GEORGIAN BAY FOREVER

Protecting your water.

SUMMER 2020
VOL 11, ISSUE 2

THE SUMMER 2020 CHALLENGE

Also Inside:

Photo taken by Kristina J. Loevenmark

CELEBRATING 25 YEARS

By: Amber Gordon with contributions by Lynn Wood, Key Gordon, and Heather Sargeant

2020 marks the 25th Anniversary of the formation of Georgian Bay Forever as the **only** water protection charity solely dedicated to protecting and securing the health of our beloved Georgian Bay. Twenty-five years young! Thanks to you.

We know how you feel about the Bay: we feel that way too. Since 1995, we have been your environmental ally in Georgian Bay using science, research, outreach, and community collaboration to protect the most crucial part of the Georgian Bay ecosystem: the water.

These precious waters are at a turning point.

Georgian Bay's waters are in imminent danger. And it's not just humans who have something to lose—it's every creature that calls the Bay home. Here's what we've been up against and, continue to battle, every single day:

1. Toxic chemicals, plastics, and raw sewage overflows polluting the water.
2. Climate change threatening our coastal wetlands and valuable aquatic habitats.
3. Invasive species devastating native fish, flora and fauna.
4. A severe shortage of scientific data on what helps or hurts the Bay, which is desperately needed to inform sustainable policy decisions before it is too late.

Our work holds Georgian Bay together.

Georgian Bay Forever—your small, powerful and super-effective champion and protector of the Bay's water, has accomplished so much in the last 25 years! Our achievements are solely attributed to you.

Because you have believed in the cause and our ability to deliver on long-term objectives, we have continued to successfully deliver huge impacts by:

- Using technology to monitor the health of the Bay's water and ecosystems.
- Funding crucial research so decision-makers have the facts.
- Forming strategic partnerships with experts and communities, so our efforts are strong and united.
- Educating the public and governments about emerging threats and solutions.
- Thanks to your support financially, we deeply understand Georgian Bay's waters enabling us to quickly identify threats, and mobilize resources around modern, evidence-based solutions to protect the water you love so profoundly.

(CONTINUE READING ON PAGE 15)

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 and Facebook page.
GBF.ORG

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APRIL REFLECTIONS

By Adam Chamberlain, Chair of Georgian Bay Forever

As I am writing this in early April we are only beginning to understand the potential impact COVID-19 will have on our society. Our time on Georgian Bay seems a long way off from where I am sitting now and I am mindful that you are reading this with more knowledge of things yet to come .

With that in mind, I will keep my comments brief and focus on what matters most, family and friends. Georgian Bay offers us all different things. Whether you are into paddling, camping, cottaging, water-skiing, fishing, sailing or something else; chances are your fondest memories of doing them involve those closest to you.

Of course, all these activities rely on the health of our natural environment (on the Bay or elsewhere) and we at GBF spend most of our time thinking about that environment—especially the quality of the water and the health of the creatures living in and around it. We will keep our focus on the water and the Bay as you, our valued supporter, would expect.

This year, however, we will likely all divert our gaze (from time to time) from the blue waters and sky, to those who we hold most dear. This is natural of course - it is what we should be doing.

I imagine we will have to learn new ways of doing our jobs, including how we communicate with you. Perhaps these methods will be useful in the future in ways that might have surprised us—until now.

Please know that when things start to return to a more normal state, GBF will still be here, working with and for you to protect Georgian Bay for our friends, family and future generations.

THE COVID SPRING

By David Sweetnam, Executive Director of Georgian Bay Forever

Canadians share a healthy respect for science. We can see this currently in the social acceptance of the COVID-19 physical separation measures prescribed by public health officials. This was a rapid onset issue and response with an immediate impact on the health of our friends and families.

We are hopeful that your family is healthy, and secondarily, we share concerns about the unknown effects and time it will take for our society and economy to recover. Victoria Day weekend may not be the same re-entry into our favourite natural spaces this year, but that will give us unexpected opportunities to look at our favourite Bay in new ways. “Absence makes the heart grow fonder” so it is said.

Our plans for an exciting summer of science and education will be impacted but we expect to accomplish all of our objectives through the application of new tools.

We are chomping at the bit to get out of seclusion and back into our modified workplan to protect the waters of Georgian Bay. This summer, our Autonomous Underwater Vehicle (AUV)* named **G**eorgie Mc**B**ay**F**ace will be deployed throughout Georgian Bay to see, for the first time, what is really happening in our precious water. Interest is growing in the new tools GBF has available such as our University-partnered AUV, and we are being asked to participate in a number of scientific initiatives as well as completing our own research plans.

During these days of bad news and sequestration, I hope you will find this newsletter to be interesting and thought provoking. There is much afoot in Georgian Bay over the coming years and only a limited time for us to collect the data we need to steer the processes in the right direction.

*Learn what the sensors on the AUV measure by visiting https://bit.ly/AUVSensors

THE PENDULUM IS NOT AT EQUILIBRIUM

By David Sweetnam, Executive Director of Georgian Bay Forever
Originally written for Georgian Bay Today, this article has been shortened.

It is a simple machine the pendulum. As a swing, it is one of life's simple joys that brings a smile to the face. Motionless, the pendulum is at it's most boring — we call this equilibrium.

Lightly push and the swing will gently rock back and forth. That energy disrupts the equilibrium of the settled pendulum and off it goes on its smile-inducing kinetic journey. Without wind or the resistance, this motion could theoretically go on for millennia — like the planets orbiting the sun.

The Earth's climate is like a pendulum — except it is not a toy, and it is swinging more and more wildly.

The human contribution to pushing the climate pendulum started in earnest in the 1800s and continues accelerating to this day. Unlike surface carbon, bringing stored carbon to the surface from deep underground and burning it added heat-trapping molecules to the atmosphere and started the pendulum swinging. As more energy is continually added, the system swings more wildly.

The system is now out of balance — not at equilibrium.

The climate is changing at a rate that we are experiencing in years rather than millennia. Take the example of water level extremes in the Great Lakes. This is directly related to the changing climate causing different weather patterns. Georgian Bay went from record low water levels in 2013 to record high levels within 6 years — due to drastically increasing levels of precipitation in the watershed (each one degree of temperature increase leads to seven percent more water in the storm and 10 percent more lightning strikes). That increasingly volatile speed of transition was what the International Joint Commission (IJC) warned us about in the 2012 Upper Great Lakes study. Water levels weren't only about dredging in the St. Clair River for the Seaway. They were predominantly driven by climate change shifting the balance between precipitation and evaporation into new territory.

