

# THE WATERSHED OBSERVER

Claudeboye; Photo: Jesse Vanderhart

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## PRESIDENT'S MESSAGE

I have spent my entire professional career working at IISD Experimental Lakes Area, a Canadian research facility that, not surprisingly, conducts experiments on lakes.

These experiments demonstrated the consequences of a variety of human insults to freshwater ecosystems: from eutrophication as a result of phosphorus loading to acid rain caused by coal-fired power plants to hormone disruption in fish from compounds like birth control pill residue in sewage effluent.

For five decades, the science produced at IISD-ELA has been sound, widely published and ground-breaking. Unfortunately, it has not always led to the changes needed to improve the health of our waters.

There have been important exceptions. Two iconic photographic images made the environmental impacts of human activities crystal clear, providing irreputable evidence that even non-scientists could relate to and compelling decision-makers into action. One was the image of a double-basin lake that clearly showed the singular importance of phosphorus as a driver of algae blooms. The other was the image of a starving lake trout, dying because acid rain had decimated its food supply. Both images led to crisis-level Canada-USA responses to stop phosphorus loading in the Great Lakes and reduce acidic smokestack emissions from coal-fired power plants.

This past summer has produced its own iconic image of the degraded state of Lake Winnipeg – a child, six-year-old Shea Keast, at the family cottage beach, with his hands covered in potentially toxic algae.

What don't our municipal and provincial leaders understand from this photo? Please help them out.

– Mike Stainton, LWF President

Iconic photos compel us to take action (from top): Six-year-old Shea Keast at Victoria Beach; Photo: Mikaela MacKenzie, *Winnipeg Free Press*. Lake 226's famous phosphorus experiment; a starving lake trout; Photos: IISD Experimental Lakes Area



**“THE PROPER USE OF SCIENCE IS NOT TO CONQUER NATURE BUT TO LIVE IN IT.”**

– American biologist Barry Commoner

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## LWF NEWS

### AQUATIC INVASIVE SPECIES TRAINING NOW AVAILABLE

Manitoba's Aquatic Invasive Species (AIS) Prevention Partnership Program is offering free training to citizens interested in learning more about zebra mussels and other AIS.

A new initiative, the half-day Level I Watercraft Inspection Training sessions will provide participants with an overview of:

- What AIS are and why they are a concern;
- AIS laws, including "clean, drain and dry" requirements, how to comply with "dispose and decontaminate" provisions within control zones, and newly introduced fines for AIS offences; and
- How to physically inspect watercraft and water-related equipment.

Sessions are conducted by staff from the provincial government's AIS unit, and include a written and practical exam. Participants who pass both exams with a grade of 80 per cent or higher will receive a certificate.

Level II training builds on Level I, equipping citizens with the information needed to become "AIS ambassadors" who can help spread awareness and assist others to be compliant with AIS laws.

To arrange a training event, call 204-945-7787 or email [candace.parks@gov.mb.ca](mailto:candace.parks@gov.mb.ca).

### THREE FRESHWATER COMMITMENTS FOR CANADA'S GOVERNMENT

LWF and our partners at the Lake Winnipeg Indigenous Collective are reminding federal leaders that restoring and protecting the health of Lake Winnipeg will require us all to work together. We are asking federal leaders to commit to:

- **Bring everyone to the table** by including Indigenous governments as signatories to the *Canada-Manitoba Memorandum of Understanding Respecting Lake Winnipeg and the Lake Winnipeg Basin*. This MOU is a formal intergovernmental commitment to long-term, collaborative, coordinated water-quality protection, expected to be renewed in September 2020.
- **Strategically engage with and support community-based water monitoring efforts** by implementing the recommendations listed in *Elevating Community-Based Water Monitoring in Canada*, a 2019 joint report created by The Gordon Foundation, Living Lakes Canada and WWF-Canada. This report incorporates feedback from more than 50 stakeholders and identifies actionable steps to advance freshwater monitoring across Canada.
- **Respect and use Indigenous knowledge** by ensuring that commitments made in federal legislation are meaningfully implemented in practice. In 2019, critical amendments were made to several acts, a positive step to honouring the vital role of Indigenous knowledge in protecting fresh water across Canada. The government must now create regulation and policies which fulfill the commitments made in these acts.

