for generations to come. Our waters are under threat from a myriad of issues: nutrient pollution and algal blooms, sedimentation and habitat loss,

and toxic pollutants that persist

in the environment for decades. The Watershed Council’s programs assess impacts from these threats on 40 lakes and 24 rivers and streams throughout Northern Michigan.

Although the dictionary definition of “monitor” points us in the right direction, it does little to describe the breadth and depth of what it means to monitor water bodies. Lakes, rivers, and streams are dynamic features of our landscape. They are in constant flux with weather conditions. Rainfall, temperature changes, wind, sunlight, and other factors impart their own changes on our waters. These waters support life, from top-tier predator fish down to the minute, unicellular algae. These organisms are dependent on high water quality, but may also impose their own changes within our waters. Interactions between land uses and overland runoff also determine the quality of receiving water bodies at the watershed level.

Volunteer Lake Monitoring Program

Background

Since 1986, Tip of the Mitt Watershed Council’s Volunteer Lake Monitors (VLM) have ventured out on 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, as well as changes to lake ecosystems. Most importantly, through identifying and documenting trends and change, volunteers gain hands-on experience protecting Northern Michigan lakes. Each spring, volunteers participate in a half-day training prior to collecting data. During the summer months, volunteers venture out each week to their monitoring station. Larger lakes, such as Charlevoix, Burt, and Mullett, have multiple monitoring volunteers and stations. All data collected by volunteers are available at www.watershedcouncil.org/lake-monitoring. The following section summarizes monitoring parameters and overall 2017 program results.

Secchi Disk

The Secchi disk was invented in 1865 by Pietro Angelo Secchi, an Italian Jesuit priest active in oceanography, meteorology, physics, and astronomy. The weighted black and white alternating colored disk is used to measure water clarity. The disk is lowered into the water and the depth at which the disk is no longer visible is recorded. Water clarity, which is principally determined by the concentration of algae and/or suspended sediment in the water column, is a simple and valuable way to assess water quality. Throughout the summer, different algae types bloom at different times, causing clarity to vary greatly throughout the season. Secchi disk depths range from just a few feet in small inland lakes to over 80 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 disk allows us to monitor mussels' impact to water clarity and identify potential changes in a lake.

Water transparency 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 the 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 disk depths in Lake Charlevoix have increased from approximately 10 feet in 1987 to over 20 feet in 2017 (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.

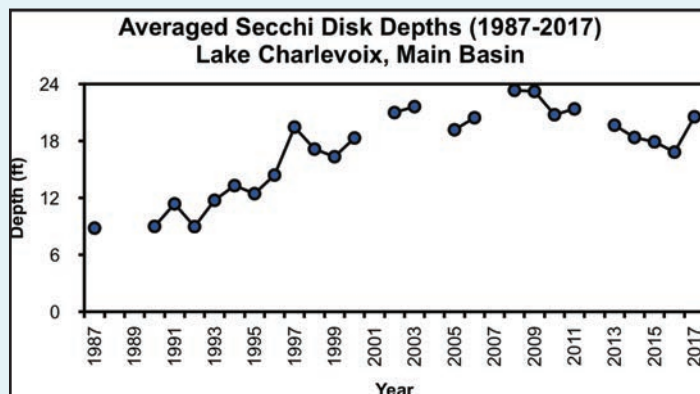


Figure 1. Secchi disk depths for the main basin on Lake Charlevoix collected by volunteers.

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 zebras, 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 from the water column, which increases water transparency. 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, which can ultimately lead to a reduction in top predator fish populations, such as trout or 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 amount of phytoplankton (tiny free-floating algae) 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 evidence in the chlorophyll-*a* data. Reduced chlorophyll-*a* has indeed been observed across a majority 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.

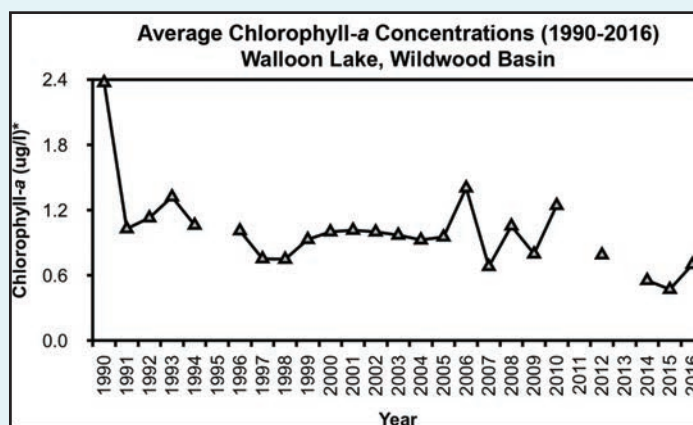


Figure 2. Chlorophyll-*a* data for Wildwood Basin on Walloon Lake collected by volunteers.

