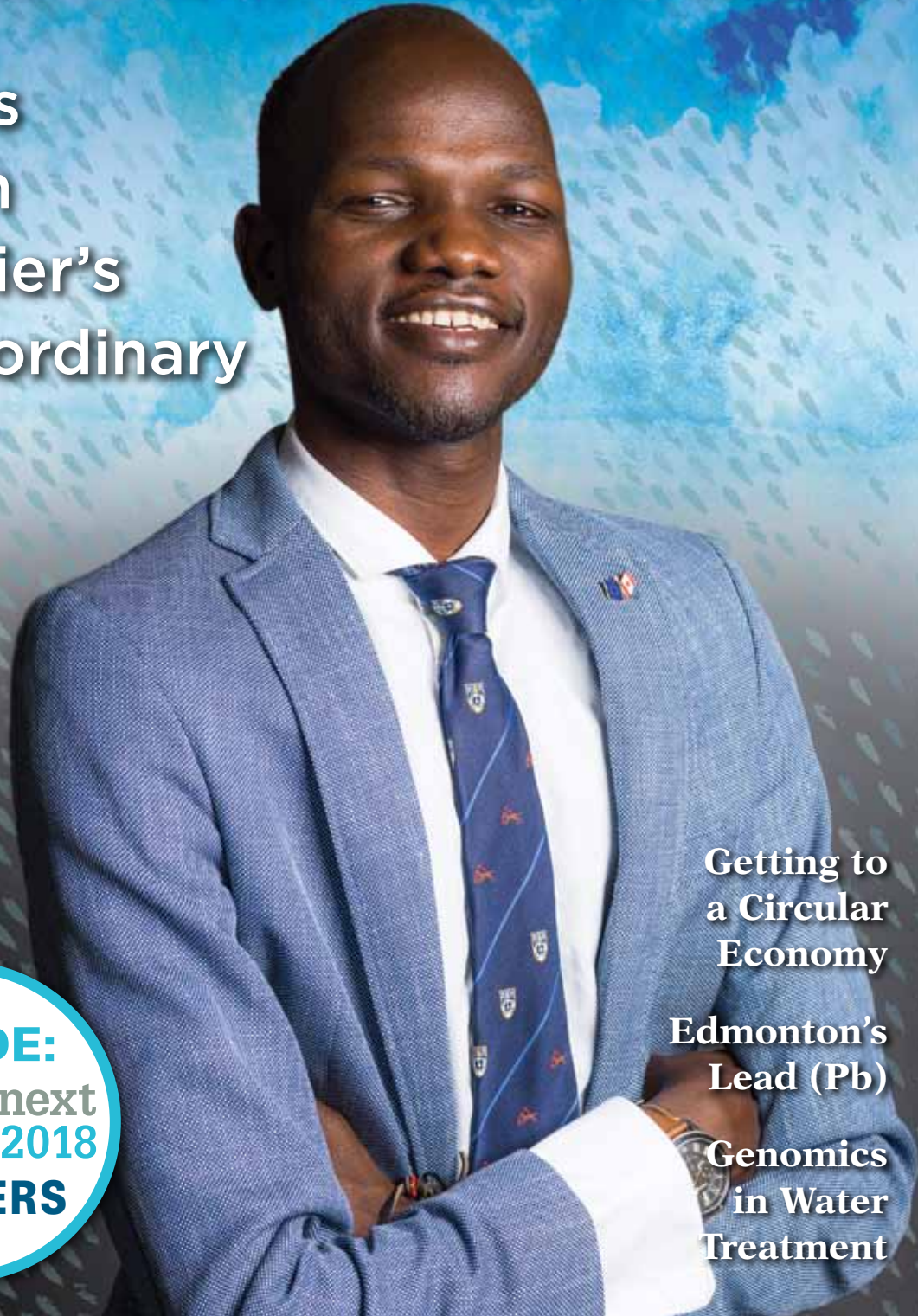


WATER CANADA

THE RAINMAKER

James
Thuch
Madhier's
Extraordinary
Story



Getting to
a Circular
Economy

Edmonton's
Lead (Pb)

Genomics
in Water
Treatment

INSIDE:
water's next
awards 2018
WINNERS

BRIDGING THE GAP

With Trenchless Solutions



“The best way to create value in the 21st century is to connect creativity with technology” - Steve Jobs

Due to favourable installation, operational and environmental advantages, Cured In Place Pipelining (CIPP) was the method chosen to rehabilitate the 45 year old Hespeler Trunk Sanitary Sewer in the City of Cambridge, On. A bridge was constructed to effectively and safely divert flows while approximately 1,400 metres of 600/675mm diameter vitrified clay pipe running along and crossing beneath the Speed River was repaired.

Visit liquiforce.com to learn more about the advantages of trenchless technology.

LiquiForce

GRAVITY
The proven trenchless sewer program cities trust.

water's next awards 2018

SPECIAL FEATURE

Water Canada
proudly profiles
the 12
Water's Next
2018 winners.

PAGE 10

DRINKING WATER

24 Lead Serious

A shift in federal guidelines on lead in drinking water will require a new approach to service delivery.

BY **JEFF CHARROIS**
AND **STEVE CRAIK**

WASTEWATER

26 Cracking the Code

Ontario unlocks genomic information to propel the circular economy.

BY **BRITNEY HESS**

WATER RESOURCES

28 Nature at Work

The role of engineered wetlands for water treatment in the circular economy.

BY **SEAN CHILIBECK**



FEATURES

8 The Adventures of Fatberg

BY **NATHAN T. WRIGHT**

30 Closing the Loop

The shift from a linear economy to a circular economy is necessary and possible.

BY **NELSON SWITZER**

32 Communication Innovation

Water management data comes to life with new tools and approaches.

BY **ALAN SHAPIRO**

COLUMNS

36 Rules & Regs

Circular Economy?
We're doing it!

BY **ROBERT HALLER**

42 H2Opinion

It's time to get serious
about resource recovery.

BY **KEVIN LITWILLER**

DEPARTMENTS

5 Editor's Note


Waste not, want not

6 Front

Plastics consortium,
Quebec water strategy

38 People & Events

Jobs, awards, contracts,
and the latest event coverage.



Trust.
It flows from
experience &
commitment.



Coming from Ontario, land of freshwater, perhaps our dedication to water quality and innovation shouldn't be surprising. Over the past 25 years, the Ontario Clean Water Agency has earned a world-class reputation in the operation of clean water and wastewater facilities. Collaboration flows through everything we do. If you'd like to discuss your municipality's needs, whatever the size, wherever you are, we look forward to talking with you.

For sales enquiries call 1-800-667-6292 or visit www.ocwa.com.
Follow us on Twitter. Like us on Facebook.

EDITOR

Katherine Balpatak

PUBLISHER

Todd Latham

ASSOCIATE PUBLISHER

Jane Buckland

ART DIRECTOR & DESIGNER

Donna Endacott

ASSOCIATE EDITOR

Andrew Macklin

CONTENT AND MARKETING MANAGER

Todd Westcott

CONTRIBUTING WRITERS

Jeff Charrois, Sean Chilibeck, Steve Craik, Britney Hess, Linda Li, Kevin Litwiller, Andrew Macklin, Jeff Sanford, Alan Shapiro, Nelson Switzer, Todd Westcott, Nathan T. Wright

ADVERTISING

Jane Buckland jane@actualmedia.ca

ADVISORS

Nick Reid, James Sbrolla

WATER AMBASSADOR

Lee Scarlett



Water Canada is published six times a year by Actual Media Inc.

ACTUAL MEDIA INC.

147 Spadina Avenue, Unit 208
Toronto, ON, Canada M5V 2L7
Phone: 416-444-5842

Subscription/customer services:
416-444-5842 ext. 211

Water Canada subscriptions are available for \$39.95/year or \$64.95/two years and include the annual Buyer's Guide issue.

©2018 Actual Media Inc. All rights reserved. The contents of this publication may not be reproduced by any means in whole or in part, without prior written consent from the publisher.

Printed in Canada.



Undeliverable mail return to:
147 Spadina Avenue, Unit 208
Toronto, ON, Canada M5V 2L7
Canadian Publications Mail Product
Sales Agreement 40854046
ISSN 1715-670X

Proud member of:

Canadian Association on Water Quality
Canadian Water Resources Association
Ontario Ground Water Association
Water Environment Association of Ontario
Water Environment Federation



Waste not, want not

BY KATHERINE BALPATAKY

SUMMER IS HERE, which means it's officially beach season. For me, that translates into weekend strolls on the shores of Lake Erie picking up heaps of plastic. It is remarkable to me that the world is finally awake to the fact that our oceans and waterways are soup bowls of an entire alphabet of polymeric material and yet until recently, we did not understand how ubiquitous the problem really is. Photographs and videos of sea birds picking at candy wrappers, sea turtles with straws up their noses, and one very delicate sea horse cradling a discarded cotton swab are powerful motivators. Solutions exist, but the challenge is stimulating widespread, global change.

Municipalities across Canada have long been struggling to find affordable ways to address the rise in consumer plastics, and on January 1st, Canada and the world got a wake up call when China, which used to be the world's largest importer of global waste, put an end to trash imports. The National Reporter stated that "up to 60 per cent of Quebec's plastics went to China before its ban; Halifax is reportedly sending three hundred tonnes of plastic to landfill; and Calgary is sitting on five thousand tonnes of plastic waste, with all of that having gone to China in the past."

Given that Canada produces more waste per capita than any other developed nation and nearly three-quarters of that waste still ends up in landfill (says the

Conference Board of Canada), we have to consider ways to live more efficiently, and it goes much deeper than plastics. It is time for Canada to take a step back and consider the concrete steps needed to achieve a circular economy.

In this issue of Water Canada, we explore the concept of production/consumption circularity and how it touches our industry. On page 6 we report on the launch of a new plastics recycling consortium; on page 18, we share a delightful story about how one Canadian invented a way to use wastewater as a building heat source when his wife told him that he wasn't quite ready for retirement; on page 30, we look at a Canadian-made technology that is disrupting how plastic fiber is produced and managed; and our H2Opinion sounds off on the weighty issue of biosolids. I also encourage you to read the uplifting op-ed by regular contributor Robert Haller about how the municipal water utility sector is already making strides to adopt the circular economy concept, albeit with different terminology. And, of course, we hope that you enjoy the profiles of our 2018 Water's Next winners.

