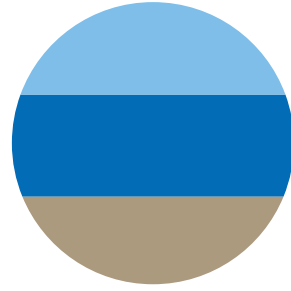


GEORGIAN BAY **FOREVER**



SUMMER 2022
VOL. 13, ISSUE 2

Protecting your water.

KEEPING IT CLEAN

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Photo by Nadine Perron, Magnetawan First Nation. See the article on page 4.

THE RULE OF THREE

Adam Chamberlain, Chair of Georgian Bay Forever



After three years on the job, this is my last issue as Chair of GBF. I look forward to being an active past-chair but I will miss being at the centre of such a wonderful organization. There are too many people to thank to name them all, but the staff, volunteers and my Board colleagues at GBF have made my role enjoyable and easy. Terry Clark will be the Chair as of June. I wish him well and look forward to supporting him as our “fearless leader”.

I am taking this opportunity to reflect a little on how GBF has matured since I first became involved back in 2013. GBF has grown since then in many ways. We have more staff, we deal actively with many more issues, we reach all manner of people with varying interests in and on Georgian Bay and we continue to seek to expand our reach all around the Bay.

While we began largely as a “cottage based” charity focused on Georgian Bay related science, GBF has grown to become a respected non-government organization with extensive knowledge of, and contacts

related to, Georgian Bay. Our staff are known for their specialized expertise, knowledge and commitment to Georgian Bay related science and issues. GBF has, in my view, become an important voice for the protection of the Bay alongside other respected Georgian Bay “NGOs”.

Georgian Bay is a special place. Whether looking west from the Pine Islands, northwest from Wasaga Beach, east from Meaford or south from Killarney; the views are unparalleled and unforgettable. We need to keep them that way and GBF and other organizations need to continue to play their critical roles in those efforts.

Finally, I would like to acknowledge that we seek to preserve what our Indigenous friends and colleagues and their ancestors have protected for untold generations. We have much to learn from those who have lived around, and travelled upon, these waters before us.

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 the 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 bodies of water. 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, 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 RR0001). We work with the Great Lakes Basin Conservancy in the United States, as well as other stakeholder groups all around the Great Lakes.

Deeply rooted and broadly drawn, Georgian Bay Forever is steered by lifelong devotees of the Bay. We are committed advocates, educators, environmentalists, realists, idealists, and of course, residents.

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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:
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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 become a regular visitor to our website.

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Design by Key Gordon (keygordon.com)

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Cover Photo by Nadine Perron, Magnetawan First Nation

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GEORGIAN BAY
FOREVER



MORE ON EMISSIONS FROM INTERNAL COMBUSTION ENGINE MOTOR BOATS



By David Sweetnam, Executive Director of Georgian Bay Forever

For many people on Georgian Bay, a boat is as necessary as a car to get to their cottages. Many water-access only communities are wholly dependant on marine propulsion systems for transportation and safety. But the nature of the propulsion systems is on the precipice of change. Increasing interest is being expressed by those concerned about global heating, water quality and the ecosystem health for zero emission propulsion systems.

As a starting point we have to accept the top line that fossil fuel powered marine propulsion systems must be replaced at some point to do our part to combat climate changing greenhouse gas emissions arising from burning fossil fuels. The question is

“when will the marine propulsion industry be motivated enough by its customers to evolve?”

I have absolutely no war against this transportation sector nor any axe to grind... I just want motors to stop adding to the global heating problem. It is time for seizing the opportunity to evolve the marine propulsion industry in synchronicity with the automotive sector and to support the numerous innovators who have been working for decades to bring a clean-tech solution to this market. Status quo operation will not provide any opportunities for the industry to evolve and change is always resisted—even in the face of this existential threat. The idea that leisure boating would add to the suffering of the planet

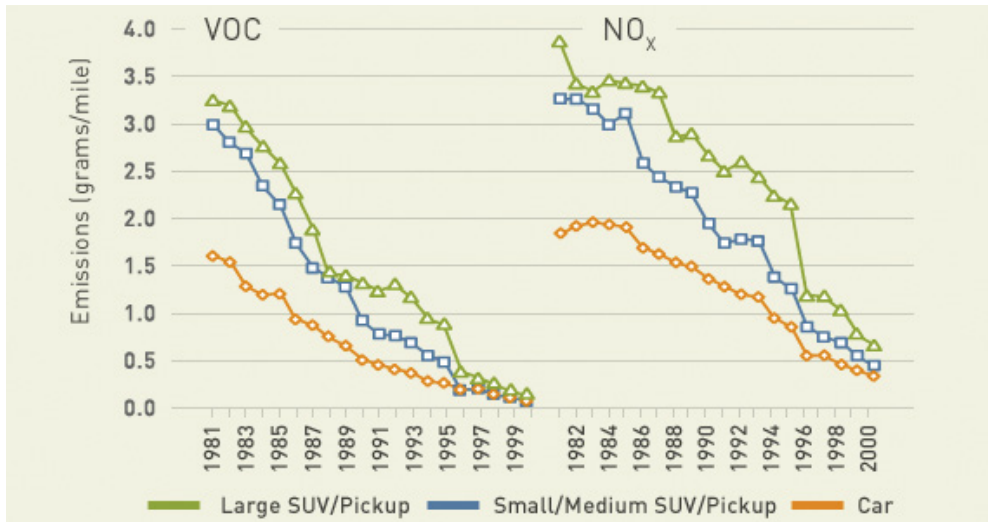
is an unjust oxymoron. Further, powered boating doesn't have to end, just evolve as it always has—from the coal powered steamers of yesteryear belching mercury and other toxins into our pristine Georgian Bay water from their sludge filled coal boilers—into today's modern lower emissions fuel injected engines—to the emerging zero-emission class of power plants.

Over the past 20 years the marine industry has been tasked with cleaning up its emissions. This was a mandate imposed on the industry by government. It isn't surprising as most of the automotive industry advancements had already happened in the latter decades of the 20th century. The automotive industry was mandated to address tailpipe emissions starting in 1968 and catalytic converters became mandatory on cars in Canada in 1988. That was 20 years ahead of the marine industry evolution. The automotive industry began this process of improving air quality and lowering emissions decades ago. And despite best efforts, still we see that even the best of the internal combustion engines (ICE) cars (even with improvements as per the graph beside) are far surpassed by electric vehicle (EV) technologies such that most ICE vehicles will be out of production by 2035.

