

Fieldwork Takes Flight

Taking off with a mosquito-like hum, the Watershed Council's drone whirred 300 feet up in the air above Larks Lake. From those heights, patches of plants showed up as dark streaks on the lake's bottom, and clouds formed a ceiling just out of reach. Moving back and forth in parallel lines, the drone captured images of the lake's surface and bottom. Later, the images were stitched together using a mapping program to make a fine-resolution aerial map.

Dubbed "The Mayfly" because of its winged resemblance to a common aquatic macroinvertebrate, the Watershed Council incorporated a DJI Phantom 4 Pro V2 drone into its field work in 2020. The drone was purchased with funds awarded by the Petoskey-Harbor Springs Area Community Foundation and with a contribution from Pickerel-Crooked Lakes Association. The new drone was part of a larger project to survey vegetation on Crooked, Pickerel, and Larks Lakes. Watershed Council staff used the drone to identify the presence of invasive species and determine if surveying could be enhanced with aerial imagery.

The invasive species identification portion of the project resulted in tangible protection of lakes with the help of local lake associations. The survey identified invasive *Phragmites*, a tall reed that can block out lake views and hinder wildlife habitat, in one location on Larks Lake. The Larks Lake Association and Watershed Council worked together to understand the benefits and risks of herbicide treatment, procure a treatment permit from the state of Michigan, and ultimately treat the *Phragmites* in the fall. While treatment may be needed for a few years, this partnership exemplified how detecting invasive species early and responding rapidly can prevent whole-lake infestations.

The Watershed Council also checked certain areas on Pickerel and Crooked Lakes that previously had or were prone to having invasive species, such as high traffic areas like boat launches. The Pickerel-Crooked Lakes Association's efforts to treat and manage invasive species (using information from the last Watershed Council survey in 2014) have been successful - only a few stems of curly-leaf pondweed (a crinkly-leaved aquatic plant) were found, and no

Eurasian watermilfoil was found in areas where it previously existed. The lake association identified one new patch of Eurasian watermilfoil and then worked with Watershed Council staff to quickly share treatment options with the riparian landowner.

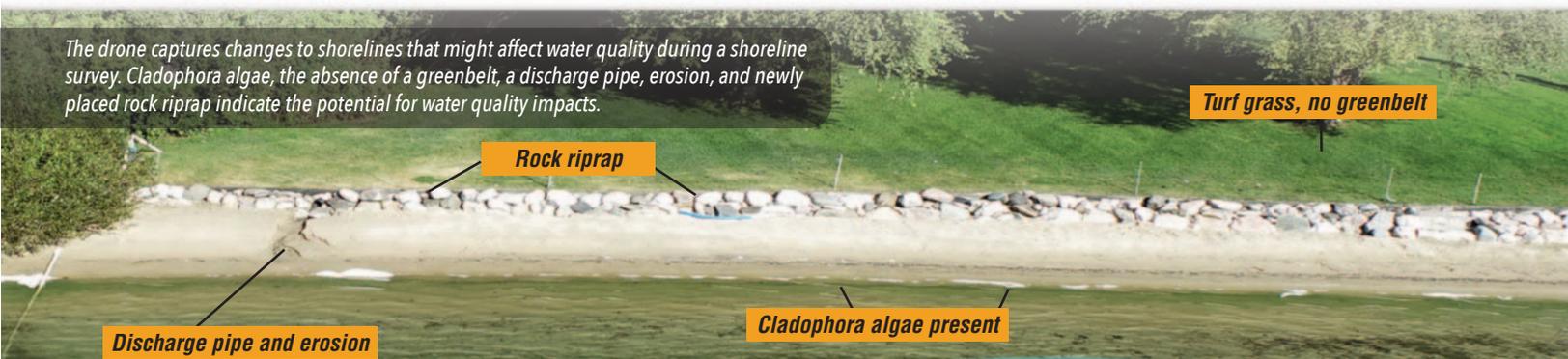


Monitoring Programs Coordinator Caroline Keson pilots the drone on Larks Lake during a vegetation survey.

So is the drone a good survey companion? The answer is as tricky as airspace regulations. In addition to complicated Federal Aviation Administration rules that the Watershed Council must follow, the drone can only fly in a light wind and can only take good aerial imagery in the calmest of conditions. Calm weather becomes especially important when photographing water, as the slightest of ripples will obscure the view of the lake bottom. Surveys over water mean that the drone has to be operated from a boat in order to keep it in sight during flight. The drone's short battery life and tracking the position of the sun to minimize shadows is also a limitation. Taking all of this into consideration means that the window for capturing aerial imagery each day becomes very small when on the water.

Once the logistics of using a drone are sorted, the resulting imagery offers a window into an underwater world. The presence and absence of vegetation can be detected, as can changes in the lake bottom and water color. In addition to vegetation surveys, the Watershed Council has tested the drone for use in detecting shoreline impacts on water quality. While analysis is still incomplete, views from the air allow both the shoreline and lake bottom to be evaluated for water quality impacts. While the drone has its own set of challenges, the Watershed Council is committed to protecting water resources with the best technology, no matter how turbulent.

The drone captures changes to shorelines that might affect water quality during a shoreline survey. *Cladophora* algae, the absence of a greenbelt, a discharge pipe, erosion, and newly placed rock riprap indicate the potential for water quality impacts.





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Reflections From Our Executive Director

Watershed Council 2020 Wins for Water

I'm sure all of you will agree, 2020 was like no other year in Northern Michigan. Despite the limitations that the COVID-19 pandemic presented to us, the Watershed Council accomplished a tremendous amount. We adjusted our approach and continued to address the threats facing our pristine waters. We are particularly proud of the important work we undertook this year and the highlighted wins for water presented here. In addition, please see the article on page 4 describing our policy wins for 2020.



Gail Gruenwald
Executive Director

- Gov. Whitmer and the Michigan Department of Natural Resources revoked and terminated the 1953 easement allowing Enbridge to operate Line 5 in the Straits of Mackinac.
- We completed fundraising for the first phase of construction for Cheboygan River fishing piers.
- We properly disposed of more than 4,500 pounds of unwanted and unused medications through our Prescription and Over-the-Counter Drug Drop-Off Program.
- Our mobile boat washing team cleaned 59 boats at 11 lakes, and educated over 400 members of the public on preventing the spread of aquatic invasive species.
- We completed our public survey on potential engineering alternatives for the Lake Street Dam.
- We obtained significant public feedback on green stormwater infrastructure projects in the Lake Charlevoix Watershed.
- We were certified by the Federal Aviation Administration to use drones in survey work.
- Staff educated over 2,000 members, lawmakers, and individuals in the public on topics that ranged from protecting the Great Lakes from oil spills to coastal resiliency and water levels.
- Our Watershed Protection Team surveyed 30 miles of the Walloon Lake shoreline.
- We completed two rain garden projects that will filter stormwater in Petoskey with support from the National Fish and Wildlife Foundation's Sustain Our Great Lakes Program and the Petoskey-Harbor Springs Area Community Foundation.
- With our fundraising support, the Emmet County Road Commission replaced a culvert at the Snider Road road/stream crossing.

Our events and education programs went virtual this year. We successfully hosted lake and river clean ups, our annual boat sale, our annual membership meeting, and several webinars and workshops. Resources on the above topics, along with many others, can be found on the Watershed Council's website at www.watershedcouncil.org.

The Watershed Council would like to thank our members and local foundation funders for making this work, and numerous other projects over the last 41 years, possible. In particular, we would like to acknowledge the Petoskey-Harbor Springs Area Community Foundation and the Charlevoix County Community Foundation. Both of these foundations have been instrumental in making several of the programs described above possible.

Our efforts this past year and throughout the past 41 years have focused on what each of us can do to protect our waters. We will continue to work tirelessly toward this end as we celebrate our forty-second anniversary in 2021. Please join us! Together, we can protect our resources for the good of our community today and for future generations.