We look forward to collaborating with Canada's newly elected government to improve the health of our shared waters.

### ONGOING ADVOCACY TO IMPROVE WINNIPEG SEWAGE TREATMENT

LWF continues to advocate for the implementation of phosphorus-removal technology at Winnipeg's North End Water Pollution Control Centre (NEWPCC). This sewage treatment plant is the single largest point source of phosphorus contributing to the growth of algae blooms on Lake Winnipeg.

We are closely monitoring ongoing developments. Stay up to date by visiting [lakewinnipegfoundation.org](http://lakewinnipegfoundation.org) and following us on social media:  [lakewinnipegfoundation](https://www.facebook.com/lakewinnipegfoundation)  [@SaveLakeWpg](https://twitter.com/SaveLakeWpg)  [@savelakewpg](https://www.instagram.com/savelakewpg)

# LAKE WINNIPEG HEALTH PLAN UPDATE

Balmoral; Photo: Julie DePauw

## EXPLORING AGRICULTURAL SOLUTIONS TO FRESHWATER CHALLENGES

Without fail, my dad will ask, “What direction are we going?” when we drive to the family farm. A third-generation farmer, he has taught my sisters and I the importance of knowing the land and being aware of where our food comes from. We’ve been farming west of Treherne, Man., since my great-grandparents moved there from Saskatchewan in 1950 after immigrating to Canada from Belgium. Like many Manitobans, farming is more than an occupation to us: it’s part of our culture, our lifestyle and our identity.

Agriculture is vital to our provincial economy. Jobs directly or indirectly related to agriculture include contributions from the transportation, food processing, retail, marketing and insurance sectors.

Although my family still farms the land, nothing is the same since my great-grandparent’s time. Farmers have gone from small, open-cab tractors to large, GPS-driven combines, from growing barley to soybeans, from hand milking cows to automated systems. Due to improved technologies and advanced breeding, today’s farmers are efficiently producing more food with the same amount of land – and thankfully so, as a growing global population requires agriculture to meet an ever-increasing food demand.

In university, I learned about the causes of Lake Winnipeg’s eutrophication. To restore and protect our lake, everyone must do their part to reduce phosphorus loading. And truthfully, both the environmental and agricultural sectors desire the same outcome: a sustainable, healthy landscape for generations to come.

Achieving this outcome is quite the challenge, however. How can we reduce phosphorus loading from agricultural activities while also meeting an increasing food demand, maintaining viable farming operations and adapting to a changing climate?

Agronomists, academic researchers and government experts are exploring practices that can minimize environmental risk. Called beneficial management practices (BMPs), these include fencing livestock out of waterways, holding water in retention ponds, and the intentional management of fertilizers and manure.

BMPs may be key to reducing agriculture’s impact to Lake Winnipeg – but uncertainties remain. Compared to the United States or Europe, Manitoba’s long, cold winters, relatively flat terrain and high snow volumes can change the effectiveness of BMPs imported from other regions. Ongoing research is needed to find solutions that work on Canada’s Prairies.

Building on what we’ve been learning from the Lake Winnipeg Community-Based Monitoring Network, LWF’s new Agricultural Water Stewardship program aims to identify and promote phosphorus-reducing BMPs that are adapted for Manitoba. In spring 2020, in partnership with landowners and conservation groups, we will begin to collect data on projects that hold the potential to reduce phosphorus loading to local waterways. This information can inform evidence-based decisions, and promote economically viable and ecologically responsible solutions for our lake.