In some lakes where invasive mussels have been present for many years, data exhibits 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. We cannot definitively determine the cause of such a rebound (if mussels have reached a tipping point and declined or not), but 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. Future monitoring efforts by volunteers and Watershed Council staff will hopefully reveal if zebra mussels could indeed be reaching an equilibrium in certain lakes of 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 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. Some lakes are naturally eutrophic depending upon variables such as age, depth, and soils. However, nutrient and sediment pollution caused 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.

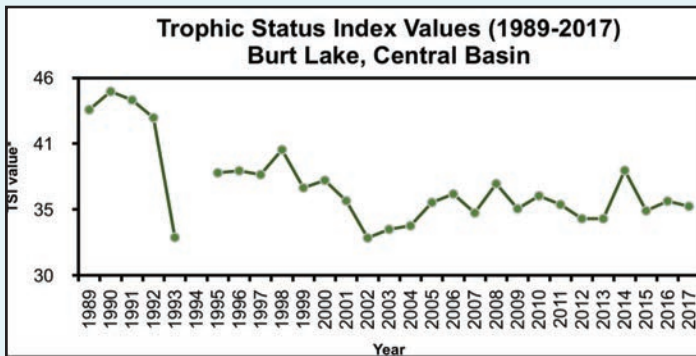


Figure 3. Trophic status index for central basin of Burt Lake calculated from data collected by volunteers.

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 we have a data gap of almost ten years, a trend of increasing TSI scores may be due to cultural eutrophication as Huffman Lake has a large watershed-to-lake area ratio, meaning the watershed surface area is 46 times larger than the lake surface area. Thought about another way, around 46 acres of watershed surface area is drained for every 1 acre of Huffman Lake surface area. This value of course does not consider water volume, but Huffman is one of the shallower lakes in our region.

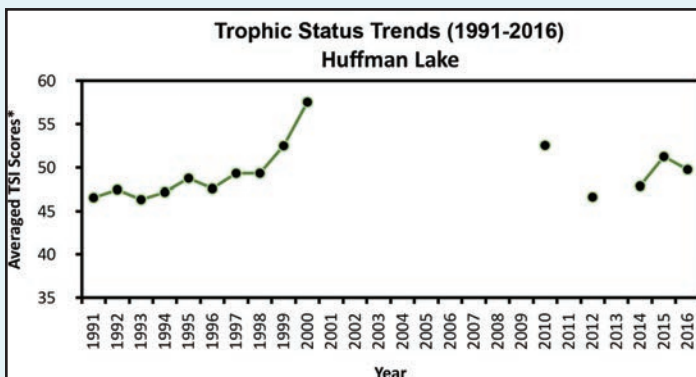


Figure 4. Trophic status index for Huffman Lake calculated from data collected by volunteers.

2017 Results and Discussion

A majority of lakes surveyed in 2017 showed values in the mesotrophic category. In 2017, a total of 26 sites were monitored on 21 lakes by over 60 volunteers. In Table 1, you will find the fruits of their labor with TSI scores and averaged Secchi disk depths so you can see how your favorite lakes compare with

others monitored in 2017. Please note that information for a few lakes monitored by our volunteers is not included in the table due to limited data. We are still awaiting results for 2017 chlorophyll-*a*.

Table 1. 2017 data for all lakes in the Volunteer Lake Monitoring Program

Lake	Secchi depth (ft.)	TSI Value
BenWay	9.92	44.14
Black	12.88	40.36
Burt, South	21.71	33.04
Charlevoix, Main	20.56	34.04
Charlevoix, South	18.96	34.90
Charlevoix, East	19.54	34.53
Crooked	11.42	42.26
Douglas	12.14	41.18
Larks	9.75	44.31
Long	20.42	33.79
Marion	14.22	38.90
Mullett, Pigeon Bay	19.21	34.60
Munro	5.75	52.00
Nowland	8.45	47.27
Paradise	8.45	46.40
Pickereel	11.77	41.93
Round	8.92	45.79
Six Mile	8.08	47.56
Susan	7.94	47.28
Thayer	9.47	45.13
Thumb	20.23	33.89
Twin Lakes	16.38	36.91
Walloon, Foot Basin	13.07	40.27
Walloon, North Basin	10.00	44.09
Walloon, West Basin	11.91	41.58
Walloon, Wildwood Basin	12.17	41.55

The hundreds of hours spent each summer by our volunteer monitors continues to provide long-term data that is used not just 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), Department of Environmental Quality (MDEQ), 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 ensure that environmental changes in and around lakes don't go undocumented. If you would like more information on any lakes listed (or not listed) in the table, or would like to become a Volunteer Lake Monitor, please contact Dave Edwards at (231) 347-1181 x109 or davide@watershedcouncil.org.



Figure 5. Volunteer Monitoring Sites for 2017 with stream water quality grades.

Volunteer Stream Monitoring Program

Background

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 2017, over 100 Volunteer Stream Monitors helped monitor 34 sites on 16 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.

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); and 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 2.

