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GEORGIAN BAY FOREVER

Protecting your water.

FILTERS STOP MICROFIBRE WASTE

PARRY SOUND STUDY PROVES IT

Also Inside:

THANK YOU

By Adam Chamberlain, Chair of Georgian Bay Forever

From the point of view of the depths of winter (where we are as I sit to write this), summer on the Bay seems somewhat distant. That said, this wintery vantage point provides a clear view both of the year just past as well as the one yet to come.

With COVID presenting new yet familiar challenges, one suspects that this year might look a bit like last year. Let's hope that the similarities are passing and that we all start to see a world where COVID is more manageable.

One way that I hope 2022 lives up to positive aspects of 2021 relates to the support so many of you provided to GBF, both financially and in the form of "elbow grease". Whether you made a monetary gift/donation or helped with GBF's various program efforts such as microfibre reduction, emission/pollution reduction, shoreline cleanups or *Phragmites* cuts, your contribution was essential to GBF's work towards the protection of the Bay.

One group of individuals who I would like to call out for recognition today are those who volunteer their time to serve on the various committees of GBF and on the GBF board. The two words I would repeat for emphasis are "volunteer" and "serve". While GBF is fortunate to have excellent and dedicated staff, GBF would not be what it is without those who willingly spend their evenings, weekends and other personal time serving GBF. They deserve the recognition and thanks of those who value the Bay and all it provides to us. Being one of those who benefits from their service, I am pleased to thank them here on behalf of us all.

Find out more online about:

GBF's Board of Directors – **gbf.org/board**
GBF's Committees – **gbf.org/committees**

REFLECTING ON THE 2021 PHRAG SEASON

By Nicole Carpenter, GBF Project Coordinator

Summer 2021 results are in — summer 2021 was an incredible success in our efforts towards eradicating *Phragmites* from the east coast of Georgian Bay. *Phragmites* is an invasive plant from Europe that if left unchecked threatens biodiversity, habitat, and proper wetland functioning.

In total, GBF manages 904 coastal *Phragmites* sites across the eastern shoreline of Georgian Bay including the Township of the Archipelago, the Township of Georgian Bay, Tay Township and Matchedash Bay with the help of many community members, municipal funding, donors, organizations, and 4 summer student staff. This year we achieved eradication of a total of 45% of the stands and a further 30% were cut — putting us at a total 75% control management (i.e. at least one cut). This year approximately 38,000 kg of *Phragmites* was removed. [See the full online report by region at **gbf.org/2021Phrag**]

In a new project area, Matchedash Bay, we discovered a total of 72 *Phragmites* sites, of which there was significant uncertainty of lineage at the time of mapping and cutting. In the fall, GBF sent in 7 samples for DNA testing, of which 6 turned out to be the native lineage. 28 of these 72 sites are native and mostly focused on the North and Coldwater River tributaries that flow into Matchedash Bay. (Online report at **bit.ly/Matchedash**.)

A scene from Matchedash Bay in winter

Due to the inaccessibility of many sites of invasive *Phragmites* found in the Matchedash Bay wetland, GBF is hoping to recruit volunteers to help with removal over the winter in areas we otherwise would not be able to reach in the summer. We are interested in the effects of winter removal and its implications on regrowth in the spring. Once safely frozen, this volunteer opportunity would involve snowshoeing or cross-country skiing short distances over the wetland to remove leftover dead stalks of *Phragmites*. If this is something you would be interested in, please contact Nicole Carpenter at **nicole.carpenter@gbf.org** or 905-880-4945 x 7.

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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You can reach David Sweetnam, our Executive Director, at ed@gbf.org or at 905-880-4945, ext 1.

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 become a regular visitor to our website.
GBF.ORG

Design by Key Gordon (keygordon.com)
Editor: Heather Sargeant

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GEORGIAN BAY FOREVER

IT'S NOT JUST PHYSICAL

STUDY FINDS COMPLEX CHEMICAL MEAL OF MICROPLASTICS CAUSE UP TO 6X MORE DEFORMITIES IN MINNOWS.

By guest writer Kennedy Bucci. Kennedy Bucci is a PhD candidate in the Rochman Lab at the University of Toronto. Her research investigates the effects of microplastics in freshwater ecosystems, looking at multiple levels of biological organization, from cells to ecosystems. Kennedy is also an avid reader, and loves hiking, foraging, and being outdoors.

Tiny pieces of plastic, some invisible to the naked eye, have been accumulating in the environment for decades. Some breakdown from larger pieces of litter, others are manufactured to be in the small size range. These pieces of plastic are called microplastics, but despite their tiny size, they can have big impacts in the environment.

The complexity of microplastic types, shapes, sizes, and chemical cocktail is often overlooked in the study of the effects of microplastics.

Many studies investigate how 'virgin' microplastics affect organisms, typically using commercially-available polyethylene (PE) or polystyrene (PS) micro-spheres. Although these studies are useful to inform how organisms ingest and excrete microplastics, their effects are difficult to translate to how microplastics truly affect wildlife.

In my research, we wanted to compare the effects of microplastics found in the environment to commercially-available 'virgin' microplastics. In the aquatic environment, 'microplastic pollution' exists as a **complex mixture** of plastic particles of different sizes, shapes, colours, and types. The types of particles that make up the mixture, as well as how much is present, also differs by region and even by when the sample was collected.

Plastic pollution also has an associated suite of chemicals, called a chemical cocktail.

This cocktail is made up of additives from manufacturing, unreacted monomers from the polymerization process, **AND** environmental contaminants sorbed from the surrounding environment. These chemicals, once they have concentrated on or within the plastic, are ingested by wildlife, providing an additional vector for these contaminants to enter the food web. Thus, plastic pollution poses both a physical and a chemical threat to organisms.