By: Julie DePauw, LWF Program Coordinator,  
Agricultural Water Stewardship

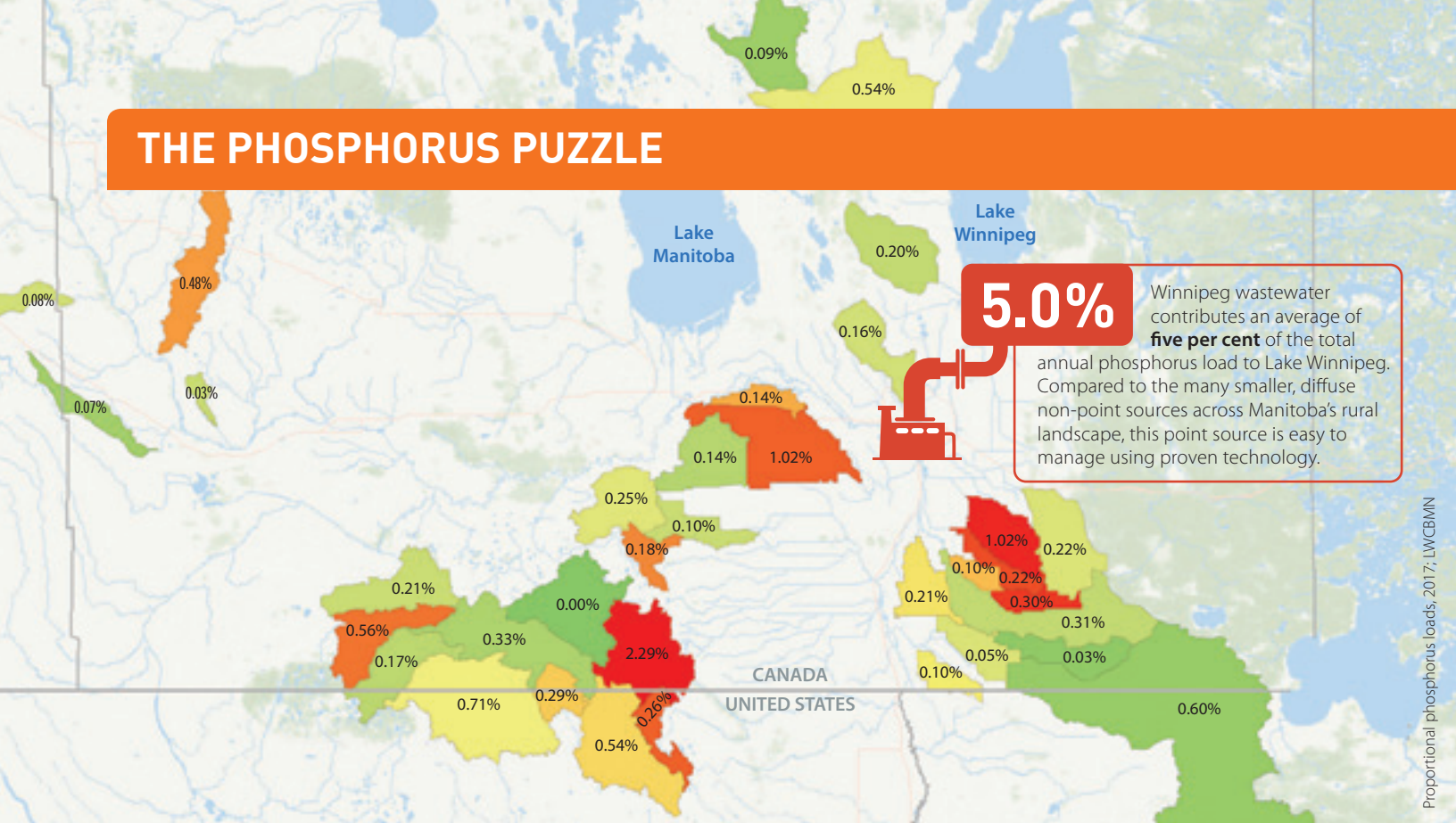


### Action 6: Promoting Agricultural Water Stewardship

Healthy farms and healthy lakes go hand in hand. We need to keep phosphorus on our fields – and out of our lake – by encouraging evidence-based farm practices.