Table 2. Average Taxa Values for Volunteer Stream Monitoring Program Sites in 2017

Stream Name	Site Location	Total Taxa Average	EPT Taxa Average	Sensitive Taxa Average	First Year Monitored	# of Years Monitored
Bear River	Bear River Rd	18	8	3	2006	12
Bear River	Mineral Well Park	14	6	2	2006	12
Boyne River	Dobleski Rd	16	10	5	2005	13
Boyne River	Dam Rd	17	9	5	2007	11
Boyne River	Mouth, Boyne City	15	8	4	2005	13
Boyne River	Thumb Lake Rd	22	12	8	2015	3
Eastport Creek	Farrell Rd	21	9	4	2005	11
Eastport Creek	M88, Eastport	17	5	2	2005	11
Horton Creek	Church Rd	15	5	1	2005	13
Horton Creek	Boyne City Rd	20	10	6	2005	13
Jordan River	Penny Bridge	22	13	9	2011	4
Jordan River	Webster Bridge Rd	21	12	7	2007	8
Kimberly Creek	Quarry Rd	21	8	4	2005	12
Maple River	Robinson Rd	23	11	5	2011	5
Maple River	Woodland Rd	23	10	4	2011	6
Minnehaha Creek	Maxwell Rd	15	9	4	2017	1
Minnehaha Creek	Pickrel Lake Rd	17	10	5	2017	1
Milligan Creek	M68	21	10	7	2008	9
Milligan Creek	Waveland Rd	19	10	6	2008	10
Mullett Creek	Straits Highway	20	5	2	2017	1
Mullett Creek	Crump Rd	20	10	5	2005	10
Pigeon River	Sturgeon Valley Rd.	22	10	6	2011	7
Pigeon River	Webb Rd	21	12	7	2011	7
Russian Creek	NCMC at mouth	15	5	2	2008	9
Schoofs Creek	Fields Preserve	11	4	2	2017	1
Schoofs Creek	Resort Pike Rd	15	5	2	2017	1
Schoofs Creek	Williams Rd	6	2	1	2017	1
Stover Creek	Brookside Cemetery	17	6	3	2005	13
Stover Creek	Mouth, Irish Boat	12	3.0	1	2005	13
Sturgeon River	Sturgeon Valley Rd.	19	11	6	2011	5
Sturgeon River	West Branch-Old 27 Park	26	13	9	2009	8
Sturgeon River	Wolverine, Webb Rd	21	11	8	2011	7
Tannery Creek	Country Club Rd	16	7	3	2013	5
Tannery Creek	Mouth, Bike Path	11	3	1	2007	11

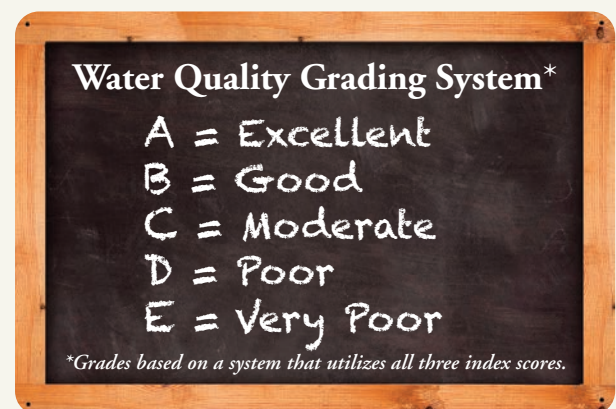
Many rivers and streams in Northern Michigan rank among the best in the State for water quality. Notable rivers such as the Jordan, Pigeon, Maple, Cedar, and Sturgeon all host diverse and sensitive macroinvertebrate populations. Should these rivers begin to undergo impacts from large-scale degradation, 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 thumb 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 the 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.

Stream Reports for 2017

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 Schoofs 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 from year to year within each respective site. The following site specific letter grades below are for only the 2017 monitoring season. The average grade for all monitoring years is located within the site description and associated map on page 8 (Figure 5). Streams without three years of data are not given a letter grade.



Bear River = B

The Bear River flows north from the outflow in Walloon Lake to Little Traverse Bay in Petoskey. Historically, the Bear River has scored in the ‘Good – B’ range, which continued with two sites monitored in 2017.

High diversity was found where the River crosses Bear River Road, about mid-Watershed. Stormwater runoff from nearby urban areas could contribute to the reduced diversity documented at Mineral Well Park near the River’s mouth. Russian Creek, a tributary of the Bear, continued its trend of lower diversity compared to other monitored sites on the Bear River. Students at North Central Michigan College have been instrumental in monitoring areas of the Bear River, especially Russian Creek.



Boyne River = A

Flowing from Thumb Lake to Elmira, west into Lake Charlevoix, the Boyne River has been monitored since 2005 and continues to show great water quality with an ‘A’ rating. In 2017, four sites along the Boyne were monitored. Friends of the Boyne River has

been devoted to monitoring this prestigious Blue Ribbon trout stream for many years.



