GEORGIAN BAY FOREVER

NEWSLETTER

Vol.17 · Issue 3 · FALL 2026

FRAMING DATA

How We Utilize Information

Data is multidimensional and should always be treated as such. When it comes to research, it's the variety of data that paints a fuller picture.



Featured in this Issue

An Interview with Melissa Duhaime on Microplastics Research

Our Experience with the Electric Boat Motor

Lake Sturgeon Can Live for Centuries: What It Means for Conservation

Understanding Ecological Responses to Warming by Kaleigh Davis

A Message from Robert Turner,

Chair of Georgian Bay Forever



Welcome to fall! Looking back and ahead, GBF has so much to be proud of and grateful for. What we accomplish comes down to your donations and the leadership within GBF that makes every dollar count. With that context, the Board of Directors is happy to announce that our Executive Director, David Sweetnam, is the recipient of the 2026 Watershed Guardian of the Year Award from the Ontario Headwaters Institute. They have recognized David as a "results-oriented ambassador working to preserve and protect the precious watersheds, ecosystems and biospheres of Ontario…the Great Lakes and specifically Georgian Bay." The Ontario Headwaters Institute further acknowledges David's work in "community-led conservation and education; preserving fish habitat; assessing and mitigating the impact of climate change on water quality and quantity; water contamination and nuisance algae; [and] invasive species and micro-plastics." David—the board joins your team, our community partners, and our donors to say "well done."

And, with that, please sit back, put your feet up, and enjoy this newsletter as David and his team touch on electric boat motors vs gas, amazing research on lake sturgeon, microplastics research, and so much more.

GEORGIAN BAY FOREVER
Research, Education, Action

Georgian Bay Forever is a community response to the growing need for major research and education to sustain the Georgian Bay aquatic ecosystem and the quality of life its communities and visitors enjoy.

We help monitor Georgian Bay's well-being, throughout the seasons, year after year.

We fund the research needed to protect the environmental health of Georgian Bay and the surrounding watershed. Using our research findings, we inform and educate the general public and governments about threats to environmental health, and propose possible solutions.

Through workshops, seminars, and online communication, we are educating the Georgian Bay community. By teaming up with reputable institutions, we enhance the credibility of our research and strengthen our ability to protect what's at stake.

Georgian Bay Forever is a registered Canadian charity (**#89531 1066 RR 0001**). We work with the Great Lakes Basin Conservancy in the United States, as well as other stakeholder groups all around the Great Lakes.

Georgian Bay Forever is steered by our esteemed board of directors, a group of dedicated individuals who are committed to ensuring the functionality and purpose of our organization. They bring their experience and expertise to all aspects of operation, with the common goal of protecting and conserving Georgian Bay.



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Canadian citizens may send their donations to the address above.

U.S. citizens wishing to make a donation to support our work can do so by giving to: Great Lakes Basin Conservancy
PO Box 504, Gates Mills, OH 44040-0504, USA

This newsletter is just a snapshot of our work. For the most up-to-date information on our projects, longer versions of newsletter articles, and breaking news about Georgian Bay, please visit to our Facebook page and website regularly:

GBF.ORG

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What do you think of when you think of data? You may conjure images of charts and graphs, empirical evidence in the form of cold, hard numbers arrived at through years of quantifiable research.

Go a little deeper and you'll find that data is so much more. Data is information based on myriad observations and experiences. It's intersectional, correlative, and endlessly contingent. When data is taken at more than face value, investigated, and critically explored, it illustrates a multi-faceted and nuanced perspective.

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Qualitative Data from the Field

Our Electric Boat Motor

By Laura Thipphawong

Environmental conservation is all about the power of adaptive and sustainable change. For Georgian Bay Forever, an opportunity for change presented itself in the spring of 2022, when we decided to switch from a gas outboard engine to an electric motor for one of our research vessels.

Our boat is critical to our seasonal field work in highly sensitive wetlands. We use it constantly throughout the field season, from late spring to early fall, during which time you can catch us working around the bay—doing everything from cutting stands of invasive *Phragmites*, to deploying submersibles for water-quality monitoring and taking water samples for research and reporting. The work we do depends on several working vessels to get us where we're going, so we didn't take it lightly when considering the impacts of a switch to an electric motor.