# THE PHOSPHORUS PUZZLE



## WHY A SEEMINGLY SMALL NUMBER IS A BIG DEAL FOR LAKE WINNIPEG

Winnipeg wastewater contributes an average of five per cent of the total annual phosphorus load to Lake Winnipeg. This number comes from the 2011 State of Lake Winnipeg Report, produced jointly by the governments of Manitoba and Canada.

Presumably, this means that something else is contributing the other 95 per cent. So why are we so hung up on a measly five per cent? Why don't we deal with the "other 95 per cent" first?

The answer, quite simply, is that there is no other 95 per cent. It does not exist in one location or arise from one activity. Unlike Winnipeg wastewater – a localized, concentrated "point source" of phosphorus – the other 95 per cent is made up of many smaller, diffuse "non-point sources" across the landscape (runoff, floodwater, drainage, erosion) that are difficult to locate and quantify.

This is not to say that we don't know where to look. The State of Lake Winnipeg Report also tells us that 68 per cent of phosphorus entering Lake Winnipeg comes from the Red River. This is a significant contribution that requires us to direct our attention accordingly, which is

exactly what the Lake Winnipeg Community-Based Monitoring Network (LWCBMN) is doing.

As part of its efforts, LWCBMN works with conservation districts to monitor tributaries flowing into the Red River. We can now pinpoint 1.02 per cent of the phosphorus load coming from the Manning Canal drainage area, an agriculturally productive landscape southeast of Winnipeg. Another 2.29 per cent comes from a downstream stretch of the Pembina River that drains 932 km<sup>2</sup> of agricultural land in southwest Manitoba.

We have begun to identify some of the pieces in the phosphorus puzzle – but we don't yet have a complete picture. In many areas of Manitoba, the proportional phosphorus contribution remains a mystery, simply because no one has been measuring it in a way that lets us determine specific sources.

Compared to dispersed, diffuse rural sources, a five per cent contribution from Winnipeg's wastewater is not only quite large – it's also quite manageable. Technical solutions exist and we need to implement them quickly, before turning our attention to the much more complicated task of identifying non-point sources across Manitoba's landscape and coordinating multiple stakeholders towards solutions.

We are not faced with a choice between five per cent or 95 per cent. The choice is to start now or do nothing. To improve the health of Lake Winnipeg, we must tackle a lot of little numbers. And Winnipeg is by far the largest of the little numbers.

# THANK YOU TO OUR DONORS

## THE LAKE WINNIPEG FOUNDATION THANKS ALL OUR VALUED SUPPORTERS

LWF is proud to be part of a passionate community of lake-lovers. Thank you to the following individuals and organizations who gave generously between Oct. 1, 2018 & Sept 30, 2019. Together, we're ensuring our lake is healthy and safe, now and for future generations.

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# LAKE WINNIPEG INDIGENOUS COLLECTIVE

## CONNECTING TO CULTURE THROUGH LAND-BASED LEARNING



Youth camp participant Trent plucks geese; Photo: Rebecca Sinclair

The Lake Winnipeg Indigenous Collective's 2019 youth camp took place in early September on Molson Lake, located northeast of Norway House on Treaty 5 territory. This now-annual event brings together Indigenous youth from around Lake Winnipeg to learn how the sacred waters provide for the cultural, spiritual and recreational needs of First Nations communities.

Our week was spent on the land and water under the guidance of elders. One of the activities was catching and dressing fish for frying and smoking. First, youth were shown how to tie hooks and construct a smoking house. More than a few hooks were flung into the open water or lost to snags but these determined teenagers soon got the hang of it – and, by the end of our time together, some had to be forced to stop fishing to come eat dinner!

Collecting medicines was another highlight. We heard oral histories of how medicines were used in the past and discussed their continued use today. We also learned about the importance of practicing reciprocity, and picking medicines in a sustainable and good way. Together, adults and youth took off our boots, rolled up our pants and waded into knee-deep water to dig out wiikies (rat root). And we found wild mint nearby!

In addition to preparing fish, we learned how to dress geese and rabbits, traditional foods which some youth had never tried before. As we shared meals, we talked about the importance of staying connected to the land and learning from traditional knowledge keepers.