To compare the effects of microplastics found in the environment to commercially available microplastics, we collected polyethylene (PE) and polypropylene (PP) plastic pollution from the shore of Lake Ontario, the most polluted of the Great Lakes. Our goal was to better understand the importance of the chemical cocktail in causing harm to wildlife.

To conduct this study, we used fathead minnows (*Pimephales promelas*), which are a prey species commonly found in lakes and rivers throughout North America. Fathead minnows are prey to larger sportfish including perch, walleye, and northern pike.

We chose PE and PP for our experiment because they are commonly produced and polluted. PE is the most widely used plastic type, and is used in food packaging, shopping bags, and products like chairs and snowboards.

PP is stronger and more flexible than PE, and is used to produce car parts, medical devices, and food containers.

PE and PP already have chemical additives from the manufacturing process, such as plasticizers and antioxidants, that give the products desired properties like flexibility and durability. The plastics collected from Lake Ontario likely have an additional suite of contaminants that are found in Lake Ontario, such as polychlorinated biphenyls (PCBs), organochlorine pesticides (like DDT), and heavy metals like arsenic, mercury, and lead.

What my study did:

- We exposed minnows to microplastics and their associated contaminants for a total of 14 days, from the egg stage into the larval stage, through the crucial development period. We observed their survival rate, length and weight, and the number of deformities.
- And, to understand the chemical dimension of microplastics, we used a unique experimental design. In one treatment, we exposed organisms to the plastic particles after soaking in water for 24 hours, to look at physical and chemical effects together. In the second treatment, we soaked particles for 24 hours, but then sieved the particles out and exposed the fish to only the leachates.

The results of our study give two main conclusions.

First, microplastics from the environment caused almost 6x more deformities in larval fathead minnows compared to the microplastics purchased from a manufacturer.

Kennedy Bucci picks up plastic litter samples

Second, we saw deformities in both the leachates only and the particles+leachates treatments. This suggests that the chemical component of microplastics does matter — it wasn't just the physical particles causing these deformities.

While more research is needed to further understand the role of chemicals in microplastic pollution, we know that microplastic pollution is harmful to the wildlife of the Great Lakes.

Policy measures that prevent plastic pollution from reaching the Great Lakes is critical — we will never solve the problem with beach cleanups alone.

Washing machine filters are one practical solution to preventing microplastics (mostly in the form of microfibres) from entering the aquatic environment.

Read on to see the results of GBF's and the University of Toronto's Parry Sound Washing Machine Filter study.

Normal Minnow

Some Deformities

Pictures: Bucci et al. 2021 *ET&C* (DOI: 10.1002/etc.5036)

IMPORTANT STUDY JUST PUBLISHED:
WASHING MACHINE FILTERS IN PARRY SOUND PREVENT SIGNIFICANT MICROFIBRE WASTE IN WATERWAYS

By Brooke Harrison, Georgian Bay Forever (GBF) Project Coordinator

The collaborative study between GBF, the University of Toronto (U of T) Rochman Lab, and the Town of Parry Sound and its volunteers, was published on November 18th, 2021 in Frontiers in Marine Science, Marine Bulletin[1]. An important publication that has already been directly read by 3,244 and been referenced to millions more in over 33 media pieces since the end of December. We are proud to share with you, our supporters — the final study conclusions and why this study is so important.

The Problem

Microfibres are the most common type of microplastic and human-produced particle in the environment. At less than 5mm in size, they are nearly impossible to remove and plastic microfibres will not biodegrade. Both synthetic (plastic) and modified natural fibres (eg. cotton) are a cause for concern due to continuous quantities ending up in our water and the risk of ingestion by aquatic animals that can lead to contamination up the food chain through trophic transfer. Negative impacts on aquatic life can include developmental deformities, decreased feeding and growth, hormone system disruption, decreased fertility and more.

While the effects to humans are currently unknown, studies show microfibres are in our drinking water, beer, salt, fish, and the air we breathe. Researchers estimate that 4.8 million tons of synthetic microfibres (e.g., polyester and nylon) have entered water bodies and terrestrial environments since 1950.

A major source of microfibre pollution comes from fibres shed during the laundering of your clothing.

A single load of laundry can release hundreds of thousands of microfibres. Although wastewater treatment plants (WWTP) can capture up to 99% of microfibres, 1% still enter water sources — billions or more daily. Furthermore, the captured 99% is also still a risk to contaminate the environment as the microfibres are captured in the form of sludge at WWTP, which can be used as fertilizer in agriculture settings contaminating soil and waterways through runoff.

While the Rochman Lab demonstrated in a lab setting that washing machine filters (Wexco Filtrol 160) are effective at capturing up to 89% of microfibres shed from laundry, filters had not been proven at a broader scale and in a real-life community setting.

Demonstrating a Solution

And in 2019, that started a collaborative study between GBF, U of T Rochman Lab, and the Town of Parry Sound and its volunteers as part of GBF's **Divert & Capture: The Fight to Keep Microplastics out of our Water.** We asked the question:

Can microfibre filters applied to multiple washing machines be effective at capturing shed microfibres at the source, and thus prevent significant microfibre pollution getting into Georgian Bay?

We looked at it in two ways:

1. We installed 97 filters in a community with 1,050 households connected to town water- we expected to see a 10% reduction at the WWTP. Measuring the WWTP final effluent before and after filters were deployed.
2. Additionally, we asked participating households to collect microfibres to be weighed and analyzed.