Making the call to change a long-standing way of doing things isn't always easy. Gas-powered outboard motors have been used reliably since the early 20th century. They offer undeniable power and efficiency in travel. But they also pollute the water through the release of greenhouse gases, unburned fuel, exhaust, and inevitable leaks and spills (it's bound to happen eventually.)

Despite our use of a fuel-efficient four-stroke engine, which drastically reduces emissions compared to older models of the two-stroke engine, it still released traces of toxic substances into the water. Polluting through the use of a gas-powered engine is unavoidable. Since our purpose as an environmental charity is first and foremost to protect the ecosystem of Georgian Bay, it was our obligation to give the electric motor a try and to share our findings.

HERE ARE SOME OF THE PROS AND CONS AS WE'VE EXPERIENCED THEM SO FAR

LET'S LOOK AT THE CONS FIRST

Charging

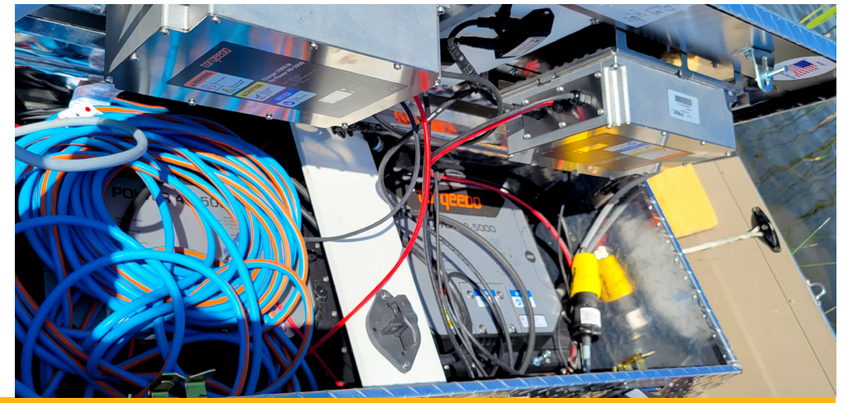
Ah, this is the big one. Since electric boat motors are not ubiquitous (yet), neither are charging stations. We installed the charger and batteries into the boat. Since most small vessels are not designed with this retrofit in mind, a decision must be made about the trade-off between vessel space and battery capacity and power output, based on your needs. You can plan to charge your boat at some marina stations, but you need to do your research before setting out, making sure you know where you can recharge, and how far you can travel and at what speeds (higher speeds deplete the battery more quickly). You also need to get used to recharging the motor ahead of time, as it can take hours to recharge compared to mere minutes when refuelling with gas. We've found, however, that it's easy to get into this habit at our dock where a "normal" electrical outlet provides sufficient energy for overnight charging. It's just a matter of routine. We are also considering adding solar panels and a marine-grade MPPT charge controller so the batteries can charge while we're working at a site.

Setup

It's not the easiest installation. As this was our first electric boat motor, so we didn't have the confidence in the installation process that we would have had with a gas engine. It wasn't an ordeal, though, not even close. It took two people a few hours to complete, with close attention to the manual and some creative retrofitting of a secured weatherproof locker for the batteries and chargers.

Power

It's not quite as powerful as a gas-powered motor. Electric motors can deliver strong torque, but matching the peak horsepower of gas engines requires substantial battery capacity, which increases cost and weight. As a result, commercially available electric outboards in typical price ranges produce lower maximum horsepower. This hasn't affected our operations (according to the manufacturer, our 10 kW electric motor delivers near-constant torque and higher propulsive efficiency, so its usable thrust can match that of a 20 HP gas engine in many operating conditions), though it may matter for activities requiring high sustained output.



Our Battery Setup on the Boat

Material

Electric outboard propellers are typically made of a thin composite that is less durable than those on gas motors. This is by design: When this sacrificial propeller blade hits a rock, for example, it breaks rather than just denting or bending. This design protects the outboard (a shear pin does so for a gas outboard but is not the optimal protection mechanism for an electric drivetrain). We keep a spare propeller or two on board in case of emergencies.

Cost

It's a higher upfront cost than most gas motors. The price tag can make it difficult to make the switch, despite long-term savings. This is true during the early adoption phase of many sustainable technologies, and typically costs come down as demand increases.

