

State of the Bay

2013 ECOSYSTEM HEALTH
REPORT FOR EASTERN &
NORTHERN GEORGIAN BAY



WELCOME

Georgian Bay is unique.
Its 30,000 islands form the world's largest freshwater archipelago.
And it is a UNESCO World Biosphere Reserve.

BUT WHAT IS THE STATE OF GEORGIAN BAY?

This report gives you a snapshot of the environmental health for eastern and northern Georgian Bay. Our team has reviewed some of the research from the Great Lakes, Lake Huron, and Georgian Bay to give you a summary of the conditions in water quality, fisheries, wetlands and natural areas in your community.



Measuring helps us better understand the environment along Georgian Bay. It helps to focus our efforts where they are needed most. It also allows us to identify healthy and ecologically important areas that require protection or enhancement.

While Georgian Bay is considered to be in good condition compared to the other Great Lakes, it is still subject to pressures from water levels, invasive species, development and other human influences.

We have found that although good environmental research has begun, there is a need for more research and monitoring. Look for stewardship programs that you can do with your family and your neighbours.

We all live, work or play in beautiful Georgian Bay.

Let's protect it for future generations.



GEORGIAN BAY ASSOCIATION

is an umbrella group of 21 cottage associations, representing over 4,000 families along the eastern and northern shores of Georgian Bay. Formed in 1916, our mandate is to act as stewards of the water and land resources of the Bay.

www.georgianbay.ca

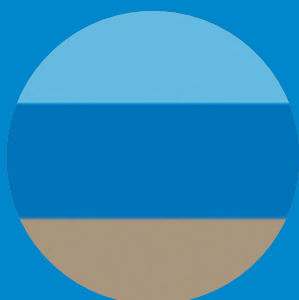


GEORGIAN BAY BIOSPHERE RESERVE

is internationally recognized by UNESCO (the United Nations Educational, Scientific, and Cultural Organization). Our team promotes community-based conservation projects, sustainable development, environmental research and education throughout eastern Georgian Bay.

www.gbbr.ca

OUR PARTNERS



GEORGIAN BAY FOREVER

conducts research on the aquatic health of Georgian Bay and surrounding bodies of water. Through our research, we inform and educate the general public and governments about threats to environmental health and propose possible solutions.

www.georgianbayforever.org



GEORGIAN BAY LAND TRUST

aims to preserve the unique archipelago along the eastern shore of Georgian Bay and the North Channel that are of ecological, geological and historical importance, and to promote the appreciation of this special area. Our GBLT stewards maintain over 2,000 acres of land trust properties, partner properties and other natural areas.

www.gbtl.org



EASTERN GEORGIAN BAY STEWARDSHIP COUNCIL

coordinates community participation and voluntary efforts that foster the establishment of healthy, productive and self-sustaining natural ecosystems. Our projects are mainly water-based and we have a strong track record in fisheries rehabilitation and management.

www.helpourfisheries.com



MUSKOKA WATERSHED COUNCIL

develops and implements science-based programs to research, assess, monitor and evaluate the health of Muskoka's watersheds. We promote land and water use management practices that improve the environmental health of the Muskoka region.

www.muskokawatershed.org



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ABOUT STATE OF THE BAY

QUESTIONS TO ASK

What are good “indicators” of ecosystem health?
Do we have high-quality, long-term data?
Can the results be “graded” so we can see trends in the future?



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WHAT IS AN INDICATOR?

An “indicator” is a certain feature of the environment that is able to give us signs whether the environment is healthy and when it is changing. For example, in this report, measuring phosphorus helps to tell a story about water quality. Past results can be compared to the present and future, to see trends. They can tell us if things are getting worse, getting better, or staying the same.



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“One of our biggest challenges was the lack of data for some of the chosen indicators. But it is also one of the most important outcomes of the report card - identifying these gaps that exist in monitoring data and research.” – **David Bywater, Report Card Coordinator**”

If you have an attachment to Georgian Bay, you know this place is special and worth protecting. Rock, water, wind and pine are some of the images we have of this unique island archipelago.

From the Severn River up to Killarney and McGregor Bay, this region contains an important diversity of habitats – including rocky shorelines, coastal wetlands, sand beaches, and distant outer islands, each of which support an amazing array of species.

While we might know how many species of birds, fish, mammals, reptiles and amphibians there are, there are still many things we don’t know about the health of Georgian Bay.

Just like a doctor who takes the vital signs of their patient, we want to understand which things are in good condition and where there are symptoms of a problem.

Georgian Bay is diverse. Conditions in near shore areas are often very different from conditions around the outer islands. Southern Georgian Bay is again quite different from the northern parts.

Georgian Bay is big. Results for this report were divided into 10 regions. To find your community on the map, see page 11.

Georgian Bay needs more research. There are many cases where the information that we need does not exist - data has not been collected through government, university, or community research and monitoring programs.

These gaps in environmental research suggest that more monitoring needs to be done, by agencies and organizations, like Georgian Bay Forever, and involving volunteers like you!

What did we measure?

1. Water - Total phosphorus
2. Fish communities
3. Coastal wetland cover
4. Coastal wetland plants
5. Natural cover
6. Large natural areas

Each of the indicators in this report provides a summary about one aspect of Georgian Bay. They were recommended, analyzed, and reviewed by experts. Together they provide a snapshot of the health of Georgian Bay and provide a baseline for tracking results in future years.



