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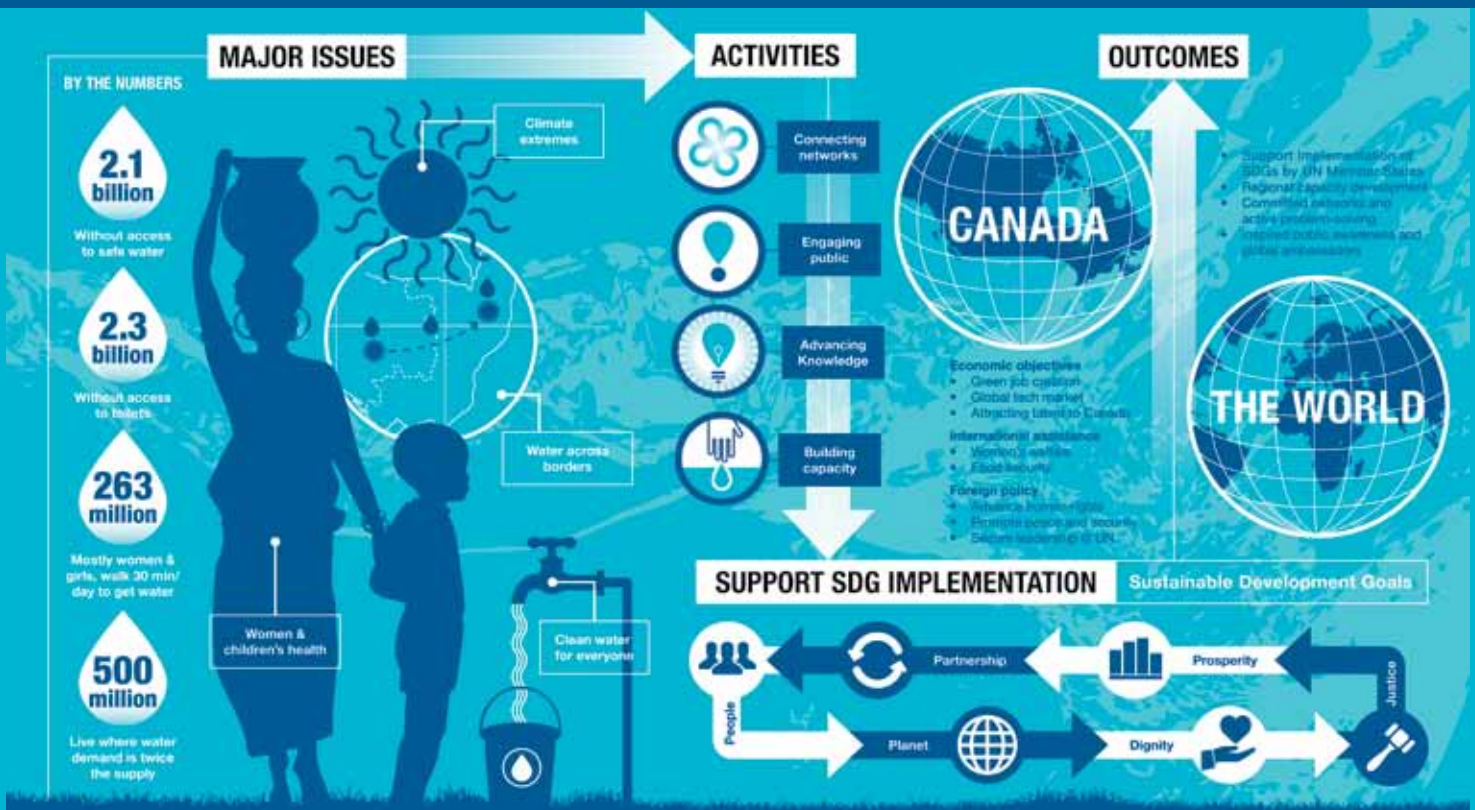
CANADA AS THE WATER COUNTRY

The International Water Decade Alliance is a Canada-wide consortium of research institutions and related organizations that plans to jointly host the international secretariat for the new water decade (2018-2028). Hosting such a global mechanism in Canada will help create new international research networks, capitalizing on the strength of Canadian water researchers and bring together operating funds for the secretariat from multiple sources, while attracting new research funds.

The International Water Decade Alliance will undertake the following core functions:

- ◆ Serve as a **platform for global dialogue** on water challenges that facilitates exchange of ideas, experiences, and innovative concepts. It would generate new knowledge and synthesize existing scientific research to provide evidence-based guidance to the UN Member States.
- ◆ Support the UN Member States through **development of capacity of individuals and institutions** to understand and respond to their respective water challenges.
- ◆ Create **networks of individuals and organizations** that are committed to achieving universal water security, including development of communities of practice.
- ◆ **Engage and inspire the general public** through awareness raising about global, regional, national, and local water challenges, and providing tools and means for responding to water challenges.

For more information, visit www.sfu.ca/pwrc/IWDA.html



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What Are We Fighting For?

BY KATHERINE BALPATAKY

AS WE GO TO PRESS, a majority of Democratic and Republican U.S. senators that compose the Senate Great Lakes Task Force signed a letter requesting \$300 million for the Great Lakes Restoration Initiative to be included in the 2019 budget request.

It is hard to get excited about a letter defending what should be the bare minimum standard for protecting the source drinking water of over 40 million Canadians and Americans. Yet somehow, it's a victory.

Around the same time, through separate efforts, Ontario Premier Kathleen Wynne, Michigan Governor Rick Snyder, and other provincial and state leaders agreed on a number of actions to protect and promote the region, including Great Lakes health. While cooperation and intent from all sides is good, the truth is the current regime is not enough to protect the Great Lakes—we must do more.

This summer, a bi-national, federal assessment determined that, overall, the state of the Great Lakes is “fair” and “unchanging,” but there are some very serious threats looming that will affect some, if not all, of the Lakes.

Consider the potentially harmful, near-record algal bloom that grew to over 1,800 square kilometres on my beloved Lake Erie; or the eight-pound silver carp that snuck past the electric barriers in the Chicago Sanitary and Ship Canal this June; or the failing water infrastructure that threatens the region's future prosperity, the result of underinvestment for decades (in full acknowledgement of Canada's recent progress in this

area.) If we can't get a handle on non-point source nutrient pollution, implement large-scale efforts to modernize water infrastructure, and prevent Asian carp from entering the Great Lakes system, the outlook will be devastating. It is simply not enough to defend the status quo.

It was difficult to narrow down the group of stories presented in this issue, because, fortunately, there are many promising demonstrations of stewardship, policy, homegrown technologies, and efforts to increase citizen, youth, and new immigrant engagement. On page 7, we share the vision for a new online platform to increase Great Lakes water literacy; on page 12, we meet the winners of a technology-based competition focused on Lake Erie; on page 14, Environmental Commissioner of Ontario, Dianne Saxe, shares a strategy to cut phosphorus without compromising climate change objectives; and page 16 is a blueprint for infrastructure renewal in the Great Lakes Basin.

As well, if you visit us on our brand new watercanada.net, we share even more original content—in case you didn't know that our print and online assets are distinct—related to technologies to optimize nutrients in agriculture, urban stormwater fees, progress with the B.C. Water Sustainability Act, Great Art for Great Lakes, and more.

To close my note, I would like to dedicate this issue to my friend and former associate publisher Lee Scarlett who continues his battle with glioblastoma multiforme cancer. WC



All back issues of Water Canada are available for download at library.actualmedia.ca

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WaterCanada



NED WILLIG
Ned is an intern with the Great Lakes Commission.
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VICTORIA PEBBLES
Victoria is the Great Lakes Commission's Program Director.
PG 16



SUMEEP BATH
Sumeep is the media and communications officer of the IISD Experimental Lakes.
PG 18



SHEILA BOUDREAU
Sheila is a senior landscape architect with the Toronto and Region Conservation Authority.
PG 42

ABOUT THE COVER



Our cover image was taken by Mark Hatcher, a 75-year-old amateur

photographer and retired account/controller from Raleigh, North Carolina.

The photo was taken on Lake Michigan in June near Charlevoix, Michigan.

"The white/silver line is what caught my eye," said Hatcher. "It's the sun reflecting off a shallow layer of fog on the horizon. Never seen that effect before."

Ten years ago, Mark and his wife (a retired statistician) decided to travel the country and photograph lighthouses. "You get to see everything off the beaten path and see parts of the country you would have never seen otherwise."

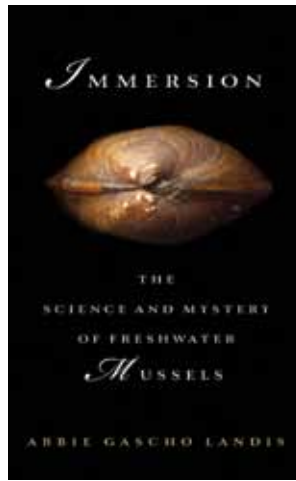
NEXT ISSUE: JANUARY/FEBRUARY

- **Small system, big savings**
- **Chasing Alberta arsenic underground**
- **Progress in First Nations water security**

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Credit: Island Press



Science and Mystery of Freshwater Mussels

BY SARAH BOON

FRESHWATER MUSSELS may not have the charismatic cuddliness of a panda bear or the wild grace of a sage grouse dancing on a lek, but they're just as threatened. Of the approximately 300 mussel species native to North America, more than 100 are endangered or threatened and 70 more are of special concern. The United States Geological Survey (USGS) calls them the "most imperiled group of organisms in the country." Ontario alone has 41 mussel species, 11 of which are endangered and 1 of which is threatened.

Most people have never heard of freshwater mussels, an organism that's over 500 million years old. In *Immersion: The Science and Mystery of Freshwater Mussels*, author and veterinarian Abbie Gascho Landis gives us a peek inside the world of these fascinating creatures and introduces us to the many scientists working not only to maintain existing mussel populations, but to increase them. Landis immerses herself fully in her research, including snorkelling in streams to find mussels—bringing the reader along on her journey to learn everything she can about these prehistoric creatures.

Mussels live on the beds of freshwater rivers, feeding from the river water and filtering over 40 litres of water a day in the process. Thus, they not only provide us with clean water but are excellent barometers of river health given their existence at the intersection of land and water. Their ideal habitat includes a stationary river bed, moderate water flow that allows them to stay attached to the river bed so they don't get washed away, and an average amount of suspended sediments and nutrients from which to draw sustenance.

Human activities, however, have substantially reduced mussel populations. Initially mussels were harvested to make buttons. Then they were harvested so pieces of their shells could be implanted in saltwater mussels to create pearls. More recently, mussel populations have declined due to the dredging of rivers for boat traffic; the introduction of invasive species such as zebra mussels, which attach themselves to native freshwater mussels and compete for the same food; the extensive damming of rivers, where the decline in downstream flows leaves mussels to shrivel up and die; and the contamination of water with pharmaceuticals and other toxins such as pesticides, fertilizer, manure runoff, and manufacturing chemicals.

Landis is hopeful, though. She expects that as scientists learn more about these elusive creatures, they'll be better able to raise them in captivity for eventual release into the wild. But reproduction is only half of the equation—habitat conservation is equally important. With the public becoming more aware of the importance of river conservation, this could be just what freshwater mussels need.

Immersion is accessible and fascinating, opening up an entirely new world of mussel science and clearly detailing the linkages between river health and mussel health. This is a recommended read for anyone interested in the health of our rivers and the fate of freshwater mussels. **wc**



Sarah Boon is a science communications expert and founding member of Science Borealis.