The camp started and ended with a sweat ceremony. This was a new experience for some youth; for others, this ceremony provided the opportunity to further connect with their spirituality and receive their spiritual names.

Many of the teachings we received over the week did not have an English translation. Learning in our traditional language was another way to connect with our culture as we connected to the land – and considered how we can work in our own communities to improve the health of Lake Winnipeg.

Thank you to Norway House Cree Nation and Elder Gordie Walker for making the 2019 youth camp an unforgettable experience.

By: Rebecca Sinclair, LWIC Program Coordinator

## MEET LWIC'S PROGRAM COORDINATOR

Originally from Brochet-Barren Lands First Nation in northern Manitoba, Rebecca Sinclair moved south, met her husband and found community in Little Saskatchewan First Nation. She has a background in environmental studies and has worked on a variety of projects in First Nations communities, most recently with the National Centre for Truth and Reconciliation. She joined LWIC in June.

"I was raised with a strong connection to the land," Rebecca says. "Now, I'm able to channel this love for the land in a way that helps youth and reignites my own spiritual side. Being back in the North was so grounding for me. Plus, I learned new things I can now pass on to my own kids!"



## SUPPORTER SPOTLIGHT

### A NEW GENERATION OF LAKE LOVERS

Andrea Wiebe's connection to Lake Winnipeg extends to both its eastern and western shores. Growing up, her mother's family cottaged at Lester Beach, while her father's family cottaged at Winnipeg Beach.

Today, Andrea is making new family memories with her husband, Graham, and their two-and-a-half-year-old son, Paxton. Lake visits are on the west side these days, where Paxton's love for the lake is blossoming.

"He's started to say 'Go to the cottage?' and it's our favourite thing," Andrea says. "I hope he will inherit happy memories. I want to have him grow up going to the lake a lot and being able to love the lake as much as we do."

A self-described "water person" and "environmental nerd," Andrea is both an LWF member and an active volunteer. Over the years, she's helped out with Walk for Water, the annual general meeting and events such as 2016's Love, Lake Winnipeg benefit concert.

The work is a good fit for her. Andrea has always enjoyed volunteering, and her job as a peer support program coordinator at



Andrea, Graham and Paxton at Winnipeg Beach; Photo: Bill Battershill

St. Boniface Hospital gives her professional insight into the vital contribution volunteers can make to organizations.

Andrea also recognizes the importance of taking action to protect Lake Winnipeg.

"It's such a huge part of our Manitoba landscape and a huge part of our identity as Manitobans," she says. "It's a very important cause to me and I want to stay involved as much as I can."

### LOCAL ARTISTS GIVE BACK

Two local artists are using their talents to support a healthy Lake Winnipeg.

Multi-media artist Gail Bacosa-Puhawan creates beautiful bathymetric maps of Lake Winnipeg in which relative water depths are illustrated using different gradients of blue cardstock.

Artisan Jill Patrick also creates bathymetric maps of Lake Winnipeg, as well as laser-cut street maps of Victoria Beach, Winnipeg Beach and other lakeside communities made from matte board and Baltic birch.

These unique art pieces come framed and are the perfect addition to any home or cottage. (Plus, they make great gifts!) Both women are donating a portion of the proceeds from selected Lake Winnipeg pieces to LWF, a wonderful way to give back to the lake which has inspired them.

**Find Gail's work at [beautifulmessstudios.com](http://beautifulmessstudios.com).**

**Find Jill's work at [jillpatrick.ca](http://jillpatrick.ca).**



Gail Bacosa-Puhawan's bathymetric map of Lake Winnipeg; Photo: Gail Bacosa-Puhawan



Dr. Darshani Kumaragamage (left) and third-year undergraduate student Emily Van inspect soil columns; Photo: Marlo Campbell

### AN INNOVATIVE APPROACH TO SOIL MANAGEMENT

If water is the vehicle which drives phosphorus to Lake Winnipeg, then the Red River Valley is the super-highway.