Parts

Replacement parts can take a while to acquire. Again, because electric motors are not the norm, finding replacement parts can sometimes take longer when you need a repair. As these motors become more commonly used, we look forward to quicker and easier turnaround and more service locations.

Article continued on next page...

THE PROS

Sound
It's quiet as a mouse! Pollution doesn't just come in the form of emissions and chemical leaks—noise is a form of pollution too. Keeping the sound pollution down is beneficial not just for the boater's relaxation and safety (it's a lot safer to hear what's going on around you when operating a boat or any vehicle), but it's also nicer for residents on the waterfront and for animals whose home you are boating in. It also means we get to see more of those wonderful creatures.

Startup
No more pulling cords, no more burning fuel at idle. Just turn on the motor and off you go.

The Ride
It offers a more pleasurable boating experience. With the immediate torque delivery of the electric motor versus the gas-powered engine, you can start the boat and change speeds without the engine needing to gradually build RPMs for power. It's a smoother ride and easier to dock, without the smell of gas or the harsh vibrations.

Long-term Cost
It's more cost-effective in the long run. The price of electricity is lower than the equivalent gasoline needed.

Maintenance
Electric motors have only a fraction of the moving parts compared to their gas-powered counterparts, and require much less upkeep, without the need for oil changes, filter replacements, engine winterization, or spark plug replacement.

Sustainability
Most importantly, there is no direct pollution from exhaust, fuel leaks, or oil runoff. Nicole Carpenter, our Science Projects Manager in charge of *Phragmites* management, says, "Using the Torqeedo has made me feel better about working every day in sensitive aquatic environments. It is nearly silent and gives off zero emissions, having very low impact to the wildlife surrounding us in the wetlands." Keeping toxic substances out of the air and freshwater benefits us all.

THE SWITCH TO AN ELECTRIC MOTOR IS A NET POSITIVE, BASED ON OUR EXPERIENCE, WITH THE ADJUSTMENT PERIOD BEING THE PRIMARY ISSUE

We hope that by sharing our experiences, we can help everyone who boats make an informed decision when considering switching to an electric motor.

When we all work collectively to protect healthy ecosystems and water quality, all communities, both local and global, are better off. All in all, we're glad we made the change, and we think that anyone who can feasibly switch from a gas to an electric outboard motor should consider it too.



Lake Sturgeon Can Live for Centuries

What it Means for Conservation

By Laura Thipphawong



Photo courtesy of Scott Colborne

TRADITIONAL KNOWLEDGE, NEW DATA

Ongoing studies indicate that lake sturgeon may live for hundreds of years, beyond the approximate 150-year lifespan Western scientists once thought. Data accumulated throughout decades of tracking in the Great Lakes indicates that, in some populations, lake sturgeon often live longer than 200 years, and some closer to 300. Now, some scientists are comfortable suggesting female lake sturgeon can even live beyond their 400th birthday, according to a study this year in the *Journal of Fish Biology*, titled "Lake sturgeon (Acipenser fulvescens) growth and longevity estimated from adult capture–mark–recapture data."

Age was previously determined by counting cross-sectional rings on the sturgeon's fin ray, but as sturgeon age and the rings become less distinct, this method becomes less reliable. Now, scientists use a method of tracking individual sturgeon growth between capture and release, then modelling the time it would take to reach certain sizes.

For Indigenous knowledge-holders, however, the news isn't news at all. As Scott Colborne, Assistant Professor at Michigan State University in the Department of Fisheries and Wildlife, noted, the recent data "were pointing us toward something that Indigenous communities had long understood." During a talk by a tribal community member from the Grand Traverse Bay Band of Ottawa and Chippewa Indians, Colborne first learned that in some Indigenous communities, sturgeon were already believed to live around 400 years. In an article for the CBC, Nipissing First Nation elder and knowledge keeper Perry McLeod-Shabogesic said that although the research is validating, the information was already known. Sturgeon are considered elders in Anishinaabe tradition because of their lifespan and ancient lineage. They live for centuries, seeing and experiencing across a timeline no human can reach.

HOW THE DATA HELPS

The newly confirmed Western data on sturgeon lifespans has a few implications. According to Colborne, the goal of many lake sturgeon recovery programs is to restore healthy, self-sustaining populations that, in many cases, can support sustainable fisheries. "If we underestimate how long these fish live, we can misunderstand the survival rates necessary to maintain those populations." He adds, "We don't want to invest decades recovering lake sturgeon only to make mistakes because we didn't understand something as fundamental as how long they can live."