Online at
WATERCANADA.NET



Can a web platform save the Great Lakes?

BY MARK MATTSON

THE GREAT LAKES, like any water system, are not simply basins full of H₂O. The Great Lakes are the foundation for the things people value most: prosperity, family, health, culture, peace of mind. More than 50 million people from Duluth to Montreal depend on these lakes for drinking water, power generation, food production, manufacturing, tourism, and much more. And yet, there is a lack of public awareness and appreciation for the lakes. This lack of awareness—called a water literacy problem—translates into missed opportunities and lower quality of life for many Great Lakes communities.

In 2016, a panel of advisors to Ontario's Minister of Environment and Climate Change recommended the creation of a virtual space to foster cross-cultural understanding of the Great Lakes by bringing together information from science, Indigenous knowledge, economy, agriculture, arts, culture, recreation, and tourism. Swim Drink Fish will build this platform and launch the first version in early 2018.

A series of firsts

The Great Lakes guide is an ambitious project that everyone in the water community should be watching. Here are just a few of the firsts that we expect to come from the initiative:

- The first one stop shop for residents and visitors to the region who want to know where to go to explore the natural beauty of the region.
- The first region-wide effort to promote nature-based recreation and activity in order to improve physical and mental health in the region.

- The first Great Lakes website to work with Indigenous nations in the Great Lakes region to integrate their knowledge, perspectives, information, and language into all aspects of the site, from mission to message.
- The first platform that will connect people who use the Great Lakes with the hundreds of organizations working to protect them in order to foster a new generation of water guardians.

More than a website

The Great Lakes Guide is a brazen attempt to improve offline life in the Great Lakes region now and for future generations. The Guide is aimed at unusual suspects: people who live in the region but aren't necessarily water literate. They often don't know what threats the lakes face, what they can do to make a difference, or why they should even care. Their attention and participation are necessary, if the Great Lakes are to be protected.

The Guide is also an effort to write a new, living history of life by the Great Lakes. It will reflect the diverse voices, experience, and knowledge that are hallmarks of life in the region, it will reflect Indigenous voices and knowledge, not only from the past but from the present. In doing so, the Great Lakes virtual space will be a model for all regions defined by their connection to water.

For more information, please visit swimdrinkfish.ca. WC

Mark Mattson is the president of Swim Drink Fish Canada.



NEWS: Water Canada launches new website. watercanada.net

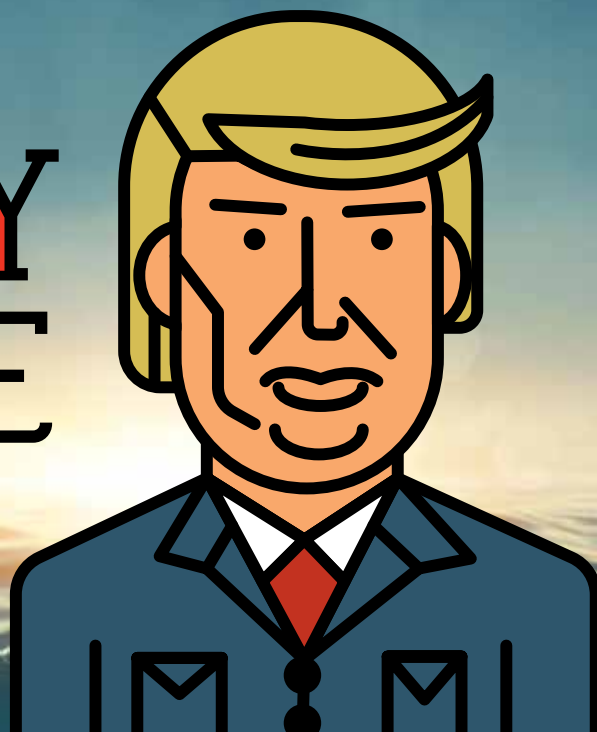


EXHIBIT: Origami art inspired by the Great Lakes. bit.ly/BLUEorigami



NEWS: Great Lakes mayors support UNESCO designation. bit.ly/GreatUNESCO

COSTLY CHOICE



Trump's efforts to cut Great Lakes funds

may have had an opposite effect. BY SAUL CERNOS

U.S. PRESIDENT DONALD TRUMP'S first year in office has been a maelstrom on all fronts. With erstwhile allies rebuffing his moves in areas such as healthcare and foreign policy, it's not too surprising that the chaos and confusion has extended to environmental matters, including protection of the Great Lakes. Oh, to have been a fly on the wall when Trump proposed to eliminate nearly all of the \$300 million federal budgetary allotment the Great Lakes Restoration Initiative (GLRI) receives annually, or when his administration put the brakes on a long-awaited government report about invasive carp.

Established early in Barack Obama's presidency to accelerate efforts to protect and restore the world's largest freshwater bodies, the GLRI has worked with all levels of government and non-governmental organizations to finance and implement action plans aimed at cleaning up areas of concern, preventing and controlling invasive species, reducing nutrients and consequent harmful algal blooms, and restoring damaged habitats. Trump's proposed funding cut would have laid waste to all of this. However, an

unlikely ally came to the GLRI's defence—Environmental Protection Agency head Scott Pruitt. Pruitt, Trump's own nominee, had sued the EPA more than a dozen times as attorney general of Oklahoma, citing its "activist agenda." So, when he rallied around a bipartisan legion of Republicans and Democrats to support the GLRI, was it political expediency? Or, was it a testament

expressed unabashed pride in the GLRI's work "to restore the health of the water that so many of our communities depend on."

"I thought maybe they'd phase it out. But that's not the Donald Trump approach. His approach is to swing with a hammer and get it done," said Dave Dempsey, a former policy adviser with the IJC who has worked in environmental

It didn't take three hours for us to realize there were plenty of people out there who were going to start fighting for it, because they know the impact this money has in their communities.

to the mesmerizing sway the Great Lakes hold over the millions of people who live within its enormous watershed and the fact that livelihoods in eight states—including key political battlegrounds where Trump had promised jobs—depend significantly on the Great Lakes? Pruitt, an unrelenting critic of Obama-era clean air and water programs, didn't appear to blink when he

non-profits for several decades, helped lobby for the GLRI's creation. The swift actions of Trump to cut the GLRI caught Dempsey off-guard. Still, he was nonplussed, knowing that the GLRI enjoys strong support from both sides of the political aisle. "I took [the proposed cut] seriously, but I didn't think it was going to succeed."



1



2



3



4



5

- 1 A beach near Racine, Wisconsin, where people swim, float, and fish, connecting with the water. 2 The Great Lakes Restoration Initiative plays an essential role in reducing harmful algae in three priority watersheds, including the Maumee river in Ohio. The Maumee, pictured here, drains into the western basin of Lake Erie. 3 John Dickert, the new president and CEO of the Great Lakes and St. Lawrence Cities Initiative, pictured here at a Congressional Breakfast in Washington, is confident in the level of support that exists of all stripes for the Great Lakes Restoration Initiative. 4 EPA Administrator Scott Pruitt endorsed the Great Lakes Restoration Initiative, months after his agency proposed eliminating its funding. 5 Jon Allan, director of the State of Michigan's Office of the Great Lakes, speaks with a reporter on the importance of investments in clean water.

John Dickert, who stepped down this summer as mayor of Racine, Wisconsin to join the Great Lakes and St. Lawrence Cities Initiative as president and CEO, was also confident that the GLRI would be defended. "I don't think the Trump administration was familiar with the GLRI funding, so it was easy to simply say they'd just cut it out," Dickert said. "It didn't take three hours for us to realize there were plenty of people out there who were going to start fighting for it, because they know the impact this money has in their communities. When you know that drinking water is so imperative, and that this was a fairly small piece of federal funding, people started taking a little bit more concern."

While the GLRI was initially funded under the Obama administration, its roots extend back to the presidency of George W. Bush, and this helps explain its political durability, said Jon Allan, director of the State of Michigan's Office of the Great Lakes. Allan, who stepped down as chair of the Great Lakes Commission in October, added that the budget is not the President's unilateral prerogative but a coordinated effort between all branches of government that reflects a deep sense of the country's values.

"I characterize [the GLRI] as broad, multi-partisan support for the important work of restoring and bringing back to important uses—both ecologically and socially—our Great Lakes shorelines,

harbours, and communities," said Allan. "This isn't some large abstraction; these are places where people go to fish, play, and recreate and where businesses grow and flourish, and this is the restoration of a century of abuse of our waterways."

The GLRI's initial inclusion as a target of budgetary trimming didn't happen in isolation. In late February, the Trump administration halted the release of a U.S. Army Corps of Engineers report proposing measures to keep invasive Asian carp from leaving the Mississippi River and ancillary waterways and entering Lake Michigan. But Illinois Republicans warned about impacts to commercial shipping, prompting Trump to halt the report's release, then the President backed

down following pressure from the other side, including a strongly worded letter from Michigan legislators calling the report “an essential next step to ensure we safeguard our region’s \$7 billion fishing industry, \$16 billion boating industry, and \$18 billion hunting and wildlife observation industry.”

While all options remain on the table, the Great Lakes community is on edge. “Zebra and quagga mussels are eating almost everything, but if these fish get into the Great Lakes it’s checkmate for the most part, because anything you can imagine these fish eat with such a voracity it’s just unbelievable,” Dickert said. He characterized the attempt to bury the report as symptomatic of a broader move towards deregulation and loss of environmental protections. “If you start taking regulations away, you end up paying a whole lot more down the road. I’m hoping Congress works with us to protect the Great Lakes. We’ve got to protect our environment, and especially our drinking water, because it is one of

the most valuable resources in the world.”

Trickle down

Dave Dempsey also worries about the impact environmental deregulation might have on the Great Lakes and points to high nutrient levels leading to excessive harmful algae. “The degradation of Lake Erie is a big problem,” he said.

any way other than paying them to do the right thing.”

While the GLRI survived the budget unscathed, Dempsey pointed out one of its key pillars is funding incentives for farmers to implement stewardship measures. However, he maintains that voluntary actions are not enough to fully protect water quality, and the real

We’ve got to protect our environment, and especially our drinking water, because it is one of the most valuable resources in the world.

“To really get a handle on [algae], the federal government is going to have to go after agriculture, because roughly 85 per cent of the problem is from runoff. But I don’t see any possibility of the EPA getting involved in a tough approach with agriculture. Both [political] parties are reluctant to deal with agriculture in

action lies with regulatory tools, such as the binational Great Lakes Water Quality Agreement.

Shortly before Obama’s presidency ended, the EPA and Environment and Climate Change Canada agreed on phosphorus targets and action plans, but Dempsey worries Trump may

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lead a coordinated effort against any resulting restrictions. Similarly, he fears for the Clean Water Rule, Obama-era regulations which clarified federal protections of water bodies and wetlands. Thanks to relentless challenge from agriculture and industry, the rule is currently on hold. "It's probably going to be reversed," Dempsey said. "The battle had been going on for 15 years. We thought it had been settled, but with the election it's been reopened. Rolling the rule back would expose those [water bodies] to development." Also vulnerable is the Mercury and Air Toxics Rule, which Dempsey described as the first strong federal control on air emissions of mercury and an ongoing Great Lakes concern.