The pendulum is swinging higher between the two growing extremes.

We are comfortable with our daily life patterns since they brought us the prosperity we are at increasing risk of enjoying.

In Woods Bay, also seen in the March issue of Cottage Life, in their article "*What's up, water levels?*".

The problem we currently face is that our now out-dated coping strategies are based on observations that were made in different times when storms were less intense; it wasn't as hot; spring snow melt was predictable; we weren't melting glaciers and the sea ice was thicker and more reliable.

We need to now address our complacency in the face of less predictability and a climate experience that is less stable and drastically different than the historic observations of our older generations. Somewhat reasonably, but to our detriment, we misattribute success outcomes to actions that in fact will no longer lead us in the desired direction — and as a result our families are increasingly at risk. Just ask the families of those 282 people missing in the Bahamas likely swept into the ocean when Hurricane Dorian blasted them with 300 km per hour winds for three straight days. And still we swing the pendulum higher and higher.

JOIN DAVID SWEETNAM'S ONE HOUR WEBINAR: WATER LEVELS. WHAT'S GOING ON?

The Great Lakes are home to 20 percent of the world's surface fresh water. But only about one percent of that water is replenished each year. The other ninety-nine percent is there because the glaciers melted and filled the deep scars on the earth's surface.

Water levels are the result of a variety of processes — rainfall, evaporation, historic dredging, erosion, ice cover, diversions, managed regulation, power generation and other factors. All interact in a complex and chaotic dance. And climate change is altering that dance — instead of a regal Viennese waltz the Great Lakes are now moshing in the pit at a rock concert.

The coming decades hold a promise: "nothing in their water levels past is a predictor of what will happen in the future."

Join my webinar to learn about all of these forces and what the coming years hold — for the Lakes, the residents and the ecosystems.

ONLY 2 TIMES LEFT! REGISTER ONLINE AT ONE OF THESE URLS:

bit.ly/GBFMay20 (1 PM)
OR
bit.ly/GBFMay26 (7 pm)
For help, call (905) 880–4945 x 4.

Scientists tell us that this increased flashiness — the swinging between the extremes — is the new normal.

Instability is increasing in the atmosphere and oceans as more and more energy is added to those systems. And the fear you see in the eyes of these experts is that we are approaching new climate warming forces that will be beyond our ability to retreat from.

The pendulum is swinging higher and higher: the melting permafrost is releasing buried methane gas; the decline of the deep ocean circulation patterns is increasing ocean surface temperatures and changing storm strength; the jet stream instability is causing storms to remain locked in place like Hurricane Harvey raining the equivalent of 400 days of Niagara Falls over Texas in three days; and the melting of land based glaciers. All of these provide a feedback loop that exacerbates and increases those very processes — in other words the pendulum is going to start pushing itself beyond our ability to ever stabilize it.

Lake Michigan-Huron and Georgian Bay ecosystems have adapted to the historic six-foot fluctuations between high and low water level extremes. So have the communities, inhabitants and businesses that established in the area. They can enjoy the slow ebb and flow. But, when water levels start moving "out-of-band" — when the pendulum swings beyond our adaptability — challenges arise.

Extreme low water levels through 2014 exposed: wooden shoreline protective structures that began to rot, eroding toes of coastal bluffs where homes sat atop, pier damage due to undercutting by wave action, and impacts to our six trillion-dollar Great Lakes regional economy and jobs as ships were forced to lighten their loads. In other words, families were under threat from low-water levels.

Then in 2014 the balance between evaporation and precipitation shifted towards increasing our water levels. This brought some initial relief, but as water levels continued to rise at unprecedented rates towards new extreme highs, that comfort quickly faded. Today, a mere handful of years later, we are seeing shorelines erode, businesses and properties flood, increased water currents impacting shipping fuel use and that crippled protective shoreline infrastructure being overtopped. All of these result in similar adverse economic impacts — again families are under threat.

People around the world share a common motivation.

From each end of the political or economic spectrum, we all aspire and work towards a common shared concern — we all want to protect our families. But that doesn't mean at the expense of our neighbours. We see this most acutely in life or death moments where the best of humanity shows through. Like those Parisians with mortal wounds caught up in the 2015 terrorist attacks who waved first responders on to strangers who they thought were in more need, we need to act despite our comfortable privilege to protect third world nations, the poor and those unable to protect their families.

Some diminishing few will point ignobly to the fact that in its history, earth has experienced higher and lower temperatures. That is irrelevant. Our complex civilizations were not around at that time. We can look back over the past 800,000 years and see that the levels of carbon dioxide have never changed this dramatically or to this extent. So the dangerous pastime of denying climate change is like training people to look only at the pendulum when it is at the bottom of the arc. Experts know that those false obfuscations threaten our families.

Accepting new truths that are at odds with established dogma is difficult. But in times of fast transitions, the ability of a society to adapt to new truths and trust in reliable sources is an important behaviour for survival. And we know climate change is such an existential threat.

In 2016, Georgian Bay Forever delivered a report on building climate resilience in the Upper Great Lakes (summary: bit.ly/solutionsWL). We asked a world leading engineering team to investigate compensating for the extreme highs and lows expected and we presented our report to the International Joint Commission (IJC). Today that study is being re-released to help better inform our decision makers. It shows what can be done to adapt to climate change impacts, but we need to take big steps to reverse and even eliminate the human causes.

We have to slow the swinging to reassure our children that we will protect them.

To make the changes, we need to push at the wrong time — an inconvenient time — at a time out of resonance with the swing — where the energy of our push goes against the amplification and brings the swinging closer to the equilibrium position.

THE PENDULUM WILL SWING. THE RANGE OF ITS ARC IS UP TO US.

STUDY UPDATE: MILLIONS OF MICROFIBERS CAPTURED IN PARRY SOUND

By Dorsa Nouri Parto. Dorsa is an undergraduate student in the Rochman Lab at the University of Toronto. Dorsa also works with Lisa Erdle to research the effects of microfibers on fish and invertebrates in the Great Lakes.

Together with the help of 100 volunteer households in Parry Sound, we are reducing microfiber emissions one washing machine at a time.

Background: Microfibers and washing machines, what is the link?

Clothing is made from a variety of textiles to suit all seasons and needs. Some are made of plastic polymers (such as polyester, spandex, and nylon) and others have non-plastic material (like cotton, wool, rayon, and silk). The action of laundering clothes in washing machines causes thousands of tiny parts of the fabric to break away into the wash water in the form of small fibers. These fibers are termed microfibers, many of which are microplastics (small plastics less than 5mm in length). Research shows that laundering can release up to 700,000 microfibers per wash. Contrary to popular belief, even non-plastic microfibers can be harmful. Microfibers regardless of their base material, often contain harmful chemical additives and dyes. For example, cotton can have up to 1/3 chemicals by weight.