Eastport Creek = B

Eastport Creek is a tributary of 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 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 = A

An ‘A’ rating in 2017 was a welcomed improvement as Horton Creek has typically shown a ‘B’ grade since initial monitoring in 2005. 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 great diversity of substrate material.

**Jordan River = A**

The Jordan River is an incredibly diverse system and continues to show a high water quality rating. Since the beginning of the Volunteer Stream Monitoring program, the Jordan River has had an 'A' rating. 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 in 2017 included Pinney Bridge and Webster Bridge Roads.

**Kimberly Creek = B**

Kimberly Creek flows north, parallel to the Pigeon River, from the Afton area before crossing M-68 and eventually emptying into Mullett Lake. The lone monitoring site in 2017 was at Quarry Road, which continues to show decent diversity. However, Kimberly Creek is likely impacted by urban stormwater and residential development.

**Maple River = A**

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 2017 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.

**Milligan Creek = A**

As a tributary of the Black River, near the Village of Tower, Milligan Creek has typically shown great diversity and water quality. In 2017, two sites were monitored along M-68 and Waveland Road. One unique feature of Milligan Creek is the bedrock substrate at Waveland Road.

**Minnehaha Creek = N/A**

The Minnehaha Creek is a coldwater tributary of Crooked Lake. Tip of the Mitt Watershed Council is currently coordinating two road/stream crossing projects on the Minnehaha, which will ultimately improve fish passage and instream habitat. As part of the project, volunteers monitored at Maxwell and Pickerel Lake Roads in 2017. Stay tuned for updates and results from future monitoring efforts of this important trout stream.

**Mullett Creek = A**

Mullett Creek is a tributary of Mullett Lake originating near Riggsville Road and the University of Michigan Biological Station on Douglas Lake. Crump Road and Straits Highway were two sites monitored in 2017 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 = A**

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 River sites along Sturgeon Valley and Webb Roads revealed similar diversity in 2017.

**Schoofs Creek = N/A**

In 2017, Schoofs Creek, a tributary to the north arm basin of Walloon Lake, was added to the Volunteer Stream Monitoring program. 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 be playing a role in the upstream reaches. (The 2017 'D' grade should not be taken too seriously as this is the first year for monitoring efforts. Future monitoring years will better indicate the diversity community and any changes to Schoofs Creek.)

**Stover Creek = C**

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 2004, and has usually received 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.

**Sturgeon River = A**

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. In 2017, the Sturgeon River won the award for the greatest number of sensitive taxa found in monitoring samples!

**Tannery Creek = C**

Tannery Creek empties into Little Traverse Bay from a valley just east of Petoskey. In 2017, volunteers monitored sites at Country Club Road and at the mouth of the Creek near the Little Traverse Wheelway. Diversity remains relatively low as Tannery Creek is usually in the low 'B' rating. Urban stormwater is contributing to increased water temperatures and habitat degradation.

Volunteer Botulism Monitoring Program

For visitors and full-time residents alike, waterfowl are an iconic symbol of Northern Michigan. Unfortunately, these beloved birds have faced a very serious threat in the form of a very tiny toxin.

Avian botulism is a paralytic disease along the shores of the Great Lakes caused by ingestion of a toxin produced by the bacteria *Clostridium botulinum*. The botulism toxin is produced in low-oxygen conditions in decaying algae along the shorelines and bottom of lakes. The toxin reaches lethal levels in birds due to biomagnification in the aquatic food web. Avian botulism has resulted in more than 100,000 bird deaths in the last half century, according to the Journal of Great Lakes Research.

Since 2007, the Watershed Council has recruited volunteers – Beach Rangers – to document bird fatalities along the Lake Michigan shoreline in Charlevoix and Emmet Counties.

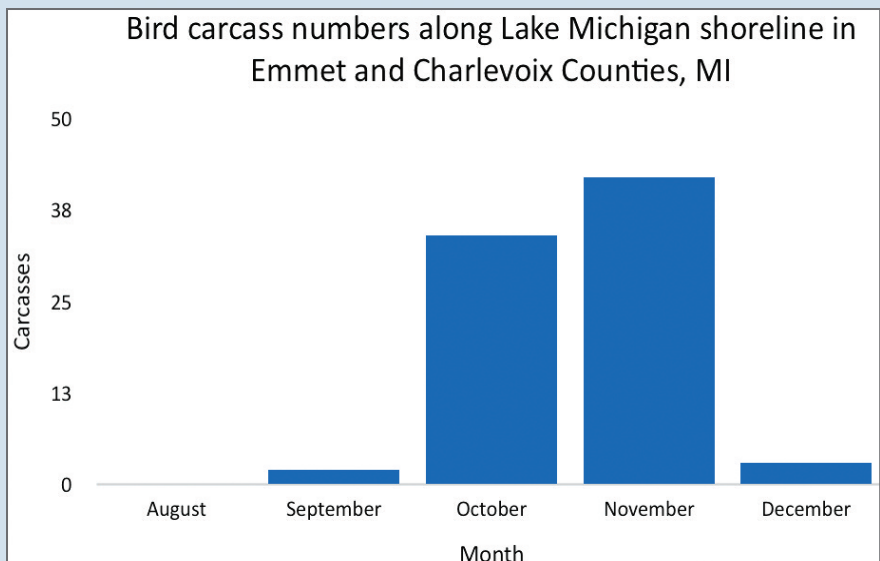


Figure 6. Carcass numbers by month in 2017.