Dempsey has taken to pinning his hopes for the Great Lakes on Canada. "I've always considered Canada to be the trump card, so to speak, on Great Lakes matters. If U.S. administrations turn their back on the Great Lakes, then Canada would hopefully be a contrast and create some indirect types of pressure for the U.S." Co-operation through the IJC might be one source for optimism. Dempsey notes that Canada's three current IJC commissioners are all appointees of the Conservative government of Stephen Harper, whereas two of the IJC's three U.S. commissioners are Obama appointees, untouched thus far by Trump (the third resigned shortly before the election.) There could be changes in partisanship at the IJC as both Trump and Canadian Prime Minister Justin Trudeau get deeper into their respective terms in office, but Dempsey hopes the drive to protect the Great Lakes wins out. "I think even Trump appointees, if they're really serious about their job, would look at the traditions and see there's 108 years of working together that's been very successful. There will always be common interests in the boundary waters." WC



Saul Chernos is a freelance writer in Toronto.

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Image courtesy: aquahacking.org



Chief Ava Hill of the Six Nations of the Grand River opened the 2017 AquaHacking Summit with a traditional ceremony.



Participants of the AquaHacking Summit participated in an online quiz developed by the AquaHacking Youth Delegation.



Five teams of AquaHackers presented their solutions to the many issues facing the Great Lakes.



Jason Deglint explains how his team's solution holds the potential to change the state of the lake with an AI-powered imaging system that will create large datasets to profile cyanobacteria activity throughout Lake Erie.



Members of the 2017 AquaHacking Youth Delegation address the crowd.

Hacking for Hope

Establishing modern data networks for Lake Erie love.

BY TODD WESTCOTT

LAKE ERIE'S SHORES are the most densely populated of all the Laurentian Great Lakes, its waters the most polluted, and permanent solutions have proven hard to find. SIM Labs, bolstered by a top award at the 2017 AquaHacking challenge, hopes to change the state of the lake with the application of an AI-powered imaging system that will create large datasets to profile cyanobacteria activity throughout Lake Erie.

"The idea is to get active monitoring of specific different types of cyanobacteria in your water and their relative cell counts," said Jason Deglint, one of the three principal members of SIM Labs, in addition to Chao Jin and Alexander Wong. Deglint recognizes that there are already technologies in the market that can produce this outcome. "But it's a very long process," he said.

"Our goal is to have an in-situ probe that you can have onsite with which you can take your water sample and, in near real time, actually get the different types of cyanobacteria, as well as the relative cell counts," said Deglint. The datasets created by user-ended water testing will then be used by SIM Labs to power their AI system, creating a high-powered predictive recognition technique for cyanobacteria outbreaks in the lake. "And as we start monitoring other environmental factors, like pH... or temperature, in combination with cell counts, we'll be able to reliably see trends. This means we'll be able to see when a bloom is imminent."

These 21st century information networking practices promise to transform problem solving, and there are hardly bigger problems than the eutrophication of more than 700 square kilometres of fresh water, as occurred with the 2015 algae bloom in Lake Erie, the largest in the last 100 years. Creating an early warning system can help drive solutions for municipalities and preventative action.

The team's data-driven solution promises agility as it scales and moves across markets, and that's part of what led SIM Labs to its first-place award among a roster of innovative solutions. "Based on our initial research and our conversations, the fact that the need is so high and people are asking for a solution, its one side that we can scale fast," said Deglint, "if we can keep up with demand." The hardware is relatively simple, said Deglint. The real power is in the data. The team's approach has already attracted the interest of North American municipalities, and team member Jin has been able to court interest in the Chinese market.

This is a critical component of the information networks: the human networks that back them. Indeed, it's one of the core principals of the AquaHacking movement launched in 2015 by the de Gaspé Beaubien Foundation. "If you don't know someone, without introductions, it's hard to break through," said Claude Perras, executive director

of the de Gaspé Beaubien Foundation. "Facilitating connections is critical." And the movement has done just that for Info-Baignade, the 2016 first-place team. By leveraging the AquaHacking/de Gaspé Beaubien's network, Info-Baignade was able to form relationships with the City of Montreal to solve a problem for the city: early warning for recreational swimmers in the St. Lawrence.

"Getting access to networks and ecosystems is important," said Perras. Those networks are about shared solutions to large problems. For Perras and the Foundation it's about "bringing a spirit of understanding that we are connected, bringing a spirit of interconnectedness."

For SIM Labs, the opportunity to leverage diverse networks and knowledge bases is a large part of AquaHacking's appeal: "I think it would be foolish to say that we wouldn't need help, or that we could just do it alone. We're going to have to succeed through others with the guidance of their help," said Deglint,

admitting that the team, despite having explored their market, is weak in sales experience. A part of the AquaHacking solution: the top three winners secure places at start-up incubators Velocity, based at the University of Waterloo, and Launch Pad, run by Wilfrid Laurier University's Schlegel Centre.

Establishing modern networks of people, knowledge, and resources was built into the AquaHacking movement, which is accelerating broader coalitions to preserve the integrity of our shared waters. "Down the road, it'd be great if we could help low-income communities who don't have as big of a budget but still need to determine whether they have algae issues," Deglint said. "Their water is just as important." WC



Todd Westcott is Water Canada's content and marketing manager.

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Cutting phosphorus with greater energy efficiency. BY DIANNE SAXE

NUTRIENT LOADINGS (particularly phosphorus) from human, agricultural, and industrial waste, combined with climate change, changes in land use patterns, and invasive species are creating algal blooms in Ontario's lakes. In some cases, the blooms involve blue-green algae, which can produce harmful toxins. There is no doubt that the rising trend of algal blooms across Ontario's lakes needs to be addressed by more phosphorus controls.

To be prudent, the province of Ontario needs to focus on the greatest phosphorus reductions at the least cost when developing additional controls—not just financial, but also environmental, energy and carbon costs. From this perspective, how do the increasingly stringent phosphorus effluent limits currently being applied to some Ontario wastewater treatment plants measure up?

Ontario's wastewater discharge limits

Compared to other sources of phosphorus, wastewater treatment plants are relatively easy and convenient for the province to regulate and monitor.

This is likely why wastewater plants have been the focal point of provincial phosphorus regulations even though non-point sources (i.e., farm and urban run-off) typically represent the lion's share (approximately 90 per cent) of phosphorus loadings to Ontario's lakes. An ECO report published in May 2017, *Every Drop Counts*, highlights the lopsided energy cost-to-environment benefit equation that can result from a single-minded focus on wastewater effluent phosphorus limits.

As a general rule, Ontario wastewater treatment plant effluent must not exceed a monthly average concentration of one milligram per litre (mg/L) of phosphorus. For some plants, the province sets more stringent effluent limits, as low as 0.02 mg/L, depending on the receiving water body, watershed-specific regulations or policies, and the municipality's ability to fund the necessary treatment technologies.

As a result, wastewater facilities may require additional chemical inputs during secondary treatment (to increase coagulation), in addition to upgrading to tertiary treatment, and in some

limited instances, quaternary treatment. Phosphorus effluent concentrations typically achievable with different levels of treatment, and their relative energy intensity.

High cost for little benefit?

Reducing phosphorus effluent concentrations at wastewater treatment plants to minuscule levels is not always good public policy. For little environmental benefit, these caps will disproportionately drive up associated costs, as a result of additional energy requirements and (in some cases) chemical inputs.

For example, in order to meet its phosphorus concentration limit of 0.03 mg/L, the Midhurst Wastewater Treatment Plant in Simcoe County, Ont. is proposing energy intensive advanced tertiary treatment, via membrane filtration, in combination with additional chemical coagulation in the secondary treatment phase.

To meet its 0.02 mg/L limit, York Region's new wastewater facility under development, Upper York Sewage Solutions, has proposed the use of reverse

Table 1: Range of achievable phosphorus concentration levels and energy intensity of secondary, tertiary, and quaternary wastewater treatment facilities.

Treatment Process	Achievable Phosphorus Concentration Levels (mg/L)	Energy Intensity (kWh per 1,000 m ³) Each step is cumulative
Secondary	0.5 – 1	372 – 450
Tertiary	0.05 – 0.5	400 – 3,000
Quaternary (i.e., reverse osmosis)	<0.05	1,500 – 2,000

Source: 2016 analysis by York Region per Water Environment Foundation, Manual of Practice #8; Ministry of the Environment and Climate Change, Water and Energy Conservation Guidance Manual for Sewage Works (Toronto: MOECC, 2011) at 4.5.4. and 63.

Note: In this table, advanced filtration processes are included under Tertiary. Recent pilot projects conducted in Ontario suggest that some tertiary treatment processes, with adequate chemical dosing and an efficient flocculation process can achieve phosphorus levels below 0.05 mg/L.

Table 2: Cost per kg of phosphorus removal for Lake Simcoe.

Phosphorus reduction method	\$/kg of phosphorus removed
Quaternary (reverse osmosis)	\$100,000
Tertiary (membrane)	\$45,000
Stormwater retrofits	\$1,700
Agricultural Best Management Practices	\$4 – \$270

Source: Lake Simcoe Phosphorus Offsetting Program Report (XGC, 2014), appendices.

Note: Including staff time, water quality monitoring, reporting, construction costs, etc., South Nation priced agricultural best management practices at \$400/kg of phosphorus removed.

osmosis technology. This technology, which is also used to desalinate sea water, requires a substantial amount of electricity to pressurize wastewater through a very fine filter. With this technology, the cost of removing a kilogram of phosphorus from wastewater effluent jumps from about \$45,000 per kilogram at tertiary treatment levels, to \$100,000 per kilogram at quaternary treatment levels.

A significant part of the increased costs is due to the additional energy use required by these systems, which can use as much as five times more energy.

According to York Region, their newest wastewater treatment plant will require 3,000 kilowatt hours of electricity per million litres treated. For comparison, the Duffin Creek Water Pollution Control Plant, which currently treats the majority of York Region's wastewater and discharges into Lake Ontario, has an energy intensity of approximately 500 kilowatt hours per million litres.

The additional energy used for advanced wastewater treatment is primarily electricity. It is true that 90 per cent of Ontario's electricity generation has low greenhouse gas (GHG) emissions.

But importantly, electricity used at peak times of day and peak seasons may be gas-fired. Gas-fired electricity produces about five megatonnes of Ontario's GHG emissions each year (about three per cent of total emissions).

Or less cost for more benefit?

In contrast, removing a kilogram of phosphorus from non-point sources costs much less (estimates range from \$4 - \$1,700), with little-to-no energy consumption, GHGs, or other associated environmental impacts.