The End of Line 5 - Could It Really Come This May?

On November 13, 2020, we experienced a historic win for the Great Lakes, our citizens, and our Northern Michigan economy. Gov. Gretchen Whitmer and the Michigan Department of Natural Resources (MDNR) revoked and terminated the 1953 easement allowing Enbridge to operate Line 5 in the Straits of Mackinac. The termination requires the pipeline to cease operations in the Straits on May 13, 2021.

After spending years and countless hours working to improve pipeline safety and emergency management, all the while working towards an end goal of decommissioning Line 5, the Watershed Council was thrilled with this decision.

The revocation and termination order came after the MDNR spent more than 15 months looking into Enbridge's compliance with the 1953 easement and determined there are persistent and incurable violations of the easement's terms and conditions. The MDNR found that Enbridge has failed to show "due care" while operating the pipeline, ignored pipeline support requirements for essentially the life of the easement, failed to properly monitor coating and address coating loss, and failed to comply with curvature requirements that can impact the structural integrity of the line. Many of these failures persisted for decades and cannot be corrected or otherwise cured.

The state also determined that the continued operation of the dual pipelines violates the state's solemn duty to protect the Great Lakes under the public trust doctrine. This body of law recognizes the State of Michigan as the "trustee" of the public's rights in the Great Lakes and lays upon the state legal obligations to protect those rights from any impairment. According to the state, "transporting millions of gallons of petroleum products each day through two 67-year-old pipelines that lie exposed in

the Straits below uniquely vulnerable and busy shipping lanes presents an extraordinary, unreasonable threat to public rights because of the very real risk of further anchor strikes and other external impacts to the pipelines, the inherent risks of pipeline operations, and the foreseeable, catastrophic effects if an oil spill occurs at the Straits."

As expected, Enbridge responded to the State of Michigan stating they have no intention of shutting down the pipeline. Instead, Enbridge filed a lawsuit in the United States District Court to dismiss the state's action. Enbridge is claiming that the revocation of the easement is contrary to federal law, and that pipeline safety resides with the federal Pipeline Safety Act and its enforcement is the responsibility of a federal agency, the Pipeline and Hazardous Materials Safety Administration (PHMSA).

Enbridge has yet to acknowledge that they entered into a binding agreement with the State of Michigan when they signed the 1953 easement. Enbridge failed to uphold the agreement and adhere to the required conditions since its inception. Their current disregard of the governor's and MDNR's revocation and termination order, which is based upon Enbridge's improper historic and current operation and maintenance of the pipeline, is inappropriate. Enbridge claims to be a good neighbor and steward for the lakes, but their brazen disrespect for Michigan law proves otherwise.

The state has a solemn, constitutional duty to protect the Great Lakes for the citizens of Michigan. We continue to support the efforts of Gov. Whitmer and the MDNR as they fulfill this duty by revoking and terminating the easement that Enbridge has breached and continues to breach. We hope to be celebrating the closure of Line 5 on May 13.





Leading in Lansing New Board Chair at Michigan Environmental Council

We are thrilled to announce that our policy director, Jennifer McKay, has been elected as chair of the Board of Directors for Michigan Environmental Council (MEC). MEC, a nonprofit organization founded in 1980, is a coalition of approximately 70 environmental and conservation organizations from around Michigan. MEC serves as a leading environmental voice in Lansing to educate officials and further protections of natural resources in Michigan. McKay has been a member of the MEC Board of Directors since 2018, and has served on a number of board committees, including as chair of the Policy Committee.

"Jennifer has been one of our strongest, most thoughtful, and most consistent policy voices at MEC, and her leadership is exactly what our movement needs as we step into an era of unprecedented challenges and opportunities," said Conan Smith, CEO and President of MEC. "Her passion for Michigan's ecological treasures and her deep experience in environmental policy will ensure that MEC and its member organizations are heard—and heeded—in the state capital."

MEC is collaborating with the Watershed Council on many current initiatives, including developing holistic surface water management for addressing lake level fluctuations in the Great Lakes and inland lakes, improving groundwater protection by implementing findings of the Water Use Advisory Council, and intervening on the Line 5 application before the Michigan Public Service Commission.

Highlights from 2020: Celebrating Important Policy Victories

As with the rest of our community, the state, and the country, Tip of the Mitt Watershed Council has grappled with the unprecedented challenges presented by COVID-19. For the Watershed Council's policy team, we went from walking the halls of Congress during Great Lakes Day in Washington, D.C., to working remotely. Despite the difficulties that have come with conducting our work in the midst of a global pandemic, we achieved a number of accomplishments in 2020.

Stopping Water Shutoffs

The Watershed Council, along with partners across the state, helped Senator Stephanie Chang pass the Water Shutoff Restoration Act. The bill protects Michiganders from the spread of COVID-19 by ensuring that every occupied residence has access to clean running water. It prohibits water shutoffs due to nonpayment and mandates that water services be restored to residences where shutoffs have occurred, in most circumstances, through March 31, 2021. Every Michigander should always have access to clean and affordable water, and the Watershed Council will continue to work toward these efforts.

Voters Passed a Referendum to Protect our Water, Wildlife, and Parks

The Watershed Council was part of a broad and diverse coalition formed to encourage Michiganders to vote yes on Proposal 1 in November. Proposal 1 was a ballot initiative to ensure that all future state mineral royalties are dedicated to conservation and recreation, and to require that at least 25% of the expenditures of these funds are used for activities like building trails, restoring historic structures, or reclaiming land for urban parks so the public can use and enjoy these special places. At least 25% of the fund will continue to be used to acquire and protect lands. The proposal passed with 84% voter support. With its passage, we are protecting our beautiful and essential land, creating opportunities for all Michiganders to experience the great outdoors, and fostering an appreciation for Michigan's natural beauty in each successive generation.

Boost in Great Lakes Restoration Funding

In a major victory for the Great Lakes and clean water advocates, the Great Lakes Restoration Initiative Act of 2019 passed through Congress and was signed into law. The bill allows Congress to continue funding the initiative for five years, and increases the program's annual funding from \$300 million to \$475 million by 2026. This is tremendous news for the more than 30 million people who rely on the Great Lakes for their drinking water, health, jobs, recreation, and quality of life.

New Standards for PFAS

In response to inaction by the federal government, Michigan enacted new standards for seven per- and polyfluoroalkyl substance (PFAS) compounds in drinking water—some of the toughest, most comprehensive standards on the chemicals anywhere in the country. In addition, the state updated its clean-up criteria for groundwater used as drinking water to include five new PFAS compounds, bringing the total number of PFAS regulated in groundwater to seven.

This highlights just a few of our 2020 policy successes. As we move forward in 2021, we will continue to be a trusted voice and a leading advocate while on the front lines protecting our water resources.

Farewell Grenetta

Watershed Policy Director Grenetta Thomassey is leaving the Watershed Council this summer after 16 years as a dedicated staff member. We are going to miss her immensely, and we wanted to take this opportunity to thank her for all of the years she's spent protecting Northern Michigan's precious freshwater resources.



Thomassey described her introduction to the Watershed Council in June 2005 as “jumping right into the fire.” She immediately started forming a coalition of Michigan environmental groups to support the Great Lakes Compact, with a goal of banning the withdrawal of water from the Great Lakes to areas outside of the basin, with limited exceptions. The coalition needed to get the compact through the legislatures of eight states and two Canadian provinces, then through Congress and onto the desk of former President George W. Bush, who signed the compact in 2008.