INDICATOR 1 WATER - TOTAL PHOSPHORUS

WHAT IS MEASURED

Good water quality is one of the top concerns of people living on or using Georgian Bay. We measure a nutrient called phosphorus in the water, and use the average concentration of total phosphorus in a given region, based on micrograms per litre ($\mu\text{g/L}$).

WHAT THE GRADES MEAN

According to the Great Lakes Water Quality Agreement, a healthy goal for total phosphorus concentration in the open waters of Lake Huron is 5 $\mu\text{g/L}$.

Our regional results combine data from two monitoring programs carried out by the Ontario Ministry of Environment:

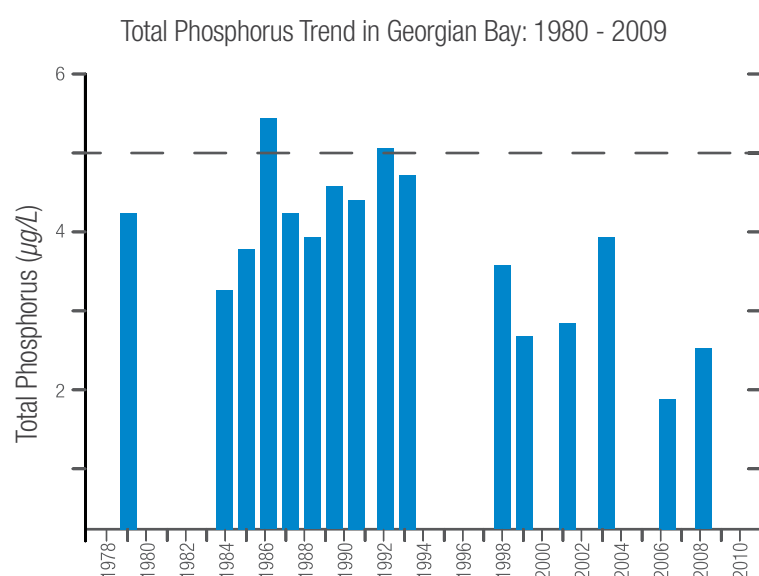
- (1) the Great Lakes Nearshore Assessment &
- (2) the volunteer Lake Partner Program.

The overall trend is that phosphorus concentrations have been declining (see below) in eastern Georgian Bay due to nutrient management in the southern parts of the Bay, and likely due to invasive species, such as zebra and quagga mussels, that absorb large amounts of nutrients.

Nutrients are the foundation of the aquatic food chain – phosphorus and nitrogen support phytoplankton and zooplankton, which in turn feed small fish, supporting a productive fish community. The overall loss of nutrients due to invasive zebra and quagga mussels is having a destabilizing effect on the aquatic ecosystem of eastern Georgian Bay.

At the same time, there are hot spots where nutrient levels are high and where blue-green algae is occurring – including Sturgeon Bay and French River.

A	< 5 $\mu\text{g/L}$
B	5 – 9.99 $\mu\text{g/L}$
C	10 – 14.99 $\mu\text{g/L}$
D	15 – 19.99 $\mu\text{g/L}$
F	> 20 $\mu\text{g/L}$



Source: Open Lake, Spring Cruise, Surface Data, Environment Canada

WHY IT'S IMPORTANT

Phosphorus occurs in natural ecosystems and is a nutrient that is required by plants to grow. In large freshwater lakes, total phosphorus levels can be quite low. In shallower, protected bays near wetlands, total phosphorus levels are expected to be much higher.

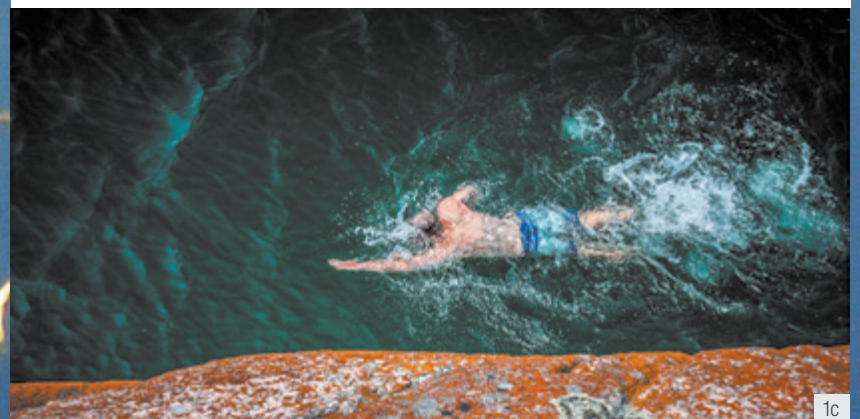
Several types of fish (such as pike and muskellunge) spawn in nutrient-rich areas, like coastal wetlands, and then they move out into deeper waters to feed.

Natural and human sources of phosphorus:

- Soil and organic matter
- Spring run-off
- Wastewater treatment plants
- Detergents
- Run-off from fertilized lawns
- Failing septic systems
- Wildlife or animal wastes

Too much phosphorus supports rapid algae growth, which can appear as “blooms” of murky scum. Oxygen levels in water decline as the algae decompose. Reduced oxygen kills fish, invertebrates, and other aquatic animals.