Everything that we produce or consume has an impact on the natural world, and this is central to the global economy. But it's time we take ownership of our mess, make better use of the resources at hand, and with these goals in mind, harness new economic opportunities. **wc**

**Contact Katherine at
416-444-5842 ext. 116 or email
katherine@watercanada.net**

**All back issues of Water Canada
are available for download at
watercanada.net/issues**



For daily news and discussion, visit

@CanadianWater /WaterCanada WaterCanada



BRITNEY HESS
Britney is a business analyst at Ontario Genomics.
PG 26



NELSON SWITZER
Nelson is the chief growth officer of Loop Industries Inc.
PG 30



ALAN SHAPIRO
Alan is a Vancouver-based science communicator with a focus on water resources and environmental issues.
PG 32

ABOUT THE COVER

James Thuch Madhier was born into the second Sudanese civil war. As a boy, he witnessed the 1998 famine, which resulted in the deaths of 70,000 people. Determined to help those around him and to gain an education, he overcame all obstacles by channeling his entrepreneurial spirit. James is the founder of Rainmaker Enterprise. He is currently pursuing a Bachelor of Arts in Peace, Conflict and Justice Studies at the Munk School of Global Affairs. James is also the 2018 winner of the Water’s Next People-Young Professional award and Water Steward of the Year award.

Read his remarkable story on page 15.

“My experiences have instilled in me the belief that talent is universal, but opportunity is not. Regardless of our experiences, we are united by the right to human dignity. I strive to restore dignity to myself and the millions who have lost it through extreme poverty and injustice,” said Madhier.

NEXT ISSUE: SEPTEMBER/OCTOBER

- **Canada’s water innovation clusters**
- **Water pricing tool for small municipalities**
- **Green bonds for ecosystem services**

PLUS Regular columns, including Rules & Regs, Groundbreakers, Fine Print, and Liquid Assets.

To inquire about advertising, contact jane@actualmedia.ca



Marine litter on a beach in Norway.

Plastics Front

BY TODD WESTCOTT

CANADIAN PLASTICS RECYCLING Veterans and entrepreneurs Tony Mouchachen and Emmie Leung have combined the market presence of their three extended plastics processing and recycling companies, Merlin Plastics Group, ReVital Polymers, and Emterra Group, to launch North America’s largest plastics recycling consortium—Circular Polymers Group (CPG).

These companies currently operate 38 multi-materials handling and recycling facilities in British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario, as well as in Oregon, California, and Michigan in the United States. In 2017, this group collected and recycled well over 136 million kilograms of plastics from residential curbside recycling systems, beverage container deposit-return systems and the industrial, commercial, and institutional sectors across Canada and the USA.

A number of organizations are pushing for the elimination or vast reduction of plastic waste globally and in Canada. Reducing plastic waste would divert plastic pollution from both freshwater and salt water bodies. Canada voiced its support for a Blue Charter in April. Despite cities banning plastic bags and bottles, a recent study

from Quebec found that banning single-use plastic bags could increase total environmental plastic pollution.

“While each of our companies will continue to do business individually, we’ll be working synergistically to offer our customers the combined knowledge of 75 years of recycling expertise, state-of-the-art technology, and solutions-oriented, strategic thinking,” said Mouchachen. “Circular Polymers Group is a consortium company that is truly greater than the sum of its parts.”

“The bulk of the plastics entering the world’s oceans comes from a handful of countries, such as Indonesia, the Philippines, Vietnam, Sri Lanka, Egypt, Thailand, and Malaysia,” said Leung. “By adapting the regulatory model for EPR that is emerging in Canada, these countries could aggressively address the ocean plastic pollution problem, reduce greenhouse gases associated with plastic production and disposal, and drive local economic development.” WC



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



Belle Stratégie

QUÉBEC'S Minister of Sustainable Development, Environment, and the Fight Against Climate Change, Isabelle Melançon, announced a new provincial water strategy for 2018–2030 and its 2018–2023 action plan. With the Strategy, the Québec government is launching a suite of measures, including major investments of more than \$550 million and the establishment of the Québec Water Council to democratize the management of water resources throughout the province. In total, the 2018–2023 action plan provides for 63 measures to be implemented by eleven government departments and agencies.

“The source of life, water permeates our present, and our future cannot be thought of without it. In many ways, she is part of us. Subjected to the pressures of human activity, it resists, flowing in abundance from the top of the mountains to the bottom of our valleys,” said Minister Melançon. “We hold three per cent of the world’s renewable freshwater reserves. That’s why I’m proud to launch the 2018–2030 Québec Water Strategy, and the first action plan for the protection

and management of our collective heritage. Protect water responsibly, use it sustainably, manage it in an integrated way; it will return to us a hundredfold!”

The water council will be chaired by the professor of economics at the School of Management of the University of Sherbrooke, Alain Webster, and consisting of forty members, the new body will be composed of representatives from the general public, municipal representatives, water users, and other stakeholders.

“Without water, there would be nothing. No clouds, no life as we know it, no climate either. Abundant and expansive, sometimes impetuous, water needs us to take care of it. I welcome the arrival of the Québec Water Strategy 2018–2030 and its action plan,” said Jean Lemire, emissary for climate change and northern issues of the Government of Québec.

“More than ever, we must take up this great conservation challenge that concerns us all. It’s up to us to make this difference in our everyday choices.” *wc*

— Todd Westcott



We love hearing from you! Tweet us [@CanadianWater](https://twitter.com/CanadianWater)

Online at
WATERCANADA.NET



Photo: BSH/12/21

NEWS: B.C. government underscores its commitment to work with Indigenous peoples with draft principles.

bit.ly/BCIndigPrinciples



NEWS: St. John’s to undertake \$46M in municipal infrastructure. .

bit.ly/StJohn46



Photo: Government of Canada

NEWS: Environment ministers meet, discuss nature conservation.

bit.ly/EnvMinConserve



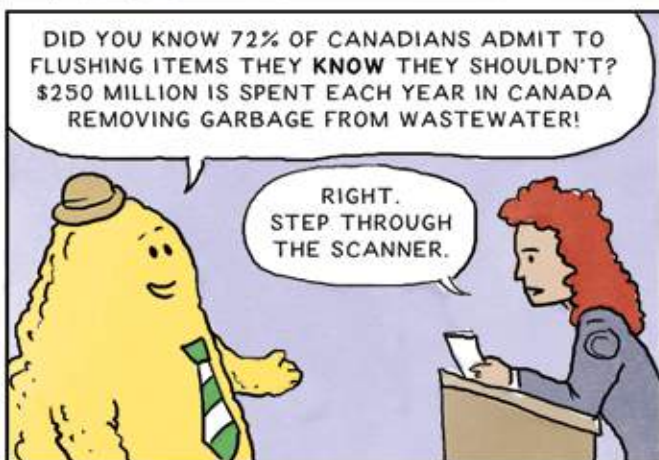
Photo: Water Canada

RESEARCH: Nanomaterials linked to algal blooms. bit.ly/NanoBloom

THE ADVENTURES OF FATBERG



PRESENTED BY KSB CANADA, WATER CANADA & MESUG
STORY & DRAWINGS BY NATHAN T. WRIGHT



VISIT KSB.CA/CONQUER-THE-CLOG TO LEARN MORE ABOUT CLOGGING AND STRATEGIES TO COMBAT IT.

Nathan T. Wright is a freelance illustrator and artist based in Des Moines, Iowa, USA.





ARSENIC IS **NOT** A GAME

Ready to make the right move?

AdEdge is your one-stop resource for arsenic treatment systems for any size community. We now supply Bayoxide E33 adsorptive media and E33 media replacements for the largest and the smallest systems. As always, AdEdge offers competitive pricing, experienced engineers, and unparalleled support.

With AdEdge's arsenic treatment systems' global success history, why would you go anywhere else?

When you're ready to make the right move, call us at **866.823.3343**.



www.AdEdgetech.com

water's next awards 2018

Celebrating Canadian water leaders and champions



Water's Next winners received a plaque and an individually hand crafted glass pin by artisan glassblower Aaron Calenda of Guelph, Ont.



(L-R) co-hosts Katherine Balpataky and Todd Westcott with award presenter and committee member Robert Haller.



Lynn Mueller, president and co-founder, SHARC International Systems Inc with presenter Kerry Freek, WaterTAP.



(L-R) Jim Brown, Lytton First Nation, Katherine Balpataky



Welcome to Water's Next 2018

WATER CANADA magazine's Water's Next Award program is the only national awards program to honour leadership across the entire water sector—including public servants, non-governmental groups, researchers, municipalities, and technology providers. Since 2010, Water Canada has hosted the awards to help strengthen and celebrate this national community of water leaders, champions, and innovators.

We believe that it is important to showcase these accomplishments, because so many of the accomplishment

that our finalists and winners have achieved go unrecognized by the broader public. And yet, our community knows that clean drinking water, healthy rivers, safe wastewater discharge, and tools to help communities understand water are precious gifts to society. Our hope is that these stories will inspire the next generation of water leaders and innovators.

This year, we owe the success of the program to the 13 outstanding and respected water leaders who participated on our selection committee.

Their guidance in the selection of our 34 finalists and 13 winners demonstrates some great breadth of knowledge and experience.

We were pleased to celebrate their success during our 2018 Water's Next Gala on June 20 at the Pinnacle Marriot Hotel in Vancouver, held in conjunction with the 9th annual Canadian Water Summit.

Thank you to the nominees, winners, and finalists for what you bring to the sector, for your vision, and persistence to protect our most precious resource. We proudly celebrate you in these pages.

Credit: Matthew Decker



(L-R) Emma Markle, U.S. Consulate General Toronto and Lynn Kriwoken, B.C. Government.



Former Ontario Environment Minister Glen Murray with Juan Alsace, U.S. Consulate General at the inaugural workshop.

Credit: U.S. Consulate General Toronto



Coastal recreation and citizen science experts gather discuss opportunities for a mobile app to encourage Great Lakes access.