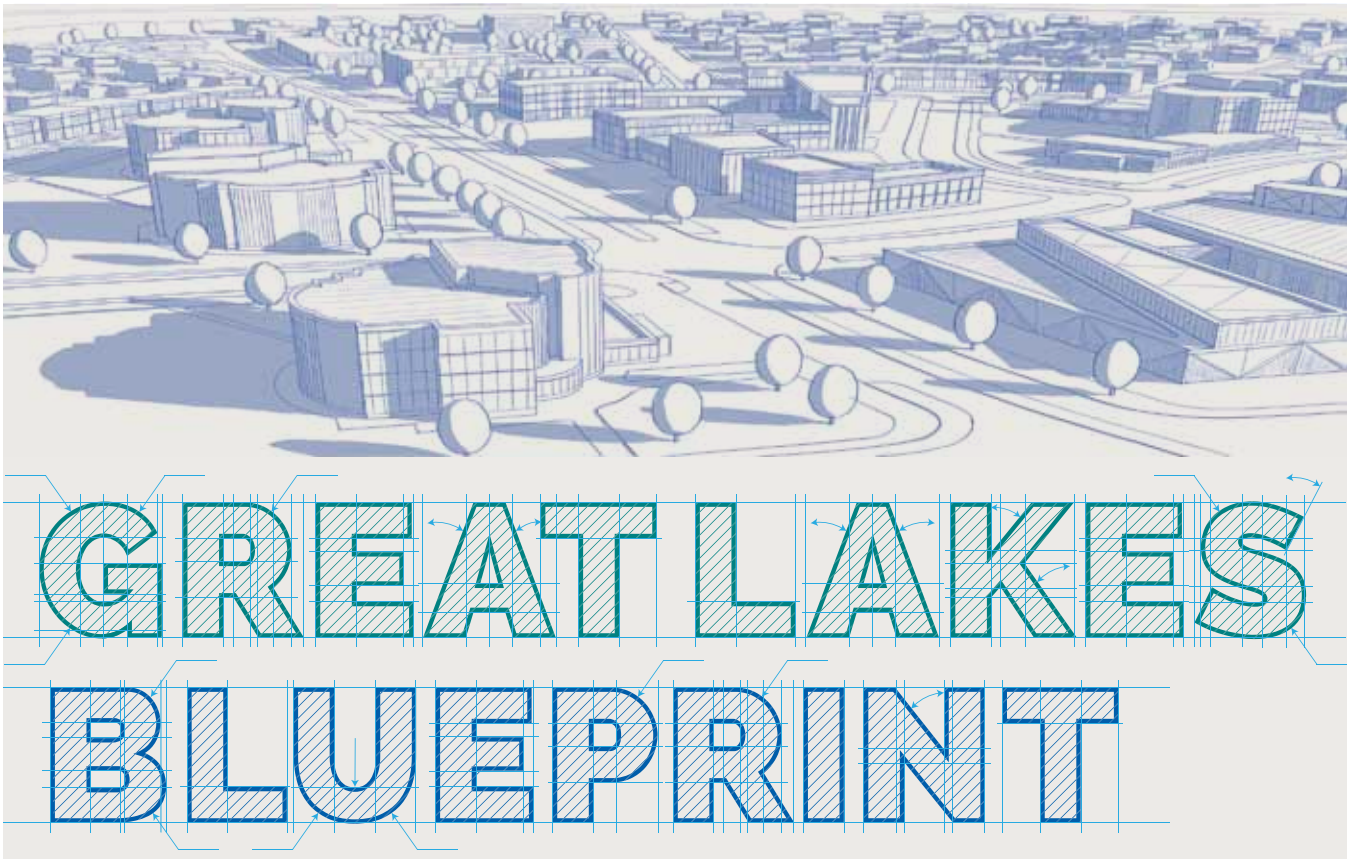
ECO's latest Environmental Protection Report, Good Choices, Bad Choices, discusses a variety of non-point source strategies to complement point-source limits, namely: phosphorus trading, targeted funding for on-farm phosphorus controls, banning spreading farm manures and fertilizers on frozen or saturated ground, and better protecting wetlands. Phosphorus trading (or offsetting) in particular enables a municipality or a wastewater treatment plant to achieve its effluent limits at the lowest costs. This type of program has proved effective in eastern Ontario's South Nation Conservation region since 1998. The key is effective monitoring and verification protocols.

Increasingly stringent phosphorus reductions are necessary as populations grow around stressed waterbodies. But why spend \$100,000 removing one kilogram of phosphorus from wastewater effluent, if the same money could reduce 50-to-250 kilograms of phosphorus from non-point sources discharging into the same lake?

As we recommended in the report Every Drop Counts, the Ministry of the Environment and Climate Change should implement phosphorus reduction programs that reduce loadings to sensitive surface waters, in a way that minimizes the energy use, financial costs, and greenhouse gas emissions needed to achieve reductions. **wc**



Dianne Saxe is the Environmental Commissioner of Ontario.



A clean water infrastructure and services action plan for the Great Lakes.

BY NED WILLIG AND VICTORIA PEBBLES

FOR THOSE WHO CALL the Great Lakes region home, life is defined by abundant freshwater, which shapes our identity and drives our economy. Everything from beaches to factories require clean, accessible water to prosper. However, much of the infrastructure that maintains our water quality is failing, posing a threat to our health, the economy, and the environment. The pipes, pumps, and treatment plants that deliver clean drinking water to homes and businesses and remove and treat wastewater are in a state of disrepair. This requires immediate action.

In September 2017, the Great Lakes Commission published the Joint Action Plan for Clean Water Infrastructure and Services, which assesses current and future water infrastructure funding needs for the binational Great Lakes region and recommends actions at the federal, state, provincial, and local levels. The action plan identifies at least \$338 billion CAD (\$271 billion USD) in needed

water infrastructure investments over the next 20 years.

The economic implications for failing water infrastructure are huge. In total, an estimated 9.1 million jobs and \$558 billion CAD (\$447 billion USD) in annual wages across the Great Lakes depend on clean water. Any disruption in clean water supply could threaten businesses, communities, and regional quality of life. In Canada, 21 per cent of all jobs in Ontario and 27 per cent for Quebec are reliant on clean water services for their daily operations.

Developing the plan

Throughout the first half of 2017, the Great Lakes Commission convened experts from Ontario, Ohio, Pennsylvania, Michigan, and Illinois to develop a list of meaningful actions to address these issues. These actions set forth a roadmap for achieving water infrastructure designed for the 21st century.

The experts reviewed more than 50 reports and documents on water infrastructure in the U.S. and Canada to develop the Action Plan, which promotes a one-water approach to clean water services, where drinking water and wastewater infrastructure needs are considered together in a way that promotes coordination across agencies and sectors. Further recommendations provide strategies to reduce per-capita infrastructure costs and provide support for low-income communities, such as regional consolidation and public-private partnerships. The plan also calls for increased support for new technologies and innovative approaches that connect communities and businesses both upstream and downstream that can deliver water services more cost effectively with greater quality.

The action plan also points out that the \$338 billion estimate very likely understates actual regional needs, due to a lack of quality data. The Great

Lakes provinces and states are without readily accessible asset inventories or asset management plans that would be instrumental in informing future investments and allowing communities to anticipate critical long-term needs, such as maintenance, upgrade, and replacement costs. This lack of information impedes policymakers from knowing the full condition of their infrastructure and how best to prioritize investments.

Canada's recent investments to repair and update critical water infrastructure assets outpace those of the U.S., primarily through its combination of federal and provincial programs that support infrastructure projects. These programs include Canada's Clean Water and Wastewater Fund and Ontario's Community Infrastructure Fund. The 2000 Walkerton tragedy in Ontario galvanized action to protect drinking water both through infrastructure investments and through source water protection. Still, more funding is needed for Canada to realize a 21st century Great Lakes water infrastructure system.

In the U.S., the decrease in federal funding experienced in recent decades has not been offset by investments from other sources. As a result, critical actions to maintain and improve water infrastructure have been taken, exacerbating the problem and increasing the cost of mitigation as these systems continue to age and deteriorate. Recent programs, such as EPA's Water Infrastructure Finance and Innovation Act, seek to address these shortfalls, but further investments are still needed.

The Action Plan was endorsed by Great Lakes Commissioners at their September 2017 annual meeting. The Commission passed a resolution pledging to pursue actions that, "address the growing water infrastructure crisis in the Great Lakes Region." These actions demonstrate states and provinces are serious about moving toward water infrastructure systems that reflect 21st century capabilities and needs, and the plan provides a blueprint for getting there. wc

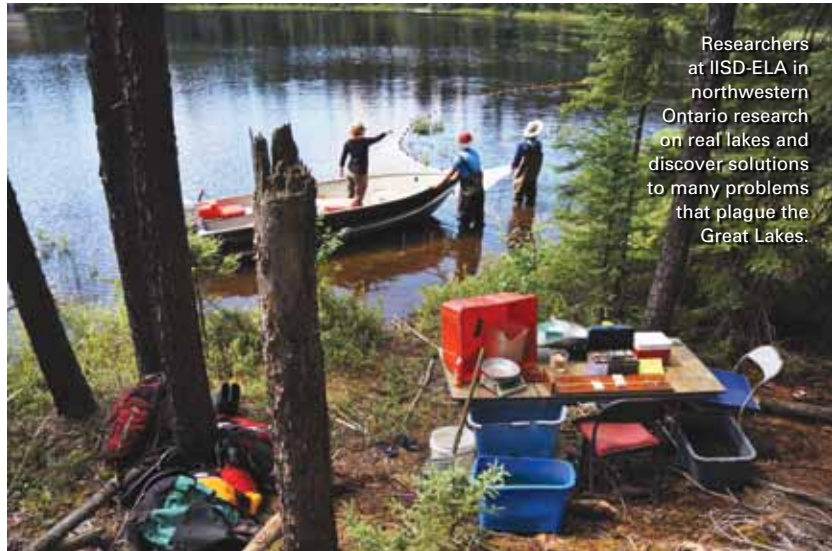
Ned Willig is an intern with the Great Lakes Commission. Victoria Pebbles is the Great Lakes Commission's Program Director.



The Dequindre Cut exemplifies the kind of green infrastructure that the Great Lakes needs, as recommended in the action plan.

All photos: Kelly Murray/Great Lakes Commission

BOB WATSON/ISTOCKPHOTO.COM



Researchers at IISD-ELA in northwestern Ontario research on real lakes and discover solutions to many problems that plague the Great Lakes.

Great Experiment

Research in real lake environments informs decisions to improve the health of the Great Lakes.

BY SUMEEP BATH

THE LAURENTIAN GREAT LAKES are a permanent testament to the shared geography, history, and culture of Canada and the United States. While it is a fact of great pride that our two countries are able to share these magnificent bodies of water, their transboundary existence should remind us that solving some of the most pressing threats to their health will require the collaboration of both nations.

It is lucky, therefore, that the world's freshwater laboratory—a unique scientific site where scientists can experiment directly on freshwater lakes—is located in Canada and is researching and finding solutions for the issues plaguing the Great Lakes.

IISD Experimental Lakes Area (IISD-ELA) is a collection of 58 lakes and their watersheds in northwestern Ontario, Canada. It is like no other fresh water research facility in the world.

Instead of researching the effects of certain pollutants and processes in a laboratory or a test tube, IISD-ELA researchers experiment directly on the lakes themselves, as they exist in nature. We call this whole-lake experimentation.



Even during Canadian winters, IISD-ELA researchers monitor lakes for a series of indicators of lake health.



IISD-ELA researchers deploy a seine to temporarily bring in fish to track their health, and then release them.

Since its inception in 1968, IISD-ELA is the only place you can do this in the world on a long-term scale. And since 1968, the site has been researching new and unstudied threats to our water supplies like no one else can.

Take phosphorus, for example. IISD-ELA helped to prove that it leads to harmful algal blooms in lakes, which in turn led to countries around the world to take steps to reduce the amount of phosphorus entering waterways. In the 1970s and 80s, IISD-ELA proved that acid rain resulted in dramatic impacts on lakes, including the collapse of fish populations. Other work conducted at the site over the last fifty years has explored the effects of hormones, mercury, pharmaceuticals, aquaculture, and more.

Our long-term monitoring of lakes has revealed that lakes in northeastern North America are getting less icy and are getting much darker, conditions which will have effects on the wildlife that live in the lakes.

Despite the progress made, threats to our water supplies, including the Laurentian Great Lakes, have not gone away. And as we start to brace ourselves for the impending impacts of climate change and need to address new chemicals and pollutants entering our waterways, there continues to be a great need for long-term monitoring and whole lake experimentation to incorporate the complexity of natural ecosystems into our decision-making framework.