This will put into perspective the emissions numbers below. Each gallon of gasoline weighs 3217 grams. So, if an outboard engine is burning 6 gallons per hour, 19,302 g of fuel is burned. This fuel is injected inside the combustion chamber with air at a ratio of one part fuel to 14 parts air (i.e. 14 g of air per gram of gas. Air is about 21% Oxygen (O₂), so approximately 3 g of O₂ are combusted with each 1 g of gasoline). Therefore, the total input product weight is 57,906 g O₂ plus 19,302 g gasoline or 77,208 g of matter mixed, burned and emitted each hour. The rest of the air is predominately nitrogen (N) and traces of argon (Ar) and a tiny but growing volume of carbon dioxide.

For theoretical total combustion all of that matter would be converted to carbon dioxide (CO₂) and water (H₂O). However, given the inefficiencies of combustion engines, there are a number of undesirable by-products emitted that are targeted by regulation to reduce contaminating our water and air. Nitrogen gas is inert, however, some oxygenated nitrogen compounds (NO_x) are produced as undesirable by-products and some unburned fuel constituent compounds are also released in the exhaust. The emissions being referred to for the purpose of lower emission marine engines ratings pertain to NO_x, HC (hydrocarbons), and CO (carbon monoxide) i.e. as defined in the EPA standards that Canada has

COMPARISON OF AVERAGE CAR AND SUV/PICKUP EMISSIONS, FROM PHOENIX I/M DATA



oica.net/emission-reduction-examples/. The automotive industry began improving air quality and lowering emissions decades ago. Despite best efforts, even the best of the ICE cars are surpassed by EV technologies. For instance, on CO₂ emissions, there is about a 95% reduction for trips to Georgian Bay (Plug'n Drive GBF article, Fall 2021). Will all these kinds of improvements in emissions happen with ICE boat motors?

adopted as well as the California Air Resources Board (CARB) stars rating system. However, there are other emissions that are not individually identified in those standards and differences between marine and automotive standards makes intercomparison difficult.

The measurement of organic chemicals like polycyclic aromatic hydrocarbons (PAH) in emissions and BTEX (benzene, toluene, ethylbenzene and xylene) chemicals are done in different ways depending on the engine and the type of equipment used in the measurement. These chemicals that are the more bioactive exhaust emissions components are captured in aggregate in the HC portion of the marine standards and the non-methane organic gases (NMOG) or non-methane hydrocarbon (NMHC) automobile emission measurement standards.

These are also the classes of chemicals that at very low concentrations can taint the taste of our drinking water and poison our ecosystems. Some persist in the ecosystem for years while others evaporate almost immediately into the air. These are the aromatics that end up either sinking into the sediments, evaporating from the water into the air, or persisting in the micro-boundary surface layer where their phototoxicity can be amplified significantly higher than in the lab. These layers where PAHs are found are also where eggs and phytoplankton exist so ecological impacts could be significant according to the literature.

The abstract of the research paper we cited in our previous winter newsletter article (Jüttner et al., 1995) read that "The toxicity of water polluted by a four-stroke engine and

a catalyst equipped two-stroke engine was negligible after a period of 14 days while toxicity of water contaminated by a two-stroke engine persisted for more than 14 days. The acute toxicity of the test stand water could be explained by the presence of aromatic compounds. Mixtures of the major components (3-ethyltoluene, 4-ethyltoluene, pseudocumene, indene, benzaldehyde, naphthalene) when tested in concentrations in which they were observed in the test stand water gave a similar inhibition response in the bioassays as polluted test stand water. The effect of two-stroke engines on the odour threshold concentrations of water was found to be severe; e.g. a 15 kW (20 HP) two-stroke engine that operates for 1 h makes 11,000 m³ of water undrinkable. The odour threshold concentrations of C3 benzenes were determined."

Some of the published data is from before the mandated changes to emissions of out board engines and some is published afterwards, but the referenced engines are still in operation throughout many watersheds.

So while we can see that there have been improvements in some emissions from newer manufactured 4-stroke Direct Injection outboard engines there are also still many older "dirtier" engines in use that—like any evolving technology—have adverse legacy emissions that detrimentally increase the entire industry average.

See GBF's video of unpacking our NEW Electric Motor for our utility boat at bit.ly/GBFElectric



MAGNETAWAN FIRST NATION

PASSIONATE ABOUT OUR ENVIRONMENT

Photo by Nadine Perron

Situated in a UNESCO designated biosphere along the Eastern Georgian Bay, Mnidoo Gamii region, Magnetawan First Nation has an abundance of plant and animal life that contribute to an outstanding level of biodiversity. Unlike many parts of southern Ontario that are severely fragmented as a result of human activities, the landscape in this region is relatively pristine and untouched.

The community at Magnetawan First Nation thrives on this landscape and the surrounding traditional territories, relying on the plants and animals to support their traditional ways of life. The mosaic of rock barrens, forests, and wetlands provide optimal habitat for medical plants and culturally significant animal species. An integral part of the lifestyle and landscape here are the cranberry marshes, sweet grass meadows, ash, cedar, birch and pine tree stands, patches of St. Johns wart, Labrador tea, sage, wild tobacco, blueberries, raspberries...the list goes on. Although some are more sacred than others, every plant, every medicine has a purpose and a story.

Much like the plants, the animals offer similar connections to land that fall within this balanced lifestyle. The traditional harvests, ceremonies and teachings associated with various animals are a profound part of the relationship Anishinabek people share with Mama Aki, Mother Earth. Of particular cultural significance is the turtle, or Miishiken.

This animal is an important piece of the creation story and how North America, otherwise known as Turtle Island to the Anishinabek, came to be. The Miishiken also carries the teachings of First Nations on its back including that of the 13 moons, or lunar calendar. Even certain species carry different teachings such as the Blanding's Turtle. In Anishinabe culture, this species is known as the turtle with the sun under its chin because it helped bring the sun back to the world in its mouth after the trickster spirit, Nanaboozhoo, stole the sun from the sky.

Beyond the cultural significance, the community here at Magnetawan First Nation has a deep respect for these animals and the ecological role they play. The community is committed to protecting turtle populations

By Alanna Smolarz and Nadine Perron for Magnetawan First Nation

The Magnetawan First Nation is within the boundaries of the territory described by the Robinson-Huron Treaty of 1850, as signed by Chief Pamiquonaishkung. The First Nation was first surveyed in 1853 and confirmed by Order-in-Council in January of 1853. In 1907, an additional tract of land in the Township of Wallbridge was added to the reserve to compensate for an error made in the 1853 survey. Our Land Base is now 4714.7 Hectares. Our proud heritage of languages includes our Mother tongue of First Nation Ojibway with English also commonly spoken. magfn.com



Blanding's Turtle

across their land by raising awareness, actively participating in road surveys, and notifying Lands Department staff members where they have been observed. The community support for our turtle egg incubation program is another incredible example of this commitment to species preservation. Each year, a water ceremony is held as the hatchling turtles are returned to their home wetlands where the eggs were initially collected in an effort to mitigate construction activities and/or subsidized predation.