Credit: U.S. Consulate General Toronto

Government: The U.S. Consulate General Toronto

WHEN U.S. CONSUL GENERAL JUAN ALSACE accepted a three-year posting with the Consulate in Toronto, he decided to elevate Great Lakes prosperity to a priority issue. Having grown up in Buffalo, New York and attended high school in Niagara Falls, Ontario, Alsace had developed a personal understanding of how U.S.-Canada cross-border collaboration is crucial for jobs, trade, and investment, and how these elements were tied to the health of the Great Lakes.

“As is well known to many people by now, water and the Great Lakes are near and dear to me,” said Alsace. “When I came to Toronto, I decided to make water and protecting the Great Lakes a priority for myself and the Consulate. It is also a personal interest and passion for me. I now proudly wear the title of ‘water nerd’ bestowed on me by my colleagues.”

To support collaboration on the Great Lakes, in 2016 the U.S. Consulate General Toronto (USCGT) hosted an expert workshop in partnership with the Province of Ontario that would eventually lead to the formation of four working groups, each addressing a different Great Lakes issue: chloride contamination, harmful algae blooms, challenges facing Great Lakes fisheries, and boosting regional economic development via recreational activity. Demonstrating innovation in their use of public-private partnerships, the USCGT convened dozens of stakeholders from both sides of the border who have achieved many milestones together. These milestones include raising awareness sponsoring training on smart salting practices; harnessing funds and expertise to launch a mobile app featuring an interactive map of Lake Ontario,

its local history, and environmental challenges; hosting a regional challenge focused on phosphorus through the 2018 global Fishackathon competition; and organizing a listening tour around the western basin of Lake Ontario to hear from community stakeholders about the negative impacts of harmful algae blooms (HABs) in the region. Much of this work is ongoing.

While these efforts were inspired by his personal commitment to Great Lakes issues, Alsace remains humble about the Consulate’s role in the outcomes. “The Consulate may have used our convening power to bring parties together, but it has been the expertise and vision of the working groups that have made them successful,” he said. “There have been many collaborators over the past few years. However, there have been a few organizations in particular who have chaired the working groups through their initiatives: the Canadian Water Network, Flow Canada, Gowling WLG, the Lake Simcoe Region Conservation Authority, Smart About Salt, Swim Drink Fish Canada, the State University of New York at Buffalo, Water Canada, and World Wildlife Fund-Canada.”

Although Alsace’s term in the Toronto office is coming to a close, the working group efforts carry on, and he said that he will remain engaged in these and other Great Lakes activities. “The Great Lakes have contributed to, and continue to play, a critical role in the economic well-being of our two nations through the transport of goods, fisheries, and tourism,” he said. “The lakes are job creators, so keeping the waters clean and healthy makes economic sense, as well.” — Katherine Balpataky

(L-R)
Katherine Balpataky,
Lynn Mueller,
Robert Haller.



© Jeff Mendenhall

Private Sector: Lynn Mueller, SHARC International Systems

SUCCESSFUL ENTREPRENEURS often possess a restless energy that drives them to get out in the world and do something. This is an energy Lynn Mueller, president and co-founder, SHARC International Systems Inc., demonstrates this quality in spades.

It was twenty-five years ago that the Port Coquitlam, B.C.-based businessman first went out and conquered the market for home and business-based geothermal systems. He did so through a company called Water Furnace Canada, which Mueller built into the largest manufacturer of geothermal heat pumps in the country. “We took that company from a 30-cent stock to a 30-dollar stock,” he said.

But when he retired from the business, he grew restless. “I was going to retire, and I spent a couple of days at home, but my wife wasn’t ready for me. She said I had to find something to do. I was driving her crazy,” he said.

Mueller knew that it was time to work on another idea he’d had brewing in his mind for years—heat recovery from wastewater.

Mueller raised four children and so he knows intimately how much energy comes into a home and is then lost down the drain as heated wastewater from showers and laundry. Up to 25 per cent of the heat in a home can be lost this way. Tapping the skills that he developed during his time in the geothermal market, he came up with the concept behind SHARC. “I had an idea, instead of taking heat from ground, why not take it from

wastewater? I’d been thinking for years, ‘My God, if we can get energy out of the ground, why can’t we recover some of that from the wastewater?’”

A reverse takeover in 2015 saw a group of individuals invest \$4 million into the company. That cash gave the group time to engineer and develop the product. Several variations are now available. “We’ve now got the PIRANHA, the SHARC [...] basically, any predatory fish,” he said. The systems have now been installed in condos, as neighbourhood-wide municipal projects, and at craft breweries. “We really just emerged from being an R&D company to being a commercial company this year. For six years we were in the lab developing the system. But now we’re really ready to do this.”

The company is moving on to larger projects, including the DC Water headquarters and an upcoming cluster of installations in Scotland (*see related story on page 18*). There is also an office in California that is targeting individual homes with a system that sells for an affordable \$3,500. “We have a pipeline of business now. What’s happened over eight years is that we went from an idea nobody had heard of to one that is on the agenda of every city. We’re on the list of things they want to investigate.” He is careful, however, to make it clear the company didn’t appear overnight. “We’re an overnight success that took eight years. I’m 63 years old. It’s persistence.” — Jeff Sanford



Lytton, B.C.



The Community Circle team outside a new installation.

Non-Government Organization: Jim Brown, Lytton First Nation

“NOTHING SHORT OF HEROIC.” That’s how Jim Brown’s work to develop local solutions to drinking water issues was described in his Water’s Next nomination.

“Jim Brown has been instrumental in bringing safe drinking water to many of the 56 reserves in his home community of Lytton First Nation,” said Danny Higashitani, senior engineer, asset management with Indigenous Services Canada in B.C. “He has been a true leader by serving as a band council member for over two decades, as well as serving as the operations and maintenance manager and lead water operator for his community for 35 years.”

In 2010, Jim led a partnership on behalf of Lytton with RES’EAU-WaterNET, an NSERC Strategic Network working in partnership with many other public and private organizations to deliver local solutions to drinking water issues faced by small, rural, and indigenous communities. This problem-solving collaboration, known as the Community Circle, has helped to systematically capture and weigh all relevant considerations within the watershed. The result has been that decisions affecting drinking water can be made based with a deeper understanding of the issues and community participation.

“Jim has been an endless source of energy, knowledge, and inspiration for the RES’EAU project teams, and for the network as a whole,” said Madjid Mohensi, scientific director of RES’EAU-WaterNET. “His undivided attention and commitment to Community Circle and his constructive

assessments have allowed us first and foremost to enhance our relationship building abilities within the communities we serve.”

Working with RES’EAU-WaterNET, Brown worked tirelessly preparing for and participating in community consultations and local community engagement events, speaking at industry workshops and conferences, helping to educate local youth, and supporting young researchers’ work in Indigenous community health.

In 2016, Brown channelled his industry knowledge into the creation of the First Nations’ Operators Water Net for British Columbia & Yukon Territories, a unique advocacy and networking organization that provides leadership and support to water operators. The organization also advocates for better training, pay, and infrastructure investment. In just two years, it has established itself as a partner representing 290 water systems and 150 wastewater systems.

“Brown’s true impact will be seen as the next generation of educated and trained First Nations operators take the reigns to lead their communities into a future where community health is achievable on their terms,” said Mohensi.

Brown’s heroic efforts have provided the next generation with the knowledge and support needed to continue to ensure that clean, safe drinking water is available for all First Nations throughout B.C. and the Yukon, and have provided an example for the rest of the country to follow. — Andrew Macklin

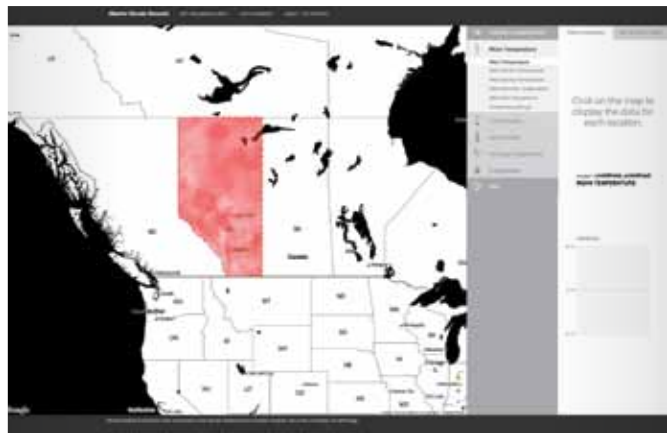
Credit: University of Lethbridge



Credit: Marlene DeGroot



Source: albertaclimateatlas.com



Academia:

Dr. Stefan Kienzle, University of Lethbridge

DR. STEFAN KIENZLE is a professor of Geography at the University of Lethbridge with expertise in hydrology and GIS, and he's putting Alberta's water on the map.

The map in question supplies a wealth of data to help contextualize climatological changes such as historical precipitation and mean temperature across the province. "It started about ten years ago," said Kienzle. "Every time I stood beside a river, I was wondering 'where is the water coming from and which are the most important watersheds?'" After inquiring with friends and colleagues about where he could find this information, he found that no one was aware of this kind of yield map. "So, I took it upon myself to create one."

The Alberta Climate Atlas illustrates how water moves into and through the province. "The story is clear: 75 per cent of our water comes from the Rocky Mountains [...] in some parts of the province, one-third of the water is produced in the United States," he said.

Kienzle has drawn on his 25 years of watershed modelling to provide a practical tool for solving water problems. "With this tool, I can answer very pragmatic questions. I can, for instance, answer questions such as: will our reservoirs be fuller or emptier in the future? Or how has the one-hundred-

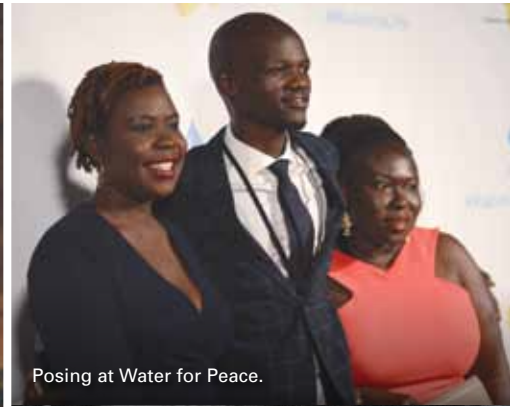
year-flood changed in the past decade and how will it change in the future?"