As climate change and its impacts on human-built and natural environments continue to become more evident, the datasets collected by IISD-ELA for the last 50 years on a critical number of indicators in its lakes become incredibly valuable for understanding and predicting how climate change will shape the future of the Great Lakes and the millions of smaller lakes on both sides of the Canada-U.S. border.

Aggregating some of the data collected over the last fifty years, our scientists were able to announce recently that climate change has resulted in: warmer air above lakes (with autumn and winter months warming much faster than summer months); less icy lakes (along with shorter winters); darker lakes (due to increased dissolved organic carbon); smaller fish; and smaller fish habitats (as a result of surface waters that are too hot forcing fish deeper into lakes). All of these patterns suggest serious implications for the health of the lakes and the industry and livelihoods that depend on them.

Our long-term monitoring of lakes has revealed that lakes in northeastern North America are getting less icy and are getting much darker, conditions

which will have effects on the wildlife that live in the lakes. We have also discovered that fish are having to squeeze into smaller habitats within lakes, and that the fish themselves are getting smaller. These results should inform debate and public policy when it comes to mitigating the effects of climate change on the Great Lakes.

Algal blooms were the original *raison d'être* for the research site. We now understand why they occur. Even so, algal blooms continue to plague many of the Great Lakes, including, famously, Lake Erie. When it comes to developing effective policy to mitigate eutrophication on the Great Lakes, the unique science at IISD-ELA will prove critical in making sure what we are doing is scientifically sound. WC

Sumeep Bath is the media and communications officer of the IISD Experimental Lakes Area.

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Waterlution founder, Karen Kun, delivers morning keynote at Porto Water Innovation Week.



Amrita Gautam, from Nepal, talks about the Waterlution experience.

top: amrita.gautam / freemove / istock / iV



The Waterlution group poses inside the Porto Cruise Terminal.



Julie Renkema and Shona Jenkins (Canada).



Facilitator, Jonas Heffels.



Watching a group presentation.

Generation H2O

A Canadian YP develops 21st century skills to become a global water leader in Portugal. BY SHONA JENKINS

AS A YOUNG PROFESSIONAL in the water sector, I have heard many people say, “water connects us.” On the one hand, it sounds corny. However, if you give it some thought, you will realize that it is a simple and powerful truth. If you are a water professional, you may sometimes take this for granted. You may see water as a catalyst for change, bringing unlikely groups to the decision-making table. Or, due to the finite reality of water, you may view it as a driver for innovation and efficiency in almost every sector.

Innovation is another word that I

hear being used quite a lot. With the unprecedented challenges that our global society faces today, we desperately need disruptive and systemic change. Water can be the entry point to spur innovation and act as the catalyst for change. But, how do you become a leader in water innovation? How do you create space for truly outside-of-the-box thinking? How do you communicate effectively across disciplines? Young people entering their careers must have these skills if they are to become leaders in innovation and adapt to a world that is changing so fast.

Waterlution is the Canadian organization behind Water Innovation Labs (WILs) that seeks to energize, empower, and equip young leaders with the skills necessary to shape the future of water. I was one of nearly 40 participants from around the globe that took part in the WIL Europe Porto 2017 from September 24-29, 2017 in Portugal. This event took place alongside the EIP Water Conference 2017 and the Mayors and Water Conference 2017 in Porto. Karen Kun, the founder and executive director of Waterlution, was one of our



Jonas Heffels describes four kinds of active listening and explains the ground rules for scenario planning.

facilitators. Alongside her dynamic team of facilitators and water resource guests, the group was led through intense days of collaborative experiential exercises designed to foster trust building, idea exchange, and to expand our views and thinking—core to the WIL experience.

The facilitators built a positive and energetic bubble for the group, where no idea is too far-fetched. By the time we made it to the final future water

scenarios program (working in teams to dream possibilities for the year 2050), we were primed to share our wildest ideas openly and stretch our powers of imagination. My group imagined this as an Elon Musk-inspired global water hyperloop. We imagined that most people will spend their lives migrating to cope with the effects of climate change and unequal distribution of water and other resources. A whole new economy will be

built around a society on the move. We presented and painted opportunities to innovate within this futuristic frame.

Now that the WIL experience has come to an end, it got me thinking as to how other young people can acquire 21st century skills necessary to become global water leaders. Karen Kun’s advice is, “learn as much as you can from a variety of viewpoints. Develop your stamina or resilience for being uncomfortable. The more diverse, adaptable your mindset and skills the more valuable you are to the workforce and water sector.”

The next WIL experience will be in São Paulo, Brazil. For more information, visit waterlution.org. WC



Shona Jenkins is a Canadian environmental and sustainability scientist with experience working in Europe, the Caribbean, and West Africa.

Shona joined the IWA in 2017 as an intern within the Basins of the Future programmes.

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FULL BLOOM

Researchers take to the skies to forecast Harmful Algal Blooms (HABs). BY KATHERINE BALPATAKY

GLISTENING LIKE THE NORTHERN LIGHTS, these Harmful Algal Blooms (HABs) were photographed in the western basin of Lake Erie in August to inform drinking water managers about potential toxins near water intakes.

Funded by the National Oceanic and Atmospheric Administration (NOAA), the program employs global airborne surveying and mapping company, Aerodata International Surveys, to capture these and hyperspectral photos to help researchers map, detect, and predict the HABs.

Dr. Andrea Vanderwoude is an oceanographer and the lead investigator for the project. “We are filling in data gaps of what satellites can’t see beneath the clouds,” she said. “The word hyper refers to the fact that the camera has channels or bands that it measures besides the typical red, green, or blue channels that most cameras have. We fly over the Ohio water intakes and some of the Michigan ones every week to provide information to drinking water managers and the Ohio EPA about whether or not the blooms are toxic,” she said.

In response to the 2017 toxic bloom that knocked out Toledo’s water supply, the National Centers for Coastal Ocean Science, with the support of NOAA’s Great Lakes Environmental Research Laboratory, started providing twice-weekly CyanoHAB bulletins to a bi-national network of governments, fishers, and recreational water users, as well as drinking water managers. Building on monitoring efforts that have been in place since the 1990s, the bulletins integrate satellite, aerial, underwater robotic, and on-water manual samples that measure toxicity to aid in early response. Ultimately, the information is fed into what is known as the HAB Tracker, a forecast model that is under development, which shows where the blooms are, how big they are, and where they are likely headed. Using new technologies and research, NOAA is making significant contributions towards understanding and resolving the issue of HABs, particularly in the Great Lakes Region. **wc**



The predictive model will take into account all the things that affect the bloom, such as temperature, light, nutrients, and wind conditions. We are trying to start that piece, because this is what people want to know.”

Andrea J. Vander Woude, Remote Sensing Specialist with NOAA, Great Lakes Environmental Research Laboratory.

Katherine Balpataký is Water Canada’s editor.



The dramatic ripples and lines through these HABS are caused by shipping tracks and wind, affecting their dispersion at the water's surface. "[The algae] have a bit of a day/night cycle," said Vander Woude. "The scum will float to the surface during the day, sink back down, and then come back up in the afternoon. This buoyancy effect is important to the HAB Tracker model."



AS EVIDENCED



Why is it so hard to let science tell us what to do?

BY BERNADETTE CONANT

THERE ARE FEW who would disagree with a goal of protecting our water resources, or the idea that good decision-making should be based on sound science. So, why not just ask what the science says we should do and do it? As it turns out, we may not be asking the right question.

Algal blooms have become the poster child for water quality protection. Unlike water issues involving aquifers or municipal distribution systems which are hidden from view, algal blooms grab and hold our attention. From the satellite photos of clouds of green spreading across western Lake Erie to citizen photos of lake water looking like pea soup, seeing is believing, and there is little public debate that an issue exists. So, what does science say we should do?

The effects of excess nutrients on water bodies isn't a new problem. Experiments by David Schindler over 40 years ago that turned Lake 226 in Ontario's Experimental Lakes Area bright green succeeded in moving the needle from an ongoing debate about the causes of eutrophication to public and political conviction on the need to manage

phosphorus levels (*see page 18*). A ban on the use of phosphates in laundry detergent followed as a result.

Knowledge to action

With so much progress having been made, why is the problem persisting? Why can't we use scientific knowledge to slay the dragon? There are several answers, and the social and physical sciences have much to say about how we make decisions, but two key challenges to acting on science are pervasive when it comes to water management: complexity and trust.

Anyone working in watersheds knows that complexity is the order of the day, both with respect to the science and the reality of the decision processes involved. Our natural tendency is to simplify situations so that we can get our hands around them, but wicked problems like watershed management, which is characterized by a complex interplay of interdependent and changing conditions, defy simplification. By definition, wicked problems can't be solved by science, which is a hard reality to acknowledge. Science may point to some clear low-

hanging fruit, like a need to manage phosphorus loads from agriculture and wastewater, but the driving concerns become how, where, and by whom; how much is needed; and what investments make the most sense?

So the question we need to ask isn't "What does the science tell us to do?" but rather "How does the science inform our choices?" That is the fundamental change in how we should access and use leading science. It is the insights that science provides about the effectiveness and consequences of our decisions that becomes critical.

If there is no evidence-based right or wrong but an informed choice needs to be made, then belief in what is being said about the choices involved is critical. Establishing (or re-establishing) trust in institutions, governments, and the relevant science is key. For practitioners, policy makers, and scientists, transparency and engagement about the complexity involved and choices on the table are possibly the most powerful route to progress. This may not be an easy road, but increasing trust in the

debates can pave the way to progress. In the end, when it comes to critical science, it doesn't matter how right you are if nobody believes you.

Science Update: Managing phosphorus in freshwater systems

In 2016, Canadian Water Network (CWN) invited a team of experts to deliberate on an updated understanding of nutrient source, fate, and transport in freshwater systems, in order to identify important insights for decision makers involved in nutrient management.

Here's a sample of what you'll find in CWN's recently released whitepaper, Nutrient Management Research Insights for Decision Makers:

Extreme weather events can dominate phosphorus transport.

The success of management practices are strongly influenced not by how they address average annual conditions,

but by their ability to manage major fluxes, particularly during short-lived, extreme events.

Phosphorus legacies may be critical to how systems respond to management actions.

Nutrients stored in soils, sediments, and aquatic ecosystems from past activities are increasingly being considered as key to the ability of management actions to reach desired goals.

Timeframes between management actions and ecosystem responses can range from seasons to decades.

This knowledge is influencing our thinking on how or where success should best be defined or measured.

Soluble reactive phosphorus (SRP) may be key to controlling algal blooms.

SRP typically is a smaller proportion of the total phosphorus load, but may be the critical ecosystem driver to

be considered in addressing nutrient management actions.

Increasing recognition of the interplay of these factors when designing effective management programs underscores the inevitability of adaptive approaches to watershed management. Dynamic systems dictate that we continue to take informed actions, but commit to revisiting how the predicted responses match our expectations and continue to adapt and adjust accordingly. *wc*



Bernadette Conant is CEO of the Canadian Water Network.



The CWN whitepaper is available at cwn-rce.ca/2017NutrientReport

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Geography of Success

The making of a freshwater, low carbon powerhouse in the Great Lakes and St. Lawrence Region.

BY NICOLA CRAWHALL

THE GREAT LAKES AND ST. LAWRENCE COLLABORATIVE, an alliance of mayors, NGOs, business organizations, and fishery advocates, have joined together to create a vision and action plan for the Great Lakes and St. Lawrence Region. Building on the foundation of trade, water quality agreements, and climate action plans nationally and in Quebec and Ontario, the goal is to make protection of 20 per cent of the world's surface freshwater, adaptive and resilient communities, and a sustainable, low carbon economy the defining features of the region.