To put into words the true value and responsibility associated with such a profound relationship between human and land is nearly impossible. Hence why acts of guardianship and stewardship are important roles we must all embrace to honor this relationship. The reality of this lifestyle and the land which supports it, is now being threatened by 'open for business' development and invasive species—along with many other anthropogenic consequences—which are slowly making their way into this region.

A textbook silent killer, *Phragmites* is perhaps the worst invasive plant of all and the main concern for communities along the coast of Georgian Bay including Magnetawan First Nation. You could say it is the best at being the worst! It spreads slowly, without anyone

noticing, which makes it extremely dangerous to the wetland ecosystems that characterize this region—the same wetlands that support the medicinal plants and culturally significant animals Magnetawan First Nation relies so heavily on. Once established, this aggressive ecosystem invader grows in dense monocultures and quickly outcompetes all endemic plant species, suffocating any other plant or animal that crosses its path. Before long, the ecosystem no longer functions as a system at all and becomes a grassy wasteland void of any biodiversity. An "eco"system by definition is characterized by the interaction of organisms with their environment, working symbiotically to feed the interconnected network of biological activity. The diversity of flora and fauna complement each other by providing habitat, food, protection, which support all life stages of each organism. There cannot be one without the other. It is all interconnected and balanced. A great example of such interconnectedness is that of the turtle. They keep the wetlands and waterways clean by eating dead plants and animals, hence why they are often regarded as wetland janitors. Some even say the bright sunny yellow chin of the Blanding's turtle is responsible for melting the snow and bringing the spring warmth as these turtles emerge from hibernation!

These turtles, along with other wetland animals and plants are threatened by many factors, the main one being habitat loss. Between direct development causing irreversible habitat alterations, to catastrophic habitat regime shifts as a result of climate change and potential invasive plant establishment, plants and animals alike are facing remarkable challenges due to human impacts.

Now more than ever we ALL need to act as stewards of the land. Our best line of defense is to act proactively by spreading awareness of the importance of proper techniques to prevent the invasion of *Phragmites* and identifying areas at risk of invasion. If we don't act now, the pristine balanced habitats that exist in this region will be lost, and along with it, traditional ways of the Anishinaabe.

Miigwech Chi-miigwech Magnetawan First Nation for sharing your knowledge.

In the spirit of acting as stewards of the land, contact Georgian Bay Forever to learn about how you can help restore important habitat by removing invasive *Phragmites* on the east coast of Georgian Bay this summer. Email nicole.carpenter@gbf.org. See the status of mitigating invasive *Phragmites* at gbf.org/2021Phrag.



Invasive *Phragmites*

WHY WE CAN'T RECYCLE OUR WAY OUT OF OUR WASTE CRISIS?



By Myra J. Hird – Professor, School of Environmental Studies, Queen's University

Canada has a waste problem. We produce nearly 1.3 billion metric tons of waste a year, and it is significantly contributing to our climate crisis. Most of this waste is produced by the resource extraction industry through oil, gas, metals and minerals mining. The next biggest waste-creator in Canada is the agricultural industry, which produces nearly 200 million tons of livestock manure amongst other waste products. Municipal solid waste (MSW) accounts for only about 1% of Canada's waste (Hird 2021). And most MSW is packaging; a form of waste that manufacturing companies have externalized to consumers (Liboiron 2013).

Our attention is focused on MSW for two primary reasons. First, as long as Canadians are focused on regulating our own waste practices (sorting discarded items to put in waste or recycling bins, washing items for recycling, moving recycling and waste from our homes to the curbside, and participating in community litter clean-ups), we are distracted from the major waste creators.

Most waste is produced before consumers ever interact with a product. *The Limits of Growth* (2004) describes the “golden rule” that for every ton of waste produced by consumers, a whopping twenty tons of waste is produced in the extraction process alone. An 11-kilogram television requires 2.5 tons of materials, or 227 times the television's weight (Ademe 2018).

The second reason is that getting waste out-of-sight is highly profitable. In fact, it's a multi-billion-dollar global industry. In Canada, MSW is managed by private companies, who

contract with municipalities to take our garbage away from us. These companies handle MSW and recycling in ways that maximize profits. Most of Canada's MSW goes to landfills. And since the 1970s, municipal and provincial governments have turned to recycling.

Given the enthusiasm with which governments, communities and non-governmental organizations around the world have championed—and become dependent on—recycling, it is important to examine what recycling actually achieves. Recycling waste involves transforming a product from one thing (such as a plastic water bottle) into something else (such as a lawn chair). So, let's consider the realities of recycling.

The Profit Margin

The materials that we put in our recycling bins are only actually recycled if the recycling company makes a profit. Thus, waste intended for recycling is often disposed of when recycling costs outweigh the profit. Some recycling companies have the capacity to stock-pile some materials while they wait for a more favorable market, but most companies simply move the materials into disposal. Moreover, municipal governments are not required to know whether the materials are taken to a recycling facility or to a landfill or incinerator.

Recycling's Negative Environmental Impacts

Recycling materials consumes a great deal of energy, and mainly entails using nonrenewable fossil fuels that pollute the soil and

atmosphere and contribute to global warming (Center for Sustainability 2012; MacBride 2012). As well, recycling needs to be transported from a community to one or more recycling centers. Transporting recycling long distances—typically much further than disposal sites—significantly increases recycling's carbon footprint and contributes to climate change.

Recycling Creates Waste

Recycling creates waste when materials undergo chemical and mechanical processing. Recycling paper, for instance, requires the significant use of toxic chemicals to remove ink and generates its own waste—sludge—that is more difficult to dispose of than paper (US Department of Energy, 2006).

The Low-Value Limit

Most materials are only recycled once, meaning that recycling only slightly delays disposal, while consuming energy and creating waste in the process. For instance, Marten and Hicks (2018) note that just the re-expanding and shaping stages of polystyrene recycling takes thirty percent of the energy used in the life cycle of this material.

A Lot of Materials Cannot Be Recycled

Many types of non-durable plastics (and other materials), such as those commonly used in food packaging, may be put in recycling bins by consumers, but they are diverted back into the disposal stream because they are either not materially recyclable, or it's too expensive to recycle them.

Recycling Does Not Decrease Extraction And May Be Increasing Consumption

We have been led to believe that recycling helps the planet by decreasing resource extraction, but the fact is that resource extraction is increasing, sometimes exponentially. We also see an increase in consumption within Ontario communities with recycling services. This may be because people assume that the products and packaging that they buy are being recycled, and that recycling benefits the environment (Harris 2015).

Burning Waste Is Not Part of The Circular Economy

Energy recovery is a linear system: the energy from burning waste is used only once and is not reused. As such, energy recovery is not part of the circular economy.