With this knowledge, governments, industries, and citizens can make informed decisions about water use and project investments. The Alberta Climate Atlas is now used widely by government and other researchers, but that's not what thrills Kienzle most. "What really excites me is that I'm aware of at least six middle high schools in Alberta that are using this to learn about climate and climate change."

Kienzle's enthusiasm for engaging young people is evident, and throughout his research career he has had the pleasure of mentoring many future water experts. "They are really the next generation of decision-makers. They are in government departments; they are in city halls, municipal offices, consulting firms. So, they are ones that help us solve the current pressing questions about water."

Kienzle hopes to see the Alberta Climate Atlas adapted to a larger scale, which given the technical acuity of the map, seems inevitable. "The methodology is published in a refereed journal. Anyone in another province can do that," he said and laughed, "If I had the funding, I would be happy to do that for the rest of Canada." — Todd Westcott

Photo: The Rainmaker Enterprise



Posing at Water for Peace.



Emmanuel Jal, a recording artist who was born into the life of a child soldier in the early 1980s in southern Sudan, leads some dance moves at Rainmaker Enterprise's Water for Peace event in Toronto in June.



James speaking alongside Lt. Gen. Romeo Dallaire about water and peace.

Young Professional: James Thuch Madhier, founder, The Rainmaker Enterprise

EACH YEAR IN SOUTH SUDAN, as the harvest gives way to the dry season, local populations begin to move off their land in search of food and water. These groups end up near the country's select few water access points. Armed militias take advantage of the chaos around the access points to round up young kids for use as child soldiers. It is a tragic fate, one James Thuch Madhier, founder and executive director of The Rainmaker Enterprise, narrowly escaped.

Madhier was matter of fact in our interview. "The headline is that over 43 per cent of people in the area don't have access to water, especially during this time of the year, and so the

people move to places near water points," said Madhier. "This happens year after year. Those limited water positions become pressure points. Armaments show up and who got access to get water turns contentious."

Born in Sudan, Madhier struggled to escape the conflict. At age ten he fled the county in search of an education and ended up in a refugee camp in Kenya. There, he not only survived, but entered school and graduated at the top of his class. In 2011, he was awarded a scholarship and resettlement through World University Service of Canada, which brought him to study at the University of Toronto. He went on to volunteer for

Young Professional: James Thuch Madhier, Rainmaker Enterprise (Continued)

the United Nations High Commissioner for Refugees and has now established himself as a leader on issues around South Sudan and water.

His present mission is The Rainmaker Enterprise, which has a goal of delivering solar-powered water infrastructure to areas of South Sudan and Africa where the water issues are most pressing. Rainmaker's solar-powered wells bring new opportunities for those in the region, providing access to water for a larger swathe of the population and eliminating the need for diesel fuel (which can attract militias) to pump water.

Rainmaker is also working to introduce drip irrigation systems into the area. Using drip irrigation techniques, water is applied directly to the roots of plants, increasing yields. In this area of the world, drip irrigation will allow local farmers to grow high-value crops that cannot be sustained by rainfall alone. Higher value crops like sorghum, millet, and peanuts can be cultivated year round. The population will benefit from higher levels of nutrition, food security will be improved, and locals will not have to move off the land, decreasing their vulnerability.

Currently the company is working to educate local decision makers in South Sudan. The head office of the company in

Toronto employs engineers who are working on the technology. The initial plan is to irrigate 50 acres of farmland and to provide clean water to 1,200 families. The organization also hopes to train 100 local farmers about how to get the most out of the new tech.

Madhier was clear: this is not a charity. This is about creating a new local economy. "Our model is profitable by year three. This means a guaranteed source of income for our farmers and employees, and huge opportunities for scaling up across the region and country."

Most importantly, the young in the area will have an alternative to joining military groups. "Access to multiple safe, efficient, and sustainable water sources creates an infrastructure that leads to durable peace among communities that are otherwise engaged in water-related conflicts," he said.

Remarkably, Madhier finds reasons for real optimism that the region could blossom as a food production area. According to him, the area in which the company will operate has never been subjected to intensive industrial-scale farming. "In this area there has never been a lot of commercial farming, so the soil is really good there. This could be a real advantage." — Jeff Sanford



 **careerlauncher**
INTERNSHIPS

Get **\$15,000** to hire skilled grads

careerlauncher.ca/watercan

 Colleges and Institutes Canada
Collèges et instituts Canada

 613-746-2222
 internships@careerlauncher.ca

Funded by the Government of Canada





Drinking Water: VTScada by Trihedral

TRIHEDRAL has long supplied the digital backbone that controls many Canadian water systems, but the year ahead may be the biggest yet for the company's flagship remote management product, used to control water flow and pumps at remote locations.

In a recent interview, the president of Trihedral, Glenn Wadden, outlined two important initiatives that will expand the footprint of the company's fast-selling program, VTScada.

"We're expanding into Chicago and LA over the next two months. We're opening offices there," said Wadden. "Times are good."

The past two years have been an exciting time at Trihedral. New offices in Texas and Alabama, an expanded sales force, as well as a solid string of industry awards that have boosted recognition, have propelled sales of the software ahead by 45 per cent. But the hiring of two new sales directors in the Los Angeles and Chicago office promise a new level of North American recognition.

"The demographics are just astounding. The number of cities of a size that can use this product across Illinois and Southern California is huge. There's a massive population base there. And we're going to be there," said Wadden.

The company is also setting plans to finish off a multi-language version of VTScada. "This is the second part of our current business expansion plan," said Wadden. "We're going

to offer this in different languages, from Chinese to Spanish. We've already got a bit of traction in Europe—one of the early adopters has been Sweden—but we're reaching out across the entire world in a whole new way with this project. We're going international."

These 2018 initiatives will expand on the success of a product that is already a standout in the market. The statistics bear out the product's success. Some 200 installations of the software translate into VTScada controlling water systems supporting the lives of 50 million North Americans.

Clients of Trihedral appreciate that in 32 years of use, a retired version has never required customers to rebuild their applications from scratch. Existing systems have always been compatible to updated versions of the software. As well, each year, Trihedral re-invests 20 per cent of revenue into R&D, a huge investment to ensure the product is always cutting edge.

Recent recognition has come through the awarding of the Engineers' Choice award at the 2018 Control Engineering ceremony. As well, the company won the Entrepreneurs of the Year award in the IT category at the Atlantic Canadian Region of the 2017 Ernst & Young awards. Plant Engineering Magazine also awarded VTScada the silver trophy in their Product of the Year Award. The buoyant mood within the company is warranted. — Jeff Sanford

Credit: Marwan Dardarian



(L-R) Lynn Mueller, SHARC International, Dave Riley, Lystek International (sponsor)



The new DC Water headquarters will embrace the future in sustainable design and construction. Heat from the pumping station's wastewater treatment operations will help condition the new building; a 30,000-gallon cistern will capture rainwater for reuse onsite; and tinted glass sun shades will reduce energy use while maximizing daylighting and the panoramic river views.

Credit: Marwan Dardarian



The new Administrative Headquarters Building will be LEED Platinum Class A, incorporating almost every state-of-the-art environmentally sustainable feature used in modern construction.

Credit: Marwan Dardarian

Wastewater: SHARC International Systems Inc.

INCORPORATING A NEW TECHNOLOGY into a high-profile project can ensure a product's success in the market. The inclusion of a wastewater heat recovery system by SHARC International in a new, state-of-the-art headquarters for the District of Columbia Water and Sewer Authority (DC Water) is one of those defining projects.

"It's one of the most important projects we've ever done," said Lynn Mueller, CEO, SHARC International. "It's a beautiful location, right by the baseball stadium. It's the first building in North America to be heated and cooled with sewage water. When it's completed, it'll be one of the most efficient buildings in North America."

DC Water provides drinking water and collects waste flow from almost 700,000 residents and the almost 18 million people who visit D.C. each year. The organization operates more than 2,000 kilometres of pipes, and the Blue Plains Advanced Wastewater Treatment Plant is the largest, most-advanced wastewater treatment facility in the world.

Now DC Water is relocating its employees to a new USD \$60-million headquarters being built in an up-and-coming neighbourhood known as Capital Riverfront. The former industrial area is rapidly being transformed into a business center and residential neighbourhood. The new DC Water headquarters will be built right on top of the O Street Pump Station, itself sitting on top of massive clay sewer lines that date back more than a century. The LEED Platinum

Class A building will incorporate almost every state-of-the-art, environmentally-sustainable feature that can be used in modern construction, including SHARC's wastewater heat recovery system.

Wastewater can carry 25 per cent of a building's daily energy consumption off the site. In most cases it's dumped as waste in the sewer system. But by harvesting and redirecting that heat energy back into the building, the SHARC system allows users to displace other forms of heating or cooling energy. The energy displaced is typically a fossil fuel source. As a result, the SHARC system leads to lower emissions and lower bills. "This a big project for us, but it looks after the taxpayers in D.C. to boot," said Mueller.

But as big as the DC Water project is, there is an even larger partnership opening up overseas. Across the pond in Scotland, there is a drive to satisfy regulatory requirements on sustainability. The country has set aggressive emissions targets and is investing heavily in green technologies. SHARC has signed a contract with the government's national water utility, Scottish Water, to build five projects in that country over the next few years, representing \$17 million in revenue. "Our next project is five times the size [as D.C.]," said Mueller. "The people of Scotland have embraced us from day one. The astonishing amount of wasted energy is what attracted them. They are really green. And they're making a huge investment. This is going to be an exciting year for the company." — Jeff Sanford



(L-R) Katherine Balpataky, Reagan Davidson, Imbrium, Jennifer Sammut, AGAT Laboratories (presenting).



An attractive and compact installation of the Filterra stormwater system.



Stormwater: Filterra Bioretention System, Imbrium

CONVENTIONAL WISDOM has been to assume that stormwater flows need to be managed in order to achieve basic green development goals. But implementing the complex infrastructure necessary to treat stormwater flows in urban environments is more challenging than ever as Canadian cities become more dense and storm events become more severe.

Whitby, Ontario-based Imbrium Systems is working to help urban planners get a handle on stormwater flows in dense urban areas. The company recently introduced the Filterra Bioretention System into the Canadian market, and it's proving its worth. Dr. Reagan Davidson, regional manager, Imbrium, explained why she's so excited about the year ahead; the company recently received some good news about an installation of the system at the Earth Rangers Centre for Sustainable Technology run by the Toronto and Region Conservation Authority.