Microfibers from washing machines make their way to septic systems or municipal wastewater treatment plants (WWTPs). While up to 98% of microfibers and microplastics can be captured in biosolids (commonly referred to as "sludge") at the WWTP, studies show that a single WWTP can still release millions of microfibers per day, directly into freshwater ecosystems. In addition, biosolids are often land applied as a fertilizer. In these fertilizers, the microplastics and microfibers are released into the soil and eventually reach water through agricultural run-off. A recent study by Crossman et al. (2020) showed that biosolids, are a significant source of microplastics to soil — it is estimated that biosolids release between 410 and 1200 billion microplastics per year to terrestrial and freshwater environments in Ontario.

*An outside filter installed for a washing machine to capture microfiber waste. Photo courtesy of Wexco.

Are microfibers harmful to organisms?

There are many types of microplastics in Georgian Bay and the Great Lakes, and some studies suggest microfibers are the most common. Our research shows that microfibers have been found in marine and freshwater ecosystems and the Arctic. Other studies show that microfibers are the most common particle types in drinking water and the atmosphere. Researchers have also found that microfibers can be harmful to aquatic organisms. A study by Jemec et al. (2016) found that polyethylene terephthalate (PET, also known as polyester) can cause feeding behaviour changes in *Daphnia magna*, a freshwater zooplankton species. Microfibers also affect larger aquatic organisms. For example, Watts et al. (2015) found that marine crabs exposed to polypropylene (PP) microfibers show decreased body size. Multiple other studies have also suggested negative effects on aquatic organisms, and the Rochman Lab at the University of Toronto (UofT) is investigating the effects of cotton and polyester microfibers on aquatic invertebrates and species of fish. Microfibers are a relatively new field of study and not much is known about their health effects on humans, although research is underway. Since microfibers can be carried in the air, there is some concern that microfibers may negatively impact respiratory systems or cells.

We know microfibers are abundant in the Great Lakes and can have negative effects. Finding ways to reduce microfiber emissions into the environment has become an important objective.

What are the solutions?

Since wastewater treatment plants cannot fully capture microfibers and microplastics, one way to reduce emissions is to capture them directly at a known source — washing machines. Our lab at UofT tested two types of innovation designed to capture microfibers in washing machines, including an in-wash device (Cora Ball), and external filters (Lint LUV-R and Filtrol160*). Our research in the laboratory shows that while all of these technologies reduce the number of microfibers, the external filters are much more effective. The Filtrol160 can reduce microfiber release by 89%.

**Ziplock bag containing lint captured by the Filtrol 160, from one household's washing machine.

Implementing a solution in Parry Sound

The filters were very effective at capturing microfibers when tested in the laboratory, and the next step was to determine whether they were also effective in people's homes at a community scale. We were lucky to partner up with Georgian Bay Forever to answer this question. With incredible help from volunteers, Georgian Bay Forever installed Filtrol160 filters in nearly 100 households in Parry Sound in summer 2019. The filters were officially "turned on" on August 1st, 2019 to begin diverting and capturing microfibers and other microplastics.

To measure the microfiber capture rate of the filters, we examined the washing machine lint. Similar to lint traps in a dryer, washing machine filters have a lint trap that requires regular cleaning. Volunteers agreed to collect and save the lint captured in their filters so we could determine what was captured**. We weighed all the lint samples in our U of T lab. We then subsampled the lint and counted

the number of particles under a microscope to quantify the microplastics and microfibers.

In addition, we have been monitoring the water at Parry Sound WWTP. We have been working closely with the Town of Parry Sound to sample final effluent (the water discharged to the lake) to help monitor the effectiveness of the washing machine filters.

Dorsa is pictured sampling at the Parry Sound Wastewater Treatment facility.

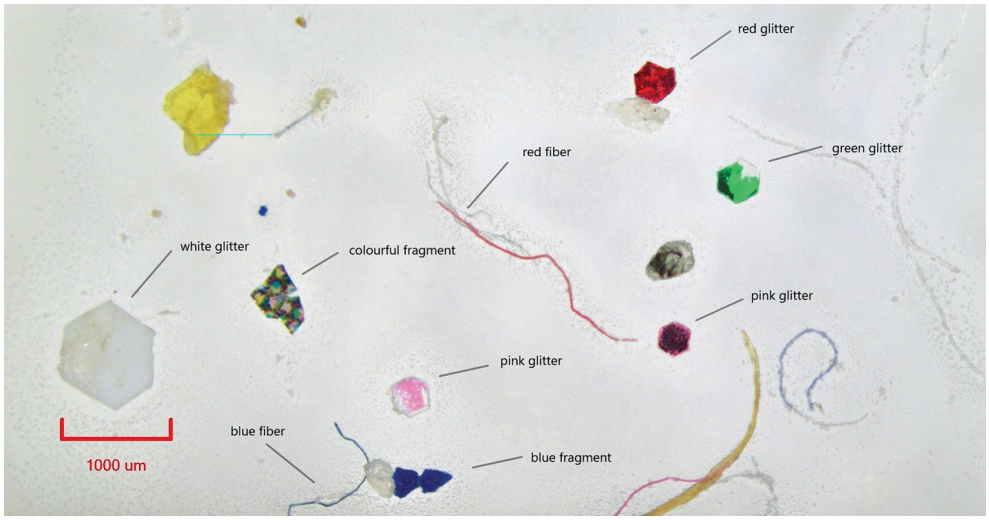
Did the filters capture and divert microfibers from Georgian Bay? YES

We found that washing machine filters captured millions of microfibers. We analyzed the lint samples and we found that during the first three months of use, the Filtrol160 captured between 162 and 371 particles per 5 mg of lint. Most of the particles captured were microfibers. We estimate that between 1.5 and 6.2 million microfibers and other microplastics were captured per household in the first three months of use. If the same capture rate continues until August 2020, we would expect each household to capture between 6 and 24 million microfibers and other microplastics over one year of use.

Scaling up our results, if we had washing machine filters installed on every washing machine in Parry Sound, we would expect between 17 and 72 billion microfibers and other microplastics to be captured every year.