It's also not a one-size-fits-all scenario. Colborne explains that similar-sized sturgeon across different populations can have vastly different estimated ages. These variations can guide conservation targets and regulatory management in different areas.

THE FUTURE OF STURGEON CONSERVATION

"The longevity of lake sturgeon presents both challenges and opportunities for conservation," says Colborne. Because of the sturgeon's slow growth rate, late maturity, and extraordinary lifespan, conservation efforts need to extend long-term. Expansive recovery plans and programs are logistically more difficult than short-term projects, especially when the most effective timelines could stretch for decades. The lifespan, however, can also help in the long term. "Adults we protect today may continue contributing to future generations for many decades to come," says Colborne. "In that sense, longevity is both what made lake sturgeon vulnerable and part of what gives us an opportunity to help them recover."

Harnessing Theory and Data to Understand Ecological Responses to Warming

As ecosystems undergo complex and multifaceted global change, it is increasingly difficult to know whether they will continue to function in healthy ways. One reason is that many aspects of global change operate across different scales, from heatwaves that stress individual organisms within days to gradual warming that reshapes ecological communities over decades. Ecological theory and models are useful tools for untangling these complicated patterns, because they let us isolate the effects of one or a few key processes that would be hopelessly intertwined in the real world. This helps us identify which processes drive the patterns we observe in nature, discover surprising ways living systems respond to environmental change, and ultimately support effective conservation and restoration of our ecosystems.


Ectotherms, such as fish, are among the predatory animals affected by warming

Warming is a key aspect of global climate change because it affects the basic workings of all living systems, from cells within an organism to entire ecosystems. We can see this in how warming affects predator-prey relationships. For ectothermic (cold-blooded) predators, such as fish, when it's hotter, predators need to eat more, increasing demand on prey populations. If this extra demand depletes prey populations enough, predators may start feeding on additional prey species, which could lead to more intense competition for food among predators. In this example, the entire network of feeding relationships in the ecosystem may reorganize, all kickstarted by a temperature-driven hunger spike. Although scientists have studied how warming affects predator-prey, or consumer-resource, relationships for decades, we still don't understand how it changes competitive dynamics among species that share resources, or what this means for ecosystem function.

In a recent study, my collaborators from the University of Guelph, University of British Columbia, Fisheries and Oceans Canada (DFO), and National Taiwan University and I combined existing data from around the world with new ecological theory to ask how warming affects competition for shared resources. Because shifts in competitive relationships often depend on which consumers and resources are present in a particular ecosystem, scientists have struggled to identify common patterns in how competition responds to warming. We overcame this obstacle by first breaking competition down into its component processes—such as how fast consumers feed and how fast their resources grow—and then searching the scientific literature for data on how each process responds to temperature. Fortunately, much research had measured these temperature responses, and we assembled a dataset of more than 150 temperature responses from nearly 80 species. Using advanced statistical techniques, we then extended these results to capture temperature responses not included in our dataset, giving us a more complete picture of how diverse species respond to warming. Finally, by simulating the effects of warming on all these processes at once, we observed how warming affects competition among many different species.

By modelling many species combinations, we identified a few general patterns in how competition may respond to warming. As temperatures rise, the ecological differences that allow species to coexist ("niche differences") tend to shrink, as do differences in raw competitive strength ("fitness differences"). Together, these changes suggest that warming pushes competing species toward a kind of neutrality, where neither species has a strong advantage. Competition doesn't disappear, but it becomes less decisive, which may leave communities more sensitive to chance events: random fluctuations, disturbances, or small environmental changes could tip the balance. We also found that dramatic shifts in competition were relatively rare. Instead, for most species, warming produced small nudges in a consistent direction. When dramatic shifts did happen, they occurred between competing species that respond very differently to warming. Because these patterns emerged from many competitive scenarios, they offer a useful starting point for anticipating how warming will affect competition in any ecosystem. They also point to a general conservation strategy: protecting a diversity of ecological conditions helps species maintain the differences in their roles that allow them to coexist.