In 2017, Beach Rangers surveyed around 47 miles of Lake Michigan shoreline, documenting 81 dead birds. Many of these were likely killed by avian botulism. Although many birds were documented, this is far fewer than 2016 when 162 dead birds were documented. In 2017, hardest hit were common loons, white-winged scooters and long-tailed ducks. Similar to 2016, the greatest number of documented fatalities occurred in early to mid-November (Figure 6).

Data collection efforts by the Beach Rangers contribute to a larger, Lake Michigan-wide research program coordinated by Michigan Sea Grant and the Michigan Department of Natural Resources. There is still much to learn about factors affecting the highly variable, and at times localized, bird die-offs.

A big thank you goes out to our 2017 Beach Rangers. Eleven concerned citizens contributed to this program between August and December. If beach walking in the name of science appeals to you, please contact David Edwards at (231) 347-1181 x109 or davide@watershedcouncil.org. The annual Beach Ranger Training will be held during late summer 2018. For more information on this program, see www.watershedcouncil.org/avian-botulism-monitoring.

Become an Avian Botulism Beach Ranger!

Our annual Avian Botulism Beach Ranger training is held at the end of each summer. If you would like to participate in the program, email davide@watershedcouncil.org.

What are PFAS?

The Great Lakes and our inland waterways continue to be plagued by pollution. As legacy contaminants such as DDT (dichlorodiphenyltrichloroethane) and PCB (polychlorinated biphenyl) decline in our waters, new emerging contaminants are identified. The latest are perfluoroalkyl and polyfluoroalkyl substances, collectively known as PFAS.

PFAS are a large group of more than 3,000 man-made chemicals that have been used in industry and consumer products worldwide since the 1950s. PFAS are found in a wide range of consumer products such as nonstick cookware, food packaging materials, stain resistant carpet treatments, water resistant clothing, cleaning products, firefighting foam, paints, varnishes, and sealants.

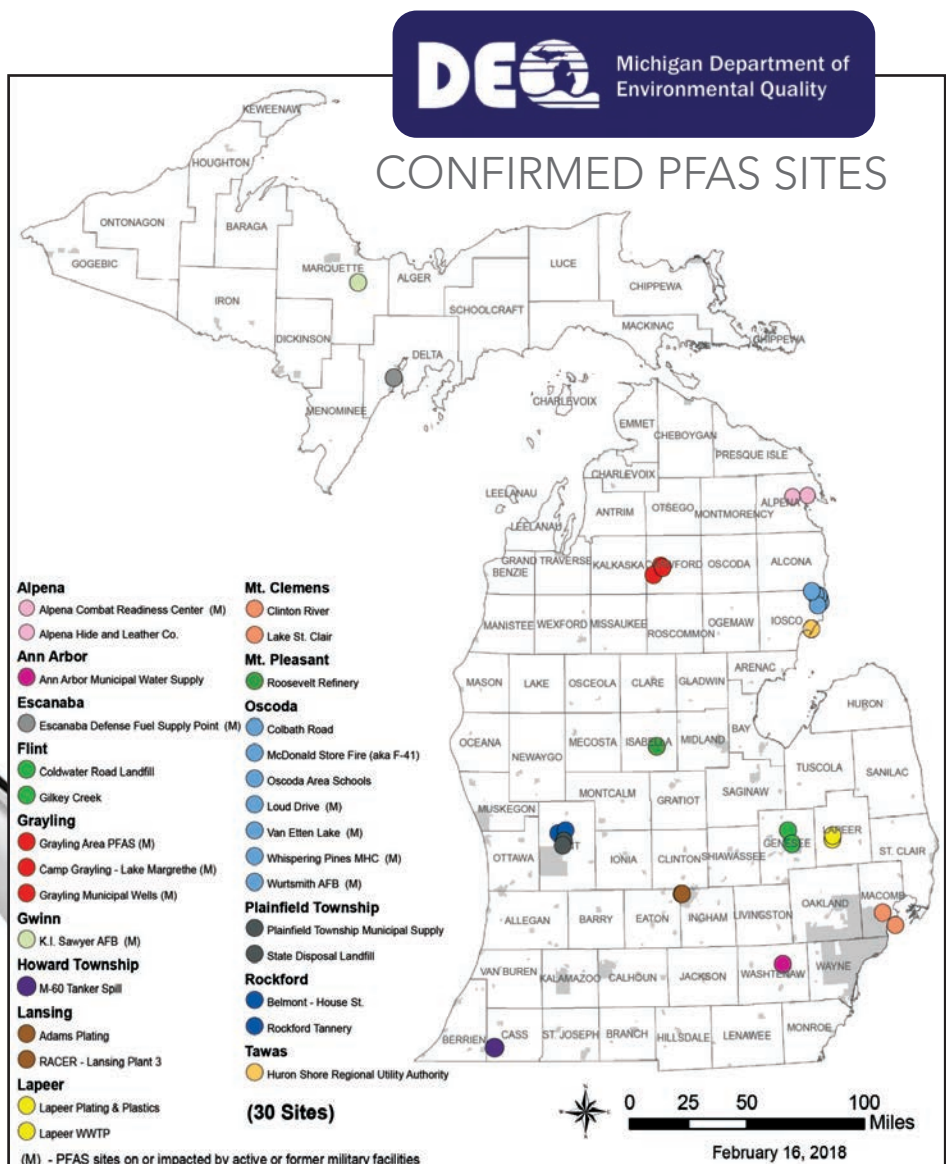
Of all of the PFAS, there are two in particular - perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) – that have been phased out of production due to concerns about health risks to humans. Although these two specific PFAS are no longer manufactured in the United States, they are still produced internationally and are imported into the United States in consumer goods.