> "Thank you, Parry Sound! Thank you to the volunteer households in Parry Sound, Lisa Erdle and the Rochman Lab at University of Toronto (UofT), the Town of Parry Sound, and the funders, donors, and partners for making Divert & Capture possible."
>
> —Brooke Harrison, Project Coordinator

Results

Over this 487-day study, 22.8 kilograms of lint was diverted from WWTP by about 63% of the 97 households. The average household collected 6.4g a week, equivalent to 179,200–2,707,200 microfibres. In addition, this study supported previous evidence that top loader washing machines generate more lint from clothes than front loader washing machines, and therefore front loaders are a better choice to reduce emissions.

We estimate we diverted 934 million to 14.1 billion microfibres from the Parry Sound WWTP, annually. A 41% reduction in the final effluent was observed at the WWTP. Although this is higher than anticipated, a possible explanation to this is behavioural change arising from the public education component of the **Divert and Capture** program.

In conclusion, YES, microfibre filters are an effective way to stop microfibre pollution at the community and WWTP scale.

This result can help inform policy decisions to reduce microfibre emissions from laundering textiles on a grand scale.

Next steps for GBF:

We will continue to share the results widely to effect mass adoption of filters on washing machines to staunch microfibre pollution in water bodies. That includes sharing information with provincial, national, and global leaders and audiences and organizations to support microfibre filters built into future washing machines, and encourage current washing machines owners to fit their laundry rooms and washers with external filters.

WHAT CAN YOU DO TO MASS-SCALE FILTERS?

Support passage of Ontario Private Member's Bill 279: Environmental Protection Amendment Act (Microplastics Filters for Washing Machines), 2021. "The Bill amends the Environmental Protection Act to prohibit the sale or offering for sale of washing machines that are not equipped with a specified microplastics filter and to provide for corresponding penalties in case of non-compliance with the requirement."

Visit **gbf.org/microfibres**

- an MPP letter template by the Georgian Bay Association,
- a petition to download
- and an invitation to register for a February 24th webinar.

At the same time, you can reduce your personal microfibre emissions by:

- Buying a Filter (The Microplastics Lint Luv-R sku EE002 and the Wexco FIltrol 160 are available online in Canada and have been tested to be over 85% effective). Costs range from about $180 – $220 CDN, and they are about the size of a paper towel dispenser.
- Wash your laundry with COLD water
- Do FULLER loads of laundry
- Wash your clothes LESS
- Avoid FAST fashion
- REPURPOSE, REPAIR, and REUSE your textiles
- Buy LESS
- If buying a new machine, buy a FRONT loader
- If you are in Collingwood, email **brooke.harrison@gbf.org** to qualify for a free filter in our program there.

SHARE THESE STATS:

Captured microfibres from household washing machine filters. **Total lint collected since 2019:** 22.82 kilograms collected over 487 days estimated to contain 639 million to 9.7 billion microfibres!

Thank you to our funders and partners

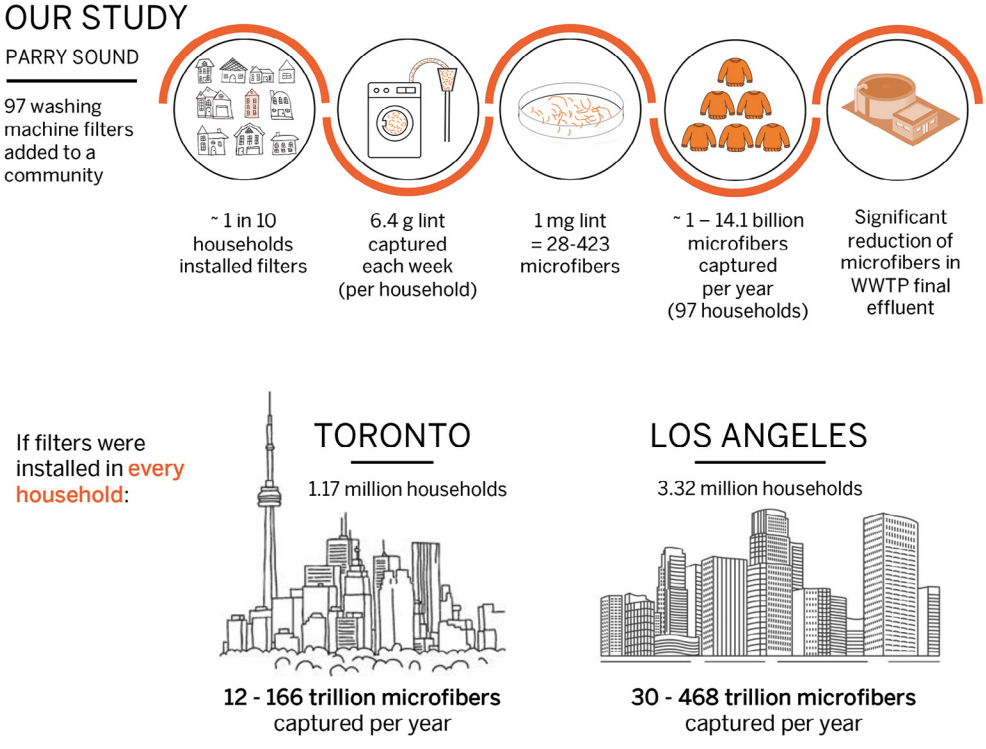
The ECCC EcoAction Community Funding Program, Lush Handmade Cosmetics Ltd., Patagonia Environmental Grants Fund of Tides Foundation, RBC Foundation, Charles H. Ivey Foundation, J.P. Bickell Foundation, LeVan Family Foundation, Helen McCrea Peacock Foundation, and GBF Donors. GBF wishes to acknowledge the support of these partners: The Rochman Laboratory at the University of Toronto, The Diamond Environmental Research Group at the University of Toronto, The Town of Parry Sound, The Georgian Bay Biosphere, The Ontario Ministry of the Environment, Conservation and Parks, Fashion Takes Action.