Additional surprise findings

In our investigation, we also found that the washing machine filters capture more than just microfibers, which was exciting to see! While microfibers were the most common particle type in lint samples (>94% of particles), the filters also captured other types of plastics. Many samples contained small amounts of glitter, sequins, and beads. Glitter is commonly made from polyethylene terephthalate (PET), a type of plastic polymer. Sequins and beads were also captured in the Filtrol160. While glitter, sequins, and beads were less common in the samples compared to microfibers, capturing



Glitter, microfibers, and other fragments found in one of the lint samples.

these other microplastics is an added benefit. In our efforts to divert and capture microfibers, we are also keeping other harmful plastics out of the environment.

What's next — building on the preliminary results

Preliminary findings show a reduction in microfibers at the WWTP over the course of this study: The water samples we collected in August 2019 (after the washing machine filters were installed) had fewer microfibers than water samples collected before the filters will installed. Laboratory analysis is still underway to count the field blanks, determine final numbers of microfibers per litre, and verify additional samples.

Since the Parry Sound WWTP releases approximately 3000 cubic meters of effluent per day, a reduction in microfibers in final effluent could translate to millions of microfibers per day. For example, if we see a decrease in final effluent by 1-2 microfibers / L, this would mean approximately 3-6 million fewer microfibers per day emitted from the WWTP and into Georgian Bay.

Our research is ongoing. We are hoping to return to Parry Sound this summer (COVID-19 permitting, of course) and to take our final water samples at the WWTP. This will help us to gather additional data spanning different seasons. We hope to conclusively show how washing machine filters can reduce the number of microfibers emitted from a WWTP.

Should we expect to find filters installed in washing machines in the future?

Microfibers are the most common type of microplastics in the Great Lakes and microfiber filters are an efficient solution to reduce our microfiber emissions. The logical next step may be to have filters installed directly into washing machines. Decision makers around the world could look to this study in Parry Sound for direction on how to implement solutions in other jurisdictions. For example, France has passed a recent legislation making it mandatory for all washing machines to have plastic-capturing filters as of Jan 1st, 2025. Policy makers in North America have also begun to draft legislation in Canada and the US that target microfiber pollution.

Thanks to the outstanding volunteers in Parry Sound and leadership from Georgian Bay Forever, we are ever closer to implementing solutions that will impact Georgian Bay and beyond.

1 Hour WEBINAR Opportunity!

Hear directly from the author Dorsa as well as Lisa Erdle (UofT) and Brooke Harrison (GBF) about microfiber pollution and solutions. Register online for your choice of:

bit.ly/MicrofibersMay12 (Tues. May 12 at 7 pm)
bit.ly/MicrofibersJune4 (Thurs. June 4 at 2 pm)
or call (905) 880–4945 x 4 for help.

References

A. Jemec, P. Horvat, U. Kunej, M. Bele, & A. Krzan. Uptake and effects of microplastic textile fibers on freshwater crustacean Daphnia magna. Environmental Pollution (2016), 219: 201-209.

A.J. Watts, M.A. Urbina, S. Corr, C. Lewis, & T.S. Galloway. Ingestion of plastic microfibers by the crab *Carcinus maenas* and its effect on food consumption and energy balance. Environmental Science and Technology (2015), 49(24): 14597-14604.

J. Crossman, R.R. Hurley, M. Futter, et al., Transfer and transport of microplastics from biosolids to agricultural soils and the wider environment, Science of the Total Environment (2020), https://doi.org/10.1016/j.scitotenv.2020.138334

VOLUNTEERING TO CLEAN SHORELINES IN A PHYSICAL-DISTANCING WAY

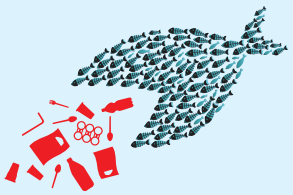
In the summer of 2019, GBF helped communities do 13 shoreline clean-ups. To quickly summarize, 112 volunteers picked up an astonishing 1369 pounds of trash. We shared the results in our 2019 Fall newsletter and in a report by Georgian Bay community, which you can find at https://bit.ly/2019GBcleanups.

Of the top 12 litter items, big and tiny pieces of foam were so abundant that they could not be counted, but were estimated at over 5000 pieces. A committee was set up in the fall to staunch a major part of this pollution in future dock replacements. The foam pollution material is formally named unencapsulated expanded or extruded polystyrene (open dock foam). To get more information on dock foam and alternates for docks, contact heather.sargeant@gbf.org.

That's a great example of why your volunteering, and your provision of data is so critical. It helps stakeholders around the Bay take action together on stopping pollution at source, so the pollution doesn't so vastly outnumber critical volunteers trying to clean it up. And, it's important to keep doing it.

The world has changed since last summer. Going out in groups of volunteers, at the time of this writing (March 26th), is not safe for public health. At GBF, we have altered volunteer instructions for volunteer shoreline cleanups to match social-distancing public policy as of March 26th but the situation is very fluid. **Please note:** It is incumbent on each individual to monitor their own behaviour and volunteering activities to adhere to the latest Public Health Advisories as it relates to COVID-19 (Ontario and Canadian government, and your local municipality).

Be the Solution to
Plastic Pollution



#GBFTrashTeam

IF YOUR GEORGIAN BAY HOUSEHOLD IS IN A POSITION TO HELP — WE NEED YOU! HERE'S WHAT YOU CAN DO:

1. Household family teams

- Go with at least one other person (1 supervising adult mandatory, and not more than 5 household family members) that you have self-isolated with in your household for a walk on your own property, your street, or on a permissible shoreline near you. This should be at a place where you will not break social/physical–distancing rules (i.e. breaking guidelines by being in a crowd with other people and other rules).

2. Preparations and safety

- For detailed safety tips, please read here: bit.ly/GBFcleanups. Take necessary precautions as it relates to weather. Do not go out in thunder and lightning for example.
- Bring proper safety gear: good shoes, sunscreen and insect repellent, gloves, hat, proper weather attire, and personal floatation device if you're near water (i.e. always practice water safety when around water). REMEMBER to bring a pail or trash bag.
- Optional — Bring a cell phone and take pictures to share later.
- A tarp is handy to have for sorting at the end of the cleanup.
- Assess the area before starting, look and avoid any possible hazards or dangers.
- Always tell someone where you are going in case of an emergency.
- DO NOT pick up any dangerous items without proper equipment (sharp objects for example). Do not pick up any toxic materials. If you come across something of toxic concern, leave it, and note its location to the proper authorities to manage.