A second achievement came about in 2009 after previous Michigan Gov. Jennifer Granholm gave the State of the State address and proposed to cut funding for the state's wetland program. Under the proposal, Michigan would have relinquished responsibility for wetland management to the federal government, meaning fewer protections and a longer and more complicated permitting process. “I fell off my couch when I heard the announcement,” said Thomassey. In the end, Michigan's wetland program and hundreds of thousands of wetlands were saved by Thomassey's hard work.

Thomassey also spent a significant amount of time reviewing water-related ordinances in our four-county service area to protect our waters and offered recommendations for improving regulations. She also advocated for a statewide septic code and worked with local municipalities to enact ordinances to ensure septic systems are monitored and remain functioning to prevent contamination of our lakes and streams. These are just a few of the many ways Thomassey has advocated for healthy Michigan waterways during her tenure here.

“Grenetta has been such a remarkable asset to the Watershed Council and the waters of our region. She has earned the respect of local government officials, lake associations and their members, state and federal representatives, and our members. It will be hard to fill her shoes,” said Executive Director Gail Gruenwald.”

Grenetta has been a tireless champion for the Great Lakes and all of Michigan's water resources,” said Policy Director Jennifer McKay. “Having the privilege of working beside Grenetta for the last 16 years, I have witnessed her passion and professionalism. She had some long, contentious battles over the years, but she never gave up. The Watershed Council and our lakes, streams, and wetlands are fortunate that she was always there to advocate on their behalf.”

“I'm one of the lucky people,” said Thomassey. “This was the perfect job for me and I think I was the perfect person for the job. I have tremendous relationships with all the staff, and I love everything about being at the Watershed Council.”

We'll miss you, Grenetta!

Diversity, Equity, Inclusion, and Justice Task Force Formed

As our nation continues to grapple with painful reminders of multi-generational injustice and inequity, we are also seeing individuals, companies, social groups, and organizations engaging in civil discourse and taking a stand for justice. The Watershed Council deemed it crucial to participate in the important conversations that have been happening across the nation around justice and equity.

As a result, the Watershed Council has formed a Diversity, Equity, Inclusion, and Justice Task Force. The task force was formed to develop strategies and action plans for incorporating the core values of anti-racism, justice, diversity, equity, and inclusion into the organization's culture, policies, operations, and procedures. The task force, comprised of board members and staff, will provide a recommended action plan to the board of directors for approval and implementation.

If you have questions about this work, contact Watershed Policy Director Grenetta Thomassey at (231) 347-1181, Ext. 1118.

Your Opinion Matters To Us!

The Watershed Council is conducting a reader survey. We want to know if our newsletter is serving you. Can you help us by taking about 15 minutes to answer some questions about your experiences with Current Reflections? The survey is anonymous, unless you want to share your contact information with us. Please help us out by visiting <http://bit.ly/TOMWCreadersurvey> and letting us hear about the topics that interest you. Thanks so much for all you do!



Piloting Coastal Leadership in Emmet County

Tip of the Mitt Watershed Council had the unique opportunity to help plan and participate in a pilot program for the Coastal Leadership Academy. The Michigan Association of Planning (MAP), in coordination with the Michigan Department of Environment, Great Lakes, and Energy's (EGLE) Coastal Management Program, Michigan Sea Grant, and the University of Michigan piloted the leadership academy for our coastal community. The academy consisted of a sequence of three intensive, peer-learning virtual workshops for local decision-makers dealing with coastal hazards.

The pilot program engaged 15 community leaders representing shoreline interests within Emmet County. Representatives from the City of Petoskey, the City of Harbor Springs, West Traverse

Township, Emmet County Lakeshore Association, Little Traverse Bay Bands of Odawa Indians, Little Traverse Conservancy, Emmet County, and the Watershed Council participated. The goal of the academy was for participants to come away from this experience with the technical knowledge and local partnerships necessary to move planning and zoning changes forward that will provide non-structural approaches to coastal shoreline protection. Participants will become ambassadors for coastal resilience.

The pilot Coastal Leadership Academy was a great success. We hope that other coastal communities across the state can participate in the academy, and that participants in Emmet County will use what was learned to preserve and protect the county's vulnerable shoreline.

Grant & Project Announcements

In 2021, the Watershed Council received a \$72,900 grant from the Michigan Invasive Species Grant Program to fund our Mobile Boat Washing Station (MOBO), which you can read more about on the last page of this newsletter. We also received a \$15,000 grant from the U.S. Forest Service to support MOBO. We'll be working to prevent the spread of invasive species among water bodies and educating boaters about simple steps to protect Northern Michigan's waters.

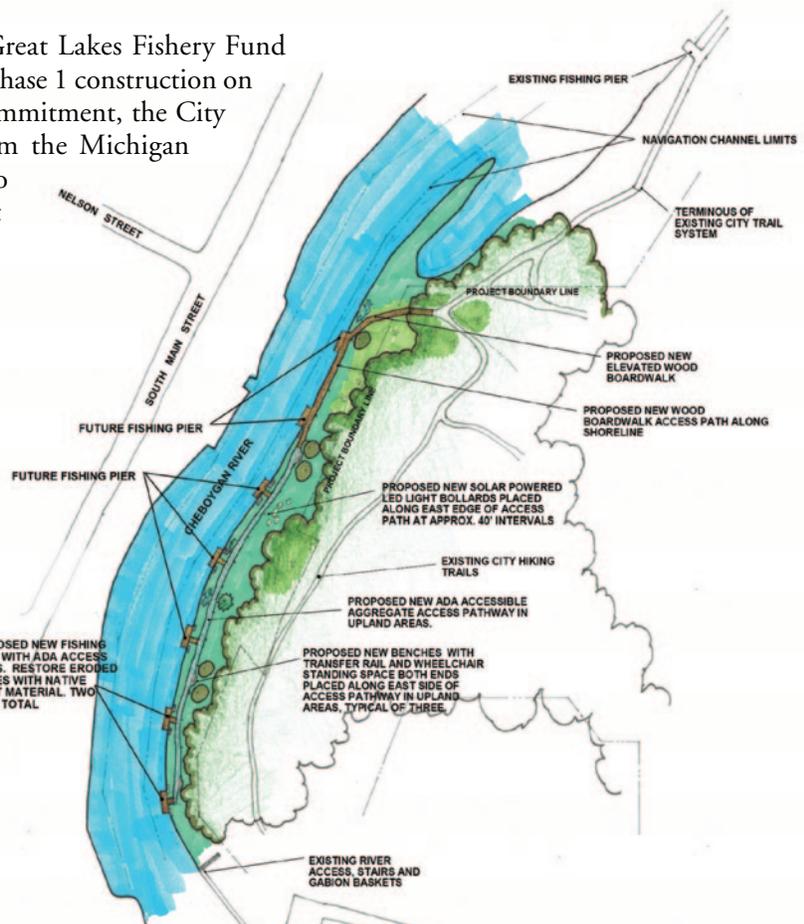
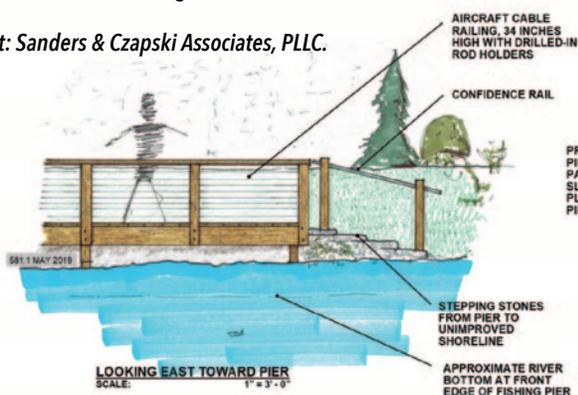
This year, we also received a \$22,600 grant from the Little Traverse Bay Protection and Restoration Fund of the Petoskey-Harbor Springs Area Community Foundation. The Watershed Council will be using the grant for green stormwater infrastructure planning in Petoskey.