Volunteer Larry Jordan with his Washing machine filter.

Parry Sound Study Reference:

[I]Erdle LM, Nouri Parto D, Sweetnam D and Rochman CM (2021) Washing Machine Filters Reduce Microfiber Emissions: Evidence From a Community-Scale Pilot in Parry Sound, Ontario. Front. Mar. Sci. 8:777865. doi: 10.3389/fmars.2021.777865

Graphic below by Lisa Erdle.



ELECTRIC-POWERED BOATS REDUCE POLLUTION EMISSIONS, BUT THEY ALSO MAKE BOATING MORE ENJOYABLE.

By Heather Sargeant, GBF Communications Director with contributions from GBF Executive Director David Sweetnam, boat enthusiasts and volunteers Greg Mezo and Kerry and AJ Mueller, donor and Point Pleasant Marina owner Drew Lichtenheldt, Gabe Johnson from Pure Watercraft[II], and the Georgian Bay Biosphere.

Boating could be so much less painful — the pain starts with noise from the internal combustion engine (ICE) chugging and revving and breaking the serenity of listening to nature around you or making it impossible to hear your friends; there's the fumes and unfiltered exhaust pollution emissions from gas and oil during boat rides and fill ups; and then there is the maintenance and winterizing of ICEs which can involve taking hoods off, draining oil, installing new oil filters, filling the crankcase, changing gear oil, stabilizing fuel, flushing with antifreeze, fogging cylinders, greasing tubes, spraying various things against corrosion, and more. Ugh.

Now — imagine a boating experience with an electric motor where all that goes away. A quiet **emission-free** ride where you can truly enjoy a boat ride on Georgian Bay without poisoning it, and where you can go from zero to full throttle instantaneously. Boating made simply more enjoyable.

That's the promise of electric boat motors. For example, a 20HP 2-stroke outboard engine that operates for 1 hour makes 11,000 m^3 of water undrinkable. And a 5 HP 4-stroke latest technology outboard produces 38 times more hydrocarbon and nitrogen oxides emissions than a small car[I].

But there are stumbling blocks like upfront costs and availability, and concerns over range and consecutive hours of stored energy. We're going to shine some light over those concerns.

Cost

Certainly today, the purchase price of electric boat motors is more expensive than dirty ICE motors, and there are fewer choices and limited availability. But, if you have the means or can start saving towards this goal, **please** do so as we know first-adopters pave the way for mass adoption.

Let's look towards the example of the Muellers. Not only do they have an electric car and an electric motor for their small outboard (Torqeedo)[II] — but they also recently ordered an electric motor from Pure Watercraft[II] for a pontoon boat. The difference in price was substantial — about 25k USD with 2 battery packs for a 50 Hp verses about 13k CDN for a 90 Hp ICE outboard. There are some offsets through reduced operation costs like less maintenance due to the few parts in an electric motor verses an ICE motor, and certainly the cost of filling up at $1.60 to $2.00 a litre (as some reported this summer) versus electricity which would cost much less (maybe about a 5th depending on where you are). But the current sticker price is certainly more expensive, and a government incentive to close the price gap should be encouraged to quicken adoption to improve efficiencies of scale so environmental pollution can be stopped at source (the motor). And currently, ICE and petroleum manufacturers and sellers are not cleaning up the emission pollution or being made to account for its impacts.

> **"My husband and I switched our cars to EV's years ago and love driving them. No looking back. So, we decided to switch our boating fun to electric too for similar benefits: the quiet ride, no unhealthy fumes to breath in or air pollution created adding to climate change, a motor with virtually no service requirements — plus in the case for boats, minimal winter preparation, the convenience and lower cost of charging at home."**
>
> —Kerry and AJ Mueller
>
> Owners of an Torqeedo[II] electric powered outboard fishing boat and Pontoon boat powered by a Pure Watercraft[II] electric motor on order.

What about battery charging and range anxiety?

What really matters in terms of reasonably being able to use an electric motor — is predicated on **how you boat.**

Many electric boat motors are marketed towards drives of 5 hp to 50 hp, and generally towards outboards as they are a large portion of the "total drives" in the market. Within this range, the battery size/weight/charging required is very doable according to Gabe Johnson, Head of Marketing at Pure Watercraft[II]. It would seem a lot of boat drives around Georgian Bay could be powered by electric motors in use on small craft outboards, pontoon boats, fishing boats, and rigid inflatable boats.

Consider the following:

Many families who use their boats every weekend during the summer months fail to hit 100 hours of running time, which is the typical manufacturer recommendations for maintenance on an ICE. This may indicate a lot of short distance usages. Additionally, many trips aren't consistently high-speed trips. These 'how you boat' points were certainly part of Georgian Bay Forever's viability calculations when we purchased the electric Torqeedo[II] 10.0 TS (20 HP ICE equivalent) outboard motor for our small 16' utility boat that you will see saving our Georgian Bay wetlands in summer 2022.

CONTINUE READING

Pontoon boat with an electric motor. Photo courtesy of Pure Watercraft[II].

Electric motor example. Photo courtesy of Pure Watercraft[II]

"Charging of the electric motor is enabled by a battery charging system that must be plugged into shore power or by the optional solar charging controller." Notes GBF Executive Director David Sweetnam. "Expected routine daily usage of the watercraft will utilize only 25% of the installed battery capacity. If the boat is not in use and the battery was starting from 10% capacity, the system would be capable of reaching the maximum battery capacity after 4 hours."

This utility boat will be used daily by students going to Phragbusting locations and mapping, and for shoreline remedial work.

IS THIS THE FUTURE?

Photo: Courtesy of Candela. Candela[II] C-7 cruising over 20 knots on computer controlled hydrofoils. GBF notes there continues to be many innovations in high-speed electric boats to deal with battery power/size required and this is just one example.