"They just presented their first round of test data and the news is good," said Davidson. "We've had lots of testing in-house, but this third-party testing also confirms the effectiveness of the system. We're very pleased with that."

The Filterra system is designed to capture stormwater runoff through a blend of aggregate and organic material, with the filter medium pulling the majority of pollutants from the stormwater flow. According to tests, Filterra can remove 85 per cent of suspended solids, 70 per cent of phosphorus, 43

per cent of nitrogen, and 58 per cent of copper, among other contaminants. The system also boasts a small footprint. The shallow profile of the system—it extends to a depth of just 1.3 metres—allows developers to maintain the aesthetic look of landscaped areas, such as parking lots and streetscapes where the fit can be tight. This flexibility and size in the system is attracting attention.

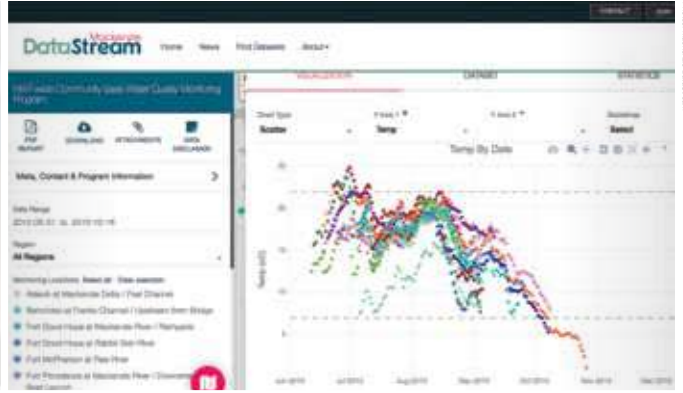
"The system can be installed on a highly developed site. To put features like rain swales in areas where property is so precious and expensive can be a drawback. Developers in urban and built-up areas want the smallest footprint they can find," said Davidson. "This system can fit into a very small footprint, but it does a large amount of filtration and can be optimized to handle high flow and achieve high removal of pollutants, even in a small area."

Many of the early installations of Filterra have been in British Columbia. But interest in the system that can deliver twelve points toward LEED Certification is spreading country-wide. "We just did an installation in Aurora, Ontario, at a retirement residence. We put nine units in. It was a really shallow site and could only incorporate a system that didn't extend too deep. Our system can handle that," she said.

Davidson is optimistic about future Canadian prospects for Filterra. "We haven't had the system that long. It's new to Canada. But we're looking for more projects," she said. "We think it's the right product for the market today." — Jeff Sanford



The NWT government has taken a leadership role in developing and facilitating community-based monitoring (CBM) programs in 21 communities, many of them remote and Indigenous.



Water Resources: Mackenzie Datastream

SIMPLE IDEAS can catalyze watershed moments. Launched in 2016, the DataStream project in the Mackenzie Basin addressed a fundamental knowledge gap: the lack of accessible data on the health of freshwater ecosystems in one Canada's largest, most pristine freshwater basins.

"We realized that we were succeeding in our mission when we started to hear directly from communities—throughout the Mackenzie Basin and across Canada—about their interest in using DataStream," said Lindsay Day, DataStream coordinator at the Gordon Foundation, which is the primary backer of the DataStream.

Prior to the launch of DataStream other community-based and government monitoring existed, said Day, but datasets were often difficult to access or not available. So, DataStream's mission was easily defined: get the data, give it freely.

"Our mission is to promote knowledge sharing and advance evidence-based, collaborative decision-making, so our waters remain healthy for generations to come," said Day. "By making it easy for data contributors to share and compare water quality data, DataStream is helping citizens play a meaningful role in shaping the decisions that affect their watersheds."

The Mackenzie DataStream project found tremendous uptake, with 24 communities contributing data to DataStream, and the Government of the Northwest Territories makes use of DataStream to guide its NWT Water Stewardship Strategy.

Less than two years into the project, DataStream has accumulated more than 340,000 unique water quality

observations, and is getting ready to expand to Atlantic Canada in November 2018 and the Lake Winnipeg Basin come winter 2018/19.

"This expansion will strengthen the project in a number of ways," said Day. "It will lead to improvements from a software perspective because, with every new community, dataset, and region, we can apply lessons learned to advance DataStream infrastructure as a whole while meeting diverse, locally specific user needs."

Ahead of its launch, the Atlantic Canada project has already gained the commitment of 36 community monitoring programs that will contribute to datasets. Environment and Climate Change Canada has also reached out to DataStream to collaborate.

The project has not only delivered essential data on water resources in the Mackenzie Basin, it has forged fundamental community, interpersonal, and knowledge relationships in the basin. Soon it will deliver these benefits nationally.

"In addition to providing software infrastructure, this program is geared towards convening data holders from across sectors, improving watershed-level cooperation, and translating data into action at multiple scales of decision-making," said Day. "We are able to achieve this through a strong partnership model developed with leading organizations from across the country."

DataStream's suite of benefits extends far beyond the software, ushering in a watershed moment for water data in Canada. — Todd Westcott



Aerial view of a drawbridge at the Welland Canal, Welland, Ont.

Conveyance: Hydrologic and hydraulic assessment of the Welland River in Niagara Falls, WSP

EXTREME WEATHER EVENTS are becoming more common. A new hydrological study of the Welland Canal using next generation modelling techniques has provided a new and important picture of what might happen along one of the most complex waterways in the country after intensive spring meltwater runoff.

For the Welland Canal project, the Niagara Peninsula Conservation Authority commissioned WSP to undertake a detailed hydrologic assessment of the river from Binbrook Dam in Hamilton to the Niagara River in Niagara Falls. The project's goal was to update and improve knowledge of the effects on downstream power generation that extreme spring floods could have. As municipalities from the west to the east coast have been surprised (and drenched) by large meltwater events, the WSP study is exactly the kind of modelling that communities along Canadian waterways need to undertake to maintain resilience in the era of climate change.

"This project allowed us to better evaluate the hydrology along the entire river," said Ashraf Zaghaf, manager, Water Resources Infrastructure, WSP Canada. "We wanted to better investigate the impact on power generation stations downstream. And so, we modelled a lot of 'what if' scenarios. What would happen if water levels change from this to this? What kind of impact will those fluctuations have? As a result, we have a new level of competence and confidence when it comes to modelling potential flows along the entire Welland River."

Previous studies have modelled the effects of flooding on downstream control structures. But according to Zaghaf, intensive development along the watercourse has changed the nature of the river from a typical inland watercourse to one that with characteristics that are similar to tidal and coastal

settings. "There is floodplain here that needs to be understood. This is all the more the case as a result of the numerous crossings, various hydroelectric facilities, and shifting channel gradients in the lower portion of the river," said Zaghaf.

The study to determine the nature of the flows along canal was a comprehensive one. The researchers did extensive data collection on all inlets, outlets, and flow rates.

"Basically, our work extended from a review of all the extensive data collected to the application of state-of-the-art hydrologic and hydraulic modelling techniques. This has improved our understanding of the river as a natural system, as well as a flood hazard," he said. "The risks have been examined in sufficient detail to provide mitigation and remediation recommendations."

Zaghaf said WSP couldn't use traditional models. The firm ended up developing a hydrology model based on winter conditions instead of those found in summer. This was key to understanding real flood risks. "We looked at snowbelt hydrology. Most of the extreme events were from swollen rivers from melt water," he said.

WSP's Hydraulic and hydrologic modelling was calibrated to account for various storm events. To do this, Zaghaf and his team deployed a new flow modelling tool, the MIKE 11 software simulation program from Denmark-based engineering consultancy DHI. "Understanding river mechanics and hydraulics is a complex task, especially when dealing with a regulated river system with such complex operation protocols at the mouth [of the Welland River]," he said. "Utilizing state-of-the-art models allowed the hydraulic condition of the entire Welland River to be successfully simulated. It's an impressive feat of hydrologic engineering." — Jeff Sanford

Photo: Water Rangers

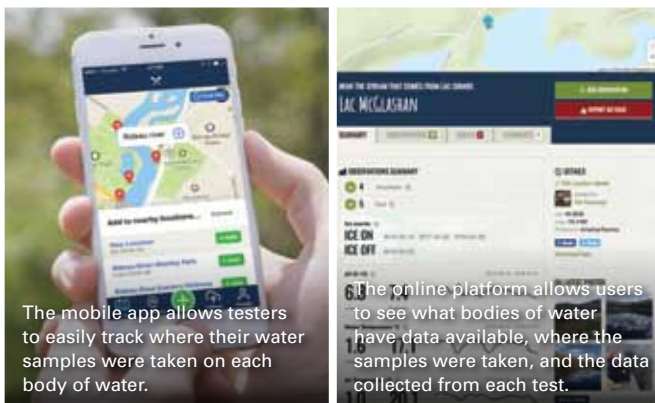


The test kits are easy to use, allowing amateur water enthusiasts to test the quality of bodies of water in their community.



(L-R) Katherine Balpataky, Kat Kavanaugh, Madjid Mohensi

Credit: Kathryn Davidson



The mobile app allows testers to easily track where their water samples were taken on each body of water.

The online platform allows users to see what bodies of water have data available, where the samples were taken, and the data collected from each test.

Early Adopter: Water Rangers

KAT KAVANAUGH didn't want her father's data to go to waste. For years, growing up next to a lake, her father would test the water to ensure its quality for those who used it.

"When he got his results, he had no idea what they meant, and he also didn't know how it really compared to others of his region."

Kavanaugh added to his filing cabinet full of data when she began helping him test the water upon returning to Canada in 2014.

The idea of grassroots water testing and data collection is where Water Rangers, a not-for-profit organization, was borne. Kavanaugh, alongside co-founder Mark Dabrowski, was one of the winning teams at the 2015 Aquahacking Challenge in Ottawa. The idea: provide community members with easy-to-use water testing kits and place the collected data in a central platform where it can be accessed by both the general public and the water research community.