Externalizing Recycling Costs To Consumers

Recycling externalizes the monetary cost of waste to consumers. As Liboiron observes, “Industry champions recycling because if a company has reusable bottles...it has to pay for those bottles to return, but if it makes cheap disposables, municipalities pick up the

bill for running them to the landfill or recycling station (2013: 10–11). Recycling deflects attention away from Extended Producer Responsibility regulations and policies.

We Can Do Better

Recycling is a diversion, drawing our attention away from the responsibility that government and industry should shoulder. There are signs that the Ontario government is moving in a more environmentally positive direction. *Beyond the Blue Box* (2017) and other reports acknowledge the limitations of recycling and the need to regulate producers and retailers to take responsibility for the waste they produce. The Resource Productivity and Recovery Authority (RPRA) introduced O. Reg 391/21 (Government of Ontario, 2021) an extension of the *Circular Economy Act* (Government of Ontario, 2021), and it will transfer the financial and operational responsibility of Ontario’s Blue Box program to the producers of plastics and other packaging (OWMA, 2021).

For a more detailed look at recycling and waste issues in Canada, see my books *A Public Sociology of Waste* (2022, Bristol University Press) and *Canada’s Waste Flows* (2021, McGill-Queen’s University Press).

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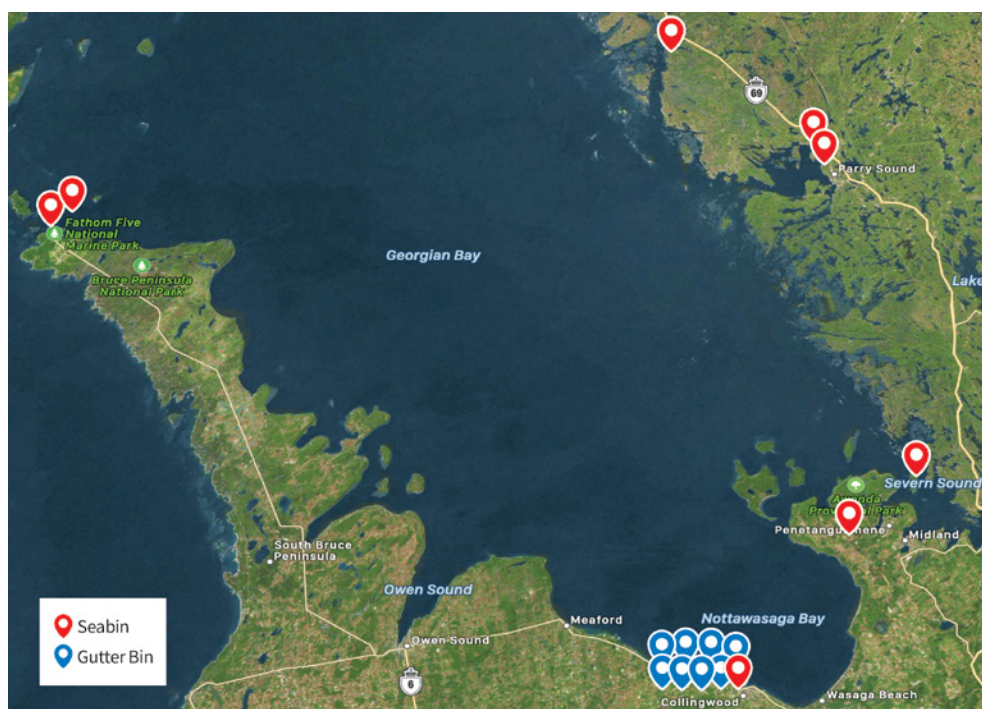
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WHAT TRASH CAN TRASH TRAPPERS TRAP?*

YEAR 1 DIVERSION 2.0 PROJECT SUMMARY

By Nicole Dimond, GBF Project Coordinator and contributions from Heather Sargeant, GBF Communications Director

Thanks to your support in 2021, Georgian Bay Forever began its Diversion 2.0 program that focused on reducing primarily plastic waste and litter that ends up in the aquatic environment. The program involves installation of trash-trapping devices, analysis of the anthropogenic debris captured, and education to public and small businesses on what they can do to move towards being free of single or



lightly-used plastics that we see littered in the water and shorelines (Plastic-Free Georgian Bay). On the next page, there is a summary of the results and learnings as we head into year 2 of this program.

Seabins: 2 at Fathom Five National Marine Park, 1 in the Municipality of Northern Bruce Peninsula, 1 in Georgian Bay National Islands Park, 2 in the Township of The Archipelago, 1 in the Town of Parry Sound and 1 in Collingwood

Gutter Bins: 8 in Town of Collingwood

Trash Trap Device Results

GBF and our Diversion 2.0 partners installed 8 Seabins and 8 Gutter Bins to divert and study pollution from Georgian Bay. Partners conducted simple waste characterizations when emptying the devices to measure the daily weight of debris collected. GBF staff, summer students and volunteers conducted 41 detailed waste characterizations (deep dives) to identify the types of plastic being collected by the Seabins and Gutter Bins.

COMBINED, THE TRASH TRAPPING DEVICES CAPTURED 421.87 KG OF DEBRIS WITH AN EXTRAPOLATED COUNT OF 23,237 PIECES OF SMALL ANTHROPOGENIC DEBRIS.

But how did the various devices differ in collection?

The 8 Seabins, located in Tobermory, Collingwood, Penetanguishene, Beausoleil Island, Parry Sound and the Township of the Archipelago captured 5.90 kg of anthropogenic in 434.56 kg of natural debris. Seabins are like stationary surface water vacuums, capturing floating debris by pulling water through the drum and into the collection bag. Not only is litter diverted from the aquatic ecosystem, but during various points of the summer detailed waste characterizations are conducted on some of the 'catches' of the collection bags. Those characterizations identified 448 pieces of anthropogenic debris.

TOP 3 LITTER TYPES FOUND IN SEABINS	PIECES COUNTED
Plastic Film	189
Plastic Foam	122
Hard Plastic Fragment	51



Seabin detailed waste characterization



A Seabin capturing litter and debris. Photo: WPS America

The information helps to identify major litter culprits, but also it is fed back to the International Trash Trap Network, created by the Ocean Conservancy and the University of Toronto Trash Team to create a regression model to estimate anthropogenic debris in the weight of non-characterized submissions. The team hopes to add to this data and adjust the regression model as the network grows and develops, and as we learn more about how these numbers may differ by location or by trash trap device.

As for the #1 offender, plastic film most likely comes from packaging. Canadians use about 1.89 million tonnes of plastic packaging a year (The Canada Plastics Pact), 53% of that is rigid plastic while 47% is flexible (like film). Only about 12% of plastic packaging is being recycled—and flexible is the worst at 1%. Big brands have a lot of work to do in conjunction with the government to be a part of reducing the plastic litter in the environment by eliminating it when it isn't necessary and making good on actually using recycled plastic in their packaging (if they have to) and not virgin plastic. Ontario is in the midst of creating rules around making producers pay for their waste (blue box recycling) instead of municipalities, the theory being that making producers accountable for their packaging's end will reduce plastic waste. If it gets implemented reasonably, recycling plastic should be less of a mirage. This should help plastic litter in the environment as well as driving awareness of our own behaviours in understanding linear waste and what actually gets recycled (more circular).