As is often the case, predicting changes in a particular ecosystem will likely require data from that ecosystem. Our study used diverse data to make generalized predictions about how warming affects competition, but in doing so, we also created a framework to predict warming's effects in specific ecosystems. We are very excited to see this framework put to work in real ecosystems. Another advantage of making generalized predictions is that, when we test them in real ecosystems, we always learn something new, whether they come true or not. For example, the patterns we identified in how competing species respond to warming may appear quickly in some ecosystems, slowly in others, and not at all in still others. When the predicted patterns do play out, we can be more confident that our models represent reality reasonably well. When they don't, we can look closely at the ecosystem to identify which factors or processes our model omits or represents incorrectly. This information is critical to refining our models and improving our understanding of how these complex systems work.

Supporting ecological resilience to rapid global change requires the coordinated efforts of concerned people across all sectors of society. In our own small corner of researchers and practitioners, I am optimistic about an ongoing back-and-forth between broad ecological theory and local practice. By using theory and existing data to make general predictions, then collecting new data to test them, we can build and refine our understanding of how the ecosystems we care about work and make informed decisions about how to protect them.


Photo Courtesy of Kaleigh Davis

By Kaleigh Davis, PhD

About me: I am an aquatic ecosystems ecologist doing postdoctoral research at the University of Guelph. These days I do mostly theoretical research and lab experiments, but I love doing field work, especially when it involves doing science underwater. I am also passionate about using science to support Indigenous Sovereignty. Outside of work (and sometimes inside of work) I love scuba diving, birding, and cheering on the Georgia Bulldogs!



Connected Data for a Connected Bay:

How a thoughtful application of Modern Tools can Strengthen Conservation Across Georgian Bay

By David Sweetnam,
Executive Director of
Georgian Bay Forever

Georgian Bay is one of the world's most complex freshwater ecosystems. Its 30,000 islands, extensive coastal wetlands, and deep open waters form a mosaic of habitats that support endangered species, sustain local communities, and anchor cultural relationships that stretch back thousands of years. Protecting a system of this scale requires more than isolated measurements or one-off studies. It requires connected data—information that moves across sensors, satellites, research institutions, and community partners to reveal the Bay as a living, changing whole.

Georgian Bay Forever's conservation programs increasingly rely on this connected data landscape. From water-quality monitoring to invasive species research, from sturgeon tracking to coastal resilience studies, GBF is building a network of tools that allow us to see the Bay more clearly, respond more quickly, and plan more effectively for long-term sustainability.
Much of modern conservation effort begins with remote observation. Satellite platforms such as Landsat and Sentinel-2 provide continuous, high-resolution imagery that allows government researchers to monitor shoreline change, wetland extent, and water quality conditions across the entire Bay.

Remotely Piloted Aircraft Systems (RPAS) extend this capability to the local scale. GBF uses this technology to map wetlands, assess and document the spread of invasive species such as Phragmites. Our system can achieve 2-cm resolution year over year, fine enough to detect individual plants and enable GBF to evaluate habitat conditions. Together, these data sets give researchers a multi-layered view of the Bay: broad patterns from above, detailed insights from close range, and the ability to track change over time.

However, the real value for true conservation depends on hands-on efforts on and in the water. GBF's staff collect data on turtle habitat usage, water quality and bacteria, and other indicators of ecosystem health or impairment. Using in-situ sensors, we can collect important field data while GBF staff undertake additional hands-on conservation work. Through initiatives such as Turning Data Into Action, GBF is building a Bay-wide, real-time monitoring network that lets the public and researchers detect changes earlier, identify hotspots of concern, and support evidence-based management decisions across municipalities and watersheds.

Conservation is also about the species that depend on the Bay. GBF's lake sturgeon program will make use of acoustic telemetry to follow the movements of one of Georgian Bay's most iconic and endangered fish. Through this data collection, we hope to identify preferred migration routes, spawning areas, and habitat use across the Bay so that we can implement conservation projects and practices to help this important relative. Other project work currently underway includes similar studies on juvenile fish, quagga mussel impacts on methylmercury, microplastics surveys, and coastal risk identification, funded by a generous anonymous foundation grant through partnerships with leading research institutions. These datasets will help tell the story of Georgian Bay through a variety of lenses.