A unique combination of topography (relatively flat prairie), soil composition (lots of low-permeability heavy clays), land use (intensive crop farming and livestock production) and climate (lots of snow in winter, prone to spring flooding) makes this area a critical battleground in the fight to protect Lake Winnipeg from potentially toxic algae blooms.

Prolonged flooding on agricultural lands during the spring melt depletes soils' oxygen levels. These low-oxygen soil conditions, referred to as "anoxic," can release large amounts of phosphorus into standing water and eventually, into the lake via overland runoff.

Dr. Darshani Kumaragamage is a University of Winnipeg soil scientist whose research focuses on the environmental impact of agricultural practices. Since 2011, she has been testing the effectiveness of chemical amendments to enhance waterlogged soils' capacity to retain phosphorus.

"Some soils can release a substantial amount of phosphorus when flooded," Kumaragamage says. "If we apply an amendment to areas prone to sustained flooding, we may be able reduce phosphorus release."

The idea isn't new; farmers have long used soil amendments as fertilizers, to improve drainage or to control acidity. What makes this research innovative is its potential use as a beneficial management practice to improve downstream water quality.

The project started out testing gypsum, alum, calcium carbonate and magnesium sulfate. This past year, with support from LWF, Kumaragamage expanded the experiment to include ferric chloride – a chemical commonly used in sewage treatment plants to precipitate phosphorus from wastewater.

Amendments were added in two dose rates to soil columns collected from flood-prone farm fields in the Manning Canal drainage area, identified as a phosphorus hotspot by the Lake Winnipeg Community-Based Monitoring Network. Each column was then artificially flooded in a climate-controlled lab to simulate anoxic conditions during springtime temperatures.

Over a period of eight weeks, a timeframe selected to replicate the spring melt, samples from both the "soil solution" and the standing floodwater were extracted with a syringe, then analyzed.

Preliminary findings suggest all amendments tested except calcium carbonate are effective at reducing phosphorus release from most soils. Magnesium sulfate is likely the best option for practical application because it will not negatively affect soils' pH or iron levels.

When it comes to responding to water-quality challenges in agricultural areas, one size does not fit all. Research conducted in other jurisdictions may not be applicable on the Canadian Prairies, an environment defined by flat land, cold winters and the spring melt.

"Elsewhere, the focus has been on runoff due to rainfall or erosion, where soil particles are carried away. This is not happening in Manitoba," Kumaragamage says. Instead, snow melt is the dominant method of transport for phosphorus to waterways.

With lab testing complete, Kumaragamage now plans to take her research into the field – literally. Next steps include testing amendments on flood-prone areas of local farms to measure the effect of amendments in real-world conditions.

## A MESSAGE FROM OUR EXECUTIVE DIRECTOR

### THE POWER OF COMMUNITY MADE MANIFEST

It was, admittedly, a tough year at the lake: algae blooms fouled our beaches from July to September; drinking water plants were forced to shut down; frustrations mounted at apparent inaction from government leaders.

But from these challenges rose the most powerful outpouring of citizen passion and commitment that I have ever seen in my seven years with LWF. In community after community, lake-lovers developed new initiatives and formed new coalitions to protect our waters. LWF members young and old united to share their concerns and advocate for change. A groundswell of grassroots energy pushed forward meaningful solutions, refusing to be ignored.

This collective action is making an impact: Lake Winnipeg's health is in the spotlight, decision-makers at all levels of government are paying attention and the momentum continues to build.

For this, you have my deepest gratitude. I am proud to stand as a part of such a dedicated community of change-makers, looking ahead to a better future.

By: Alexis Kanu, LWF Executive Director



Alexis, collecting water samples from the Whiteshell River at Jessica Lake;  
Photo: Daniel Gladu Kanu

*cut mail-in form here*

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## BRING THE LAKE HOME THIS HOLIDAY SEASON

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Lake Winnipeg Foundation  
107-62 Hargrave St  
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A clean, healthy Lake Winnipeg and watershed now and for future generations.  
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