Exposure to PFAS can lead to adverse health outcomes in humans and animals. You can be exposed to PFAS by drinking contaminated water, eating fish caught from water contaminated by PFAS, accidentally swallowing contaminated soil or dust, eating food that was packaged in materials that contain PFAS, and using certain consumer products. According to the Agency for Toxic Substances and Disease Registry (ASTDR), PFAS may be associated with decreased fertility, increased cancer risk, developmental issues, and immunological impacts. On the other hand, research suggests that exposure to PFOA and PFOS from today's consumer products is usually low, especially when compared to exposures to contaminated drinking water.

Michigan is one of 36 states across the country dealing with PFAS contamination. As of February 2018, Michigan had 30 confirmed PFAS sites, including Alpena, Ann Arbor, Grayling and Rockford. (See map below.) To date, no PFAS contaminated sites have been found within the Watershed Council service area. These sites are associated with military installations, tanneries, plating operations, or legal/illegal disposal sites. A Michigan PFAS Action Response Team (MPART) was formed to address the potential effects of PFAS in Michigan and protect public health.

The Watershed Council is in the process of learning more about PFAS contamination and how we can be proactively engaged, both in policy and advocacy, as well as monitoring and research, to ensure the health of our Northern Michigan waters and the citizens who rely on those waters every day.

For more information about this emerging contaminant, visit <http://michigan.gov/pfasresponse>.



Elk River Chain of Lakes Greenbelt Initiative

Are you a lakefront property owner on the Elk River Chain of Lakes?

Is your shoreline in need of a greenbelt boost or makeover? If so, the Watershed Council may be able to help! Thanks to a grant from the Michigan Department of Environmental Quality, the Watershed Council has funding to help eligible property owners install greenbelt projects. Funding will only be available during 2018, so don't delay! For more information, contact Jen Buchanan at (231) 347-1181 x 112 or jen@watershedcouncil.org.

Funding available
for eligible property owners
to install a greenbelt.



Project Rain Garden

Spring is here and Tip of the Mitt Watershed Council is **seeking five more residential locations for rain garden projects** within the City of Petoskey. Project rain garden is a cost/share program for city residents to construct a rain garden on their property. This year marks the second and final year for the program.

Rain gardens are a smart and proven way of using landscaping to protect our water resources, enhance habitat, and beautify our homes and neighborhoods. A rain garden is a bowl-shaped garden designed to slow, filter, and absorb stormwater runoff from nearby impervious surfaces, such as roofs and driveways.

Do you want to do your part to protect Little Traverse Bay? Do you think you might have just the spot for a rain garden on your property? If so, visit www.watershedcouncil.org for more details about Project Rain Garden. Our brochure *Plant a Rain Garden: A How-To Guide for Homeowners* is also available for download or printed copies are free and available for pickup at our office. For more information, contact Jen Buchanan at (231) 347-1181 x112 or jen@watershedcouncil.org.

Don't wait for a rainy day, get planning for your rain garden today! Support for Project Rain Garden is provided by the Little Traverse Bay Protection and Restoration Fund of the Petoskey-Harbor Springs Area Community Foundation.

Line 5 at Straits: RISK ANALYSIS

The State of Michigan has contracted with Michigan Technological University and a team of academic experts to evaluate the economic and environmental impacts of a worst-case scenario spill from the Line 5 Straits pipelines. The Risk Analysis will focus on Enbridge's potential liability for a worst-case scenario spill from the Straits pipelines and its responsibility to maintain adequate financial assurance should such a spill occur. The independent Risk Analysis is being led by Dr. Guy Meadows, director of the Great Lakes Research Center at Michigan Technological University. His team is comprised of 41 researchers from nine universities including Michigan Technological University, the University of Michigan, Michigan State University, Wayne State University, Western Michigan University, Grand Valley State University, Oakland University, and two out-of-state universities, North Dakota State University and Loyola University Chicago.