3. Get started cleaning the shorelines!

- Pick up as much litter on the shoreline as you can safely accomplish.
- Ensuring your gloves are still on, take the collected litter and dump it out (on a tarp for example) so that you can count it and record your findings on the Tally Sheet (see page 9).
- If you have nothing to weigh the garbage with (very understandable), make a good guess or leave blank. If you need more tally sheets, print one out from url: bit.ly/GBFcleanups, or email brooke.harrison@gbf.org and she will email some for you to print out, or mail some copies to you.
- Disposing of the garbage. After recording the tallies (thank you citizen scientists!), sort the garbage into what goes into landfill and what goes into recycling according to the municipality you are in. Dispose of these items with your own waste.
- Wash your hands thoroughly (at least 20 seconds!)
- Send the Tally Sheet in by one of these methods:

1. Email to brooke.harrison@gbf.org .
2. Mail it to Georgian Bay Forever. Att: Brooke Harrison. P.O. Box 75347, Toronto, ON M4M 1B3.
3. Call us at (905) 880–4945 x 6, and we'll take your info over the phone.

- This data capture is vital to assessing sources of pollution, providing proof to stakeholders to take action, for GBF to ask for funding to do more projects that help protect the water, and for us to understand and acknowledge your great work!
- Feel free to repeat this as many times as your Georgian Bay household is able this summer. Look for GBF's "litter" report in Fall 2020.

THANK YOU FOR TAKING THE TIME TO CLEAN THE SHORES AND MAKE THEM SAFER FOR THE WILDLIFE AND AQUATIC CREATURES THAT USE THEM!

SHORELINE CLEANUP INFORMATION SHEET

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 that 1 recycle bag	

TRASH TALLY

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

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

GEORGIAN BAY FOREVER

VOLUNTEERING TO TACKLE PHRAG IN A PHYSICAL-DISTANCING WAY

By Heather Sargeant, Georgian Bay Forever's Director of Communications

In GBF's last newsletter, we identified that there are 588 invasive *Phragmites* stands that have been mapped on the East Coast of Georgian Bay and that there is a 5 year plan to tackle the 344 untreated sites, plus reduce the already treated 201 sites, so they can all eventually join the 43 eradicated ones.

Phragbusters know each stand takes 2–5 years to eradicate, with each year getting easier and easier. The success of this 5-year plan counts on volunteer help every year to tackle the smaller and reduced stands, so GBF can get to the bigger ones and get them to a manageable volunteer size.

The world has changed since that winter newsletter. At GBF, we have altered volunteer instructions to match social-distancing public policy as of March 26th but the situation is very fluid. It is incumbent on each individual to monitor their own behaviour and volunteering activities to adhere to the latest Public Health Advisories as it relates to COVID-19 (Ontario and Canadian government, and your local municipality).

The changes to the volunteer *Phragmites* program to comply with (March 26th) public safety advisories on coronavirus are highlighted on page 11. **If your Georgian Bay household is in a position to help — we need you!**

CONTROLLING INVASIVE *PHRAGMITES* ON SHORELINE PROPERTIES

What is invasive *Phragmites*?

Phragmites australis subspecies australis (also known as the European common reed) is an invasive grass that grows into dense monocultures that can grow as high as 5 m. Stands of *Phragmites* severely impair wetlands, threaten biodiversity, reduce habitat, damage municipal and private property, and impede access to recreational activities.

How can I distinguish the native plant from the invasive?

There are differences between the two; some that require experts or having the different plants side by side, which is rare. To find out more about identification and see more pictures, please visit GBF.org or this url: http://bit.ly/IDphrag.

One of the more obvious differences is seen at the base of the stalks in mature stands. Native *Phragmites* tend to have a red colour at the base, and be smooth. The plants in a native stand are often more scattered. Mature stands of invasive *Phragmites* are very dense, and the base of the stalks is beige in colour and feels a little rough.

Native Phragmites: Red shiny at base

Non-native Invasive Phragmites: Tan, dull at base

WHAT CAN I DO TO HELP?

1. Change alert:

FIRST (Now to Mid-July). Call or email either your local community or cottage association leader on *Phragmites*, or email heather.sargeant@gbf.org to direct you. GBF has worked with many communities on a plan that identifies specific stands of small or medium size that can be tackled by 2 volunteers. Ensure that there are 2 of you that can volunteer from your household, with no one younger than 16 years old, and that the two of you have been isolating together and free from any symptoms of coronavirus for 14 days. You will be going out as a 2-person team (in Mid-July to late Aug) to tackle a stand or more by yourselves, to the location(s) indicated by your community leader. You will need a way to get to the spots by yourself. There can be no groups doing this work at the time of writing this article.

2. What do you need to do when you go to do the cut, mid-July to mid-August?

GBF and/or your community leader can take you through these steps in greater detail if needed. You will ensure that you are still complying with point 1. Then, here are the basic steps and rationale:

A. You cannot apply herbicides. Use a manual "selective" cut process where only invasive *Phragmites* stalks are removed. Again, GBF is only advising tackling small to medium stands as noted in point 1.

B. Gather this equipment from your own household: hand-held cutters, natural twine, scissors, heavy-soled shoes that can go in the water, gardening gloves, eye protection, a hat, sun-block and insect repellent, appropriate clothes that can get wet and protect from elements, PFD, and some yard waste bags. Note: a few people have gotten swimmer's itch, wear a protective layer of clothes, but there is no fool proof way to avoid. If you can, bring your smart phone and take before, after, and during photos to share.

C. How to remove invasive *Phragmites*:

- **Timing:** The timing to remove the stalks is between mid-July and mid-August before seed heads emerge.
- **Location:** Tell someone where and when you are going, and when you expect to be back.
- **Cutting:** For safety tips, please review here: http://bit.ly/safetyphrag. You are responsible for your own safety. If there are seed heads, remove them first and put the heads into yard waste bags to be burned in a burn barrel.
- **To start:** Begin on the outside and work inwards. Cut each stalk underwater as close as safely possible to the sediment level (not just below the surface). You are only removing the stalks and attached leaves — do not try to disturb the roots — they are extensive, and uprooting them will contribute to the spread. Keep watch for floating pieces of *Phragmites* and gather them up as best you can to prevent spread.
- **Disposal:** Do not leave stalks and debris in or near the water. On the property, find a designated spot where cut stalks can decay (best with sunlight) far enough from the water edge that rising waters and storm waves and wind will not get to it. Wrap 20–40 stalks piled end to end in natural twine to prevent them from blowing away. Check the site next year to ensure that nothing has sprouted. It is unlikely, but it is very critical to monitor these sites, and dispatch anything that may grow. In Tay, there are other options for disposal, contact heather.sargeant@gbf.org to find out more.
- **Follow-up**: Report about what you've done by phone or email (with pictures optimally) to either your local community leader or heather.sargeant@gbf.org (community leaders and GBF share info). This is critical for us to understand where we are all in this important fight to restore coastal wetlands and remove **invasive *Phragmites***. We also want to make sure your effort is recognized, and it is not duplicated. Make sure you wash off when you get home (not in the lake where you might wash off a piece of Phrag), and we suggest drying out your clothes in the sun before washing them.