For the #2 offender, some of the foam litter (mostly polystyrene, but also polyethylene) should be reduced when the federal ban on some takeout containers comes into effect at the end of the year, as well as the Ontario private member's Bill 228 in May 2023 on unencapsulated dock foam that we all helped get passed. There will surely be other types of foam to look out for and stop at source.

You can be vigilant on these by looking for products without plastic packaging (hard to find, but try bulk or some of the re-fill stores), and writing your favourite brands to encourage

them to implement re-fill programs, bottle deposits, eliminate unnecessary plastic packaging and plastic types, and if plastic is used—make sure it is working towards at least 30% use of post-consumer plastic resin by 2025 and will continue on that trajectory to 100%. Check out the Canada Plastic Pact for more information and encourage its members towards implementation.

Gutter Bins

The Town of Collingwood partnered with us in installing all 8 Gutter Bins! Gutter Bins capture pollutants and organic materials 6 mm and larger at storm drain openings in a specially designed "Mundus Bag". During precipitation events, stormwater that includes litter/pollutants from our residential and street surfaces runs off into the gutter and into drains on our streets that outflow into bodies of water like Georgian Bay. The Mundus Bag captures the run-off materials under a storm drain until the bag becomes completely full. Water is still able to drain through to prevent flooding.

In 2021, the Collingwood Gutter Bins diverted 2.21 kg of anthropogenic debris in 125.23 kg of natural debris. During, detailed waste characterizations we identified 2,166 pieces of anthropogenic debris.

TOP 3 LITTER TYPES FOUND IN GUTTER BINS	PIECES COUNTED
Cigarette Butts	1058
Plastic Foam	386
Hard Plastic Fragment	256



Gutter Bins located along Hurontario St, and Second & Pine Streets



Gutter Bin contents being characterized

Film and plastic foam top the list again, but a new offender cigarette butts was revealed making up 49% of all litter found in the Gutter Bins! Cigarette butts are also prevalent in many beach clean-ups. Not only do littered butts (filters) contain a number of chemicals (some toxic) that can leach into water but the filters often contain plastic fibers (cellulose acetate) that don't biodegrade. Finding a program and educational material that encourages proper disposal of cigarette butts will be a key objective for Georgian Bay Forever and its trash-trapping partners. If you or a friend smoke, please know that butts discarded on streets and on beaches often find their way to harming the aquatic ecosystem. The environment is not an ashtray!

Trash Trap

A Trash Trap is engineered with reusable commercial grade netting to capture pollutants and handle powerful stormwater runoff. Trash traps are attached to the end of stormwater pipes where they collect pollution and organic materials 25mm and larger. Unfortunately, we were unable to collect data from Trash Traps in 2021. A learning was that due to the size of the trash trap and installation requirements (a 1200mm outflow pipe with a suitable headwall), there were less opportunities. However, we are close to finding partners for 2022!



Trash Trap. Photo: InfraStruct

Education

Since the start of Diversion 2.0 in December of 2020 we have been able to educate over 15,000 Canadians about plastic pollution, single-use plastic consumption, recycling, and the circular economy using a mix of in person, online and print materials!

We educated:

- 566 people educated at farmers markets, during waste characterizations, and other community events and walkabouts
- 217 people attended presentations
- 339 registered for an educational webinar series

- 206 views on YouTube Videos
- 14,443 households and businesses received plastic waste educational pamphlets via mail drop brochures
- 48 businesses reached multiple times via email, phone & in person
- Multiple social media posts and media postings about the project.

2022—Moving Forward & How You Can Get Involved in Diversion 2.0

We look forward to continuing the important work of fighting plastic pollution in Georgian Bay. [To participate or for more info, email sean.mullin@gbf.org](#). We need your help to do the following:

- ✓ Join GBF in detailed waste characterizations around the Bay this summer!
- ✓ Join a zoom or in person presentation/workshop to learn more about plastic pollution, what you can do to reduce plastic waste, and GBF's work around the Bay.
- ✓ Try a Yellow Fish Road Program in your community (quantities limited). GBF wants to work with interested camps or children's groups to execute Trout Unlimited Canada's Yellow Fish Road awareness campaign. It's a campaign that engages children to paint fish near drains to remind Canadians that what goes down these drains ends up in our freshwater, and therefore often has plastic litter components from wrappings, cigarette butts, gum, bottle caps and more. They will reinforce the message by distributing door-hanger pamphlets to educate nearby residents about the symbols and what they represent.
- ✓ Businesses, schools, and organizations interested in reducing plastic consumption, please reach out and join our Plastic-Free Georgian Bay Community!



- ✓ Teachers! Our partner Plastic Oceans Canada has a free program for teachers to run in their classrooms starting in Fall of 2022. The program focuses on teaching youth about the impacts of plastic pollution on our environment, gets them out in their community to clean up debris and act as citizen scientists as they sort, track, and divert their findings,



ultimately learning about the importance of a circular economy. It's called "Plastic Oceans Canada's Circular Economy Ambassador Program (CEPA)"

- ✓ More for Teachers! The Nottawasaga Valley Conservation Authority provides a Grade 10 curriculum in Collingwood based on citizen science program activities. For more information, please email nsaunders@nvca.on.ca

Acknowledgments

This project, and many others, are made possible by our amazing funders, donors, volunteers, and partners, who continue to support and fund our research and outreach on Georgian Bay. The views expressed herein are solely those of Georgian Bay Forever.

This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :



Great Lakes Local Action Fund, Township of Georgian Bay, Archipelago, Lush Cosmetic, J.P. Bickell Foundation, Charles H. Ivey Foundation, and LeVan Family

A thank you to our valuable partners

Municipality of Northern Bruce Peninsula, Fathom Five National Marine Park, Town of Collingwood, Town of Penetanguishene, Georgian Bay Islands National Park, Town of Parry Sound, Township of the Archipelago, The Nottawasaga Valley Conservation Authority (NVCA), Rochman Lab, University of Toronto Trash Team, International Trash Trap Network (ITTN), Plastic Oceans Canada (POC), and Great Lakes Plastic Cleanup (GLPC)

And a thank you to GBF's Plastic Pollution Program 2021 Summer Students

Emma Christensen, Bronwyn Kirby, Kerri Lynch and Sofie Ohrling

*Play on a clever title of a blog by Hannah DeFrond who works with GBF partners Ocean Conservancy and the University of Toronto Trash Team to coordinate the International Trash Trap Network, where we also submit data from trash trappers. Info here: oceanconservancy.org/blog/2022/03/30/trash-trap/

¹ Roadmap to 2025. A Shared Action Plan to Build a Circular Economy for Plastics Packaging, V1 Oct 2021. Canada Plastics Pact. Retrieved on April 12, 2022, at roadmap.plasticspact.ca/ Page 16.