The test kits that Water Rangers utilizes are simple, making it easy for even the amateur water lover to provide valuable data. The test kits provide information on temperature, oxygen levels, connectivity, and pH. Combined, the data shows each water body's unique footprint. As the testers revisit the site, they are able

to understand ecological changes, share their results, and intervene in the event of any emerging issues. By empowering volunteers, Water Rangers allows researchers, scientists, and water-industry associations to focus more time on data analysis and response, rather than the arduous task of collecting samples.

As it continues to expand its relationships with amateur water enthusiasts and hyper-local water associations, Water Rangers is hoping to embark on its next water testing venture: phosphorous testing. In association with the University of Alberta, Water Rangers is looking for the necessary funding to roll out a simplified test for phosphorus levels in water bodies using an app-based colour metric analysis. The colour metric would facilitate near-immediate readings, which will transform how people test for phosphorus according to Kavanaugh. If the funding is secured in the next few months, phosphorus testing will begin in the fall.

Kavanaugh's hope is that sometime in the near future, a point can be reached where community members are testing every body of water in Canada and that researchers are using data across the country and around the world.

"Then we can work as a community to protect waterways and improve them." — Andrew Macklin

water's next awards



Water Steward
of the Year



James Thuch Madhier,
The Rainmaker Enterprise



Company
of the Year



**SHARC International
Systems Inc.**

water's next awards 2018

Celebrating Canadian
water leaders
and champions

THANK YOU TO OUR 2018 SPONSORS AND SUPPORTERS



To participate next year, contact Jane Buckland
416-444-5842 ext.115 jane@actualmedia.ca



@WatersNext

watersnext.ca

While newer communities may not feature lead anywhere in their water infrastructure, cities built before 1950 often have thousands of homes that still rely on lead service lines.

Lead Serious

A shift in federal guidelines on lead in drinking water will require a new approach to service delivery. BY JEFF CHARROIS AND STEVE CRAIK

SOME OLDER CANADIAN HOMES still have lead water pipes, posing an important and complex public health challenge. About one per cent of water service lines in Edmonton, most of which were built before 1960, are still lead on the utility's side. At that time, lead was an option available to homebuilders for water lines. Today, the preferred materials are copper and plastic.

One of EPCOR's top priorities is to protect the health of people in more than 80 communities in western Canada where we provide water and wastewater services. Since 2008, EPCOR has been proactively addressing lead concerns through engaging in research, educating customers, and replacing lead service lines. So, when Health Canada solicited feedback on an update to its guideline on lead in drinking water, EPCOR got involved.

Health Canada's 2017 Consultation on Lead in Drinking Water proposed a couple of significant changes:

- Lowering the maximum acceptable concentration (MAC) for lead in drinking water from 10 mg/L (µg/L) to 5 mg/L; and

- Applying the proposed MAC to water samples taken at the tap.

"At the tap" is important, because when drinking water leaves a treatment plant, it typically contains no measurable level of lead. Lead at the tap in the home comes mainly from lead service lines. Plumbing components on the customer's side can also contribute—in some cases significantly. Currently in Canada, lead is regulated as it leaves the treatment plant or within the distribution system, not at the tap, so a shift in point of compliance would introduce major challenges for utilities who may have limited or no access to the customer's side of the infrastructure. It's difficult for a utility to ensure the quality of water that has passed through a customer's private plumbing.

Opportunity for utility leadership

Today, EPCOR's Lead Management Program aligns with Health Canada's Risk Management Strategy for Lead, which seeks to reduce exposure as much as possible. We also partner with Alberta Health Services to help field

questions related to lead. As part of our comprehensive program, we:

- Send annual letters to homes where the utility's portion of the service line is lead;
- Offer complimentary water sampling to test lead levels at the tap;
- Offer free one-time, point-of-use filters certified to remove lead;
- Educate customers and provide advice on maintaining good water quality; and
- Replace the utility's portion of lead service lines.

We prioritize lead service line replacements for homes with young children and pregnant women, and for homeowners who replace their portion of the line. Replacing only one section is not as effective in reducing lead levels at the tap and may result in temporarily increased lead levels.

EPCOR notifies customers with lead service lines when we have planned construction in their area, as ground disturbance can release lead scale and temporarily increase lead levels at the tap.

Lessons learned

Lead communications

A barrier to full lead service line replacements is homeowner reluctance to invest in replacing their portion of the line. It's not uncommon for property owners to be surprised they own a portion of buried lead pipe. Many Edmonton neighbourhoods with lead service lines have high populations of renters. The success of our Lead Management Program is dependent on customers (property owners and residents) being aware of their lead service lines and knowing what it means for them. Currently, we communicate with customers about their lead services lines, potential health concerns, steps they can take and how EPCOR can help, and we continue to look for opportunities to raise awareness and help the public make informed decisions about replacing lead lines and buying or selling homes with lead lines.

The legacy of lead

EPCOR and many other utilities continue to address lead at the tap despite uncertainties about the proposed guideline and when it could take effect. We are exploring options, including homeowner incentive programs to replace lead lines. We are also improving how we manage historical records, so we can more accurately identify customers with lead service lines. In 2015, we started a city-wide random daytime sampling program to better understand lead at the tap from all potential sources. We are also considering corrosion control strategies (e.g. addition of a corrosion inhibitor at our treatment plants) but are mindful of the impacts this could have on our customers, wastewater treatment operations, and environment.

The future shift

Lead in drinking water is an important public health issue, and Health Canada's new guideline has the potential to

enhance public health protection.

Once Health Canada introduces the new guideline, provinces and territories would then determine how and when they would apply it. Generally, water utilities would have a challenge complying immediately with the introduction of a new MAC and at-the-tap sampling requirement. A successful introduction of this new guideline should consider a phased rollout to allow water utilities across the country time to comply, while also getting customers the right tools and information they need to limit lead in their households immediately. *wc*



Jeff Charrois (left) is the senior manager, scientific services, EPCOR. Steve Craik (right) is director of quality assurance and environment, EPCOR.

What if the largest source of waste became a cheap, efficient, and sustainable source for heating every building?

Every day, a tremendous amount of warm water is used once before ultimately being discarded down the drain. Wastewater provides the ultimate renewable energy source, with an inexhaustible supply of thermal energy.

SHARC, the world's largest waste heat recovery company, offers two innovative products that use wastewater as an energy source. The SHARC and PIRANHA reuse thermal energy in wastewater to provide cost-effective and environmentally clean domestic hot water pre-heating and space heating and air conditioning.

SHARC is proud to be a Canadian company saving energy and emissions around the world!

SHARC Energy Systems Inc. | 604.475.7710 | info@iws-sharc.com | www.sharcenergy.com
 CSE: SHRC; Frankfurt: IWIA; OTC: INTWF



Microbial communities populating BWT's BioCord Reactors for biological wastewater treatment.

© BWT/STRENGTH

CRACKING THE CODE

Ontario unlocks genomic information to propel the circular economy.

BY BRITNEY HESS

UNDERSTANDING THE GENOMICS of our biological planet is key to addressing the grand challenges facing our world today, from climate change and global population growth to increasing food and energy demands, health issues, and protection of our natural resources.

Every living organism has DNA—a code that directs its biological functions and influences how it grows and interacts with the environment. Genomics is the science of understanding, interpreting, and harnessing this genetic code. In addition to innovations in healthcare, agriculture,

and advanced manufacturing, the insights gleaned from genomics are resulting in the creation of environmentally-friendly solutions that are allowing us to improve the water we drink, the air we breathe, and the way we extract minerals and energy from the earth.

Ontario Genomics is a not-for-profit organization focused entirely on stimulating, enabling, and nurturing genomics innovations across all sectors of the bio-economy. Connecting scientists, ideas, and partner organizations from across the province and around the

world, Ontario Genomics works with project teams to develop plans and secure funding to enable the development and application of solutions for our circular economy. Several of these projects are developing innovative genomics-based techniques for water monitoring, treatment, and re-use—three of which are highlighted here.

Real-time water toxin detection

Harmful algal blooms (HABs) are a major environmental problem and a growing concern in Canadian waters.

Harmful bloom events are caused by cyanobacteria, which has negative impacts on other organisms through production of toxins and oxygen deprivation and severe impacts on human health, aquatic ecosystems, and the economy. Climate change, nutrient imbalances from phosphorus, and warming water temperatures provide optimal conditions for growth of harmful bacteria.

Environmental Bio-Detection Products Inc. (EBPI) is an Ontario-based biotechnology company working with researchers at the University of Guelph and the University of Waterloo to develop a rapid on-site detection platform for water contaminants produced by bacteria found in HABs. The most prevalent of these toxins is Microcystin-LR (MC-LR). The team developed a portable hand-held detector that employs DNA aptamers, which are short DNA strands, to detect and signal the presence of MC-LR contaminants in real-time with sufficient sensitivity to meet World Health Organization drinking water guidelines. The platform has also shown promise for detection of other small molecule contaminants in water samples.

Responsible solutions for wastewater treatment

With recurring droughts and increasing water shortages, wastewater is becoming an ever-more valuable resource. The main objectives of wastewater treatment are to protect the planet from harmful toxins and to restore our water supply.

Based in Renfrew, Ontario, Bishop Water Technologies (BWT) has partnered with Dr. Chris Weisener at the University of Windsor to understand and improve their environmentally-friendly treatment solution for wastewater. By characterizing the microbial ecosystem through genomic sampling, the team is working together to identify and quantify the microbes and to determine their activities in relation to nutrient removal from wastewater. BWT manufactures a novel microbe-based solution called BioCord which is a man-made, inert, polymer scaffold. It provides more surface area for nutrient cycling biofilm to develop, enabling the removal of



Aaron Witham
of EBPI.

nitrites and phosphates from wastewater, and reducing point source nutrient loads to the Great Lakes at a fraction of the cost and without any chemicals.

Reducing sulphur contamination in mining wastewaters

Sulfur-contaminated wastewater is the largest global mining-related environmental liability, with a legacy cost of trillions of dollars. Bacteria drive the key sulfur compound transformations responsible for water contamination, however little is known about how these bacteria affect the sulfur geochemistry in mining wastewater impoundments. Consequently, these impoundments are viewed as a “black box.” With mines in every province and territory, and as pressures on Canada’s freshwater water supplies grow, there is an urgent need to gain greater understanding and develop sustainable approaches to the treatment of mining wastewaters.