These algal blooms make water less attractive for boating and swimming and, if you draw lake water for drinking, it will taste and smell foul. The algal blooms can also produce cyanobacteria or blue-green algae, which in turn, can create toxins dangerous to both wildlife and humans.



1c

LAKE PARTNER PROGRAM VOLUNTEER

Rosita Jones of Naiscoot Marina began water testing in Naiscoot Lake in 2007. She says that the free program involves collecting water samples once a month, from spring to fall. “Water sampling involves 28-38 hours per year depending on the number of sampling dates,” explains Rosita.

“As a year-round resident at Naiscoot Lake, I feel connected to the lake and wanted to learn about and keep track of the health of the lake. Many other property owners on the lake are interested in this information and appreciate the fact that this data has been collected and is made available.”



15a

4a



WHAT IS MEASURED

Scientists have found that one of the best ways to study lake health, is to look at the health of a “fish community” – in other words, track how many fish species and numbers there are in particular areas and how that community might change over the long term.

WHAT'S IN THE BAY?

- **Predators** - walleye, northern pike, muskellunge, small & largemouth bass
- **Panfish** - black crappie, rock bass, pumpkinseed, yellow perch
- **Benthic fish** - white sucker, northern redhorse sucker, brown bullheads

WHAT THE GRADES MEAN

Unfortunately, there is not a scientifically sound way to give fish communities a grade, because the system is changing so quickly and we are lacking long-term, consistent, and comparable data.

Add the issues of invasive species, low water levels, loss of wetlands, and warmer summers, and measuring the health of fisheries seems almost impossible!

Trends in the Severn Sound

Predators	Slight increase overall, increase of smallmouth bass, decrease of pike.
Panfish	In decline since 1995, decline of black crappie, dominated by pumpkinseed and rock bass.
Benthic	Abundance has been variable over 35 years, generally community is stable. Higher abundance since late 1990s.

WHY IT'S IMPORTANT

Beneath our Georgian Bay is an amazing story of fish communities and how they have changed over the past 50 years. Their health is a critical component of understanding the health of Georgian Bay's aquatic environment. But at this point, using fisheries as an indicator is a challenge.

Despite some good research, the vast changes to our Great Lakes makes it very hard to measure the overall health of fish communities in eastern and northern Georgian Bay. From over-fishing in the 1940's and the introduction of invasive species, to the impacts of shoreline development, water levels, and the effects of climate change, there is a lot we don't know!

By continuing to research fish communities, they can become an important indicator of what is happening in the larger environment.

WHAT ARE THE THREATS?

Invasive species are considered by many to be the largest threat to the health of the Great Lakes ecosystem. The recent explosion of round goby and quagga mussels have changed the natural food web of Lake Huron and Georgian Bay. For example, when zebra mussels feed, they are using up important nutrients in the near shore areas. Recently, a close relative – called the quagga mussel – has moved in and is using nutrients in the deeper offshore waters. The effect is reduced phytoplankton and zooplankton for small fish to feed on, and therefore fewer top predators, which destabilizes the whole fish community.

“There are complex changes happening due to invasive species that are actually changing the whole system. Overall, there is a lot of pressure on the health of our fisheries.”

– **Arunas Liskauskas, Fisheries Biologist**
MNR Upper Great Lakes Management Unit



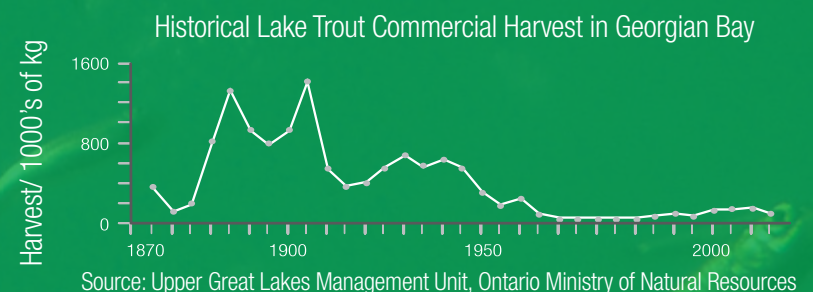
WALLEYE

There are 17 surveys conducted for walleye in eastern Georgian Bay; **close to 65%** show that walleye populations are below average compared to other areas of Ontario. Walleye populations throughout Georgian Bay have declined compared to historic levels due to a combination of over-fishing, damage to spawning habitat, and declines in water quality. Efforts to rehabilitate the walleye include: stocking, habitat restoration and regulations that restrict harvest rates. Eastern Georgian Bay Stewardship Council is leading efforts with others to improve spawning habitat for walleye in areas where they have disappeared, in the hopes that they return.

LAKE TROUT

Lake trout were historically the top coldwater predator in Lake Huron and Georgian Bay. Our area supported a healthy population in the deep offshore waters and they used shallower waters for spawning in the fall and for feeding in the spring. The invasion of sea lamprey, in combination with over-fishing, caused lake trout populations in Lake Huron to collapse in the 1940s in all but two isolated locations, Iroquois Bay in northern Georgian Bay, and in Parry Sound.