FAMILIES FOR CHANGE 5.0



Content assembled by Georgian Bay Forever Communications Director, Heather Sargeant

It's not easy talking to your kids about climate change or the plastic waste and litter from our throw-away economy. But we can't not talk about them—because these problems are real and serious for everywhere in the world including Georgian Bay. How can we talk to our kids without provoking high anxiety? How can we nurture problem-solving and coping to help our collective future? One consideration is through Experiential Learning, narrowly defined and often quoted as “learning through reflection on doing.” [Felicia, Patrick 2011]. GBF is not claiming to

be an expert on teaching, however this program attempts to capture that spirit with actionable tips that can be taken with your parental supervision—a situation where children can feel the safest in learning and where you can attenuate worries by guiding the reflective process.

Our 5th “Families For Change” (F4C) program is geared to younger families (kids 3–10), and we're always interested in your feedback as to how we can improve. The experiential learning suggestions in the next pages are organized into 3 themes for your family to try.



Burt Family members clean up a shoreline



1 DECREASING GREENHOUSE GAS EMISSIONS

What are greenhouse gases (GHG)?

The short answer is that they are gases that trap heat in the Earth's atmosphere. There is a more fun explanation and printable cards of the majors: water vapour, carbon dioxide, methane, ozone, nitrous oxide, and chloro-fluorocarbons. There are two sides to each card of the 6 GHG gases; one side explains what they are and the other side refers to how they impact global warming. Check it out at climatekids.nasa.gov/greenhouse-cards/

Investigate the greenhouse effect.

"Over one week [use:] two thermometers, two shallow open boxes lined with soil, with one covered tightly with clear plastic wrap, and a notebook for taking temperature readings through the day and night. Or use a different,



but well-controlled method of comparison." Place the boxes outside. Note the differences. climatekids.nasa.gov/science-fair/

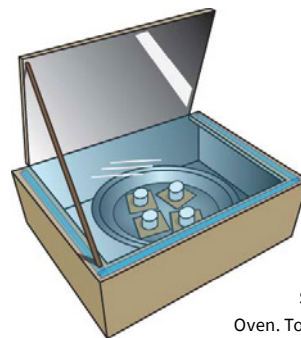
Try a more sustainable energy source.

Make S'mores with a Solar Oven. Potentially, you can re-use some of the materials from above. Get the instructions here: climatekids.nasa.gov/smares/

Some of these experiments require "lightly used or single-use" materials. It's an opportunity to talk to how these experiments are re-using some materials (great), but also

in some cases, they are not—like the plastic film (not so great). And, that there is a larger opportunity for all of us to continue to move away from the convenience and reliance on these materials that are contributing to land-fill and litter waste, and to work towards this waste either not being used or being turned back into products in a circular economy in the future. That's our next theme.

Thank you, NASA, for these ideas and pictures under this theme: Decreasing GHG emissions.



S'mores in a Solar Oven. To learn more, visit: climatekids.nasa.gov/smares/

2 REDUCING WASTE AND LITTER IN THE ENVIRONMENT

Why is using so much stuff once or twice so bad?

Because a lot of it is plastic, and most ends up in landfills and too much litters the environment like shorelines in Georgian Bay. Only 9% of the world's plastic has ever been recycled. Learn about the solutions hierarchy from the U of T Trash Team in this kid-friendly video, "The Solutions Hierarchy". Watch the video here: youtu.be/x5wCFPsaQ3Q

Clean-up a shoreline or help sort captured litter!

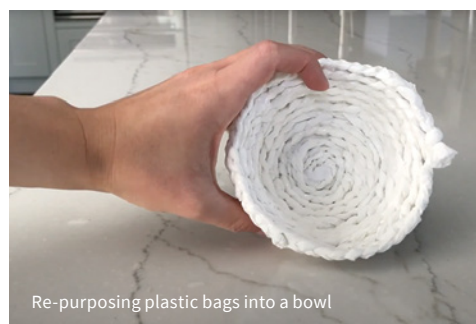
Last summer, GBF staff and volunteers collected and sorted over 22,000 pieces of litter from shorelines and from litter catching devices. Not only does this divert litter away from fish, birds, and other aquatic animals that might eat the litter and get sick, these actions also make the shorelines and water prettier to look at and swim in. And, there's another benefit—you can call yourself a citizen scientist if you help sort the litter and send it in to us. That helps all of us know what the

worst litter is and then we can work together to stop it. For example, one year we found out dock foam was littering shorelines and we all worked together to make sure future docks can't have unencapsulated foam that breaks up because it is not securely covered. Email us at ashley.morrison@gbf.org to see if there is a shoreline cleanup or waste characterization that you can join, OR do your own shoreline cleanup and send us the data (page 13).

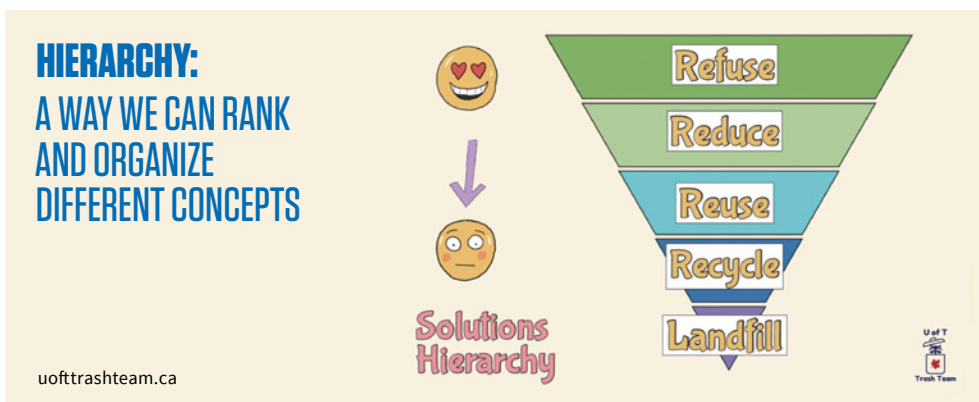
Re-use litter items and make great art!

Make a wind-chime out of litter you find in your clean-ups or you are about to throw out. Check out this video for inspiration and put your own creativity to it from Full-Time Kid/

PBS Parents at bit.ly/windchime2. Also, the U of T Trash Team has this ingenious video on re-purposing plastic bags that you can try (make ropes and bowls for instance!) at bit.ly/bagbowl.