An international team led by Dr. Lesley Warren at the University of Toronto and Dr. Jillian Banfield at the University of California, Berkeley is working to apply genomics, geochemistry, and modelling to mining wastewaters with the objective of developing innovative biological monitoring, management, and treatment

tools for sulphur compounds in their wastewaters, as well as support science-informed, cost-benefit decision-making for the mining sector. This project, the first of its kind in Canada and possibly the world, involves three mining and two environmental consulting companies, as well as provincial and national sector industry associations and government.

Genomics is the most transformative technology of the 21st century. Recent advancements are accelerating our knowledge and the opportunity to develop sustainable solutions to protect and treat our waters, as well as innovative applications across all sectors of our bioeconomy to help move Canada towards a circular economy. [WC](#)

Britney Hess is a business analyst at Ontario Genomics.



For more information about these and other amazing genomics-based projects, visit OntarioGenomics.ca

Abydoz Engineered Wetland Facility constructed in 2006 serving the Towns of Appleton and Glenwood, with a design population of 1,800.



Abydoz Engineered Wetlands in Bishop's Falls commissioned in 2016 with a design population of 4,300.

Nature at Work

The role of engineered wetlands for water treatment in the circular economy.

BY SEAN CHILIBECK

WHEN TALKING ABOUT fresh water in Canada, rivers and lakes come to mind first, but we often overlook one of the most important environments for water in Canada, wetlands. Wetlands represent 14 per cent of Canada's landmass, and provide invaluable filtered and purified water to our streams, rivers, lakes, and aquifers. On top of that, wetland ecosystems are the most productive water purification system in the world, capable of providing more biological productivity per acre than tropical rainforests and coral reefs.

Looking to these invaluable natural resources in terms of wastewater treatment gives Canadians additional methods for introducing components of the circular economy into their communities and facilities.

The circular economy is an alternative to the linear economy of "make, use,

dispose." A circular economy encourages extended product lifespan, reduced energy inputs, and reusable and recyclable end products, representing a "cradle-to-cradle" approach. This process includes biomimetic approaches to the design of products and systems that models human industry on nature's processes.

Through biomimicry and regenerative design, replicating the intricate processes observed in natural wetlands through engineered wetlands have proven to be an effective, low maintenance, and economical method of providing secondary wastewater treatment in Canada for 20 years.

The Town of Bishop's Falls in Newfoundland and Labrador had a series of outfalls that discharged directly into a freshwater river which is home to the largest population of North Atlantic Salmon in the world. The Town was

looking for solutions that would provide high quality effluent, while minimizing any increases to operational costs for the new facility. Engineered wetlands were chosen as the preferred solution, and by replicating the structures in natural wetlands, engineered wetlands encourage diverse and dense microbial growth within the hydraulically active zones of the wetland. With wetlands about the size of 15 hockey rinks, the Bishop's Falls facility now releases effluent averaging below 10/10 mg/L TSS and BOD, far below the provincial regulations.

The root mass of the wetland vegetation provides a diverse habitat of variable aerobic and anaerobic areas, with naturally high surface area for the growth of beneficial microorganisms. The wetland plants provide an ever-changing microbial habitat and prevent short circuiting of the wetlands. This ensures that the hydraulic

capacity stays constant throughout the beds, adding to the lifespan of the facilities, which exceed 40 years.

The hydraulic flexibility of natural wetlands has also been employed to ensure that adequate treatment is provided during average daily flow as well as stormwater flows. These fluctuations can be particularly extreme in communities with aging collection infrastructure and combined sewers. The rural towns of Appleton and Glenwood in Ontario have high flows during stormwater events and a receiving river with significant tourism and recreational activity, which meant that a flexible, low maintenance solution was required.

To ensure treatment of flows during storm water events, like their natural counterparts the wetlands use integrated surface storage and are capable of filtration. This allows for the intermittent attenuation and treatment of higher flows with lower contaminant loadings during storm events.

During winter months, the vegetation dies back leaving the dry stocks standing on the beds. By leaving the stalks on the beds they continue to carry oxygen to the water column through capillary action. The stalks also trap snow on the beds, which insulates the wetlands, keeping temperatures higher and improving bacteriological activity during the colder months. During spring, the old plant stalks will fall on the wetlands providing an insulating layer of biomass for the next year. Where viable, the plants can also be harvested and used as biomass for energy, or as thatching and insulation for buildings.

In addition to the expected benefits of natural wetlands, engineered wetlands also eliminate the need for mechanical equipment such as blowers, pumps, and rotating equipment. This reduces the risk of plant failure due to wear, breakdowns, or electrical disruption, and eliminates any electricity needs. This is particularly valuable in remote or rural communities where repairs and replacement parts can

be difficult and expensive to acquire, and skilled maintenance staff are required to operate the facilities.

Incorporating the circular economy using biomimicry and regenerative design of engineered wetlands can provide economical and effective wastewater treatment. Through providing high quality effluent and stormwater solutions, the Towns of Appleton and Glenwood and Bishop's Falls provide significant improvements to their wastewater systems with minimal inputs and costs. Engineered wetlands deliver low maintenance and low-cost solutions to wastewater treatment for municipalities, biosolids, landfills leachate, and industrial sources for a Canadian climate. **WC**



Sean Chilibeck is a project engineer focused on design, research, and development of Engineered Wetlands in Canada at Abydoz Environmental Inc.

WATER CANADA

THE COMPLETE WATER MAGAZINE

Coming up in
the next issue:
September/October

Money Talks

Investment Buzz
and Water Project
Finance

AD BOOKING DEADLINE: AUGUST 17
MATERIAL DEADLINE: AUGUST 24
DISTRIBUTION DATE: SEPTEMBER 7

For ad sales, contact **Jane Buckland** at
416-444-5842 ext.115 or jane@actualmedia.ca

WATERCANADA.NET

BUYER'S GUIDE

Your source for water
products and services.

DISTRIBUTOR

MANUFACTURER

SUPPLIER

Are you listed?

Make it easier for online buyers
to find your complete details.

BEST OFFER: Complete Listing

MATERIAL DEADLINE: OCTOBER 5

WATERCANADA.NET/BUYERS-GUIDE

Closing the Loop



The shift from a linear economy to a circular economy is necessary and possible.

BY NELSON SWITZER

WE HAVE BEEN PLAYING a dramatic game of chicken with the natural limits of the planet for centuries. On one side is human behaviour and our linear ‘take, make, and waste’ habits and systems. On the other side is the Earth, humbly maintaining a continuous loop of recovered and recycled resources. For the Earth, there is no waste. And, as human behaviour rumbles ever closer to the Earth’s natural limits (some say we have already exceeded them) in this global game of chicken, there is only one outcome—the Earth will win and it will reorganize and redistribute all things.

But there is hope if we can think differently and shift to an economic model that mirrors that of the Earth’s system.

So, what’s so bad about the linear economy, anyway?

For centuries, the ability to more

rapidly harvest raw material and convert it into a commodity like minerals, energy, clothing, and food has helped people all over the world live more comfortably, travel farther, and prosper more greatly than each generation before. While the economic gains have been many, the social and environmental losses may have outstripped the economic wealth created. Many of us remember the grossly flawed adage, ‘the solution to pollution is dilution.’ It is engineering philosophies like this that are the product of linear thinking and the reason there is nary a waterway in the world in which contaminants are not found in some concentration.

Socially, while we are living longer, a 2017 study cited in the Economist by San Diego State University noted that we are growing more anxious and depressed

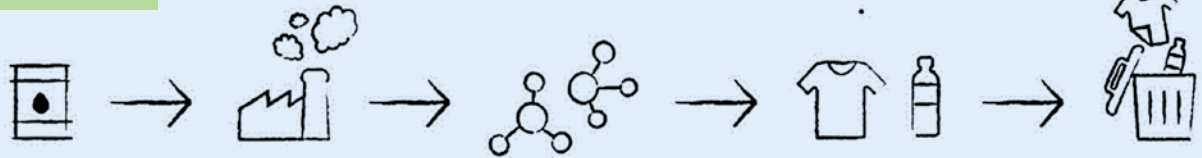
as the pace of our civilization and our ultra-connectedness increases. Perhaps as a result of over-consumption or over-exposure through social media, but is there another possibility? Could the by-products of the linear economy be contributing? Could the parts per billion and parts per trillion floating through the air and water biomagnified in our food and our bodies be responsible for this trip down the emotional rabbit hole, at least partly?

If the answer is yes, then we have not one, but two solid arguments for transitioning to a restorative and regenerative economy that recovers and recycles resources, that eliminates waste, and that conserves our natural capital. These two arguments are: 1) we cannot exceed the limits of the natural system—we cannot take more than the natural system can replenish; and 2) we

THE PROBLEM: THE TALE OF TWO ECONOMIES

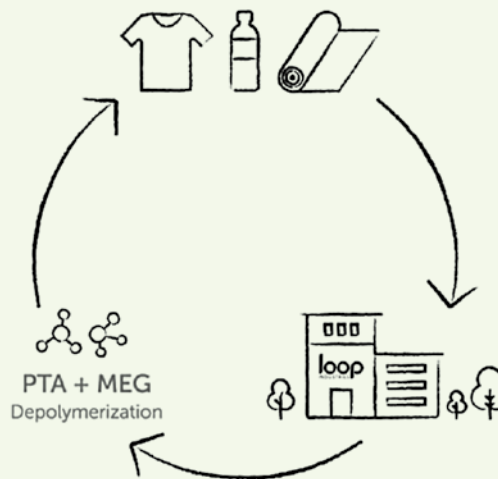
LINEAR ECONOMY: Where We Are

- Today, 93% of all plastics are derived from fossil fuels
- A 'take, make and dispose' model
- Disposed material ends up in landfills and oceans



CIRCULAR ECONOMY: Where Loop Takes You

- Reuse and regenerate resources
- Keep plastic in the economy and out of nature
- Enter the "re-cycle™"
- Meet the need and demands of consumers and stakeholders



With Loop's revolutionary technology, 100% of waste PET plastic can be up-cycled

cannot allow any resources to escape our industrial system lest they pollute our natural environment and impair the functioning of animals, plants, and the systems that regulate them.