Efforts to rehabilitate this species have been ongoing since 1969. In Parry Sound, the surviving population of native, locally adapted lake trout was enhanced by strict harvest regulations, the creation of a “no-fishing” zone including spawning beds and stocking trout until 1997. Outside of Lake Superior, this is the only population of lake trout to be considered fully rehabilitated across the Great Lakes.





INDICATOR 3 COASTAL WETLAND COVER

WHAT IS MEASURED

We measure the percentage of each region covered by coastal wetlands. This large-scale indicator provides a good understanding of the overall health of the coastal aquatic environment.

Unfortunately, we can't give wetland cover a "grade" yet because scientists don't have long-term records on coastal wetland cover. Hopefully, future research about the total area of wetlands will be able to show trends, identify causes of wetland loss (such as development or low water levels), and report on the quality of those wetland areas to support wildlife habitat.

A research team from McMaster University's Coastal Wetland Research Group, led by Dr. Pat Chow-Fraser, has been visiting Georgian Bay for the past decade. They developed a successful inventory of coastal wetlands in 2004 and they identified at least **12,629** wetland areas along the eastern and northern coast adding up to 17,350 hectares! Dr. Chow-Fraser has called them the "gold standard" of wetlands and urges their protection, especially where shoreline development is visibly spreading.



WHAT THE GRADES MEAN

Although we can measure coastal wetland cover, there is no scientifically sound way to "grade" each region, because we lack historical data. However, the results in this report create a baseline for monitoring changes to wetland cover in future reports.

Some factors to consider when we track the total area of coastal wetlands are:

- When water levels change, so do wetlands
- Will sustained low water levels result in a net loss of wetlands?
- Quality of wetlands, and not just quantity, is important.

A variety of natural processes will affect wetlands. They may be transformed into drier meadows and eventually bush and forest, or they may be altered in type and size by beaver activity.

Water levels have the most direct impact on coastal marshes, which rely on periods of low levels and high levels to thrive. Between 1999 and 2008, water levels in Georgian Bay fluctuated at approximately 50 cm below the long-term average. Further research is needed to fully understand impacts of low water on wetlands and the species that depend on them.

WHY IT'S IMPORTANT

Our coastal wetlands are essential for a healthy environment. Wetlands support high numbers of birds, fish, reptiles, amphibians, insects, and land-based animals that feed in marshes. You may have noticed that wetlands near you support ducks and other waterfowl, especially during spring and fall migration, and are home to fish during their various life-stages. It is estimated that over 80% of the approximately 200 fish species in the Great Lakes rely on coastal



wetlands for spawning, nurseries and food sources.

For fish like pike, the loss of wetlands means less habitat and access to foraging & spawning sites.



Wetlands have significant economic and cultural benefits as well. Wetlands support local tourism through activities such as fishing, hunting, bird watching, and nature photography.

Wetlands also act as water treatment plants! Aquatic plants filter sediment and excess nutrients from the water and reduce the concentration of both phosphorus and nitrogen.

Certain species of plants are also known to absorb chemical contaminants into their stems, helping to control pollution.



“ We have to look at coastal wetlands as a group – not just individually – because there are species, like pike, that travel between wetlands. Fish use them for spawning and nursery habitat, refuge from predators, shade and cooler temperatures, and an area to find food. ”

- Dr. Jon Midwood, Carleton University





Kids love exploring wetlands! They are full of frogs, minnows, ducks, lily pads, purple pickerel weed, and underwater creatures. Although they may seem buggy or swampy to some, these areas are critical for a healthy Georgian Bay. Our local wetlands seem common to us – but they are certainly special when we look at the bigger picture.



WHAT IS MEASURED

The Wetland Macrophyte Index (WMI) was developed by researchers at McMaster University as a simple way to determine the health of our wetlands based on the plants growing there. A score is then calculated. The Volunteer Aquatic Plant Survey (VAPS) lets you paddle into a wetland and identify plants both above and below the water’s surface. For details, stateofthebay.gbbr.ca/get-involved/



WHY IT’S IMPORTANT

Native wetland plants provide essential food and shelter for a range of wildlife, from ducks and other birds, to fish and amphibians.

High quality wetlands indicate good water quality. For example, some species are only found in areas with clean clear water, such as freshwater sponges, whereas others can tolerate nutrient rich, even polluted waters.

Over time, wetland plant surveys can show water quality trends, and point to areas that are experiencing stress caused by human activities.



WHAT THE GRADES MEAN

The WMI score of a wetland can range from 1 to 5. Wetlands with WMI scores below 2.5 can be considered degraded and may require restoration and other management interventions. Wetlands with WMI scores above 3.5 usually mean that the wetland is in good condition.

While a score of 5 is the high end of the scale, a wetland will never record this value because it is an average between the plants that can tolerate poor water quality and those that are found in pristine areas.

The highest WMI score recorded was 4.10 in Tadenac Bay, a fish and wildlife sanctuary in eastern Georgian Bay, which has been managed with minimal human disturbance since the late 1900s.

A	> 3.75
B	3.74 - 3.50
C	3.49 - 2.50
D	-
F	< 2.50



WHAT PLANTS CAN TELL US

Tolerant of Poor Water Quality

- Narrow-leaf cattail
- Yellow pond lily
- Coontail
- Eurasian milfoil
- Curly-leaf pondweed

Intolerant of Poor Water Quality

- Three-square bulrush
- Pipewort
- Little floating hearts
- Floating burreed
- Beck’s marsh marigold
- Freshwater sponge
- Large-leaved pondweed



INDICATOR 5 NATURAL COVER

WHAT IS MEASURED

Percentage of each region's land area found in natural cover. Natural cover is defined as forests, wetlands, rock barrens, and other natural features that are not divided by roadways, railways, built-up areas like towns, or developed shorelines.