Where can I get more help and information again?

Contact Heather, your community leader, at heather.sargeant@gbf.org or (905) 880–4945 x 4. We are in contact with each other on the progress of this important project to save coastal wetlands in Georgian Bay. If you're interested in more information generally on *Phragmites*, visit GBF.org or visit http://bit.ly/1PgjnuO.

THANKS AGAIN FOR YOUR HELP AND STAY SAFE.

FAMILIES FOR CHANGE

FROM MAY 15 – OCT 9 2020, TAKE ON CLIMATE CHANGE AND POLLUTION BY PARTICIPATING IN THE F4C 3.0 EDITION!

By Helen Bryce, Director of the Georgian Bay Forever Education Committee, with some contributions by Heather Sargeant

Families For Change (F4C) is back with version 3.0 — challenging new and participating families to do more because we agree that the family unit can be the greatest powerhouse for long-term change.

There is no contest this time around — but we encourage challenging another family (in a virtual way during these times), creating your own friendly competition to get more families tasking for the environment. After all, our goal is to unite all families who share a love for Georgian Bay to have fun and take action by changing their habits in ways that will benefit the Bay, and ultimately, the globe.

What is involved?

F4C 3.0 can take as much or as little time as you and your family have to devote to it. You can choose from a variety of tasks in different categories or you can simply focus on one or two. *It's entirely up to you.*

F4C 3.0 challenges families to work in the following four areas:

1. Eating for the planet
2. Reducing shoreline litter
3. Clothing & transport choices
4. Preserving wetlands

LETS GET STARTED...

COVID-19 note: It is your responsibility to be aware and respect all current and relevant provincial, state, federal, and local/municipal PUBLIC HEALTH guidelines as it relates to covid-19, and apply to doing or not doing these tasks accordingly.

1 EATING FOR THE PLANET

Did you know that...

- Cow farts aren't that bad for the environment, but their burps are a real problem.
- When cows digest food, the process produces the powerful greenhouse gas methane, which gets released into the atmosphere when they burp.
- We cannot save the planet unless we significantly reduce our consumption of animal products.

What your family can do...

- Have a family BBQ and organize taste tests of non-meat burgers, e.g., "Impossible Burger", "Beyond Meat" and for non-pork products try "Field Roast" or others. Taste them first *without* your favourite condiments, then slather on the ketchup!
- Have a family discussion about reducing the amount of meat you eat both inside the home and at restaurants. Pledge to reduce meat in family meals by at least half or more!
- To ease the transition, try gradually shifting portions from animal-based foods to plants until vegetables, fruits and nuts make up half the plate. (Tip from Donna Mitchell's GBF article at http://bit.ly/GBFPlantDietTips)
- Eat locally and seasonally, where possible (https://bit.ly/SeasonOntario) and seek out imperfect-looking produce (a.k.a. "ugly") at discounted rates. Freeze fresh produce or buy frozen fruit and vegetables, which can be just as fresh and more convenient. (Tip from Donna Mitchell's GBF article at http://bit.ly/GBFPlantDietTips)
- Composting. If you are staying at a temporary residence this summer that does not have composting services, consider accumulating your food waste compost and disposing of it at your primary residence if they have a compost program. Why? Food waste that goes to **landfill** (in anaerobic conditions) contributes significantly to GHG emissions (methane waste), which are not released during a composting process (aerobic). Methane is 26 times more potent than carbon dioxide as a greenhouse gas and is a significant contributor to global greenhouse gas emissions.[1] (Thank you to Sandy Thompson for this tip)

2 REDUCING SHORELINE LITTER

Did you know that…

- What's under your dock? Some docks around Georgian Bay are kept afloat by unencapsulated extruded or expanded-polystyrene (EPS for short, a commercial form is often known as Styrofoam®). If not enclosed, the foam breaks apart with wave, wind, and burrowing animal action making an unsightly mess on shorelines that there will never be enough volunteers to pick up. EPS from docks and other sources is one of the top items of debris found on shorelines, beaches, and surface water around the world. Not only is it unsightly, this litter can hurt wildlife. Widespread and global contamination has resulted in EPS being found in the gut contents of wildlife, including in the Great Lakes St. Lawrence River Basin. EPS pose adverse effects to wildlife when ingested. Laboratory experiments show negative impacts of EPS on feeding behaviour, growth, hepatosomatic index (HSI), and reproduction. Under certain conditions, EPS leaches styrene and benzene, which have known toxic properties. GBF has formed a committee to work with partners, consumers, municipalities and businesses to stop this pollution at source. Read on to see what you can do and check out GBF's 2019 report on shoreline cleanups at https://bit.ly/2019GBcleanups.
- Used cigarette filters (butts) are listed # 2 in collected shoreline pollution by both the Great Canadian Shoreline Clean Up,[2] and GBF's 2019 data collected by citizens from 9 shoreline clean ups.
- Why are littered butts a problem? Most cigarette filters are composed of cellulose acetate, which combine with microfiber plastic that is slow to degrade and will never decompose. Invisible ultraviolet light (UV rays) from the sun will eventually break cigarette butts into smaller pieces, but, "Those filters are made up of hundreds or thousands of tiny microfibres. And when a cigarette butt breaks down it's just breaking apart into these individual fibres and these might get ingested by wildlife and they can carry toxic chemicals," said Lisa Erdle, from the University of Toronto[3]. Furthermore, at the end of each cigarette is a filter. Filters are designed to remove toxins from tobacco while the cigarette is smoked, so a used filter can contain up to 165 chemicals, and leaching happens much faster when the butt is soaked in water. This litter is a risk for water quality and aquatic animal health.