Still — that fear of being stranded is real — so GBF asked the Mueller's (M) about that fear for **both their electrically powered-boats** (a small watercraft and a pontoon boat).

Before you bought the electric motor — were you worried about being stranded somewhere?

M: We're concerned so we bought two Torqeedo[II] batteries. However, one battery has been sufficient on Otter Lake to go about 8 km which is about as far as we go.

Were you worried that charging would be very hard to figure out?

M: No, we knew how easy charging can be from driving EV's.

If so, how have you overcome this fear?

M: We had a charging outlet installed at our dock for a cost of $1900 where we plan to charge the Pure Watercraft[II] electric motor for the pontoon boat. The small portable Torqeedo[II] (4 HP) motor and batteries are light weight and easy to store in our basement and re-charge there in about 7 hours if near empty (average plug). **We like the convenience and over-all lower operational cost of charging at home.**

Is charging your battery(s) really complex or time-consuming or really hard to do?

M: Re-charging a battery is simple. Like recharging one's cell phone.

What about bigger, high-speed boats?

That doesn't mean there aren't options for big high-speed boats, and yachts and so on that travel very large distances and require a lot of energy. There probably are — but they represent a smaller portion of drives due to the high price point, and/or require huge batteries that make them difficult to design. Hydrofoil speedboat technology might be one way to overcome the significant challenge of drag that sucks up battery juice and would therefore increase efficiency, according to an article on Swedish company Candela[III].

This company has apparently also developed a range of high-speed long-range ferries, and yacht options. Other potential areas of interest and progress centre around building in operational artificial intelligence. Smart boats, like smart cars, can benefit from technology whereby performance is constantly optimized via "the cloud" and software upgrades can routinely improve boat performance[IV]. There are likely many other progressive technologies and solutions arising, and we are interested in hearing of any developments from you (email: **info@gbf.org**).

But, if you can't charge at home/seasonal residence — charging at your marina is a challenge that needs a lot of government support to help identify and solve.

GBF talked to marina owner and GBF donor Drew Lichtenheldt of Point Pleasant Marina. Drew wants to do more to support the reduction of polluting emissions from all combustible engines though electrification but notes that the grid (at least up farther north) does not support more than a few electric charger installations for cars at his marina let alone adding capacities for charging more and bigger electric boats. Also, he points out that while a few of his docks on the water support hydro/electricity (as a service for electric amenities in bigger boats) — the costs of expanding the number of hydro supported docks is at least 4 times as expensive as straight mooring docks.

Drew points out there is a real opportunity if proper financial and regulatory supports are put in place. Supplying gas to customers is a cumbersome service, not a profit-making exercise for many marina owners — and pollution emissions from oil and gas motors are clearly evident in his experience on the water.

- Drew has deployed a Seabin, a kind of stationary surface water vacuum at Point Pleasant Marina that is collecting pollution and data as part of the Great Lakes Plastic Cleanup program of which GBF is a collaborator. The Seabin has an absorbent cloth that is designed to catch hydrocarbon pollution (such as oil and gas) that are in the water. 90-95% of the time it is completely saturated when he goes to empty the Seabin!

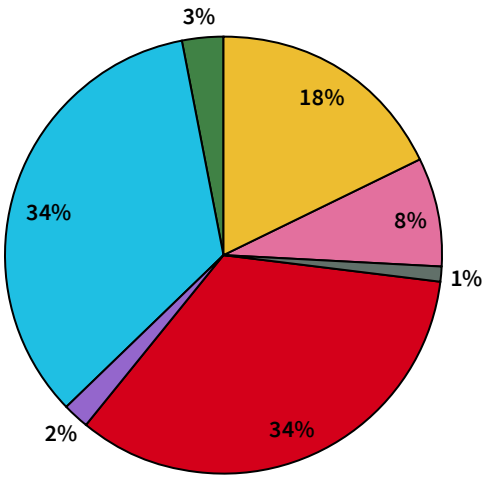
- That is especially worrisome given the care Drew takes when summerizing customer's inboard/outboard boats. He makes sure they are outfitted with a fresh specially made pad in their bilge that absorbs oil pollution from ICE inboard engines. (GBF will be looking to do a specific article on this tip/process which should be widely adopted for ICE inboard/outboard engines). Even if everyone adopted use of these pads and had the newest 4 stroke engines — a really high bar — it is been his experience that there are still concerning amounts of emissions that would get into the water.

CONTINUE READING

And we can't ignore the role gas-powered (ICE) boats play in pushing greenhouse gas emissions (GHG) into our atmosphere that contribute to global warming and more suffering from extreme weather events.

Waterborne transportation community GHG emissions are about 34%[V] of total community emissions, as noted by the Integrated Community Energy and Climate Action Plans partnership published by the Georgian Bay Biosphere in partnership with 5 regional townships in the Georgian Bay area. As individuals and families, it is clear a lot more of us need to avoid trips that involve fossil fuels — to help reach Canadian GHG reduction targets of 45% over the next 8 years[VI].

TOTAL REGIONAL COMMUNITY [GHG] EMISSIONS, 2016 ICECAP MEMBERS (5 TOWNSHIPS)



1. This graph of GHG emissions is supplied by the Georgian Bay Biosphere **gbbr.ca/climate-action** part of the Integrated Community Energy and Climate Action Plans that include 5 regional townships and many other partners.
2. In the Fall, GBF did some myth-busting around electric cars with the Electric Vehicle Discovery Centre (video – **youtu.be/zfAsqOU7aXU**), or read the article here: **bit.ly/GBFecar**

Certainly, from an environmental point of view, there are significant benefits to electric motors:

- No water and air pollution from exhaust including greenhouse gas emissions (A 4-stroke engine emits 38 times more than a gas-powered car)[VII].
- No water contamination from re-fuelling
- No land or water contamination from transfer during storage and maintenance.