Inspired by the U.S. Great Lakes Restoration Initiative, a number of groups met with federal Minister of Environment and Climate Change Catherine McKenna to propose the idea of such a collaborative on the Canadian side.

"I saw firsthand how grassroots groups and governments came together to shape a plan for the Great Lakes in the United States," said Robert Lambe, executive secretary of the Great Lakes Fishery Commission. "The coordinated efforts of thousands of people on the ground and the financial commitment of the U.S. federal government under the Great Lakes Restoration Initiative was truly transformative for the Great Lakes region."

Abundant riches

If the entire binational Great Lakes region were a country, it would rank as the third largest economy in the world. The region holds over 20 per cent of the world's surface freshwater and is home to over 34 million people and more than 3,500 species of plants and animals. Ontario and Quebec have already made great strides in reducing their dependence on carbon-based energy, with their electricity supplies sourced mainly from hydro, nuclear power, and an increasing share of other renewables. Both jurisdictions are participating in the Western Climate Initiative Cap and Trade



(L-R back): Louis Charest, Mayor Randy Hope, Mark Fisher, David Ullrich, Ashley Wallis, Mayor Paul Dyster, Mayor Denis Lapointe, Scott McKay. (Front): Elizabeth Hendriks, Molly Flanagan, Nancy Goucher, Teresa McClenaghan, Marie-Claude LeClerc, Marc Gaden, Mayor Mitch Twolan, Robert Lamb, Mayor Sandra Cooper.



Nicola Crawhall, Matthew Wilson, Marie-Claude Leclerc, Louis Charest, the Hon. Catherine McKenna, Chris Smilie, Mayor Chantal Rouleau, Nancy Goucher, Mark Fisher, Molly Flanagan, Mayor Mitch Twolan.

program to reduce greenhouse gases even further. The region is also home to four of Canada's top five technology hubs in Toronto, Montreal, Ottawa, and Waterloo.

"The Great Lakes and St. Lawrence mayors are thrilled to put their support behind this collaborative," said Collingwood mayor Sandra Cooper, who is also vice chair of the Great Lakes and St. Lawrence Cities Initiative. "We need to coordinate our investments and our actions for the greatest benefit of the waters we all rely on and love."

"A shared vision and action plan for restoring our lakes while growing our economy using clean energy will allow us to best leverage our resources and position the Great Lakes to be a global leader in the new economy," said Mark Fisher, president and CEO of the Council of the Great Lakes Region.

The Collaborative, and other supporting organizations, will return to Ottawa later this year to meet again with

Minister McKenna and her colleagues, at their request, to present a proposal for process to arrive at a shared vision and action plan for the Great Lakes and St. Lawrence Region. To ensure the process reflects the needs and interests of the many diverse people living and working in the Region, the collaborative is proposing an inclusive, multi-stakeholder, consultative process. It is seeking the federal government's commitment to endorse and finance an 18-month consultative process, with the active support of the governments of Quebec and Ontario and Indigenous governments and groups.

"Freshwater Future is proud to be part of the collaborative, and to support Great Lakes NGOs in bringing our perspective into this important initiative," said Tony Maas, manager of strategy with Freshwater Future. "The diversity of organizations involved is very encouraging. We need as many voices as possible at the table to make

sure the vision and action plan that emerges results in stronger protections for the Great Lakes and St. Lawrence River ecosystem." Jean Eric Turcotte of Stratégies Saint Laurent added, "I'm involved in the collaborative because I know that the waters that pass through the Great Lakes have an impact on the quality of the water that passes through the St. Lawrence River. The integrated management of the St. Lawrence requires the involvement of all those who use the water to develop a vision together."

Organizations and companies that operate in the Great Lakes and St. Lawrence region are encouraged to get involved. For more information, visit glsocities.org/collaborative. WC



Nicola Crawhall is the principal at Westbrook Public Affairs.

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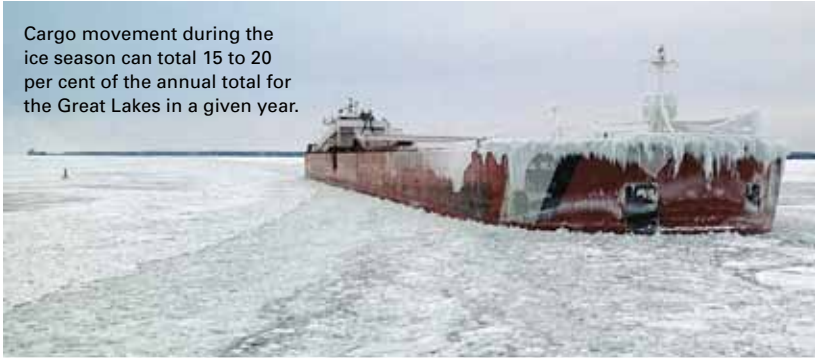
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Cargo movement during the ice season can total 15 to 20 per cent of the annual total for the Great Lakes in a given year.



Both a U.S. and Canadian laker and a U.S. and Canadian Coast Guard vessel.



The M/V PAUL R. TREGURTHA is the largest vessel ever to work the Great Lakes. Vessels this size have carried more than 75,000 tons of iron ore in a single trip.



USCG Mackinaw in Lake Superior.



Stronger Together

Increased regulatory cooperation needed to support transportation.

BY JAMES H. I. WEAKLEY

THE GREAT LAKES are a critical shared waterway and cooperation between the United States and Canada has been key to the safety and efficiency of waterborne commerce for many decades. Such cooperation will be even more important in the years ahead. Take for example, the regulation of ballast water discharges. Canada is a signatory to the International Maritime Organization (IMO) convention that recently came into effect. The United States is not. The potential for conflict is there and very troubling for U.S.-flag and Canadian-flag operators on the Great Lakes.

While Canadian carriers dominate the U.S./Canada trade (more than 90 per cent), how Canada implements the Convention could stop the movement of cargo on U.S.-flag lakers between U.S. ports. The route ships steer (known as course lines) in the St. Marys and Detroit and St. Clair Rivers go back and forth between the United States and Canada numerous times. If Canada imposed the transit standard that has been discussed over the last five years instead of the IMO prescribed discharge standard,

an iron ore cargo loaded in Silver Bay, Minnesota that is bound for Cleveland, Ohio, could not be delivered. The U.S.-flag vessel would have to sail through Canadian waters a number of times, even though this voyage is technically a domestic move. Although domestic travel is governed by American laws, safety and environmental regulations, taxation, et., Canadian domestic voyages between Thunder Bay and Windsor must also transit American waters in order to remain in the navigation channel.

The U.S. remains intent on protecting the Great Lakes from additional non-native species introduced by oceangoing vessels. The *Commercial Vessel Incidental Discharge Act* (S. 168) which has been added to the *Coast Guard Authorization Act* of 2017 (S. 1129) sets the highest achievable standard for ballast water discharges (mirroring the IMO numeric discharge standard) and will raise the bar as technology advances. There is no reason for the U.S. and Canada to be at odds over ballast water discharge standards, particularly for vessels merely

transiting and not discharging.

The history of Great Lakes shipping is a shining example of how two nations work together for the betterment of both. I am confident that can be the future as well, as American and Canadian policy-makers continue to pursue the priority files highlighted above, ideally in the spirit of collaboration and partnership towards better economic prospects for both. We may not be in the same boat but we are in this together. *wc*



James H. I. Weakley is the President of the Lake Carriers' Association, the organization representing U.S.-flag vessel operators on the Great Lakes.



This story is truncated.

To read the complete editorial, visit bit.ly/GLakeCarriers



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WELCOME TO THE 2018 BUYER'S GUIDE

It's here that you'll find Canada's definitive source of information for industry leaders, including distributors, manufacturers, and suppliers. Water professionals in Canada keep a copy of the guide handy because they know it's a great starting place for finding the products and services they need. We're confident you'll be using the guide throughout the year, too. And it's also available online at watercanada.net.

The information compiled in this year's guide was provided by the product and service providers. Basic summary listings can be found online at watercanada.net/buyers-guide. Detailed listings including contact information, descriptions of products and services, social media links, and company logos, are showcased in this book.

PURCHASING TIPS

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Credit: Nanna Woghtman - The Adventure of Frank

Rules For Wipes Surface

BY ROBERT HALLER

THE RULES AND REGS COLUMN typically focuses on existing or proposed regulations pertaining to water utilities in Canada, but there is an ongoing saga—a serious issue—that I want to talk about. It’s the issue of what’s considered flushable. Technically, you can put a flushable sticker on anything, be it a box of nails or a package of golf balls. We know that none of these items should ever be flushed down a toilet, but there is no legal definition of the term. Today, in Canada, there are no rules about what’s labelled flushable. So, manufacturers of “disposable” bathroom products are having a heyday marketing new products as conveniently flushable.

Our job, as municipalities, is to provide safe and affordable water/wastewater systems. While we improve the health of communities, we’re also learning to be wiser with our resources

by reusing effluent and converting waste into biosolids and energy. The only responsibility of a wipes manufacturer is to turn a profit. They do this by creating demand for a product that we have survived without for centuries, and they do it in total disregard of the consequences.

For decades, municipalities have been educating customers on the 3Ps principal: pee, poop, toilet paper are the only things that get flushed. Now, the wipes industry has confused the consumer by unilaterally declaring their products safe for sewers and septic. When confronted, they refer to a guideline that was created by the industry and rejected by wastewater professionals. Adding to the confusion, their “flushable” products are placed next to others that are labelled disposable or biodegradable, further

promoting toilets as convenient garbage cans. This problem is bigger than wipes. It includes feminine hygiene products, paper towels, flushable scrub brushes, and now even the Shitten (a mitten for you know what.)

At present, none of these products are designed to be dispersible—they do not breakdown quickly enough to make it safely through our wastewater infrastructure. Canadian municipalities pay to address clogs, repair and replace pumps, and to deal with the plastics in final biosolid products. Municipalities are spending hundreds of millions of dollars to fix a problem that the wipes manufacturers are making billions of dollars off of by selling improperly labelled products to Canadian consumers. One 2016 estimate suggested that the personal care wipes market generated \$2.8 billion in sales

and consume over 88,000 tonnes of nonwovens. Canadians are paying twofold for flushables: they pay to purchase the products, and they pay to fix the problems created by using them.

The ultimate question is: Who owns the wastewater system and who gets to decide what is safe to be flushed? Municipalities own their wastewater systems and are required to adhere to provincial and federal regulations and held liable for system failures in the interest of public good. Yet, this very notion is being challenged in U.S. District Court. Kimberly-Clark, a manufacturer of personal wipes, is challenging the District of Columbia's (Washington D.C.) right to claim ownership of their sewers and to decide what is safe and appropriate for their municipal systems.

Beyond 3P

Municipalities recognize the need to be reasonable in assessing new consumer

products. In fact, CWWA has joined a group of Canadian partners as part of the Municipal Enforcement Sewer Use Group (MESUG), teamed up with the Water Environment Federation (WEF), National Association of Clean Water Agencies (NACWA), and American Public Works Association (APWA) to work with the industry to find a reasonable solution. For over five years, we have been trying to work with the Association of Non-Woven Fabrics (INDA) to develop better labelling standards, but have been unable to reach any agreement on dispersibility standards. In tandem, Canadian partners were pursuing an ISO standard definition for flushable/dispersible, meant to promote equitable and more seamless trade. Again, the process was frustrated and we were unable to get any science and engineering-based discussions.