Collecting data is only the first step. The challenge is then in transforming raw information into actionable insight. Cloud computing and artificial intelligence now make it possible to process large volumes of environmental data quickly and accurately and to gain new insights from large data sets. By connecting multiple data sources, imagery, sensors, field observations, and research outputs, GBF hopes to make faster, more informed decisions about where to intervene and how to prioritize resources. However, as conservation organizations decide if or how to adopt these fast-developing technologies, a new paradox emerges. The very technologies that help us understand and protect ecosystems can also place enormous pressure on them. Large-scale data centres consume significant volumes of electricity and, in many cases, potable water for cooling. In regions where water scarcity is increasing, or where municipal systems are already stressed, these demands can place unsustainable burdens on communities and





undermine the environmental goals they are meant to support. In areas where water seems infinitely abundant, these same impacts are less obvious, not absent, just harder to see, and therefore even more likely to be overlooked.

For Georgian Bay Forever, this paradox reinforces a simple principle: the tools we use to protect the Bay must not harm it. Any adoption of technologies must be evaluated through a clear lens that includes environmental impacts—even if they aren't in our own backyard. The question is not only "What can this technology do?" but also "What does it cost the environment to do it?"
GBF's goal is responsible deployment—using advanced tools where they add clear value, and avoiding them where simpler methods suffice.

It is important to acknowledge that Georgian Bay benefits from a major source of knowledge that is carried and held by Indigenous communities who have stewarded this place since time immemorial. Through the principle of Two-Eyed Seeing, GBF respects the depth of knowledge and wisdom gained through the disciplined practice of learning through the strengths of both knowledge systems without collapsing one into the other—the pairing of technological observation and analysis with long-standing ecological memory, cultural relationships, and place-based expertise – while respecting Indigenous data sovereignty and community leadership.

Georgian Bay Forever's conservation programs are increasingly shaped by this convergence of knowledge systems, allowing us to see more, understand more, and act more effectively. Technologies and collaborative research networks are not just tools – they are necessities in achieving evidence-based, ecosystem-scale stewardship. This approach must inform responsible decision-making and enable transparent evaluation of environmental costs. GBF is actively constructing a long-term conservation framework that protects the Bay now and equips future generations with the knowledge and tools needed to steward its waters responsibly.

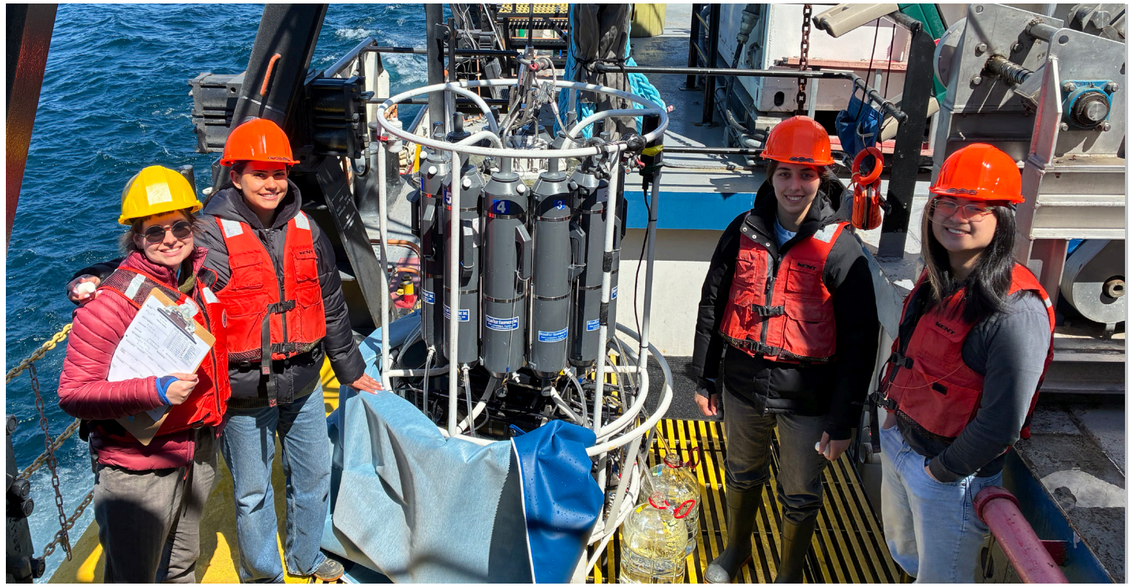


Photo courtesy of Melissa Duhaime

An Interview with Melissa Duhaime

This interview is the abridged version.
For the full version visit our blog

In strategic partnership with an anonymous foundation, Georgian Bay Forever was chosen to select five projects directly in line with our mission to protect and conserve Georgian Bay through scientific research for long-term impact. Due to disbursement requirements, this funding could only be given to organizations registered in both the US and Canada, so while GBF could not directly receive funding, we will continue documenting these projects in the years to come.