(These above 3 points were more fully explored in GBF's David Sweetnam's article online at: **bit.ly/ZeroEmissionProject**)

- No smells
- A lot less noise

Environmentally — electric makes sense.

Operationally, electric suits a lot of 'drives' in Georgian Bay and improves the boating experience on small watercraft with outboards, pontoon boats, rigid inflatable boats, and some fishing boat models provided you have the ability to charge up at your own place. The faster these situations can go electric — the better Georgian Bay will be.

We salute all the fast-adopters of electric boats and their quiet emission-free rides, and we will be turning our attention to help educate and remove barriers to more of us experiencing this better boating.

Disclaimer and References

I A) Friedrich Jüttner, Diedrich Backhaus, Uwe Matthias, Ulf Essers, Rolf Greiner, Bernd Mahr, "Emissions of two-and four-stroke outboard engines—II. Impact on water quality", Water Research, Volume 29, Issue 8, 1995, Pages 1983-1987, ISSN 0043-1354, doi.org/10.1016/0043-1354(94)00331-Z.

B) Emissions comparison: outboards vs. autos (United States Environmental Protection Agency, California Air Resources Board, European Commission, Environmental Capital Group, Torqeedo, 2016)

II GBF tried to talk to a few manufacturers within reason given our resources, and where volunteer participants had been buying electric motors. Pure Watercraft was kind enough to respond. Our mentioning of electric motor brand names does not constitute an endorsement. It is simply factual to what was purchased with those who provided info for the article, or as noted — because of some perceived insights into the market.

III Springer, Bill. Candela's High-Performance, Long-Range, Electric-Powered, Hydrofoiling Speedboats Are Going To Revolutionize Boat Travel Just Like Tesla Revolutionized
Car Travel. Forbes, Aug 14, 2021. Retrieved at: https://www.forbes.com/sites/billspringer/2021/08/14/candelas-high-performance-long-range-electric-powered-hydrofoiling-zero-emission-speedboats-are-going-to-revolutionize-boat-travel-just-like-tesla-revolutionized-car-travel/?sh=72c9cb6361e4

IV GY Luxury Yachts, May 4, 2021. ©robbreport. Retrieved at https://www.g-yachts.com/en/news/electric-boats-are-coming-but-how-fast-will-they-get-here-233

V https://www.gbbr.ca/climate-action/

VI Government of Canada July 12, 2021 News Release: "Today, the Minister of Environment and Climate Change, the Honourable Jonathan Wilkinson, formally submitted Canada's enhanced Nationally Determined Contribution (NDC) to the United Nations, committing Canada to cut its greenhouse gas emissions (GHG) by 40-45% below 2005 levels by 2030." www.canada.ca/en/environment-climate-change/news/2021/07/government-of-canada-confirms-ambitious-new-greenhouse-gas-emissions-reduction-target.html. Canada has joined over 120 countries to commit to net-zero emissions by 2050

VII Friedrich Jüttner, Diedrich Backhaus, Uwe Matthias, Ulf Essers, Rolf Greiner, Bernd Mahr, "Emissions of two- and four-stroke outboard engines—II. Impact on water quality", Water Research, Volume 29, Issue 8, 1995, Pages 1983-1987, ISSN 0043-1354, https://doi.org/10.1016/0043-1354(94)00331-Z

22,309 PIECES OF LITTER DIVERTED FROM GEORGIAN BAY IN 2021

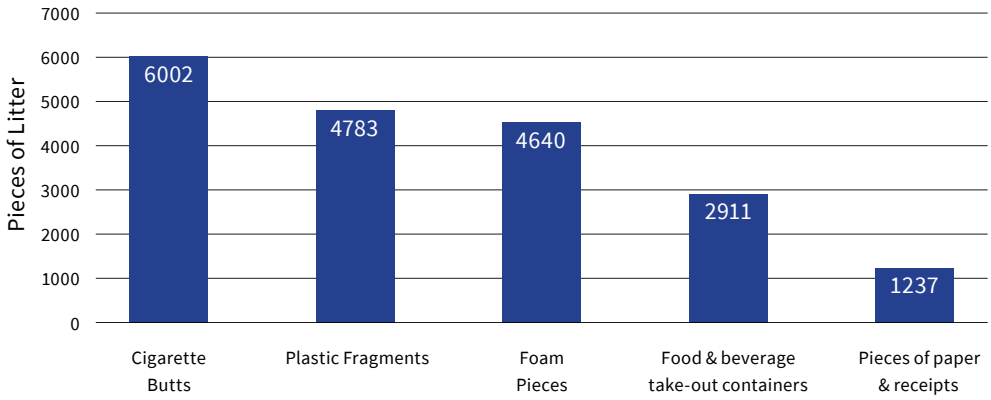
By Nicole Dimond and Brooke Harrison, Georgian Bay Forever Project Coordinators

Plastic pollution in our waterways is unsightly, harmful to animals and has the potential to leak chemicals into the water. Pollution enters our waterways through a variety of channels including: littering, blowing out of our bins on pickup days, through our stormwater drainage systems, through our wastewater in the form of microplastics, and more. The Rochester Institute of Technology estimates that 10,000,000 kilograms of plastic pollution enter the Great Lakes every year.

Thanks to you, two of our programs diverted more than 470 kilograms and 22,309 pieces of litter from Georgian Bay, of which 90% was made or contained plastic parts.