Re-purposing plastic bags into a bowl



PRESERVING WETLANDS

What's a wetland?

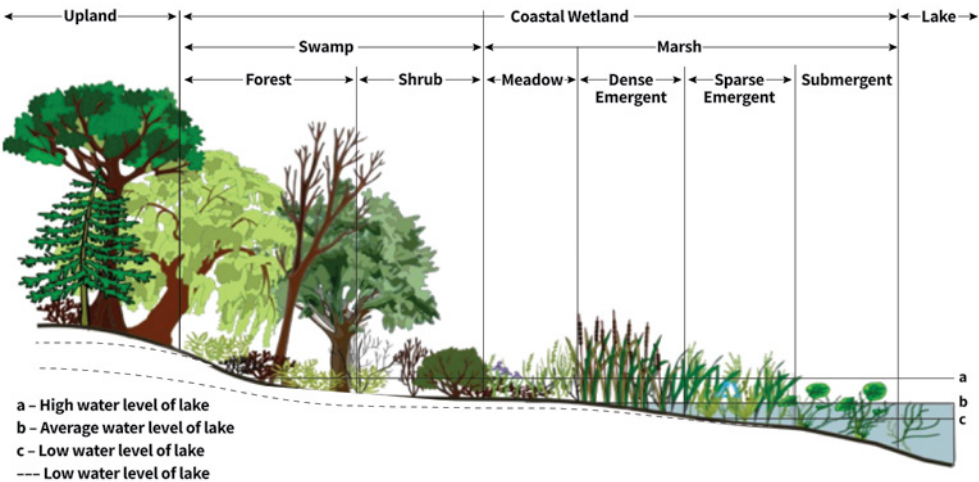
The Great Lakes, including Georgian Bay, support more than 3,500 different species (like turtles, frogs, and fish), and many of them rely on coastal wetlands in which to live, have babies, take shelter and shade, get food, and stay safe from predators. There are different types of wetlands including swamps, bogs, fens and marshes. Coastal marshes (wetlands) make up at least 90% of the provincially and regionally significant (important to save) wetlands found on the Great Lakes shores in Ontario. Marshes are wetlands that are almost always flooded (covered with water) and have a mix of different kinds of plants that either float, or are underwater, or emerging from the water. Enjoy colouring the graphic below, and read about the different types of vegetation that can be found in a coastal march (wetland). Check out a full coloured graph at bit.ly/marshcoloured.

Help protect a wetland or shoreline habitat in Georgian Bay from an invasive plant called *Phragmites*.

The invasive form of this plant is from Europe—where the plant functions well in that environment. In our environment, it doesn't have natural predators, making a lot of unusable habit in our wetlands for the native animals that live in Ontario, and impairing the nutrient cycling (the energy flow) of the wetland. You can learn about this plant and ways to remove it by participating with your parents in a removal of the invasive plant on a shoreline in Georgian Bay. To find out more, contact nicole.carpenter@gbf.org.



WETLAND VEGETATION COMMUNITY ZONATION



COLOUR ME!



Thank you, FAMILIES, for all you do to protect the Bay. Let us know how your experiential learning went, and if you have any ways for us to improve. Email info@gbf.org.

TYPES OF VEGETATION IN A COASTAL MARSH

SHRUB	WET MEADOW	FLOATING	EMERGENT	SUBMERGED
Woody plants less than six metres tall that grow above the water line. Influenced by periodic flooded conditions. Examples willows, sweet gale.	Found between the wetland and terrestrial environment. Flooding is seasonal, in spring and moist to dry by summer. Examples: Jewelweed, grasses, and sedges.	May be rooted under water but have leaves that float on the surface, such as Yellow Pond Lily and duckweeds.	Roots that might be under water, but grow and flower above the water's surface. Common examples include cattails and bulrushes.	Submerged plants are rooted under the water and grow entirely underwater such as Wild Celery and Coontail.



SHORELINE CLEANUP INFORMATION SHEET

GEORGIAN BAY
FOREVER



SITE INFORMATION

Name (1 or 2)		Location (Georgian Bay Community eg. Sans Souci)	
Date		Location (optional) GPS coordinates	
Distance Cleaned (m)est.		Total Weight Collected. Estimate if no scale in pounds	
If you collected more than one garbage bag, note #		If you collected more than 1 recycle bag	

TRASH TALLY

Items	Total #	Fishing Gear	Total #
Beverage Cans*		Fishing Lures	
Bottle Caps		Rope (1 meter = 1 piece)	
Cigarette Butts		Fishing Line	
Coffee Cups/Lids		Personal Hygiene	
Food/Candy Wrappers*		Condoms, diapers, tampons	
Glass Bottles*		Masks	
Paper Items		Tiny Trash (>2.5 cm)	
Plastic Bags*		Plastic Pieces	
Plastic Bottles (eg. water bottles)*		Foam	
Six Pack Holders		Large Pieces Blue (bigger than your finger)	
Utensils		Large Pieces other colour(s) , if you can indicate colour	
Straws		Medium and small pieces Blue (smaller than your finger)	
Balloons		Medium and small pieces other colours (smaller than your finger)	
Other (insert...)		Styrofoam Packaging/Containers (eg. bait containers)	
Other (insert...)			
Other (insert...)			
Other (insert...)		Please send us other observations	

* If a brand name is apparent, can you please make note of the brand name.

SEND COMPLETED TALLY SHEET TO ASHLEY.MORRISON@GBF.ORG OR CALL (905) 880-4945 X6

GEORDIE DALGLISH

A TRUE GEORGIAN BAY ADVOCATE



As written by Geordie Dalglish, Director of Weston Family Foundation and Georgian Bay Cottager

As children, we were always outdoors. Rain or shine. (Actually, I don't ever remember wanting to be indoors). We were actively encouraged to go out and enjoy nature. My family and I lived in Toronto and I remember spending hours in the ravines, exploring and playing with my friends. It was always a fun time but even then, I was continuously shocked by how much trash was thrown off bridges into those amazing spaces! Nature had a huge impact on me growing up and its destruction made me sad.

My parents, and I come from a long line of nature lovers and we are unified by the desire to learn about our natural environment and protect it. From a young age, my parents would make a point of teaching me about the importance of nature and biodiversity, and I know, in turn, they were taught by their parents, and them from their parents all the way up the line. The process of this shared family learning has had the largest impact on my life and I owe my passion for natural spaces to my family conservationists.

Protecting the environment is a critical activity that our family believes in. One of the greatest things my grandparents did, early in their business career, was channel much of the profits of their business into the creation of our family foundation, The Weston Family Foundation. This initiative, thanks to their

foresight and the continued work of their children, has allowed, and continues to allow, our family to join together to support shared passions for nature, conservation and biodiversity.