WHAT THE GRADES MEAN

Since this is the first **State of the Bay** report card, these results form the baseline against which we can measure changes over time.

Our Ecological Footprint

The ecosystems we value continue to face pressure from our human activities. Cottage, marina and resort development, and associated roads and utility corridors, are among the most significant stressors in the region today.

Waterfront development almost inevitably results in disturbance to sensitive shoreline habitat, alteration of native plant communities and the introduction of invasive species. Dense cottage developments create a barrier to species movement and may be avoided completely by species that are sensitive to human activity.

A	> 90%
B	75 - 89.9%
C	60 - 74.9%
D	50 - 59.9%
F	< 50%



9a

WHY IT'S IMPORTANT

This area is recognized as one of the most biologically diverse regions in the province and is globally recognized as a UNESCO world biosphere reserve. Species diversity is linked to the variety of natural cover in our area. Each distinct habitat type supports different species; for example, Ontario's only lizard, the five-lined skink, is found mainly on rock barrens while red-shouldered hawks seek nesting sites deep in mature forests.



10a



11a

SPECIES DIVERSITY

- 840 native plants
- 44 mammal species
- 170 breeding bird species
- 34 reptiles and amphibians

Natural cover such as forests and wetlands provide many essential functions. They reduce soil erosion, sedimentation, and stormwater run-off. They store water in times of drought. They help recharge groundwater by providing places for water to seep into the soil and feed our wells and underground water systems. Research shows that water taken from forested watersheds is cleaner and more abundant.

In general, the higher percentage of natural cover in a region, the healthier an ecosystem will be in terms of wildlife habitat, and the more resilient it will be to stress.



Information about natural cover is used in forest management planning and land-use planning decisions. Westwind Forest Stewardship Inc. is a non-profit organization that works with dozens of foresters and lumber mills to protect and sustainably manage the French-Severn Forest. Based in Parry Sound, Westwind was the first operation in Canada to achieve the international Forest Stewardship Council (FSC) certification for sustainable forestry. Look for this FSC symbol on wood and paper products.



19b



Large natural areas are important for healthy ecosystems. Areas farther from roads and human development are known to have higher water quality, provide better wildlife habitat, and support biodiversity. They support both species large and small, such as packs of wolves that require large spaces to move that connect their habitat, and tiny songbirds that need 200 hectares of intact forest for successful nesting.

WHAT IS MEASURED

No research could be found that defines the size of natural areas required to maintain biodiversity and healthy ecosystems in eastern Georgian Bay. How much habitat is enough? Future research is needed to answer this question.

WHAT THE GRADES MEAN

Unfortunately, there is not a scientifically sound way to give Large Natural Areas a grade because more research is needed to determine how much is enough for eastern Georgian Bay.

Roads, railways, hydro corridors, trails, and boat channels divide up large natural areas, so these can be analyzed, but we don't know what the results would mean for different species and habitats. More science will help us learn about what matters most for this unique archipelago.

WHY IT'S IMPORTANT



6d

RESILIENCE

Large natural areas support higher biodiversity and this allows the system to adapt to change or disturbances by events such as forest fire, development, and climate change.



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WILDERNESS

Many people go to Georgian Bay for a feeling of wilderness. They love the barren rock islands, wind-swept pines, the sunsets and the solitude. With large areas of Crown land for camping, we are fortunate to have access to a freshwater paradise.



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12b

BIODIVERSITY

Large natural areas tend to have healthier and larger populations of more species than fragmented areas. Many songbirds ignore nesting habitat within one kilometre of a road since the noise interferes with their ability to communicate.

Unfortunately, roads have major impacts on wildlife. Ontario averages a vehicle/wildlife collision every 38 minutes and that's just larger animals – imagine how many frogs, songbirds, snakes and turtles are killed?

In Georgian Bay, waterways are needed to help some wildlife move from the mainland to islands. For example, the eastern foxsnake has a range of 11km² to allow swimming along the coast and among the islands.

One of the main threats to reptiles and amphibians is roads. A 2-year survey of Honey Harbour Road reported 275 snakes and turtles killed, including 16 globally endangered eastern foxsnakes.



11b



13a

WATERSHED HEALTH

Large natural areas protect water quality. A watershed collects rainwater and melting snow and drains through creeks and rivers into lakes or into Georgian Bay.

“We know that large natural areas are important in eastern Georgian Bay's unique interior, coastal and archipelago landscape. These large natural areas are needed to facilitate the movement of wildlife from the mainland to the islands, and among the islands, which is critical for maintaining healthy ecosystems.

- Georgian Bay Islands National Park, 2006

”

RESULTS

What did we find? This table shows results for 10 regions, as well as an average for eastern and northern Georgian Bay. You will see that for some ecosystem health indicators, not enough data was available. In some cases more research is needed to define what should be measured.