Canada has led the creation of the International Water Services Flushability Group (IWSFG) in an effort to develop an international definition for

flushable/dispersible with some simple, straight-forward tests. CWWA and MESUG are also developing a Canadian standard and calling for financial support from Canadian municipal utilities. Several municipalities have already contributed to this campaign, knowing it's an investment for a solution that will reduce the millions in annual costs spent to address this issue. We could use your help. [wc](#)



Robert Haller is the executive director of the Canadian Water and Wastewater Association.



For more information, visit iwsfg.org or cwwa.ca

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A strange thing was happening under the streets of London. Everything flushed down toilets or poured down sinks ended up here, in the sewers. Stuck together in big yellow lumps.



The lumps are called Fatbergs. Over time, they grow and grow.



The sewers got clogged and the Fatbergs had to go. But one Fatberg was different from all the rest. It had eyes, a mouth, arms, and feet. This Fatberg was alive!



First things first. This Fatberg needed clothes. But measuring, fitting, and tailoring takes time. "No time for pants, this hat will do!" said the Fatberg.

...CONTINUED...



The Fatberg took his new friend's advice and ran the London Marathon! It took eight hours, but it was still a big deal. This Fatberg really could do anything

To read more of **The Adventures of Fatberg**, visit nathantwright.com



The Adventures of Fatberg

Interview with the creator

of a spokesblob. BY KATHERINE BALPATAKY

UNEARTHING THE CONGEALD nasty bits that clog up municipal pipes isn't fun business for most. Nathan T. Wright is the exception.

Wright is a freelance illustrator and artist based in Des Moines, Iowa, specializing in custom illustration projects, graphic recording, prints, and books. In 2016, he published an illustrated book titled, "The Adventures of Fatberg" about the life and times of one particularly ambitious lump of oil, diapers, and wipes. Wright said the idea from the book came about when news of a fatberg randomly crossed his newsfeed.

"I first learned about the phenomenon of Fatbergs in 2013 and quickly became obsessed with them," said Wright. "While they are infrastructure nuisances, they also have a renewable energy upside. I felt that Fatbergs were misunderstood and I began to anthropomorphize them in my head."

When asked about the reactions he gets to the book, he said, "Adults are grossed out at first, but kids absolutely love the fatberg character. The story triggers lots of questions for mom and dad, which results in Google searches and discussion afterwards."

In addition to social media fame, the Fatberg character has become the spokesblob for an Irish startup, SwiftComply, which connects regulators, food service outlets, and compliance service providers, enabling the effective recovery and reuse of fat, oil, and grease waste.

Although the book has picked up sales in the U.S. and U.K., Wright acknowledged that it's not easy to get people interested in household waste disposal. "The challenge for municipalities is to educate everyone on what can and can't go down the drain." wc

Katherine Balpatak is Water Canada's editor.

APPOINTED



KAREN KIDD

Internationally recognized ecotoxicologist, **Karen Kidd**, has been named the Stephen A. Jarislowsky Chair in Environment and Health at McMaster University.

“Most of my work has been focused on the contamination and health of fish and the organisms that fish eat,” said Kidd. “This move to McMaster provides me with an excellent opportunity to expand my research program and to collaborate with researchers that are focused on human health and how human health is affected by the environment.”

Previously holding a Tier 1 Canada Research Chair in Chemical Contamination of Food Webs from the University of New Brunswick, Kidd’s research is focused on understanding the effects of human activities on aquatic systems and how contaminants, such as mercury, pesticides, industrial chemicals, pharmaceuticals, and other pollutants, impact the health of fish in freshwater ecosystems in Canada and abroad.

“Karen’s stellar track record of research excellence and leadership in this area, as well as her collaborative approach and passion for mentorship, provide an outstanding opportunity to enhance McMaster’s research programs,” said Maureen MacDonald, dean of Science at McMaster.

Kidd’s research program is interdisciplinary in nature and draws on a number of areas including toxicology, chemistry, biochemistry and ecology



PIERS McDONALD

On September 21st, the Government of Yukon appointed **Piers McDonald** as the chair of the Water Board. McDonald brings a wealth of experience to

this position. He has previously served as chair of Northern Vision Development and has extensive leadership experience from his work as a businessperson, miner and politician.

“I would like to welcome Piers McDonald to the Water Board, and I am

very pleased that he has accepted this position. His breadth of experience will certainly serve the Water Board well,” said Premier Sandy Silver. “I would also like to thank **Greg Komaromi**, who has acted as the chair for the last several months, for his service.”

Former chair of the Yukon Water Board **Loralee Johnstone** resigned in May 2017 for personal reasons. The board currently consists of nine cabinet-appointed members. The chairperson of the Yukon Water Board liaises with board members, facilitates board meetings, and provides important leadership to the board as they work through licensing decisions regarding the use of water and the deposit of waste.

“I am looking forward to taking on this new position of chair of the Water Board and helping to ensure that the Water Board runs as efficiently as possible,” said McDonald.



JANE RABINOWICZ

In August, Tides Canada announced the appointment of **Jane Rabinowicz** to its board of directors. Rabinowicz has 20 years of experience in community leadership at local, regional, national, and international levels and driving change in food sovereignty. She is currently the co-executive director of USC Canada, a nonprofit promoting strong family farms, rural communities, and healthy ecosystems.

“Jane’s insight and experience in community building and engagement is an asset to the board and our continued work to solve some of Canada’s most complex environmental and social issues,” said Jodi White, chair of the Board.

Rabinowicz is a prominent leader in food security and sustainability in Canada. At USC Canada, Rabinowicz works with partners in 12 countries to develop seed biodiversity, promote ecological agriculture, and protect farmers’ rights.

“It is exciting to welcome Jane

to our board given her many years of work in building equitable communities and food security. We are looking forward to her innovative and collaborative thinking,” said **Ross McMillan**, president and CEO, Tides Canada.

Rabinowicz holds a Bachelor’s from McGill University and is based out of Montreal and Ottawa.

Ottawa’s BluMetric Environmental Inc. has announced the appointment of **Jane Pagel** as chair of its Board of Directors. Pagel has been acting as interim chair since the Annual General Meeting held March 29, 2017. Prior to that, Pagel has been an independent director from February 3rd, 2014, and has served as chair of the Human Resources and Compensation Committee for the company.

In conjunction with this board appointment, on September 1, 2017, Pagel was granted options for 60,000 shares, in accordance with the board’s compensation structure.



MICHAEL TOLENSKY

Toronto and Region Conservation (TRCA) announced **Michael Tolensky** CPA, CA as its new chief financial officer.

Prior to his appointment to TRCA’s deputy chief financial officer position in January 2016, Tolensky was a senior manager at PwC, where he led client engagements in the firm’s audit and assurance group, including servicing a variety of public sector and not-for-profit organizations.

Since joining TRCA, Tolensky has focused on implementing additional governance solutions and finding cost savings and efficiencies in existing policies and procedures, while learning under the tutelage of **Rocco Sgambelluri** CPA, CA, his predecessor, who stepped down as CFO after a remarkable 36-year career at TRCA.

Tolensky began his term as CFO of TRCA as of October 1, 2017.



Ride the River Parade and Picnic Ottawa, Ont.

On Sunday, September 10 almost 400 people took to the Ottawa River to participate in the Ride the River Parade and Picnic, hosted by Ottawa Riverkeeper. Dozens of boats rounded the bend into Bytown Bay. Elder and firekeeper, **Peter Decontie** welcomed everyone to traditional Algonquin and Anishinaabe territory and Environment Minister **Catherine McKenna** joined the parade in one of the Voyageur Canoe. The parade travelled 10 kilometres, taking in sights such as Parliament Hill and the parliament buildings, the Canadian Museum of History, Rideau Falls, and Kettle Island. Ottawa Mayor **Jim Watson** and Ottawa-Vanier MPP **Nathalie des Rosiers** both welcomed the participants to the picnic following the parade.

“We wanted to bring everyone together on the water, and to have an event where everyone could truly appreciate the river,” said **Emma Conrad**, Ottawa Riverkeeper’s communications coordinator.

Great Lakes Chloride Forum Toronto, Ont.

On October 4, stakeholders from private industry, academia, government, and community groups gathered at Gowling WLG in Toronto to collaborate on best practices for road salt. Issues of liability and environmental objectives were both discussed in relation to the application of road salt and how to balance public safety with the health of freshwater ecosystems in the Great Lakes watershed.

Presented by the Consulate General of the United States in Toronto, World Wildlife Federation Canada, Lake Simcoe Region Conservation Authority, and Gowling, the forum included presentations by subject experts on the state of the environment and chloride, best practices to reduce impacts on freshwater ecosystems, networks and actors that are

working to reduce road salt use, and liability considerations.

Presenters included, Dr. **Hilary Dougan**, University of Wisconsin-Madison; Dr. **Ryan Sorichetti**, Ontario Ministry of Environment and Climate Change; Dr. **Claire Oswald**, Ryerson University; and **Sandi Moser**, Environment and Climate Change Canada.

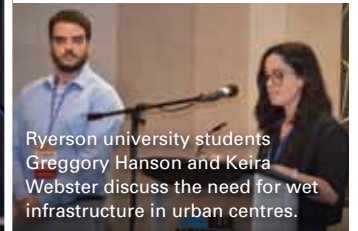
The majority of attendees supported the formation of a group to continue evaluating solutions, and more that one agreed that a media campaign to raise awareness would be useful. **David Miller**, president and CEO, WWF-Canada closed the session. “We need everyone involved if we’re going to address this issue,” said Miller.



Former Ontario premier Bob Rae delivers his keynote address.



OPPI past-president Andrea Bourrie.



Ryerson university students Gregory Hanson and Keira Webster discuss the need for wet infrastructure in urban centres.

Ontario Professional Planners Institute Annual Conference Collingwood, Ont.

For three days, planning industry stakeholders gathered at the Blue Mountain Resort near Collingwood for the Ontario Professional Planners Institute annual conference. Among the presentations was a keynote from former Ontario premier **Bob Rae**. Rae discussed the need to work with, and listen to, Indigenous peoples in the creation of sustainable infrastructure in our communities.

“I think the Indigenous value system [...] has a lot of teachings about sustainability. The absence of sustainability in much of our policy thinking over the last 300 years is causing us a lot of damage, a lot of pain,

and a lot of harm. And I think we would do very, very well to listen to Indigenous voices and their experience in what impacts things can have and how cumulative impacts can take place.”

Building sustainability includes the need to build with nature, rather than against it. This was the message presented by Ryerson University students **Greggory Hanson** and **Keira Webster**, who pointed to Netherlands as an example of a nation that underwent a paradigm shift in the 1990s. That country made the transition to an adaptive approach, using nature to assist with flood management.

Resilient Toronto: Part One Toronto Ont.

The Canadian Urban Institute (CUI) and the City of Toronto hosted the first of a three-part Resilient Toronto event series on September 26 at Innis Town Hall. Sponsored by Mott MacDonald, the series was designed to inform the City’s new Resilience Strategy. **Elliott Cappell**, Toronto’s new chief resilience officer, presented the focus areas for the new Strategy.

Discussions focused on ways to engage citizens and stakeholders in a meaningful way that leads to action. Toronto’s Resiliency Strategy reflects local and regional needs, but also includes national, global scale, and inputs. Livability, emergency response stormwater fees, and bike lanes were discussed.