- In the GBF **Diversion 2.0** project, 41 waste characterizations were completed by GBF staff and volunteers on our partners trash-capturing Seabins and Gutter Bins. A waste characterization includes the emptying of these devices, rinsing and then sorting debris to identify the large (greater than 3 cm) debris and small debris (smaller than 3 cm and greater than 2 mm). This valuable information was sent to the International Trash Trap Network, created by Ocean Conservancy and the University of Toronto Trash Team, to create an international database of litter captured by trash-trapping technologies. We estimate that greater than 252 kilograms of debris was removed by the Seabins and Gutters Bin in 2021. Learn more about GBF's Diversion 2.0 project visit **gbf.org/divertplastics**
- As part of our **Divert and Capture** project, we worked with volunteers to complete 26 shoreline cleanups across Georgian Bay, with a focus in Collingwood. Using our trash tally sheet, we conducted waste characterizations to get a count of 19,688 litter pieces. With help from 185 dedicated volunteers, we were able to remove 465.25 kilograms of litter covering approximately 37.1 kilometers of Georgian Bay shoreline.

Top 5 Litter Types Collected During 2021 Shoreline Cleanups and Trash Trapping Device Waste Characterizations on Georgian Bay.



Why is it important to know what the litter is?

GBF keeps detailed records of shoreline cleanups and waste characterizations for reporting to funders and the public, educating about the pollution problem on Georgian Bay and for planning future projects that reduce pollution at source and protect Georgian Bay. We have seen this data work positively in the past, for example by supporting the passage of Bill 228, Keeping Polystyrene Out of Ontario's Lakes and Rivers Act, 2021 that bans future unencapsulated dock foam.

In the chart we have compiled the top 5 types of litter collected this summer by count. Cigarette butts were the number one item collected at 6,002 butts! When cigarette butts sit in water, they leach an assortment of toxins that threaten our freshwater environments. GBF will continue to remove cigarette butts from the environment with shoreline cleanups, trash trapping devices and look for new ways to reduce cigarette butt pollution. Please help us by encouraging others to dispose of cigarette butts properly.

Thank you to all the volunteers and partners that helped us remove pollution from Georgian Bay and our donors that helped make this work in 2021 possible! In 2022, you can help by emailing **brooke.harrison@gbf.org** about shoreline cleanup opportunities and **nicole.dimond@gbf.org** to find out if there is a trash capturing device in your area to assist in waste characterization.

Gutter Bin (street view) and Seabin. Photos courtesy of Frog Creek Partners and WPS America

Litter picked up by GBF Students and Rotary Club Volunteers. See 2 min video at **youtu.be/m1iKLxjiCB0**

GEORGIAN BAY FOREVER

It is with great sadness that the Georgian Bay Forever Board and staff have learned about the passing of John Honderich on Saturday, February 5th, 2022. For the past 21 years, John was a champion for and a staunch supporter of water protection work and was critical in helping our organization, and our projects and programs, reach new heights.

In December of 2021, a couple of months before his passing, John had agreed, and was excited, to share his story with us for publication in our newsletter. His memories and experiences revealed the true depths of his love for his family, their cottage adventures and for Georgian Bay itself.

Wanting to be respectful of his wishes, and with the blessing of his family, we are pleased to include in this package, the GBF Winter Edition featuring John's profile. We hope you enjoy it as much as he did when sharing and reminiscing.

At this time, we wish to share our sincerest condolences with the family and we know that John will rest in peace forever under his favourite maple tree on the island that he loved so deeply.

JOHN HONDERICH LOVES GEORGIAN BAY

By Amber Gordon, GBF Director of Development

Being born and raised in Toronto, John fondly remembers his time growing up surrounded by the big lights and towering buildings that make up the skyline of Ontario's capital city. The buildings and bright lights still enchant him, as he gazes out his picturesque window pane, which overlooks St. Michaels cemetery, and reminisces about days gone by. "It was a vastly different time back then. A time when your parents shooed you out for the day and told you not to come home until the street lights came on. It was endless days of playing at the park, shooting hoops, and ice skating on frozen ponds unsupervised. And yes, it was also a time where kids were expected to walk to and from school, in all kinds of weather, by themselves at the young age of six! My, how times have changed in today's society," he chuckles as he compares the different parenting styles of his parents, his own style and now his son Robin's, who is a father to two bouncing boys.

Throughout his childhood, John lovingly remembers the two-week family vacation Chateau Woodland on Lake Kashagawigamog in Haliburton. It was a family tradition for many, many years until, one day, John's family was invited to join their neighbours, the Pearsons, at their cottage in Starvation Bay. From that day on, the family, hoping for additional invites, were lucky enough to almost always have the joy of summering on the shores of Georgian Bay. John distinctly remembers his first impression of the Bay — dramatic and breathtaking — and his first glimpse of the stunning rocks and formations for which the eastern side of the Georgian Bay are so well known. He also remembers when Twelve Mile Bay Road was a small dirt laneway and Hwy 400 stopped at Coldwater. Little did he know, way back then, the huge role Georgian Bay was going to play in his adult life.

Growing up, John had some amazing experiences that helped shape and form his life. His father, Beland Honderich, was the Chairman and Publisher of the Toronto Star and would take John to work with him frequently. Because of this, John spent much of his childhood surrounded by some of the greatest journalists of all time, as well as some of his father's most trusted colleagues. One man in particular, Alex MacIntosh, helped John's love and passion for the law grow and he encouraged John to pursue his dream of becoming a lawyer, which he did when he was called to the bar in 1973. However, it was also during this time when John had an epiphany. He finally came to terms with the fact that journalism was his one true calling and that he "shouldn't cut off his nose to spite his face". And at once, he began applying for writing jobs. After a few months, young John was offered a copyboy position at the Ottawa Citizen for $73/week, working nights. And then, after a few years of "getting his feet wet", he decided to join the Ottawa Bureau of the Star in 1976. The rest, they say, is history.