REGION	1 WATER - PHOSPHORUS Average Total Phosphorus (µg/L)	2 FISH HEALTH Research Required	3 *COASTAL WETLAND Percent Wetland Area	4 WETLAND PLANTS Average WMI Score	5 NATURAL COVER Percent Natural Cover	6 LARGE NATURAL AREAS Research Required
McGregor Bay & Killarney	DD	RR	2.5%	3.3 = C	95.7% = A	RR
French River	8.6 = B	RR	2.4%	3.7 = B	98.4% = A	RR
Britt	6.6 = B	RR	3.3%	3.6 = B	97.7% = A	RR
Pointe au Baril	8.4 = B	RR	5.4%	3.5 = B	98.3% = A	RR
Carling	9.6 = B	RR	3.2%	3.6 = B	95.6% = A	RR
Parry Sound	9.7 = B	RR	2.6%	DD	83.5% = B	RR
Massasauga & Sans Souci	9.8 = B	RR	2.3%	3.5 = B	95.8% = A	RR
Twelve Mile Bay & Go Home Bay	4.8 = A	RR	5.4%	3.7 = B	98.2% = A	RR
Cognashene	6.1 = B	RR	2.7%	3.8 = A	98.1% = A	RR
Honey Harbour	8.1 = B	RR	10.6%	3.3 = C	88.1% = B	RR
Georgian Bay	8.0 = B	RR	3.3%	3.6 = B	96.0% = A	RR

DD = Data Deficient
RR = Research Required
*Excludes interior wetlands





LUCKY TO LIVE HERE

We are fortunate to have an extensive network of protected areas which support long-term monitoring and habitat conservation, while providing recreation and education opportunities along the coast:

- 1 Georgian Bay Islands National Park
- 6 Ontario Provincial Parks and Nature Reserves

<i>Massasauga</i>	<i>Killarney</i>
<i>Killbear</i>	<i>Limestone Islands</i>
<i>French River</i>	<i>O'Donnell Point</i>
- 25 Ontario Conservation Reserves
- 34 Georgian Bay Land Trust protected properties

REGIONS

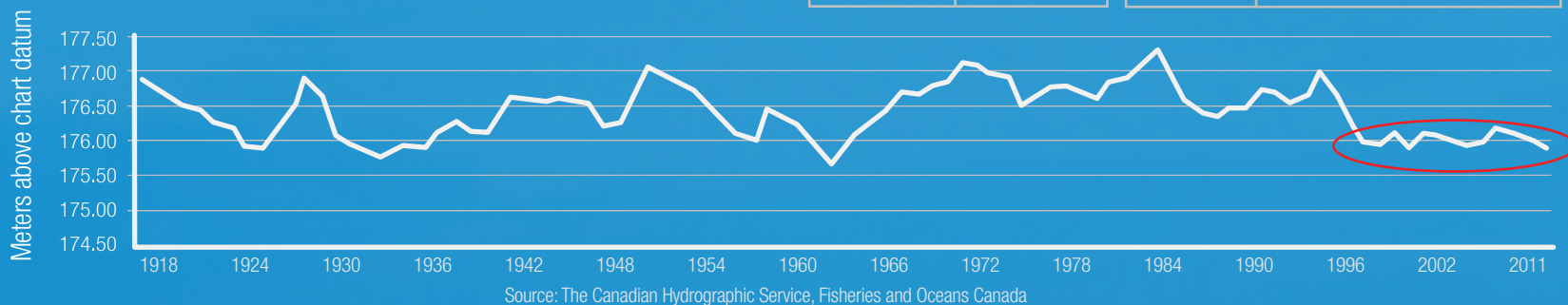
How were these regions chosen? Since Georgian Bay contains diverse ecosystems from south to north, and east to west, it was important to present results by region. Of 250 survey participants, the majority wanted results for their own backyards - which is another reason the report uses these coastal communities.



WATER LEVELS

As part of Lake Huron and the larger Great Lakes system, Georgian Bay is subject to water level changes that are complex and unpredictable. We are now experiencing water levels at the low end of the historic range including the setting of a new all-time low in January 2013.

Historic Water Levels on Lake Huron



Source: The Canadian Hydrographic Service, Fisheries and Oceans Canada

Lake Huron	
Low Years	High Years
	1952
1934	1974
1964	1987
2013	1997

Lakes Michigan-Huron	
Water Input	39% in is precipitation
	34% in is runoff
	27% in is inflow
Water Outputs	31% out is evaporation
	68% out is outflow (St. Clair River)
	1% out is through Chicago Diversion

Source: U.S. Army Corps of Engineers

WHAT AFFECTS LOW WATER LEVELS?

WEATHER: A dry winter with less snow and a dry spring with less rain will usually result in lower water levels. If this pattern persists for several years, the water levels will likely drop over time.

SEASONS: A mild winter, with less ice cover, leads to much higher evaporation. The Great Lakes Environmental Research Laboratory in Michigan found that over the past 40 years, there was a **71% loss of ice coverage** in the Great Lakes.

CLIMATE CHANGE: The concern is that climate change may result in less ice cover, less precipitation, and increased temperatures, leading to lower water levels. So what does it mean? Some models predict that the water levels of the past decade might become the new norm.

OTHER FACTORS: A small percentage is lost through water consumption (agricultural, human, or industrial use) and diversions (in or out of the Great Lakes basin). Geological uplift of the land (post - glacial rebound) also changes the tilt of the lakes and appearance of water levels.