This interview is about one of those projects.

PROJECT: MAPPING THE MICROPLASTICS THREAT IN GEORGIAN BAY: NEXT-GENERATION METHODS FOR PLASTICS DISTRIBUTIONS AND ECOTOXICOLOGY
PRIMARY INVESTIGATOR: DR. MELISSA DUHAIME
INSTITUTION: UNIVERSITY OF MICHIGAN

How would you describe this project to someone you just met?

Microplastics are everywhere, in our water, our bodies, and the bodies of the animals that live in our lakes. Yet, very little data exists for the smallest microplastics.

Together with my colleagues, Drs. Anne McNeil (University of Michigan) and Matthew Hoffman (Rochester Institute of Technology), we are using advanced laboratory instruments to identify and map microplastics across Georgian Bay's waters and sediments at a level of detail that hasn't been done before.

Based on the amounts of microplastics we find, we will use laboratory experiments to find out at what concentrations microplastics are harmful to worms that live in lake sediments; these organisms are at the base of the food web and are a bellwether for ecosystem health. We will also use knowledge of Georgian Bay hydrology to simulate the ways that currents move and transport microplastics of different sizes and shapes to better predict whether there are microplastic hotspots that can guide mitigation efforts. Our goal is to co-create science that results in open data and tools that Georgian Bay communities and decision-makers can use.

How did you get started in this area of research? What interests you about this field of study?

I am a microbiologist who studies aquatic ecology. I began my career studying viruses in the ocean. Viruses are among the most abundant and impactful entities in any aquatic ecosystem. That work trained me to think carefully about the invisible parts of ecosystems, the things you can't see that have enormous consequences for ecosystem health.

Microplastics pulled me in through a similar logic. Once, while on an ocean research expedition in 2011, I began seeing plastics turn up in Southern Ocean samples collected around Antarctica. I'd been looking for zooplankton zipping around in small jars of water, but instead I saw bright orange, yellow, purple, and blue thin filaments. It was obvious from their size and shape that they were fibers that had shed from fishing lines. The discovery hit me hard, a sinking feeling in my gut that imparted the gravity of the observation.

I founded my own lab in 2012 and we turned our sights on the Great Lakes. We joined a growing number of microplastics researchers who were beginning to understand how little was known about where microplastics go and what they do.

The Great Lakes are a vital part of our identity in this part of the world; many of us feel a strong connection to them. Day to day, they provide drinking water and food for millions of people. This centrality to the livelihoods of the people in our region makes the research a responsibility, not just a career or intellectual pursuit.

Why does Georgian Bay and the environment at large need this research right now?

This is an important moment for microplastics research. Legislation to address microplastics pollution is being discussed at the federal level in both the US and Canada, and in multiple Great Lakes states and Ontario. Policymakers want to act, but the science they need to set data-driven and enforceable thresholds doesn't yet exist.

Georgian Bay is a perfect study system to address this challenge. It's large, biologically rich, and very important for fisheries, drinking water, Indigenous communities who have stewarded these waters for generations, and for the millions of people who recreate and live along its shores.

We have an opportunity to generate high-resolution, harmonized data that can support the policy and management decisions being advocated for.

How will this project affect the ecosystem of the Georgian Bay area and the Great Lakes in the long run?

The most immediate contribution is data. Right now, the absence of good data is itself an obstacle to protecting Georgian Bay. Our work will fill those gaps directly.

We will generate open-access maps of microplastics distribution across Georgian Bay's waters and sediments, and we'll produce a controlled ecotoxicology study of a Great Lakes benthic species under environmentally realistic microplastics exposures.

"[THE GREAT LAKES] PROVIDE DRINKING WATER AND FOOD FOR MILLIONS OF PEOPLE. THIS CENTRALITY TO THE LIVELIHOODS OF THE PEOPLE IN OUR REGION MAKES THE RESEARCH A RESPONSIBILITY."