What your family can do…

- Be citizen scientists. Clean the litter on your own shore, record the data and send it in to GBF. This information helps GBF develop partnerships and policies to stop major pollutants at the source. Please turn to page 8 on what you can do, or email brooke.harrison@gbf.org for more information.
- See if your dock is made with uncovered foam (unencapsulated EPS) and consider a plan to move away from this pollution contributor. Contact info@gbf.org to get a brochure (online or printed) outlining the impacts of "open foam" on the environment, and some alternate suggestions for your dock.
- Read these 5 points on why disposing of cigarette butts properly is so important: https://bit.ly/noButts. Then, create "Small item — BIG problem" art and share it digitally with 5 friends.
- Plastic bottles — learn the true facts about recycling. It's not what it seems right now, so reduce accordingly or really dig into the source of the packaging. Water and pop bottles are made from polyethylene terephthalate (PET). In theory, this is one type of plastic that is endlessly recyclable back into plastic bottle packaging. **However**, the recovery rate in the US is terrible, a lot end up as landfill, and in Canada while the recovery rate is above 70%[4] most recovered PET is still problematic (and even that CDN number is in dispute by environmentalists). About 50% of Canadian's recycled PET is sent to the US where it gets turned into things like carpets and pillows because it is slightly degraded (dirty) — and ultimately will likely end up in a landfill. Cleaning PET to make it high enough for more recycling to bottles, requires more energy and is therefore more expensive and often not a choice for manufacturers. "The average recycled content of PET bottles in Canada was only 19 per cent in 2015."[5]. Some companies, like Ontario's Ice River Springs, use 100% recycled bottles. Change your source of plastic-bottled pop or water to a company that uses 100% recycled bottling to truly support the circular economy we need to move to, or change how you get your water (research and install a drinking system).

In summer 2019, Sue McPhedran (pictured) and other Woods Bay volunteers picked up plenty of shoreline trash. Much of it "dock foam". Sue has volunteered as a director of the Woods Bay Association and the Georgian Bay Association (GBA) among other activities to help the Bay. Thanks Sue!

3 CLOTHING AND TRANSPORT CHOICES

Did you know that ...

- Buying a used clothing item reduces its carbon footprint by approximately 82%. A great thing to consider both in your individual retailer choices and if you work in a business. One example from Italy: in Prado some 3,500 companies employing 40,000 workers process discarded textiles by spinning them back into yarn and ultimately recycled clothing.
- Chemicals in dyes and the manufacturing process add chemical pollution risks. These microplastic fibres find their way into our water through a variety of sources, including our washing machines.
- *How you get around* matters a lot to how much carbon pollution is emitted. As of writing this article, we are in a forced period of basically non-movement for our own public health. But, when we come to the other side of this crisis, reducing movement has benefits for carbon emissions damaging the earth's health. Consider these two points: 1. According to the Government of Canada (2017), transportation was the second highest GHG emitter behind the oil and gas sector 2. "A frequent flyer can have a larger carbon footprint from their work or leisure travel than their entire carbon footprint at home," according to Dr. Daniel Scott of the University of Waterloo.

What your family can do...

- Check out this article with your family and learn about the fashion resale industry https://bit.ly/CBCThrifting.
- Try not buying any "brand new" clothes this summer. If you need something, try the fashion resale industry (see above), try buying used clothes from a thrift store, or if your clothing has simple damage, consider mending it.
- Wash your clothes less often, only in full loads, with cold water and without fabric softener or perfumed dryer sheets that contain toxic chemicals. Add baking soda to your wash cycle as a natural deodorizer and use reusable wool dryer balls.

4 PRESERVING WETLANDS

Did you know that ...

- "In the Great Lakes, more than 60 per cent of all lake fish species spawn in coastal wetlands and numerous endangered and threatened birds, reptiles, and amphibians use coastal wetlands for all or part of their life cycles. Over the past two centuries, over two-thirds of southern Ontario's original wetland area has been lost. Unfortunately, wetland values are still not widely recognized.
  To effectively conserve coastal wetlands, more must be known about their ecology and their values must be more widely understood." (The Canadian Wildlife Service, more at https://bit.ly/CoastalWetlands)

What your family can do...

- Help rehabilitate coastal wetlands by becoming a Phragbuster volunteer. You'll be removing an invasive plant called *Phragmites*, that is spreading in Georgian Bay and impairing the proper functioning of Georgian Bay's coastal wetlands, and reducing habitat. Turn to page 10 to see what you can do or email heather.sargeant@gbf.org for more information.
- Make conscious efforts to read and find out about other invasive plants, how to recognize them and slow their spread. Here's one to get to know: Eurasian watermilfoil (also has a fun colouring sheet) https://bit.ly/EurWatMil by Peter Andrews.
- Your garden this summer. Research and purchase native plants so that you don't inadvertently plant an invasive that will harm the biodiversity of Georgian Bay. Deadline to order from GBBR is May 15th: https://bit.ly/GBBRPlantSale2020

If you want to be first to hear about the next Families For Change program, email us at info@gbf.org. We also so appreciate your feedback. We can improve too, and we can share tips that you might have that would work for future F4C editions.

THANK YOU FAMILIES FOR TAKING PART IN SAFEGUARDING THE FUTURE OF GEORGIAN BAY!

We would like to acknowledge these sources of information:

Kaplan, Sarah, "Are my hamburgers hurting the planet?", Washington Post, November 18, 2019. Retrieved March 13, 2020 at https://www.washingtonpost.com/climate-solutions/2019/11/18/are-my-hamburgers-hurting-planet/?arc404=true

Foer, Jonathan Safran, We Are the Weather, Saving the Planet Begins at Breakfast, Penguin Random House Canada, 2019.

Kunzig, Robert, "The End of Trash", National Geographic, 03.2020, pg. 42-71.

[1] Department of Primary Industries and Regional Development, Government of Australia. "Composting to avoid methane production.", Updated July 23, 2018. Retrieved April 3rd at https://www.agric.wa.gov.au/climate-change/composting-avoid-methane-production

[2] Great Canadian Shoreline Cleanup — Ocean Wise and WWF. "Facts and Figures, Cleanup results by year." Retrieved April 3rd at https://www.shorelinecleanup.ca/impact/facts.

[3] Nanowski, Natalie. "Think before you flick — cigarette butts aren't biodegradable." April 4th, 2019. CBC News. Retrieved April 3rd at https://www.cbc.ca/news/canada/toronto/cigarettes-filters-butts-microfiber-microplastic-litter-1.5083847

[4] Leslie, Keith. "Too many water bottles end up in Ontario landfills: environmentalists." Oct 14, 2016. CTV News. Retrieved April 3rd at https://toronto.ctvnews.ca/too-many-water-bottles-end-up-in-ontario-landfills-environmentalists-1.3115584.

[5] Chung, Emily. "What really happens to plastic drink bottles you toss in your recycling bin." CBC News. Jan 7, 2020. Retrieved April 3rd at https://www.cbc.ca/news/technology/bottle-recycling-1.5416614.

CELEBRATING 25 YEARS (CONTINUED FROM PAGE 2)

GEORGIAN BAY FOREVER 25 Years

We have a strong track record of success.