It was during this time in his life that he met his future wife, Katherine Govier, a renowned writer and novelist in her own right. They were married on February 27th, 1981 and shortly, thereafter, had two children, Robin and Emily. It was also during this time, that he shared his love of Georgian Bay with Katherine, who also fell head over heels with the breathtaking vistas of the Bay. In 1988, they purchased their island paradise and spent many happy years there, building memories and exploring magical haunts like the Umbrellas, Pomeroy, and Georgian Bay Islands National Park, before deciding to go down separate paths. John and his children and their families still spend as much time as possible at the island every summer. Robin, a Camp Hurontario alumni, spends a lot of time canoeing the kids around, when they are not out zipping around in their own boats, swimming, tubing, rafting or playing basketball. In John's own words "the place is non-stop action when the grandkids are here!"

In 1994, John took over as publisher of the Toronto Star and was its chief until he retired in 2004. Now he gets to have even more time building precious memories, enjoying his place of peace and sharing his love of the Bay with his family.

It's important to John to pass along his love of Georgian Bay to his kids and grandkids. He wants to get them involved in protecting our water health and the special places that are so magical to them all. He shares the good works of Georgian Bay Forever with them and encourages them to become educated about the threats to our water from climate change, overdevelopment and the important need to keep shorelines natural. He wants them to be inspired to protect this place that brings him, and them, solace and peace; the place that one day, a long time from now, will be the final resting place of John, as his ashes are strewn around his favourite maple tree on the island that he loves so deeply.

Thank you, John, for your support of Georgian Bay Forever and your deep passion for the Bay!

EXTREME WATER LEVELS:
IMPACTS AND STRATEGIES WEBINARS WELL RECEIVED

This fall, the Georgian Bay Association (GBA) and Georgian Bay Forever teamed up to deliver three webinars about Extreme Water Levels. Out-surveys showed that in all webinars, more than 85% of people's expectations were met or exceeded, and the webinars made them overwhelmingly want to take one or more of the actions suggested. We want to thank all the speakers, and our other major partners including Severn Sound Environmental Association, the International Joint Commission, and the Council of the Great Lakes Region.

If you missed the three webinars, you can find all the information including top highlights and access to the 2-hour webinar videos online at gbf.org/h2o or georgianbay.ca.

GEORGIAN BAY FOREVER

WHILE THERE WERE ABOUT 7 MAJOR TAKEAWAYS FROM EACH WEBINAR — HERE IS A SMALLER SELECTION:

1. What's Happening? What's New?

- Both precipitation and evaporation are projected to increase under various climate change scenarios, with future lake levels, depending on the balance between the rates of increases. The highs are likely to be higher and the lows lower as we move into an increasingly volatile future.
- Changes to climate drivers — including temperature (air and water), wind speed, and precipitation — operate at different scales, including basin-wide and local scales. Future projections predict 'warmer, wetter, wilder' conditions. Lake impacts include ice (cover and phenology) and algae growth. Blue-green algae blooms like it hot, so extreme events favour blooms.
- Additional lake impacts can be seen in wetlands, flora and fauna. While wetlands in Georgian Bay evolved within the long-term water level regime of 6.33 feet fluctuations, increasing sewage discharge (among other factors) will increasingly tax the ability of our coastal wetlands to keep our water clean. Many plant and animal species will be unable to adapt to the effects of even an intermediate scenario for the future climate, with taxonomic groups depending most on water (e.g., molluscs, fishes, amphibians and lichens) being most vulnerable. Additional impacts can be seen in fish (e.g., less ice cover meaning lower egg viability) and birds (e.g., botulism bacteria being passed through the food chain from algae to invasive mussels to round goby to birds).

2. Shorelines, Docks & Shoreline Structures

- Wake boats should be operated in sufficiently deep water to protect bottom sediments and near shore vegetation.
- 'Living shorelines' absorb energy through the use of softer materials and live vegetation, and help buffer wave energy before it reaches shore.
- Municipal governments should be approaching natural assets collectively, including that they can benefit from the delivery of core services, they can be managed (which is the focus of local government natural-asset management), and they are often overly depended upon and under-recognized.
- There are significant differences in the approach to the high-water mark across Georgian Bay's coastal municipalities. Those marks that have been set are at a lower level than the 2019/20 water level, and these may need to be re-considered given higher water levels are expected in the future.

3. Septic Systems and Potable Water Vulnerabilities, Insurance & Planning, Coastal Infrastructure

- Septic-system design and construction will need to be adapted to the rising water levels that we can already anticipate, which includes siting tile fields on high ground (and can mean moving away from gravity-fed septic systems).
- The many water-related consequences of climate change mean that we need to: 1) avoid consuming untreated surface water; 2) plan for an increased need for water treatment (filtration and chlorination); and 3) plan for the costs of upgrades to water-treatment systems.
- A step-by-step approach to addressing the most common water damage-related risks includes a focus in the shorter term on completing simple, low-cost maintenance and upgrade actions, and in the longer term completing more complex upgrades after evaluating options with qualified professionals, government and insurance representatives. Select a particular approach to protecting your cottage based on:

  1) unique flood and erosion risks;
  2) severity of risk;
  3) budget; and
  4) insurance coverages.

If you missed the three webinars, you can find all the information including top highlights and access to the 2-hour webinar videos online at gbf.org/h2o or georgianbay.ca.

*Thank you John Lavis (GBA) for summarizing the webinars.

GEORGIAN BAY ASSOCIATION
SINCE 1916

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Honoring our loyal supporters for their cumulative donations of $15,000 or more to January 25, 2022.

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Using the enclosed envelope, send in your donation today!

GBF.org | 905-880-4945

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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