The team is expected to complete the draft Risk Analysis and hold a public presentation on the draft report in July 2018. This will be followed by a 30-day public comment period that will end in mid-August. The Watershed Council will host workshops throughout Northern Michigan to provide assistance in developing meaningful comments on the draft report.

Look for updates on the dates and locations of these workshops at www.watershedcouncil.org.



We raised \$19,895 for Youth Programs and Environmental Projects!

Tip of the Mitt Watershed Council was recently selected for the Patagonia x Moosejaw \$30,000 Flash Charity Thing, a fundraising competition on CrowdRise, a large online crowdfunding platform. Each team had one week to fundraise online. The teams with the top three amounts won cash prizes from Patagonia x Moosejaw.

With the help of 119 members and non-members, **we raised over \$9,000 and secured the \$10,000 2nd place cash prize!** Thank you to everyone that contributed!

Thank you for your support!

11/7/17 - 4/9/18

New Members

45 North Management
John Bell
Black Lake Preservation Society
Ronn Blodgett
Mr. and Mrs. Dennis Choate
Mr. Stacy Daniels
William and Linda Dolinski
Mary and Michael Durkin
Mr. Dave Edwards
Ms. Nancy F. Ferguson
Mr. and Mrs. William Foster
Barb Frisk
Roger and Susan Gauthier
Michael Hodges
Lori and Ken Hoehn
Michael and Priscilla Horton
Tom and Carol Houle
Mr. and Mrs. Frank Jakubus
Marty Jones
Amy Naylor Joye
James and Dawn Kerwin
Cameron Brunet-Koch
and Bruce Koch
Sarah Little
Herman and Carol Madison
Mrs. Joseph Marshall
Mr. and Mrs. James A. McKimmy
Mr. Ronald V. Miller
Ms. Victoria R. Morris
Dr. Robert D. Morrison
Mr. Tom Murray

John and Linda Nedroscik
Patrick and Linda O'Leary
Gerald and LouAnn Parka
Mr. and Mrs. Thomas Smith
Ms Margaret Soderberg
James and Dorothy Spousta
Mr. and Mrs. Joseph Thomas
Van Andel Foundation
Mr. and Mrs. James F. Walters
Mr. and Mrs. J. Robert Watson
Mr. David A. Weisblat
Allen and Marge Whittemore
Lynn Gruenwald and Norm Williams
Rex and Nancy Winter
Don and Alexandria Wolfbauer

Honorariums

In honor of...

Linda Badalucco
Linda Heller
John T. Baker
David M. Culver
The Boat House of Harbor Springs
45 North Management
Jen Buchanan
Northern Michigan Master Gardener Association
Art Curtis
Owen Curtis
Kris and Terry Finn
Kenneth Knowles

Mr. and Mrs. A. W. Hallett
Charles and Patty Forsberg
Irish Boat Shop and Michael Esposito
45 North Management
Barbara Kauper
Charles and Patty Forsberg
Nolan Little
Sheila Little
Barb Wotila and Steve Little
Sarah Little
Sue Maxey-Hovey
Jim and Therry Colombo
Tony Naylor
Amy Naylor Joye
Jeanne Branby and Timothy Nelson
Valerie B. Nelson
Nancy and Brian Nowitzke
Linda Heller
Chase and Jena Offield
45 North Management
Dr. Kean T. Oh
Lindy and Gary Buffington
Joellen and Rod Rodgers
Maureen Owens

Memorial Gifts

In memory of...

Richard C. Calvin
Nancy Harrison

Virginia Carroll
Elaine and Bowden Brown
Ashlo Craine
Tim Craine
Howard Gilbertson
Linda and Steven Alexander
Scott G. Basler
Henry Jallo
Robert and Connie Kamphuis
Harold E. Nelson
David F. Tuthill
Martha Z. Ward
Philip John Hense
Deborah and William Strohaber
Fred G., Stephanie and Fred (Fritz)
R. Secrest
Stephen Secrest
Fritz Secrest
Daniel Secrest
Art and Marion Gold
Mary Sorrell
Clifton Sorrell
George Squibb
John Bell
David Squibb
Jan Swanson
Elaine and Bowden Brown
Millicent G. Wallin
Sandra J. Zietz
Lonny Zietz

Many Thanks to...

Beard's Brewery and **Gypsy Vodka** for donating products for the Winter Carnival Ice Bar that benefitted the Watershed Council.

Pond Hill Farm for hosting a fun winter snowshoe fundraiser for us at their location.

Crooked Vine Winery and Vineyard for hosting a snowshoe and wine tasting event at their location and **My Sister's Bake Shop** for offering a significant discount on catering the event.

Stigg's Brewery and Kitchen for hosting a Euchre Tournament and Beer Release Party for the "Walloonie IPA" that benefitted the Watershed Council.