That data will flow into the models, risk assessments, and policy frameworks that govern how these lakes are protected. It will be submitted to international databases that researchers around the world use to calibrate their own assessments. It will be shared with Georgian Bay Forever, the Anishinabek/Ontario Fisheries Resource Centre, and regional communities, so that local stewardship can be grounded in local data.

The ripple effect we are hoping for is a Georgian Bay where communities have the evidence they need to protect these waters and the ongoing capacity to keep watching.

What advice would you give to individuals who want to help create a more sustainable environment?

Start with what's in front of you, what is in your hands, at your feet, in your gaze. The Great Lakes hold roughly 20% of the world's surface freshwater. Paying attention to your local water, your local land, your local food systems is not a small thing. It's how change happens. Stop talking just for a moment. And take notice.

From there, I'd say get engaged. The most important insights come from residents and Indigenous communities who know these waters and have been watching them for generations. Strong environmental stewardship is always collaborative.

And on the personal side, reduce your plastic footprint where you can. Know that individual choices matter, but they're not sufficient; we are parts of a bigger strategy. Advocate for system change and strategy designed around a new vision. Support organizations doing monitoring and restoration work in your communities. Show up to town halls. Communicate to representatives when microplastics legislation is being considered.

Science can only do so much if it isn't met by political will, and political will follows from an engaged, informed public.
The world needs people who can bridge rigorous science with practical outcomes, and that's exactly the kind of work this project represents.



Dr. Melissa Duhaime, University of Michigan

Postdoctoral Fellow, University of Arizona, EEB (Marine viral genomics) - 2011

Ph.D., Max Planck Institute for Marine Microbiology, with distinction (Bioinformatics) - 2010

B.A., Cornell University, Biology (Microbiology) - 2005

Profile: Catherine Smart, New Board of Directors Member

By Amber Gordon

Growing up with adventurous and community-oriented parents and grandparents set Catherine (Cathy) Smart up for a life of volunteering, doing good for others, and enjoying every bit of the natural world around her.

From a very young age, Cathy was encouraged to "blaze your trail" and "make your mark", words she took to heart. She spent her early years sailing, swimming, paddling, hiking, and skiing, and has travelled widely, including to Europe, Australia, New Zealand, Mexico, the Bahamas, Nepal, Bhutan, and East Africa, to name a few.

At 19, she combined two of her passions—philanthropy and being on the water—by starting her own school, Independence Afloat, to teach kids and adults living with a disabilities how to sail. She also created Access to Adventure, a program in partnership with the Ontario March of Dimes and the Canadian Outward Bound Wilderness School that helps provide access to Outward Bound courses for adults living with disabilities. Being a perpetual go-getter means assessing situations, rolling up one's sleeves, and making things happen, something Cathy exemplifies.

In 2003, she and her husband, Steve, decided (when their two boys were still little) that a move to rural living would suit their outdoor-loving family. Having access to trails, ski hills, and a large body of open water for sailing and swimming was the golden ticket. They purchased their first home in the Town of Blue the Mountains, and they've never looked back. The family spends much of their time on their boat, the *Clearwater II*, Cathy's happy place as an avid sailor, exploring the water and landscapes around Georgian Bay together.

Cathy is passionate about spending time near or on the water, a self-proclaimed "water gal", but her concern for Georgian Bay's health and well-being is mounting. Development, damaged shorelines, and contaminated waterways have driven her desire to make a difference. Joining GBF supports her dedication to creating change.



"Follow one's heart. Passion, enthusiasm, knowledge, and accountability go a long way.

When I am invested, the world knows it!"

- Catherine Smart

In Cathy's own words:

"There is only so much water and shoreline on Georgian Bay. Paying attention to the health and preservation of this body of water has a direct impact on the rest of the Great Lakes and beyond. Good, consistent, meaningful stewardship creates a ripple effect. Being proud of where one lives, including protecting a significant asset, is both essential and rewarding now and for future generations."



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"The Baykeeper" indicates that Georgian Bay Forever is a member of the Waterkeeper Alliance, a global movement of on-the-water advocates who patrol and protect more than 6 million square miles of waterways, supporting nearly 2.5 billion people worldwide.
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