WEFTEC Chicago, Illinois

The 90th Annual Technical Exhibition and Conference saw over 22,000 technology providers and end-users descend on the City of Chicago, including over 100 Canadian companies. Canadians were peppered throughout the two sprawling exhibition floors and showcased within the Ontario Pavilion. Professional engineer **Christine Zimmer** of Credit Valley Conservation in Mississauga, Ontario delivered the keynote address during the Stormwater Congress.

“WEFTEC continues to be an excellent platform for Ontario companies to showcase their water and wastewater technologies,” said **Rita Patlan**, area director of clean technologies in the Americas Unit, Ministry of International Trade.

“Companies exhibiting in the Ontario Pavilion indicated that the exhibition and business programming offered by the Ontario Ministry of International Trade and Global Affairs Canada was of great value,” said Patlan. “The mission helped solidify business for the companies who are already in the market and opened up opportunities for



the new entrants.”

Many side events were organized specifically to enable further networking between Canadian and U.S. markets, including the Great Canadian Icebreaker hosted by the Water Environment Association of Ontario (WEAO), the Ontario/Quebec Water Networking Reception, and Global Affairs; the Consulates of Canada in Chicago hosted a well attended business-to-business (B2B) session and Americas Best Practices workshop. The Canada@WEFTEC group also hosted a CEO roundtable entitled, Closing the Loop, Proven Reuse technologies for Cities and Industry, moderated by **Peter Gallant** of WaterTap, featuring **Frederic Dugre**, H2O Innovation, and **Ron Osborne**, Farmer's Edge, **Howie Honeyman**, Forward Water.

Atlantic Canada Water and Wastewater Association Annual Conference

Charlottetown, P.E.I

The Atlantic Canada Water and Wastewater Association (ACWWA) hosted its annual conference to consult and coordinate on what the Association calls a complicated job and a sacred public trust.

“This conference lets the operators of water services come together to share learning, discover best practices, and discuss how we can better do our jobs and serve the public,” said **Richard MacEwan**, manager of the Charlottetown water and sewer utility and 2017 ACWWA conference chair. There is ongoing interest in sourcing water sustainably, in purifying it reliably, and in treating wastewater effectively, said MacEwan.

The ACWWA meeting brought together 300 water experts from across the region.

As signature of the conference is the annual drinking water taste test, which saw food and beverage experts evaluate blind samples of municipal water to determine which community produced Atlantic Canada's best. The winner was the city of Halifax, followed by Miramichi and Saint John.



1 Robert Mankowski, simulation product management, discusses how Bentley's recent product acquisitions will enhance their water distribution modelling platform. 2 Be Inspired finalists from Enorsul Sanitation Services in Brazil pose for a photograph with their project, Optimization of Water Distribution System and Reduction of Losses. 3 Water Canada's content and marketing manager, Todd Westcott (far right), in discussion with Andrew Farr, Water Finance & Management (second from right), and Will Maize, Bluefield Research (third from right).

Year in Infrastructure 2017 Singapore

From October 10–12, Bentley Systems Inc. hosted the 2017 Year in Infrastructure. The conference offered a wide array of programming, including keynote presentations, panel discussions, industry forums, and the Be Inspired Awards ceremony.

The Be Inspired Awards recognizes cutting-edge practice in infrastructure project design, engineering, construction, and operations. This year, jury panels selected 51 finalists from over 400 nominations across 50 countries. Two

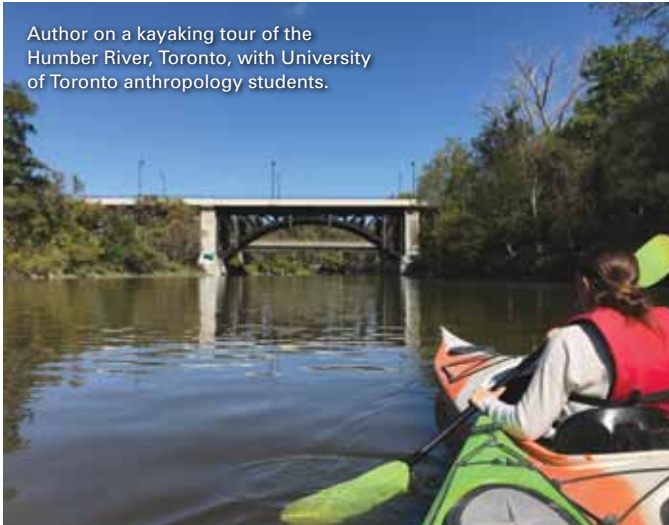
water categories were included in the awards program: BIM Advancements in Water and Wastewater Plants & BIM Advancements in Water Networks. Winning in the Water and Wastewater category was the Beijing Institute of Water for their Beijing South-to-North Water Diversion Project. In the Water Networks category, the winner was the AEGEA Prolagos Sewerage Master Plan 2041 based in Região dos Lagos, Rio de Janeiro, Brazil.

Keynote presentations in 2017 were delivered by **Greg Bentley**, CEO, Bentley

Systems Inc.; **Keith Bentley**, executive vice president and chief technology officer, Bentley Systems Inc.; **Bhupinder Singh**, chief product officer, Bentley Systems Inc.; **Helmuth Ludwig**, global head of information technology, Siemens AG; and **Corey Sanders**, director of cloud compute, Azure, Microsoft.

Presentations from K. Bentley, Ludwig, and Sanders highlighted the intersections of technology and infrastructure, outlining how new digital applications are accelerating asset development, construction, and lifecycle management.

Author on a kayaking tour of the Humber River, Toronto, with University of Toronto anthropology students.



Stormwater outfall on the Humber River, Toronto.

Stormwater Fee Refresh

Roof tax or a tool for social transformation? BY SHEILA BOUDREAU

IN 2012, the International Joint Commission's Great Lakes Water Quality Agreement acknowledged that pollutants enter the Great Lakes from surface water and runoff from non-point sources. But cities have done such a great job of delivering clean water to taps and draining lands efficiently, hiding storm drainage systems out of sight (out of mind), that the general public has become disengaged with water in general; Stormwater only becomes newsworthy when rivers overflow, lake levels rise, beaches are closed, or basements flood. The connection of urban flooding to the loss of absorbent green space and increased paved lands, buildings, and rooftops draining to storm systems, is lost. Add to this scenario the frequent and intense rainfalls predicted with climate change, and it's not just a recipe for ecological disaster with significant financial impacts, it's a predictable one.

Paying for the true cost of water is an emerging issue, and as noted by the Environmental Commissioner of Ontario, using property taxes to fund stormwater management isn't a viable solution. Instead, municipalities should levy dedicated stormwater fees to provide stable and equitable funding. That's why I find the Toronto City Council's recent decision to put their

proposed stormwater charge on hold perplexing. While this event took some by surprise, it is seen as more evidence of a lack of understanding of the urban water as well as personal responsibility. In fact, the first recommendation by RBC in their 2017 Water Attitudes Study analysis of national poll data is to: "Better communicate the value of water to our economy."

We all have an innate connection with water. Just watch a baby splash in it! It hits all of our senses, restores us, heals us, and keeps us alive. But I challenge you to find people outside of the water sector who can explain to you what stormwater is, let alone cozy up to the term wet weather flow.

There is another way. Imagine recreating the stormwater charge as a water fund that sends a positive message about the programs designed to increase water literacy, while building a resilient and livable city. This fund could support initiatives like Calgary's Watershed + Art program, incentives for green infrastructure on private lands, development of eco tours, and communicating the green jobs created. This approach would go a long way towards meeting the City of Toronto's Wet Weather Flow Management Guidelines (Nov. 2006) principle: "Toronto's communities need to be made aware of

wet weather flow issues and involved in the solutions."

Indigenous communities also remind us of the need to protect water and land, and that their cultural heritage is tied to this important work. We could look for opportunities to support working in collaboration with Indigenous people on watershed initiatives.

For a city that is expecting its downtown population to double in the next 25 years with no signs of slowing down, the pressures on stormwater infrastructure can only intensify. Landscape architects working with engineers and others can design beautiful places that retain stormwater on site, filter pollutants, harvest rain for reuse, reduce pollutants from runoff, and mitigate urban heat. Decisions around planning and funding water infrastructure need to be made collaboratively, with creative thinking about water in city-building at its heart. Managing stormwater in urban areas comes with a cost, but failing to reinvent it as a tool for social change comes with an even greater one. *wc*

Sheila Boudreau is a senior landscape architect with the Toronto and Region Conservation Authority.

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The Canadian Water Summit was launched in 2009 and has grown into Canada's largest and most diverse annual gathering of business, government, academic, and non-profit water leaders, attracting 300+ attendees each June. The 2018 event will include three days of dynamic programming, including young professional skills training, women in water networking reception, field excursions, live theatre, H2O slam poetry, dynamic exhibitor sessions, and the Water's Next awards gala. The week showcases the industry's best, while offering an enjoyable forum to building meaningful relationships to improve your business.

Growing Canada's blue economy requires smart people who are collaborating outside of their traditional circles and transferring knowledge into practical solutions. The 9th annual Canadian Water Summit will focus on how the R&D of universities, technology providers, NGOs and governments, as well as traditional knowledge, is being applied in the business of water.

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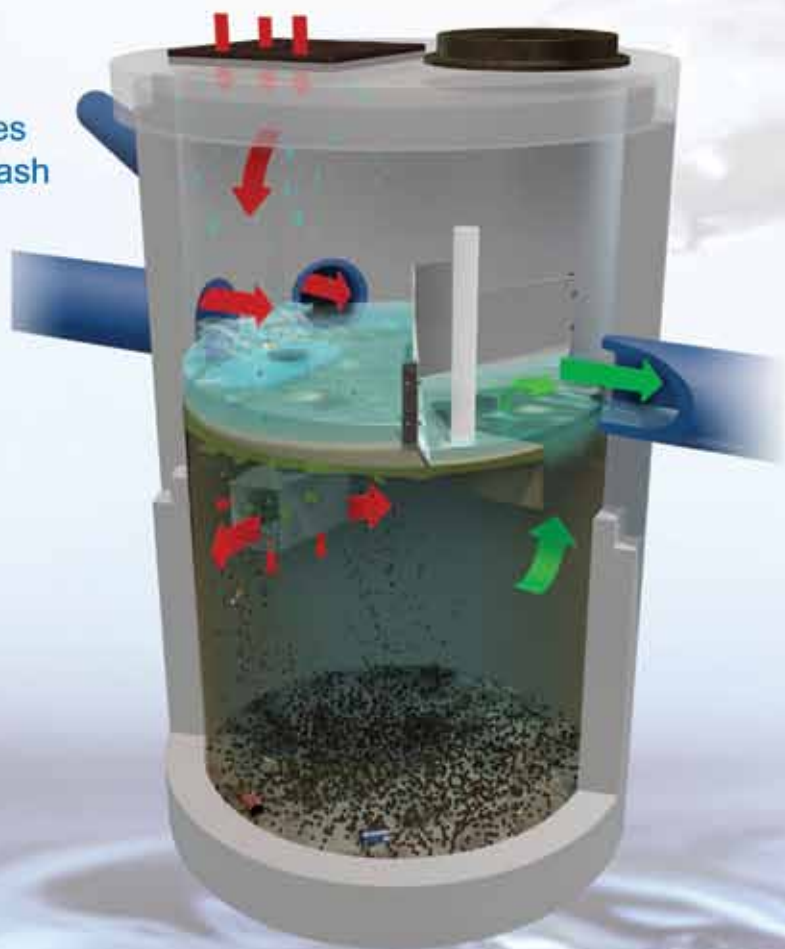
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