Roast & Toast for donating coffee for our off-site meetings.



May 25 - June 25, 2018

All great food and drink requires great water to be produced!

During May 25 to June 25, 2018, the Watershed Council will be working with many Petoskey food and drink venues raising funds and awareness to assist in our tremendous efforts to protect the waters of Northern Michigan. Watch our website's event page for a list of participating venues, dates, and times.

Do you own a dining establishment in the Petoskey area?

Contact Paula Buckman, Volunteer Fundraiser, at (708) 642-5499 or paula@watershedcouncil.org to discuss the many ways you can support the Tip of the Mitt Watershed Council through a fundraising event held at your venue this spring! We would be very grateful for your participation in this campaign to raise awareness and funds for the future of our waters.

SAVE THESE DATES

For details, visit www.watershedcouncil.org/attend-an-event

- May 5 Volunteer Stream Monitoring - Training Day
- May 19 Volunteer Stream Monitoring - Field Day
- May 21 Volunteer Lake Monitoring - Training Day
- June 3 Volunteer Stream Monitoring - Indoor ID Day
- July 21 Whale of a Sale
- August 4 Bear River Cleanup
- August 20 Waganakising Bay Day *(During Festival on the Bay)*



Smithsonian Water/Ways Exhibit

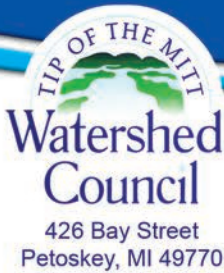
June 23, 2018 - August 5, 2018
St. James Township Hall, Beaver Island

August 11 - September 23, 2018
Raven Hill Discovery Center, East Jordan

Prescription and Over-the-Counter Drug (POD) Drop-off Community Collection Events

Visit www.pillsinthepod.com for complete details.

- April 19 McLaren Northern Michigan
Cheboygan Campus
9:00 a.m. - 1:00 p.m.
- April 24 McLaren Northern Michigan
Petoskey Campus
7:00 a.m. - 4:00 p.m.



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This newsletter contains information worth sharing. When you're done reading it, don't throw it out. **Pass it on!**



Education Update

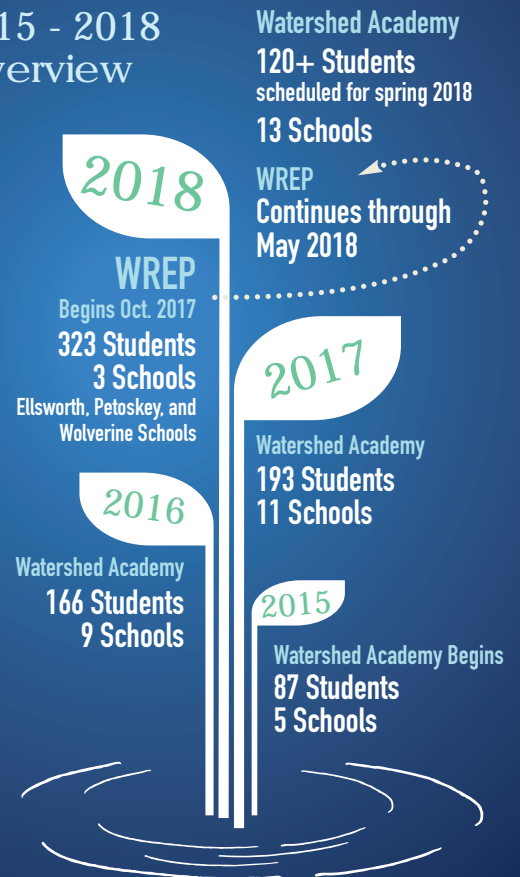
We are excited to report that our youth education programs are expanding! Students from all over the Watershed Council's service area continue to learn about their local watersheds and how to protect them through hands-on learning experiences.

Since 2015, our flagship education program, the Watershed Academy, has grown to include 13 schools. Wolverine and Beaver Island Schools are the newest additions to the program. Each year over 150 students work together in school teams to learn about their local watersheds and collect valuable stream data that is used to inform protection and restoration efforts.

In 2017, the Watershed Council initiated the middle school-based Water Resources Education Program (WREP). Over 300 students from Ellsworth, Petoskey, and Wolverine Middle Schools participated in the program. WREP focuses on teaching students about important water resource issues in their local watersheds and encourages them to design and implement projects to address these topics. Student team projects range from cleaning up a local beach and developing signage, to encouraging people to recycle, to creating native plant gardens. The teams will be wrapping up their projects by the end of the school year and will share their work with other teams at the WREP Summit on May 30th at the Petoskey Middle School Auditorium.

For more information about Tip of the Mitt Watershed Council's youth education programs, and to check out our videos, go to our website at www.watershedcouncil.org or contact Eli Baker at eli@watershedcouncil.org.

2015 - 2018 Overview



Our Youth Programs are Growing!