In late 2019, the Great Lakes Fishery Trust Access to the Great Lakes Fishery Fund pledged \$325,000 to the Watershed Council for a portion of Phase 1 construction on the Cheboygan Fishing Access Project. In addition to this commitment, the City of Cheboygan applied for and was awarded \$300,000 from the Michigan Natural Resources Trust Fund in late 2020. We are excited to begin construction in 2021 with plans funded by the Great Lakes Fishery Trust in 2019.

Thanks so much to all our funders and partners!
We couldn't do this work without you.

Plans for an improved fishing access along the Cheboygan River in downtown Cheboygan will allow for anglers of all abilities to fish along boardwalks while reducing erosion from foot traffic.

Image credit: Sanders & Czapski Associates, PLLC.



Old Equipment Collects Data for Modern Problems

“I’m rusty, but I can still get the job done,” I thought. It was the first monitoring day of the season and I was on my way to the deepest point of my home lake. It was the same trip I’d taken once a week every summer since 1986. The wind felt warm, the sun bright. It was a bumpy ride, but I managed. My job? To collect a water sample for the Watershed Council’s volunteer lake monitoring program. I was there from the program’s start and the data I’ve collected has been used to detect trends and changes in water quality in inland lakes over time. Now, you might be thinking I’m a volunteer lake monitor, but you’d be wrong. I’m just a simple water sampler, a coffee can weighted with concrete and a plastic bottle. I might be a crude, cobbled together piece of equipment, but I’ve been a steadfast companion over the years to our real human volunteers (who honestly do most of the work).

Watershed Council volunteer lake monitors are very familiar with those humble water samplers, which they use to measure phytoplankton populations. Chlorophyll-*a*, a pigment found in all green plants and algae, is first collected in the water sampler. Water is then filtered and later analyzed to estimate the density of phytoplankton in the water column. Higher chlorophyll-*a* concentrations indicate greater phytoplankton densities, which reduce water clarity. Volunteers also measure water clarity by lowering a black and white Secchi disk into the water and recording the depth at which it is no longer visible. These two parameters together can tell us about a lake’s productivity, or ability to support aquatic life. Water that is clear can indicate a lake without a lot of plant growth, while water that is turbid, or cloudy, can indicate abundant plant life.

Trophic state index (TSI) is a way to classify lakes using Secchi disk, chlorophyll-*a*, and total phosphorus measurements. Nutrient availability, water volume, and the rate at which water is added to or lost from a lake are just a few of the factors determining some of this productivity. TSI values range from 0 to 100. See Table 1 to learn about each category.

Table 2. Volunteer lake monitoring results in Northern Michigan, 2020.

Lake or Basin Name	Secchi disk average (ft)	Chlorophyll- α average ($\mu\text{g/L}$)	Total phosphorus ($\mu\text{g/L}$)	TSI Carlson
Black Lake	12.25	0.42	--	31.52
Burt Lake, South	17.57	0.92	--	32.79
Clam Lake	11.75	0.97	4.8652	32.98
Crooked Lake	10.15	0.37	--	32.23
Douglas Lake, Otsego	16.96	2.25	--	37.43
Elk Lake	19.50	0.19	--	24.32
Lake Bellaire	11.45	1.02	3.9483	32.27
Lake Charlevoix, Main West	22.50	0.50	--	28.02
Lake Charlevoix, South Arm	13.90	1.37	--	36.43
Lake Louise/Thumb Lake	20.54	0.30	--	26.18
Larks Lake	6.32	2.09	--	44.18
Mullett Lake, Mullett Creek	14.61	0.24	--	27.52
Mullett Lake, Pigeon Bay	16.36	0.63	--	31.43
Nowland Lake	10.07	2.01	--	40.64
Pickereel Lake	9.69	0.98	--	37.41
Six Mile Lake	7.06	1.70	--	42.39
Skegemog Lake	16.09	0.65	--	31.72
Thayer Lake	8.04	2.43	--	43.19
Torch Lake North	28.14	0.25	2.739	21.58
Torch Lake South	26.38	0.30	1.0287	17.18
Twin Lake	16.50	1.30	--	34.93
Walloon (Foot Basin)	13.23	0.96	3.70	35.07
Walloon (North Arm Basin)	8.59	1.33	7.04	39.77
Walloon (West Arm Basin)	13.60	0.80	4.54	33.98
Walloon (Wildwood Basin)	14.69	0.51	2.6384	31.18

Note: Summary data only includes data collected between June 1, 2020 and August 30, 2020. Quality assurance controls were applied to data to ensure summary results are representative of the entire season and reduce bias towards a particular month. Data was only available for Crooked Lake in June and July 2020. Total phosphorus was either collected by the Watershed Council or volunteers.

Table 1. Trophic state indices and their relation to lake characteristics.

Trophic State	Carlson TSI	Lake Characteristics
Oligotrophic	<38	Low levels of organic matter, deep, clear, oxygen-rich bottom, cold-water fish species like trout, limited by phosphorus
Mesotrophic	38-48	More organic matter, oxygen is low at lake bottom, good habitat for walleye
Eutrophic	48-61	High amount of organic matter, lots of plant growth, poor clarity, no oxygen at lake bottom
Hypereutrophic	>61	Nutrient-rich, nuisance algal blooms and plants, low visibility

The majority of lakes monitored in the Watershed Council's program were oligotrophic in 2020, meaning they were relatively clear compared to high productivity eutrophic lakes. Oligotrophic lakes are characteristic of glacial geology and point to some success in controlling excess nutrients from outside sources like fertilizers and leaky septic systems. A few lakes were mesotrophic, and still have high water quality while providing extra habitat for certain fish species like walleye.

The seasonal averages reported here do not capture changes in lakes from month to month, as some lakes became eutrophic later in the season. The Watershed Council uses volunteer data to help lake associations and riparians understand and address nonpoint source pollution.

Are you interested in being a lake monitor? We need help on a number of lakes! Contact us at info@watershedcouncil.org or call (231) 347-1181, Ext. 1111, for more information about our monitoring programs.

We need help monitoring the following lakes:

Emmet County

O'Neal
Wycamp Lake
French Farm Lake
Round Lake

Charlevoix County

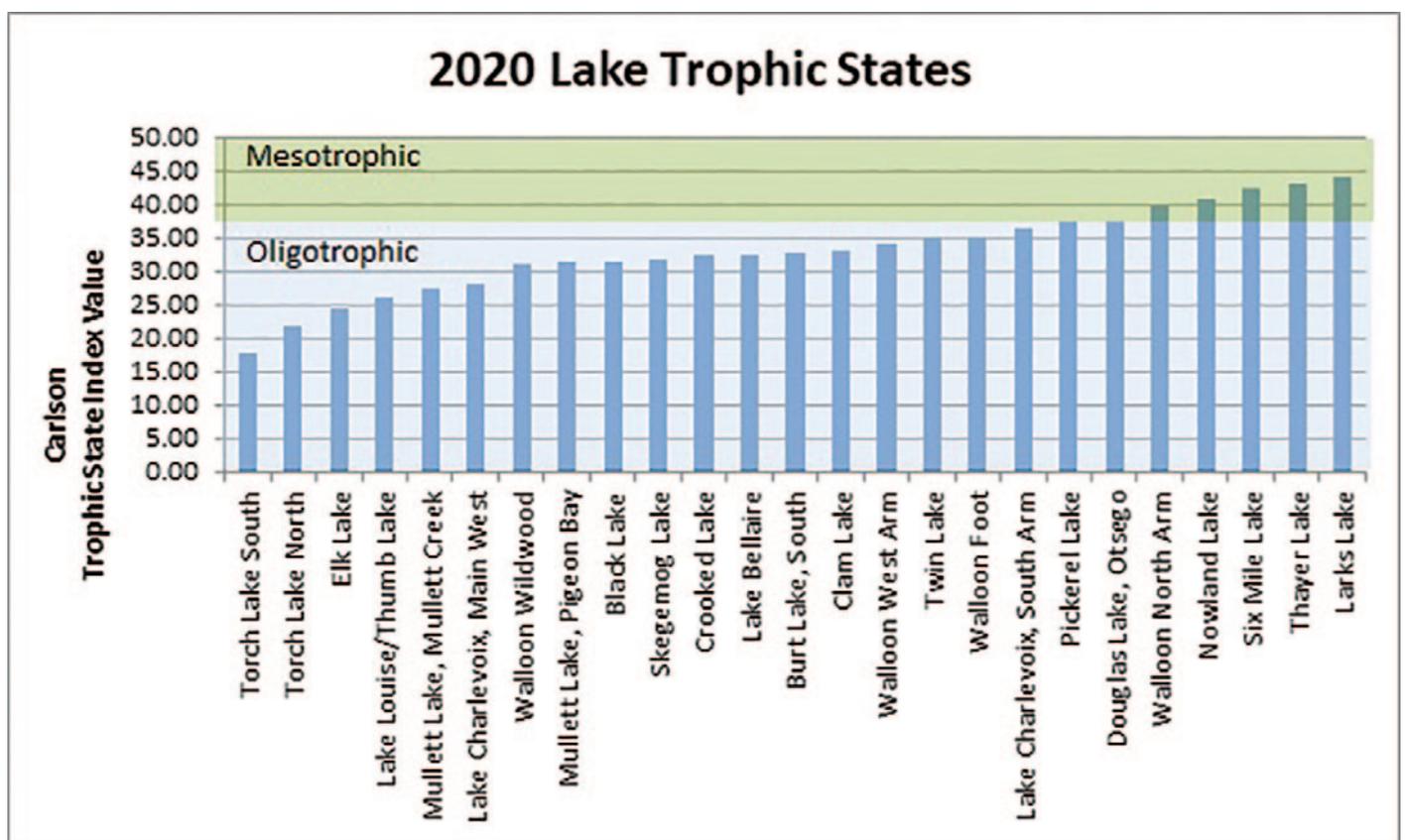
Deer Lake
Huffman Lake
Marion Lake
Susan Lake

Cheboygan County

Douglas Lake
Munro Lake
Lancaster Lake
Silver Lake
Wildwood Lake

Antrim County

Bass Lake
Beals Lake
Birch Lake
Ellsworth
Hanley Lake
Scotts Lake



Volunteer Stream Monitors Get the Scoop on River Health

Nestled in submerged logs, tucked away beneath rocks, and clinging to pieces of pondweed, tiny macroinvertebrates live in an underwater world, owing their existence to resources traveling down streams and rivers. They breathe water, eat slime, spin nets, and cocoon themselves in rocks and sand for protection. They don't have backbones, and many of them have complicated camouflage. They go about their daily lives, filtering, feeding, and relying on their adaptations and water quality to keep them alive. While they spend most of their lives in the water, you may be more familiar with their adult forms as they hatch into flying mosquitoes, black flies, caddisflies, mayflies, and stoneflies. Their omnipresence and sensitivity to pollution make them good candidates to indicate water quality.

Every spring and fall since 2005, Watershed Council volunteer stream monitors perform biological monitoring by scooping aquatic insects and other macroinvertebrates out of streams using nets. Volunteers look for macroinvertebrate groups such as mayflies, stoneflies, and caddisflies, which are highly sensitive to environmental change or pollution. A healthy variety of these pollution-sensitive macroinvertebrates indicates a healthy ecosystem with high water quality, while a stream with only pollution-tolerant aquatic worms and midges suggests an ecosystem is likely suffering. A water quality grade is assigned to each monitoring site using a weighted numeric scoring system based on total groups of mayflies, stoneflies, and caddisflies. Because so many factors can affect macroinvertebrate counts, it's important to compare 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.

COVID-19 concerns prevented many teams from monitoring in 2020. Stay-at-home orders only allowed teams to monitor in the fall. Six streams were monitored this year and we have included the results for four of them in this summary. The Watershed Council plans to offer volunteer stream monitoring in the spring and fall of 2021 as long as the activity meets

The Pigeon River lies in the heart of the Pigeon River Country State Forest Area. The area is the largest undeveloped and publicly owned block of land in Michigan.



Bill Beeman uses a dip net to collect macroinvertebrates in the south branch of the Boyne River near Boyne Falls.

COVID-19 criteria for gatherings set by the state government. Volunteers will also have the chance to be at the forefront of invasive species detection as New Zealand mudsnail monitoring will be incorporated. The mudsnail is a rapidly spreading and highly adaptable miniscule snail. Many agencies in the region will work together to determine if it is present north of Traverse City, Michigan.

Boyne River = A

Flowing in two branches that begin near Thumb Lake and Elmira, the Boyne River feeds into Lake Charlevoix. It has been monitored since 2005 and both the north and south branches were monitored in 2020. The Boyne River is a designated trout stream and the north branch is home to the endangered Hungerford's crawling water beetle. Historically, the Boyne River has an A rating and it received the same score in 2020.

Eastport Creek = C

Three Lakes Association has found high bacteria and phosphorus in the creek in the past. The stream has been sampled for macroinvertebrates since 2005 and has a mix of agricultural, developed, and natural areas in its watershed. Historically, the stream was rated a B. The abundance of sand at one site may account for the lower score, as sand has less habitat for macroinvertebrates than a mix of cobble, rock, and vegetation.

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 scores and the river retained its historic A score.

Stover Creek = C

Stover Creek is 6.9 miles long and flows into Lake Charlevoix just south of the City of Charlevoix. Its watershed encompasses over 4,000 acres and is dominated by agricultural lands upstream and urbanized areas towards the mouth. This year, the Brookside Cemetery location decreased from a B to a C, which held Stover Creek at its average C score. The monitoring day was very stormy, which may have resulted in fewer macroinvertebrates found.

Thinking about monitoring a stream? We've got one for you! The following streams are Watershed Council priorities because they are slated for road/stream crossing improvements or they need more local volunteers to monitor them.

Charlevoix County	Cheboygan County	Antrim County
Boyne River	Berry Creek	Cedar River
Horton Creek	Kimberly Creek	
Jordan River		

Contact us at info@watershedcouncil.org or (231) 347-1181, Ext. 1111, to learn more about becoming a stream monitor.



Richard Jenkins monitors Stover Creek in Charlevoix, which was the first stream monitored in the volunteer program.