MYTH ALERT

It is often heard that water levels are simply part of a 7-year cycle, or a 30-year cycle – but there is no such thing! Water level changes on the Great Lakes can vary substantially from season to season and from year to year.



“If water levels continue to drop, which is a significant risk if no action is taken, then conditions will get considerably worse. While the negative impact on the economy may provide the impetus for government action this isn't just all about commerce. A return to a healthy historic range of water levels is also needed by the critters with which we share this piece of paradise. - **Bob Duncanson, Georgian Bay Association**

MORE STUDY PLEASE

Complex problems require the need for a system wide approach – in our case, one that will possibly require new structures in the outflow of Lake Erie and/or Lakes Michigan-Lake Huron. The IJC advice to governments in April 2013: “...much more detailed work would be required to address fully the selection of a preferred option and undertake the engineering design.”

MEET THE IJC

The International Joint Commission (IJC) is a committee that provides advice to both Canadian and U.S. governments on Great Lakes matters. The International Upper Great Lakes Study Board, undertakes expert studies to help the IJC make their decisions. These studies take years to complete, involving over 200 scientists and public consultations. To read about the impacts of the St. Clair River (2009) and the more recent *Lake Superior Regulation: addressing uncertainty in upper Great Lakes Water Levels (2012)*, please visit www.iugls.org

In 2013, the IJC made several formal recommendations, including that governments undertake further investigations of options to increase water levels in Lake Michigan-Huron by 13 to 25 cm (about 5” to 10”) and that it be done as quickly as possible.

They noted that this action might take up to a decade for the water levels to recover to a normal range, that it would hopefully provide relief during low water periods, but would be unlikely to mitigate future high water levels. The IJC recommended a detailed environmental impact study and a binational cost-benefit analysis for any proposed projects.

OUTFLOW 101

Water levels in Lake Ontario and the top of the St. Lawrence River are controlled by locks east of Brockville. And flow controls on the St. Mary's River can be used to hold back Lake Superior.

But Lake Michigan and Lake Huron (Georgian Bay) flow out the St. Clair River, which lacks controls, so an estimated 68% flows out to Lake St. Clair, then through the Detroit River, down to Lake Erie.

Controls to slow outflow of Lake Michigan/Lake Huron-Georgian Bay have been the subject of years of debate and study, with billion-dollar estimates for various works proposed – still, many believe, only a partial solution given the uncertainties of climate change.



Phragmites

20a



Emerald ash borer

INVASIVE SPECIES

An invasive species is a plant, animal, or micro-organism that has been introduced to a place outside its natural range, and the spread has negative impacts. They usually can grow or reproduce quickly, and have few natural predators to control their populations. Over time, invasive species can alter food webs and water quality. There are more than 180 non-native species in the Great Lakes region!

Invasive species can totally change natural habitats and may displace native species. They can also bring foreign diseases that harm native species. Once established, invasive species can be very expensive to control.

Zebra mussels were released from ocean-going cargo ships that dumped their ballast water into the Great Lakes in the late 1980's. In the short term, their population explosion and filter feeding activity rapidly increased water clarity in some places. With clearer water, sunlight was able to penetrate to deeper areas and stimulate the growth and spread of aquatic plants and algae, leading to toxic algal blooms in some cases. A close relative called the quagga mussel has also spread throughout Georgian Bay and is causing similar problems. Invasive mussels may also be responsible for the increase in Type E botulism outbreaks which has led to the death of thousands of fish-eating birds such as loons.



Zebra Mussels

Emerald ash borer insects arrived through improperly treated wooden shipping crates from Asia. Despite early detection and substantial efforts, this beetle has spread to several areas of the province by actions such as people moving firewood.

Phragmites (European common reed) is an invasive plant that has the potential to significantly change our wetlands and shorelines. It's an aggressive plant that spreads rapidly and secretes toxins into the soil to kill neighbouring plants. Phragmites stands are dense, with up to 200 stems per square metre, and individual plants can grow up to 5 metres tall. It offers little food value to wildlife and will impact recreational activities such as swimming, boating, and fishing.

Spiny water flea is a small invader (5 - 15mm) that can have a big impact on Georgian Bay. These tiny invertebrates are not insects, but small, predatory crustaceans with a long, barbed tail spine that protects them from predators while they compete with other fish for zooplankton. They were first discovered in Lake Ontario in 1982 and spread to all five Great Lakes within a few years.

“Among many ills, perhaps the greatest threat is a continuously changing ecosystem with the introduction of invasive species: sea lamprey, zebra mussels, quagga mussels, spiny water flea, round gobies, and now the threat of Asian Carp hanging over our heads. The ecosystem is continuously evolving, but the addition of each new invasive species further destabilizes it.

- Eric McIntyre,

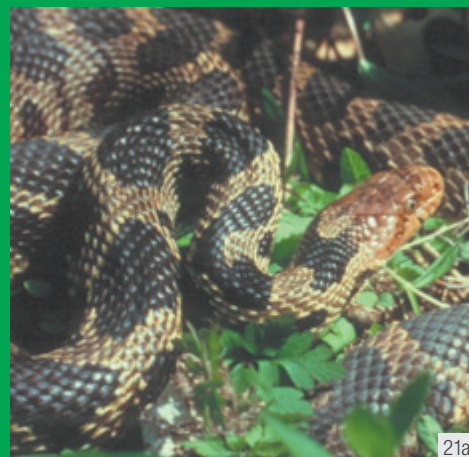
Eastern Georgian Bay Stewardship Council

Spiny water flea



13b

Populations of bald eagles, and other fish-eating bird such as ospreys, have recovered since stricter controls were placed on pesticides.