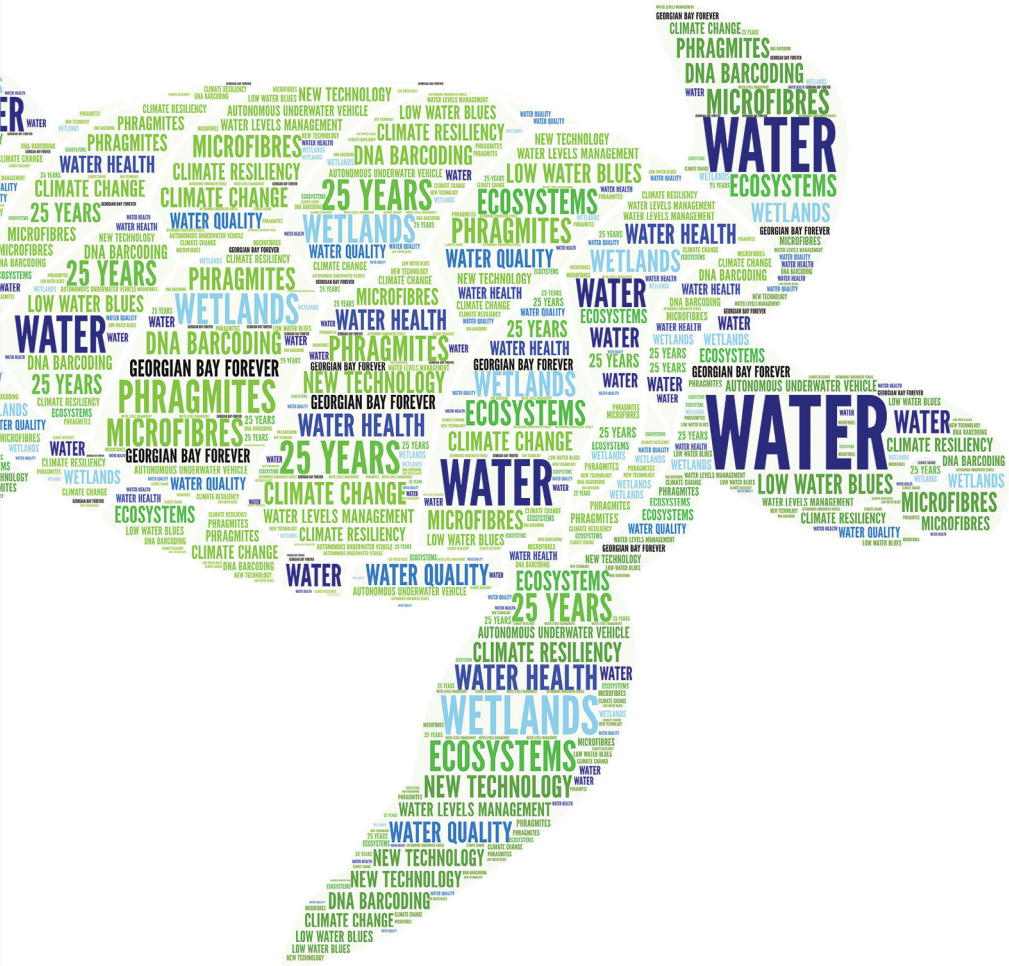
✓ **Water Quality.** When it comes to policy, information is power. We're using new technologies and effective, results-driven partnerships to revolutionize water quality monitoring across the Bay. Technologies that you have made possible. Technologies that are unique to the Bay like our newly acquired **Autonomous Underwater Vehicle** set to be deployed in summer of 2020. This tool will revolutionize data collection and provide key information that will assist all levels of government in their quest to make better informed decisions about policies and regulations; assist scientists to be better equipped to model and trend impacts on water quality; and allow coastal managers to be better prepared to protect the watershed proactively against threats.

✓ And how about our one-of-a-kind **Divert & Capture Program**, working to keep microfibres and plastics out of our water through the use of specialized filters and community engagement.

✓ Other key water quality projects that GBF has been instrumental in leading over the past 25 years have been: monitoring **Blue-green algae bloom** formation with partners York University; the **Paleolimnological study** of both north and south bays in the Honey Harbour area with environmental organization Hutchinson Environmental, looking at how events such as climatic change and human impacts can effect the water, through studying core samples of soil and rock; complete **water quality monitoring** in partnership with the Township of Georgian Bay; assisting in the delivery of the **Lake Partner Program** for the Ontario Ministry of the Environment and Climate Change and assistance from volunteers and other ENGO's around the Bay, and **bacteriological testing** of local cottage communities within the Township of Georgian Bay to ensure septic systems were not leaking sewage into our water.

✓ **Water Levels.** We've delivered contemporary solutions directly to the US and Canadian governments, through both the ***Low Water Blues*** study in 2014 which highlighted the economic impacts of doing nothing in regards to the extreme fluctuations in water levels, and our more recent study, ***Managing Water Levels in the Great Lakes: The Search for New Solutions*** in 2016 that explored the need for and use of climate resilient structures in the Great Lakes to mitigate the huge fluctuations which are becoming the norm. Solutions that are not only practical, but specially designed to withstand the challenges of climate change.

✓ **Ecosystems.** We're leading the development of urgent conservation tools to catalogue and safeguard the Bay's biodiversity, through our partnership with the University of Guelph and the **DNA Barcoding Biodiversity Study** which has successfully catalogued over 500 GB species. We've also mobilized communities across the Bay to remove invasive *Phragmites* and repair the Bay's wetlands. In communities such as Tay, Tiny, The Township of the Archipelago, Township of Georgian Bay, Honey Harbour, Collingwood, and Cognashene, we've removed almost 150,000 kg's of this reed in seven years, so that the 2,800 species that use these wetlands can thrive. Thanks to you, GBF has also commissioned a report on aquaculture: ***Freshwater Aquaculture: A Review of the Environmental Implications***.



Friends, this is only a small snapshot of all that **you** have enabled to be done in the quest to protect the water you love. Thank you for the last 25 years and we hope we can count on you to support us for another 25! Water will become ever more precious in the coming years and we all must do our part to ensure the jewel in our backyard, Georgian Bay, is protected for all! There are many ways to give — monthly, annually or through a long-term pledge. And if you are new to our organization — connect with us and learn more!

THANK YOU AGAIN FOR THE LAST 25 YEARS!

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 March 31st, 2020.

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Using the enclosed envelope, send in your donation today!

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"The Baykeeper" indicates that Georgian Bay Forever is a member of the Waterkeeper Alliance, a global movement of on-the-water advocates who patrol and protect 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