Record High Water Levels Mean Fewer Bird Deaths Due to Avian Botulism

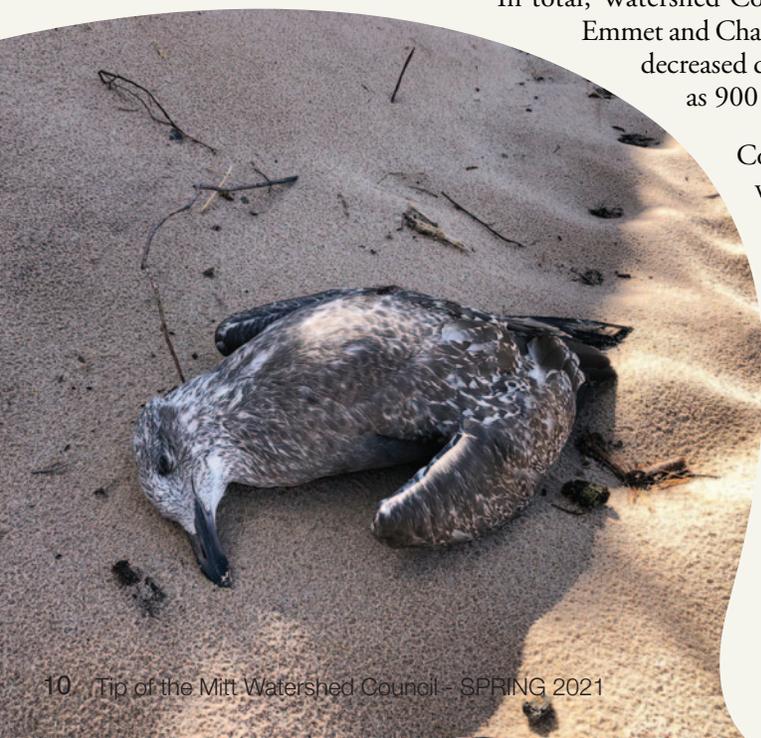
While the Great Lakes' high water levels are a bane to beach lovers and riparian property owners, they could be a boon for birds. Water levels and water temperatures are related to the production of a neurotoxin called botulinum. Lower water levels and higher water temperatures can cause an abundance of Cladophora algae. The algae provide a food source for the bacterium that creates the botulinum. Two invasive species (zebra mussels and round gobies) help botulinum up the food chain where it bioaccumulates and causes paralysis and eventually death in fish and birds. If you've seen a dead bird on a Great Lakes beach, it may have died from botulism.

In fall 2020, high water levels made for the second difficult year in a row for avian botulism monitoring. The absence of beaches reduced collection points for washed up birds, so volunteers focused on coves and bays that were "hot spots" in previous years.

In total, Watershed Council volunteers walked 49.2 miles of Lake Michigan shoreline in Emmet and Charlevoix Counties in their search and found 11 dead birds. The mortality decreased drastically from previous years in the same two counties (some as high as 900 birds).

Common loons made up the majority of dead birds in 2020, and none were sent to the Michigan Department of Natural Resources because of difficult logistics caused by working remotely. The Watershed Council's data is used to estimate total Lake Michigan mortalities and predictions for next year. Botulism outbreaks throughout the Great Lakes are mapped using the Wildlife Health Information Sharing Partnership (WHISPers), which can be viewed at <https://whispers.usgs.gov/home>.

Freshly dead birds such as this juvenile gull found at Sturgeon Bay in Emmet County can be frozen and later tested by the MDNR's Wildlife Disease Lab in Lansing for the botulism toxin. This bird likely died from an injury and was not sent in for testing. Photo by Sue Stewart.



Bringing Back Brookies

One of Michigan's most iconic fish—the brook trout—got a boost when the Emmet County Road Commission, with help from Tip of the Mitt Watershed Council, replaced two culverts at a road/stream crossing in the Crooked River Watershed.

Road/stream crossings are areas where roads pass over flowing bodies of water. An inventory completed by the Watershed Council in 2015 indicated there are 168 crossings in the 580 square miles of the Burt Lake Watershed, which includes the Crooked River Watershed.

Why are road/stream crossings important? Aquatic animals need room to roam and reproduce. For a fish, some areas of a stream might be much better places to find food or mates than others. If a road crosses a stream, and the passageway that diverts water under the road is too small or perched above the water level, aquatic species can't travel as easily.

At Snider Road, two old culverts were rusted and undersized. They were also perched a few feet above the stream level, leaving no way for brook trout to swim through without a big struggle.

Brian Gutowski, the engineer manager of the Emmet County Road Commission, explained that undersized culverts can build up water pressure on the upstream side. "This forces the



water through the culvert at high speed and on the downstream side it washes a lot of material away." The Snider Road culverts were responsible for eroding over 500 pounds of soil per year from the banks of the tributary.

To address these problems, the Snider Road culverts were replaced with a single, larger culvert that will allow aquatic species to pass through and prevent flooding. The next road/stream crossing improvement on the list is at Berry Creek and Banwell Road, in which two culverts will be replaced with a 26 foot clear-span bridge.

"We've partnered with Tip of the Mitt Watershed Council on several road/stream crossings in the past and this is the next phase," said Gutowski. "Without working with the Watershed Council on funding, we'd never be able to get them replaced."

Funding for these road/stream crossing improvement projects was provided by the U.S Fish and Wildlife Service's National Fish Habitat Partnership Program and the Michigan Department of Natural Resources Aquatic Habitat Grants Program.

We Speak For Our Waters

Protecting our region's waters benefits everyone in the community. Our lakes, rivers, and wetlands have no voice in our political or economic system. Oftentimes, the advocacy undertaken by the Watershed Council acts as the only "voice" for our waters.

To give voice to our waters, we review copies of all permit applications within our four-county service area for projects that may impact wetlands, streams, shorelines, inland lakes, and the Great Lakes. We first determine if the proposed project meets the requirements of state and/or federal law. This includes looking to see if the proposed project will avoid and minimize adverse impacts to water resources, if there is a feasible and prudent alternative to the project, and if mitigation has been proposed. For those projects that could impact water resources, we often provide recommendations to avoid or reduce impacts. In some circumstances, the project is so poorly designed, not needed, or will have unacceptable impacts on aquatic resources that we recommend denial of the project.

Because we review all permit applications in our service area, we highly recommend that any home owner or consultant who will be submitting an application meet with us first. We will gladly review site plans and provide you with our thoughts and recommendations prior to the permitting process. We would much rather review your proposed project than recommend denying it. Please contact the Watershed Council with any questions on this permit review program at (231) 347-1181 or info@watershedcouncil.org.

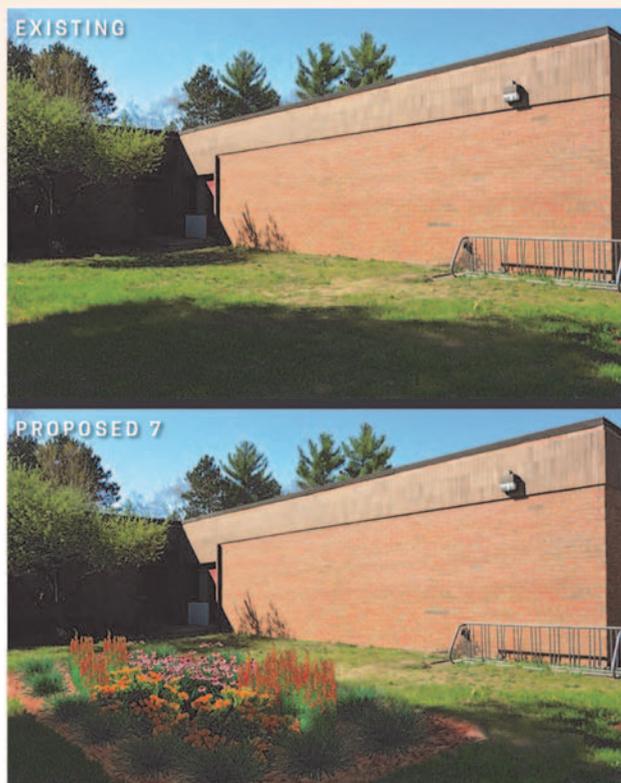
Protecting Lake Charlevoix with New Green Stormwater Infrastructure

After a year of conducting site surveys, monitoring stormwater, meeting with local government officials, and hosting interactive community meetings, the Watershed Council's Lake Charlevoix Green Stormwater Infrastructure (GSI) project, Increasing Capacity for Coastal Resilience, has concluded. Boyne City, East Jordan, and Charlevoix have been presented with a variety of potential site-specific GSI practices—like rain gardens, bioswales, and tree box filters—that, if implemented, will protect the water quality of Lake Charlevoix. These GSI techniques help to manage stormwater by mimicking natural processes that can help keep water resources clean and protect public health. When used in tandem with existing stormwater infrastructure, they lower costs and can enhance stormwater treatment prior to release into Lake Charlevoix.