21a

The eastern foxsnake is found only along the shorelines of Lakes Huron & Erie in Ontario, Michigan and Ohio. Ontario contains 70% of their global distribution.



16a

Spotted turtles grow up to 13cm and rely on small wetlands including bogs, marshes, ponds & streams.



8b

Barn swallows and other aerial foraging birds are experiencing drastic population decline.

SPECIES AT RISK - SAR

A species at risk is any native plant or animal that is at risk of extinction or of disappearing from our province. Almost 200 species at risk are found in Ontario and 43 of those species are found along eastern Georgian Bay. For several of these species, this area is essential for their survival.

The entire Ontario population of a plant called branched bartonia is found in the wetlands of Parry Sound and Muskoka. For species such as the eastern foxsnake and massasauga rattlesnake, this is one of the few areas where they are found in North America.

SOME GOOD NEWS... Bald eagles have recovered from near extinction to a small and slowly increasing population. In the 1980s, there were only a few pairs of bald eagles nesting in southern Ontario. Last year, that number grew to over 40 successful nesting pair (that each produced at least one young). We have two confirmed nests on eastern Georgian Bay's shore.

As a result, the bald eagle was “down listed” by the Ontario government from endangered to special concern in 2009. The special concern status recognizes that bald eagles are still vulnerable to human or natural events, but it is no longer at risk of extinction.

SOME BAD NEWS... Barn swallows, whip-poor-wills and common nighthawks are in trouble in Ontario and throughout their North American range. These birds are considered to be aerial foragers -- they catch insects, such as mosquitoes and mayflies, in flight.

The Ontario Breeding Bird Atlas shows that most aerial foraging birds have declined by 70% in the past 40 years and the rate of decline appears to be increasing. The cause of their widespread decline is unknown, although habitat loss, climate change and decreasing availability of insects are possible reasons.

For more information on species at risk in in our area including pictures, videos, and maps, or to report a sighting, go to: www.gbbr.ca/our-environment/species-at-risk



IT'S YOUR TURN !



17a

As individuals and communities, we can work together to help maintain healthy natural environments. The best place to start is in our own backyard!

GO NATURAL

Protect wildlife habitat by minimizing changes to the natural landscape. Choose native plants to help filter the water that runs off your house or driveway towards waterways or storm drains. This helps protect fish habitat and other aquatic life.

Consider installing a rain barrel under your downspout to provide you with a handy source of clean water for your garden during the dry summer months.

Don't use old railway ties or pressure treated lumber in your landscaping. Dispose of these at the hazardous waste landfill.

If you build a dock, consider using a small floating dock. Locate docks and other structures carefully to reduce their environmental impact. Always contact your local municipality to determine if you require a permit.

Feral and domestic cats roaming outside kill more birds than any other human activity! Please neuter your cat and keep it indoors.

LEAVE NO TRACE

Summer picnics and camping are great ways to enjoy the Bay. Always pack out your garbage and dispose of soapy dishwater in soil at least 50 metres from the water's edge. Remember, no washing in the water even if your soap is biodegradable. For more information: www.leavenotrace.ca

Respect a volunteer fire ban on Georgian Bay during the summer, where drought makes islands with thin soil a higher risk for forest fires.

BOATS IN OUR BACK YARD

Canoes, kayaks and rowboats are non-polluting and good exercise too! If you need a power boat consider an efficient four-stroke or E-Tec engine. Be aware of your wake near the shore. Power boats can produce a wake which disturbs species like the loon that nest close to the water.

Refuel your boat carefully. If you have portable fuel tanks, never fill them on board. Take them ashore where spills are less likely to occur.

Water from on-board sinks and toilets should be pumped out at marina facilities to prevent phosphorous and bacteria entering our waterways.

19e

MIND YOUR WASTES

Handle gas, oil and other chemicals carefully. Don't dump chemicals into a toilet or drain. Ensure all hazardous materials are disposed at an approved waste centre. Return unused pharmaceuticals to a pharmacy.

Switch to natural cleaners and use only phosphate-free detergents.

Have your septic system maintained regularly. Pick up after your pets.

Conserve water by installing simple water saving devices on your faucets and shower heads.



6e

Volunteers constructing a foxsnake nesting box.



19f

WHAT YOU CAN DO!

Plan any work in or near the water carefully to prevent or minimize impacts to fish and fish habitat. Fisheries and Oceans Canada (DFO) has details on their website about the impacts to fish and fish habitat from projects such as dredging, and shoreline stabilization.

www.dfo-mpo.gc.ca

TO LEARN MORE
GO ONLINE:

stateofthebay.gbbr.ca



16b



17b

ACKNOWLEDGEMENTS



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FURTHER INFO

Please go to stateofthebay.gbbr.ca for more details and our downloadable background document.

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State of the Bay



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To explore your region, learn more, donate or get involved, go to: ► stateofthebay.gbbr.ca