Georgian Bay has played a big part in my life. I have been on the Bay for over 35 years, and can still remember my first view of it as a young boy, when I visited school friends whose parents had a cottage in Go Home Bay. To this day, I can remember my awe and disbelief at all the islands I saw and the knowledge that we were actually on the Great Lakes! I think I was most shocked that we could actually drink the water. Up until that point, I had been told that the Great Lakes were "ultra-polluted" and I thought I would be visiting a version of the Love Canal in Niagara Falls and not the beautiful Bay we still see today.

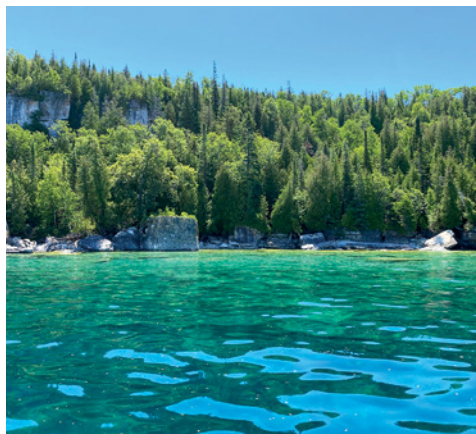
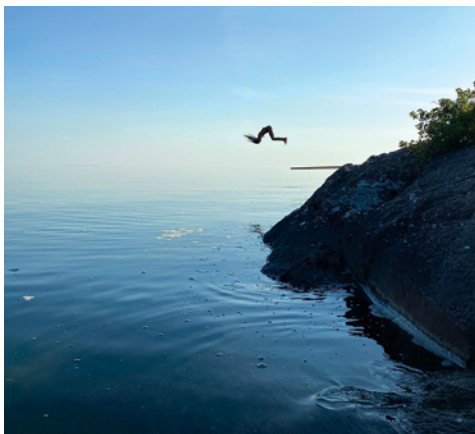
Georgian Bay is a very exciting place and I know that many people love it for the same reasons I do. It's also such a harsh but fragile place and the biodiversity is incredible. All these things are important but the main attraction to me is all that clean sweet water. Truth be told, when people argue about the superiority of their cottage location, I always laugh. It's all good as long as it's on Georgian Bay. We like to share the beauty and uniqueness with friends, parents, grandparents and every

generation in between. For us, Georgian Bay represents an ever-changing dynamic. Our love of the Bay is always there but, like the Bay itself, our love ebbs and flows depending on the season, the weather or the daily chores. Some days we shout in anger at the wind or tremble through a thunderstorm, but we always come back for more.

The beauty and the water we cherish needs our help. Right now, I am horrified by the plastic problem we have. The world is drowning in plastic and it is getting into the Bay in ways you and I would never think of. Microplastics are escaping through washing our laundry. They are in our toothpaste, soap and pretty much everything we eat and drink on the Bay. We are also seeing more visible plastic in the water, around marinas and campsites, and washed up on shorelines. Don't get me started on the balloons we find along the shoreline which people have released into the sky. I sound like an ogre but this is a real problem.

Our family believes in supporting projects that make a real difference. This is why we like Georgian Bay Forever—they use innovative approaches to preserve and protect our environment. The Divert and Capture project is a great example of this. It educates us about this big problem with plastics finding their way into our water, but the best part is that the program also offers solutions to the problem. It's great to have an organization that can find and implement solutions rather than just crow about a problem. To that end, you will find me doing shoreline sweeps for garbage this coming summer, as well as just talking.

We need to be very careful with Georgian Bay water. Educating people about its quality and threats, providing solution-oriented information and actually implementing those solutions, engaging the public and building stewards of the future, is ultra-important. Thank you GBF, for protecting our Georgian Bay water and wetlands, forever. Now can we talk about antenna and tower light pollution?



SWIM FOR GEORGIAN BAY!

August 6, 2022

Alan Harman and **Chris Galberg**, veteran Georgian Bay swimmers, will be swimming 4.1 kms across open water from Jagged Island to Long Island (part of the Westerns) to raise funds for Georgian Bay Forever.

THE BEST PART?

You can support their swim by sponsoring their efforts per km (consider \$20, \$50 or even \$100 per km) or by a one-time gift of any amount.

Double your impact — ALL DONATIONS will be matched by Alan up to \$5,000!

Want to join in on the fun? Swim, paddle board, canoe or kayak. Want to do more? Pledge to raise \$1,000 to help safeguard Georgian Bay!

Call Amber at **905-880-4945** ext. 3 to donate or get more information.

Disclaimer: This is a third-party event, and participation is at your own risk. Receipts will be provided for all donations over \$10.00. Rain date August 7. If weather is bad both days, Alan and Chris will swim an inner, more protected route of the same distance.

GBF IS PLEASED TO RECOGNIZE THE MEMBERS OF THE GEORGIAN BAY FOREVER CIRCLE

Honoring our loyal supporters for their cumulative donations of \$15,000 or more to April 26, 2022.

Help us protect Georgian Bay. Forever.

Using the enclosed envelope, send in your donation today! GBF.org | 905-880-4945 x3

PROTECTOR | \$250,000+

Great Lakes Basin Conservancy, Inc.
RBC Foundation
Doug and Ruth Grant
Bill & Carol Prior & Family

DEFENDER | \$100,000-\$249,999

Bruce Power
The Carrick Family
The CSL Group Inc.
The Geoff Hyland Family
Husky Injection Molding Systems Ltd.
Jackman Foundation
The McLean Foundation
The Anthony and Amie Munk Foundation
Robin and Robert Ogilvie
The Schad Foundation
Weston Family Foundation

GUARDIAN | \$50,000-\$99,999

David and Shelagh Blenkarn
James and Erica Curtis
Echo Foundation
Barry and Laurie Green
Michael and Jacquie Green
Hodgson Family Foundation
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Roger Jones and Joanne Muther-Jones
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Peter and Catherine Singer
Philip and Eli Taylor
Rob and Val Thompson
John and Josie Watson
R. Howard Webster Foundation
The Michael Young Family Foundation

HERO | \$25,000-\$49,999

Jennifer Ivey Bannock
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Margot Roberts and David Williamson
The Ruby Family
Larry Smith

Brian and Sabine Thomson
Mary Thomson and Jan Ruby
Wayne/Coleman Family Fund

PATRON | \$15,000-\$24,999

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Jason Drysdale and Laila Daumants
John and Sybil Eakin
Fednav Limited
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Janet Walker
Larry and Judy Ward
Cameron Wardlaw
Michael Wenban and Virginia Froman
Sandy Wood and Don Darroch

THESE LOCAL BUSINESSES STEPPED UP TO HELP PROTECT THE BAY:



Other Businesses include:
Bay Port Yachting Centre

"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 over 100,000 miles of rivers, streams and coastlines in North And South America, Europe, Australia, Asia and Africa. For more information go to waterkeeper.org