During the fall of 2020, residents of the three cities were invited to participate in a unique online survey using ArcGIS StoryMap, an immersive online platform, to gauge their interest in 25 potential GSI projects that could be constructed in their cities. The ArcGIS map showed participants artistic renderings of proposed GSI practices and compared them to existing site conditions. In total, more than 150 people participated in the online survey.

Of the proposed GSI projects presented across the three cities, all were met with a mostly positive public response. In fact, most survey respondents expressed a desire to see more GSI implemented in their communities. Also, a majority of the survey respondents strongly agreed that GSI is important to improving the water quality of Lake Charlevoix, demonstrating a strong local understanding of the interconnectedness between GSI and water quality.

Funding for this project was generously provided by the Coastal Management Program, Water Resources Division, Michigan Department of Environment, Great Lakes, and Energy; the National Oceanic and Atmospheric Administration; and the Charlevoix County Community Foundation. The project was a collaboration among Tip of the Mitt Watershed Council, Drummond Carpenter, and the three municipalities within the Lake Charlevoix Watershed. Now, leaders from Boyne City, Charlevoix, and East Jordan can move forward in pursuing funding to bring these design concepts to life, which will help protect the Lake Charlevoix Watershed for generations to come.



These photos show some of the proposed GSI projects for the Lake Charlevoix Watershed that survey participants could choose as their favorites.



Watershed Academy: More Than Meets The Eye

The students scoop their nets into Bellaire's Shanty Creek and dig into the rippling water and sediment. Water Resources Education Coordinator Eli Baker directs them to take the muck they've collected and deposit it into trays. When their time wading in the creek is finished, the students and Baker hunch over the trays, searching for signs of life. Petri dishes fill with wriggling masses of insects, and they even spot a few fish. They record the species they found, take off the waders, and head back to Bellaire High School. This is the Watershed Academy (WA), where students monitor the state of Northern Michigan streams as part of their science curriculum.

The Watershed Council's WA programs have been implemented across Northern Michigan for the past six years. Before the pandemic changed how classrooms operated, Baker was educating students at 13 high schools and students were monitoring 14 streams. However, WA is more than just an education program.

"The students are collecting the same data that our volunteer stream monitors are collecting over our entire service area," explained Caroline Keson, our monitoring programs coordinator. Not only are the students learning about ecology and water chemistry, they're also contributing to the baseline data that we use to detect changes in stream water quality and habitat over time. For instance, Shanty Creek runs through a golf course on its way to the data collection site, and the students could detect potential changes in the creek due to landscaping practices.

Baker said that students collect data on stream characteristics like potential aquatic habitats and macroinvertebrate diversity, hence the long trays full of interesting insects scooped from Shanty Creek. They also collect information on pH, dissolved oxygen, nitrates, phosphates, and bacteria levels.

Baker loves getting into the streams with new students: "For some it might be their first time stepping into this water body or their first time wearing waders. It's exciting to explore and see their discoveries firsthand."

The students' hard work doubles the Watershed Council's reach of data collection, according to Keson. She said that the quality of student's data means that it can be used for water management plans and entered into a statewide database that allows for the comparison of stream quality all over the state.

Tom Baeckeroot is a science teacher at Bellaire High School, and he's been working with the Watershed Academy since 2016. Baker comes into his freshman science classes to pitch WA to the students, and encourages students that are interested to apply for the program. Baeckeroot's had a lot of fun, and a lot of success. As a result of the program, three of his WA students have gone on to study environmental sciences.

"Two of them would tell me, 'I hate science,' and now they're looking into a career in science," Baeckeroot said. "I sit back and smile and think, 'Told ya.'"

Bellaire High School students identify the macroinvertebrates they found in Shanty Creek and measure water chemistry.



Upcoming Events

We are still recipients of the **Pour for More** Microgrant program. All year round, your purchases at certain restaurants benefit the Watershed Council. Visit www.pourformore.org to find participating venues, and make sure to ask for the Pour for More drink when you go.

Volunteer Stream Monitoring

New Monitor Training: May 12, 5:30 p.m. to 7:30 p.m. Located at the Bear River Shelter, Bear River Valley Recreation Area, Petoskey. Register at www.watershedcouncil.org/attend-an-event.

Volunteer Lake Monitoring

Existing Monitor Training: May 18, 10:00 a.m. to 12:00 p.m. Register at www.watershedcouncil.org/attend-an-event for this online training.

Volunteer Lake Monitoring

New Monitor Training: May 20, 5:30 p.m. to 7:30pm. In-person training, with location dependent on number of registrants. Register at www.watershedcouncil.org/attend-an-event.

Whale of a Sale: July 15 – 17, 10 a.m. to 2 p.m., Irish Boat Shop Storage Unit, 7580 S. State Street in Harbor Springs. For more information, check out www.watershedcouncil.org/wos.

Annual Meeting: July 20, 10:00 a.m. to 11:30 a.m. Join us as we celebrate the retirements of devoted staff members over Zoom. See www.watershedcouncil.org/attend-an-event for details on registration.

Clean Waters Challenge: Join us August 7 – 14 for our socially distanced virtual lake and river cleanup. There will be fun challenges and prizes! See www.watershedcouncil.org/clean-waters-challenge for more details.

Winter Wonderland

From the surface, everything looks lifeless. Dried sedges and cattails rustle in the wind, and the ice is an opaque sheet over the lake's surface. In winter, it's hard to imagine that life still goes on under the frigid water. After all, a fall into a frozen lake would be treacherous for a human. Still, animals make their lives and homes beneath the ice and snow while we huddle beside our wood stoves, and then emerge victorious in the spring. What were they doing down there while we tried to keep warm? If you've ever asked that question, read on!

Fish tend to slow down a lot when it's cold outside. The ice that forms over water insulates lakes and rivers, while the warm water sinks towards the bottom. While some fish, such as invasive round gobies, burrow into the sediment, most fish just hang out and rest near the bottom. Their lowered metabolisms mean they don't have to move around as much to find food. It can take a bit of work for anglers to find that sweet spot of warm water to pull out a walleye or perch in winter.

What about aquatic macroinvertebrates? Those small animals without backbones, like stoneflies, water striders, and other lake and stream residents, have different strategies to deal with the cold. Insects like water striders find places on land to hide from the snow, while whirligig beetles burrow into the mud. However, some insects party like it's 1999 under the water. Some types of larval stoneflies, which can indicate good stream quality, transition from larvae to adult in the freezing cold winter, crawl out onto the snow and ice, and look for mates. Nymphs of mayflies and dragonflies are also active underwater in winter as they hunt for food and prepare to emerge as adults in the spring.

Do you miss frogs and turtles in the winter? While not entirely aquatic like fish, some spend a lot of time in or near aquatic habitats. Michigan has 12 frog species, two kinds of toads, 12 salamander species, and 10 kinds of turtles. None of them enjoy winter very much. American bullfrogs, leopard frogs, and a few others go dormant underwater. The rest burrow beneath the frost line or find shelter from the snow beneath logs or other debris. A handful of our Michigan frogs actually produce loads of sugar that acts as antifreeze in their vital organs. Most of the salamanders burrow underground in the winter, but a few, like the intrepid mudpuppy, stay active underwater. Our turtles can handle the winter months at low oxygen levels buried under sediment in the bottom of lakes and streams, though box turtles hibernate on land.

When you look out over a frozen inland lake or the stilled oxbow of a river next winter, don't be fooled! Animals are still there, either moving in slow motion, like walleye; thriving without the threat of predation, like stoneflies; or deep in a contemplative sleep, like snapping turtles. If you're interested in reading more about adaptations that make animals so successful in winter, check out Bernd Heinrich's book, "Winter World."



Bear River. Photo by Kristy Beyer



THANK YOU

Tia Esposito

Kathy Germain

VSM, VBM, and VLM monitors

Daniel Gonzalez, Watershed Council Policy Intern in 2018, who generously volunteered time in the final quarter of 2020 to help organize raw data from survey responses, and created graphs needed for reports and presentations.

Welcome New Members

- | | |
|------------------------------------|--|
| Mr. and Mrs. Bill Albertson | John and Carrie Hayden |
| Dr. and Mrs. Mark Antonishen | Mr. and Mrs. Ralph Heid |
| Ruth and Jerry Augustine | Glenn and Dorothy Hessler |
| Mr. and Mrs. Josh | Karen and David Hill |
| Baker Marianne and Thom Barry | Dr. Charles S. Holmes |
| Roger and Jennifer Bates | Mr. and Mrs. Thomas L. Jackson |
| Alex and Phyllis Bauer | Mr. and Mrs. Adam Jankowski |
| Ray and Susan Bice | Claire Kafer |
| Birch Lake Association | Mr. and Mrs. David L. Kendall |
| Mr. and Mrs. James M. Braun | David Kolar Milos Koscica |
| Mr. and Mrs. Robert F. Brinich | Mr. and Mrs. Kurt Lacks |
| Tim and Deb Broderick | Lake Club of Hidden Valley Property Owners Association |
| Barbara M. Camp | Ty and Lisa LaPrairie |
| Mr. and Mrs. Michael W. Carland | Ms. Phyllis H. Ledyard |
| Donald Carpenter | Harry Lenick |
| Mr. and Mrs. Todd Chappell | Mr. and Mrs. Martin Luchtefeld |
| Martha Churchill | Mr. and Mrs. Joe Malloure |
| Mr. and Mrs. Royal Clippert | Ronald Miller |
| Martha H. Coscina | Ms. Dana Mulder |
| Mr. and Mrs. Loic Couraud | Chris and Molly Nawrocki |
| Patricia Zajac and Mark Cowles | Andrew Norden |
| Crooked Tree Breadworks | Mr. Jonathan Parlow |
| Frank and Dana D'Andrea | Frances Pattison |
| Nancy P. Dennis | Todd and Sharon Pawlik |
| Mr. and Mrs. John Dorland | Ms. Pamela Reyburn |
| Danyelle Douglas | Mr. David Robinson |
| Mary Dye | Mr. and Mrs. Mark Rowlands |
| Mr. and Mrs. Charles R. Eisendrath | Tom and Joan Schellenberg |
| Barbara Nixon and George Elias | Mr. and Mrs. Joseph Sgroi |
| Jacalyn and Andrew Elsoffer | John D. Staley |
| Kurtis and Lynn Finch | Mr. and Mrs. Thomas A. Teel |
| Nathan Fleshman | Wendi Tilden |
| Mr. and Mrs. James S. Goetz | Chris Tracy |
| David and Laurie Graham | Mr. and Mrs. Jeffrey R. Twyman |
| Green Toe Gardens | |

New members since 10/31/2020

Honorarium & Memorial Gifts

In Honor Of:

- | | |
|--------------------------------|---------------------------------------|
| Mr. and Mrs. A.W. Hallett | Ashley Soltysiak |
| Barbara Kauper | Mr. and Mrs. David Lurie |
| Charles and Patty Forsberg | John and Sandy Baker |
| Mr. and Mrs. Erik Borgen | Mr. and Mrs. David M. Culver |
| Mr. and Mrs. Greg Renker | Jerry Draheim |
| Mr. and Mrs. Alex Taylor | Mr. Andy Draheim |
| Mr. and Mrs. Michael Pettibone | Andrea Kramer |
| Tom Stringer | Nathaniel Kramer |
| Mr. Bill Craig | Mike and Peg Supernault |
| Mr. and Mrs. John McCoy | Ty and Lisa LaPrairie |
| Mr. and Mrs. Matt Bowman | |
| Mr. and Mrs. Robert Bowman | In Memory Of: |
| Mr. and Mrs. Todd Winnell | Janet MaCris |
| Evening Star Joinery | Barbara M. Camp |
| Isaac and Lauren Winnell | Judi Walter Pabst |
| Kate Winnell | Sandy Smith |
| Liz and Ben Doornbos | Leonard Stenger |
| Michael and Kate Winnell | Birchwood Association of Mullett Lake |
| Todd and Jennifer Winnell | Dave Irish |
| James and Dawn Kerwin | Coastal Crawl Swim Club |
| Sue Maxey | John Douglas Zoerhoff |
| Jim and Therry Colombo | Doug and Nancy Zoerhoff |
| Sue and Gary Stewart | Debbie Messer |
| Ken and Jan Stewart | John Messer |
| Kris and Terry Finn | Charles Letts |
| Kenneth Knowles | Mr. and Mrs. Charles G. Kneese |
| Barb and Frank Rider | Asho and Lyle Craine |
| Linda Badalucco | Mr. and Mrs. Tim Craine |
| Linda Heller | |

Share Your Love of Water

Give a personalized gift membership today. Not only does this unique gift idea help protect our waters, it will be enjoyed by your friends and loved ones throughout the whole year. To learn more about gift memberships, visit our website at <https://www.watershedcouncil.org/donate>.

POD

PRESCRIPTION & OVER-THE-COUNTER
DRUG DROP-OFF

2021 POD Community Collection Events

Saturday, April 10, 2021

9:00 a.m. – 1:00 p.m.

McLaren Northern Michigan

Petoskey Campus - Hospital Circle Drive off Mitchell Street

Cheboygan Campus - Entrance North of the Emergency Department

Saturday, July 10, 2021

9:00 a.m. – 1:00 p.m.

McLaren Northern Michigan

Petoskey Campus - Hospital Circle Drive off Mitchell Street

Cheboygan Campus - Entrance North of the Emergency Department

Please note, all events are subject to cancellation due to COVID-19. Please contact Tip of the Mitt Watershed Council at (231) 347-1181, or check our Facebook page for the most up-to-date information.



Non-Profit Org.
USPS Mktg.
Mail
Petoskey, MI
Permit No. 108



This newsletter contains information worth sharing.

When you're done reading it, don't throw it out.

Pass it on!

ADDRESS SERVICE REQUESTED

Blasting Away Invasive Species

After completing a successful 2020 pilot year, we're making big plans for our 2021 Mobile Boat Washing Station field season. Our station, lovingly dubbed "MOBO" by last year's crew, is ready to kick off this year's programming starting on Memorial Day weekend and running through Labor Day. Last season, we visited 11 water bodies and engaged with over 400 members of the public despite challenges presented by COVID-19. This year, thanks to funding provided by the United States Forest Service and the Michigan Invasive Species Grant Program, we are pleased to expand upon the existing program and have an even greater impact.

Our crew will again use hot water to blast away invasive species, like Eurasian watermilfoil, zebra mussels, and curly-leaf pondweed, among many others, from the boats entering and leaving our area lakes. The program, which will run each weekend throughout the summer, will continue to limit new aquatic invasive species (AIS) introductions and reduce the transmission of established invasive species populations from Northern Michigan waterbodies. We will accomplish this goal by physically removing organic material from water crafts and raising public awareness about AIS and effective mitigation tactics.

We are especially excited to highlight two weekend events with the U.S. Forest Service, with more information on our website as the details are finalized. Additionally, we are expanding our efforts to team up with local lake associations to reach even more lakes in our service area this summer. Volunteers are welcome to participate and help spread the word. So, please stop by when MOBO comes to your area. Check our website, <https://www.watershedcouncil.org/attend-an-event.html>, and social media posts for our MOBO schedule. We encourage people to help themselves to our free AIS information and fun summer swag. Don't forget to get your boat or trailer washed so we can all continue to enjoy healthy Northern Michigan lakes for many summers to come.

Garrett Greer washes a boat in summer 2020 as part of our inaugural year with the Mobile Boat Washing Station.