So then, how do we take a more than \$74 trillion linear economy and enable

We cannot allow any resources to escape our industrial system lest they pollute our natural environment.

its shift to restorative, conservationist circularity? We need to change our mindset first. As producers we need to think harness over harvest. As inventors, we need to innovate and not only create. As governments, we need to have vision

rather than subsidy. And, as consumers, we must require rather than forgive.

Recently, I joined a company called Loop Industries, Inc. based in Terrebonne, Quebec. Loop is a technology company that is disrupting how plastic, specifically polyethylene terephthalate (or PET) and polyester fiber, is produced and managed. No longer is PET, like water bottles, polyester, and your favorite hoodie, a waste to be landfilled, incinerated,

or continuously downcycled. With Loop's technology, PET and polyester fibers can be recovered and broken down into their base components with no heat, no pressure, and no water, all impurities removed and then

reassembled as virgin quality material. This process so neatly mimics the natural environment that materials once considered symbols of the linear take, make, and waste economy will become a new symbol of hope for the circular economy.

Watch closely as companies that embrace the circular economy outperform in all the measures that matter—environmental, social, and economic. If we work together to challenge the wisdom of the old economy, we can make the transition to the circular economy happen swiftly and completely. Together, we can close the loop. wc

Nelson Switzer is the chief growth officer of Loop Industries Inc.



Users can explore landscapes in virtual space on their own or fly between pre-defined points of interest with text, images and links to additional content.



The Alberta Water Tool is a point-and-click tool that helps users to understand accurate, real-time information about water resources in Alberta.



Ben Kerr, Foundry Spatial CEO and senior water scientist.

Communications Innovation

Water management data comes to life with new tools to and approaches.

BY ALAN SHAPIRO

UNDERSTANDING and deriving value from environmental data is an ongoing challenge for watershed managers and regulators. In an era where the demand for community engagement in environmental decision-making is on the rise, finding tools to effectively decipher data is increasingly important. In response to these demands, the market of innovative data visualization and sharing tools is growing rapidly.

If you were to attend a typical town hall meeting for a mining project, you would see stacks of maps and complex diagrams depicting the landscape before mine construction, during mine operation, and following mine closure

and reclamation. Mining companies and their hired consultants need to convey massive amounts of data, which can be overwhelming and unintuitive for stakeholders and decision-makers.

Enter Ada, a dedicated software platform for visualizing environmental data. The platform was developed by BGC Engineering, an engineering consulting firm that provides professional services in applied earth sciences. Ada runs on Microsoft's HoloLens mixed reality headset, allowing stakeholders to visualize environmental data, maps, and images projected on the world around them.

A 3D topographical map may appear on a boardroom table, allowing the user

to pan and zoom as needed, or the room may transform into an underground mine or a reclaimed landscape. Engineering designs can be experienced in an immersive and tangible form.

"About two years ago, BGC was looking at different technologies to help communicate complicated designs, often located in remote areas or underground or underwater, to different stakeholders," said Matthew Lato, senior geotechnical engineer at BGC and one of the Ada project leads. "We were interested in this tool, because it brought our projects to life."

Developed as a prototype in 2016 through a partnership with Microsoft, Ada can now be used to bring any

elevation-based map data onto the HoloLens platform in a matter of hours. BGC believes this software will eventually become a standard part of their workflow. Internally, BGC is interested in using Ada to equip engineers and geoscientists to see data in 3D and check their designs and model outputs. "This will become part of how we do engineering."

The Ada Platform is currently in use on a project with Indigenous and Northern Affairs Canada on closure planning for Yellowknife's Giant Mine, one of Canada's largest contaminated sites. To support this process, BGC developed HoloLens models of the underground mine and the proposed remediation, which could then be displayed in community forums. The models were presented to various stakeholders and received positive feedback and high engagement. "A comment we've heard over and over again from stakeholders is, 'I get it now.'"

Connecting stakeholders to remote sites

Another common communications challenge in natural resource consultations is that environmental sites are remote and cannot be easily accessed by stakeholders and the public. Drone survey technology is changing that.

Nathan Vadeboncoeur is the president and founder of Smart Shores, a company that uses drones to collect environmental spatial data and turn it into a range of visual and virtual products. Aerial surveys support a range of applications, including ecological monitoring, assessment, and management; flood risk assessment and protective works planning; storm impact assessment; and shoreline change monitoring. "You can connect people emotionally to an area," said Vadeboncoeur. "With drone data, it's possible to go beyond building traditional GIS data sets and create engaging models, landscapes, and futures."

He explained that drone data can provide a wealth of information, but small companies and non-profits are often limited in being able to make use of the information, due to a lack of analytical capacity. "More data



FER-PAL
INFRASTRUCTURE

FER-PAL. HELPING YOUR COMMUNITY HELP YOU.

FER-PAL has been working in the background since 1986 helping to provide communities like yours with clean water using technologies that are sustainable and eco-friendly.

Learn more about us and our projects at youtube.com/user/ferpalinfrastructure

Stay ahead of the curve with FER-PAL






e: info@ferpalinfrastructure.com ferpalinfrastructure.com



The University of Lethbridge congratulates **Stefan Kienzle** for being a recipient of a Water's Next Award 2018 for People in the Academia category.

Stefan Kienzle is a hydrologist whose work aims to improve decision-making about water and land management at the watershed and provincial scales, to ensure water security, resilience in adaptation to climate change.

ulethbridge.ca

creates more work for people who don't have enough time. So we started creating processes to digitize data that are very time-consuming for GIS professionals, things like counting logs and trees and assessing sediment. The goal is to help people get more value out of their data."

Smart Shores is currently working on a tool that will enable stakeholders and decision-makers to walk through and learn about a site in a web-based application. "We can create a really nice immersive interface to make it look like you're playing a video game while you're looking at flood data." Coupled with remote data acquisition, these products allow users to experience landscapes and explore their curiosity from any location.

Creating platforms for data sharing

Good data on its own is not enough to support decision-making. Data must be stored and shared in a form that is accessible and relevant to users. A

range of data platforms has emerged to serve this purpose, including the B.C. and Alberta Water Tools, created by environmental data firm Foundry Spatial. "Our core philosophy is that data should be free, open, and available for anyone who wants to use it," said Ben Kerr, Foundry Spatial CEO and senior water scientist.

Foundry's involvement in this space began with the emergence of elevated water demands in northeastern B.C. due to hydraulic fracturing. This created a challenge for water managers and regulators who had to make sense of the limited water data that was available. Foundry launched the NorthEast Water Tool in 2010 to aggregate and share data on surface water supply, demand, and environmental needs for the region, which laid the foundation for similar platforms across B.C., Alberta, and California.

At present, the BC Water Tool offers 75 per cent geographic coverage for

the province. In Alberta, the tool offers 20 per cent coverage and there are plans for its expansion. Funding is provided by the provincial government in B.C. and by industry and NGOs in Alberta, with both tools free and open for anyone to use. Foundry is also collaborating with University of Victoria researcher Tom Gleeson to integrate groundwater into all of its platforms.

"The goal is eventually to have these tools available across North America so water managers and users, as well as people concerned about water sustainability, can understand supply and demand in the context that's relevant to them," said Kerr. "We want to help people move toward a more sustainable water future." WC

Alan Shapiro is a Vancouver-based science communicator with a focus on water resources and environmental issues.

weftec 18
the water quality event™

91st Water Environment Federation Annual Technical Exhibition & Conference
New Orleans Morial Convention Center New Orleans
Conf. Sep 29 - Oct 3, 2018
Exh. Oct 1 - 3, 2018

JOIN THE REGENERATION

REGISTRATION IS NOW OPEN!
Best Rate Deadline July 12

#Weftec18
www.weftec.org

The image is a promotional graphic for Weftec 18. It features a large blue circular graphic on the right side that resembles a water pipe or a lens, with the text "JOIN THE REGENERATION" curved along its top edge. Inside this circle is a photograph of two men in a trade show booth, one pointing at a blue pipe component. The background is a dark blue gradient. On the left, the Weftec 18 logo is displayed, along with event details: "91st Water Environment Federation Annual Technical Exhibition & Conference", "New Orleans Morial Convention Center New Orleans", "Conf. Sep 29 - Oct 3, 2018", and "Exh. Oct 1 - 3, 2018". At the bottom left, it says "REGISTRATION IS NOW OPEN! Best Rate Deadline July 12". At the bottom right, it includes the hashtag "#Weftec18" and the website "www.weftec.org".

canadian 9th Annual **water** summit

Knowledge to Practice

Applying science,
policy, and research
to the blue economy

Thank you to our sponsors and supporters for helping make the Canadian Water Summit such a success!

PLATINUM



PRESENTING



Faculty of Applied Science
THE UNIVERSITY OF BRITISH COLUMBIA

MEL | Master of
Engineering
Leadership
THE UNIVERSITY OF BRITISH COLUMBIA

GOLD



SILVER



CONTRIBUTING



MEDIA



SEE YOU NEXT YEAR: Water Week at Blue • May 26-31, 2019 • Blue Mountain Resort • Collingwood, Ontario



The National Conference of the
Canadian Water and Wastewater Association

National Water & Wastewater Conference 2018



*Montréal
C'est beau*

November 4 - 7, 2018
Hotel Bonaventure, Montréal

nwwc2018.ca



Circular Economy?

We're doing it. We just don't know it!

BY ROBERT HALLER

WE'VE BEEN HEARING the term “circular economy” a lot lately, but when I was asked to write about it, I had to pause and think about what it really meant. I've always been known for looking words up when clarification is needed. In this case, the definition I found suggested it was an alternative to the traditional linear economy of make, use, dispose. The definition went on to stress three objectives of a circular economy: a) keeping resources in use for as long as possible; b) extracting the maximum value from them while in use; and, c) recovering and regenerate products and materials at the end of each service life.

The more I thought about it, the more I realized that the water utility sector is already addressing the circular economy. The objectives may currently be addressed separately or in silos, but we are active in these three areas. The circular economy concept simply connects them and emphasizes their interrelation.

Keeping resources in use

Keeping resources in use for as long as possible is the basis of asset management. We're not all the way there yet, but

we all understand the concept. Many provincial governments have introduced asset management as a mandatory requirement for municipalities, at least as a requirement for grants and the federal government's Long-Term Infrastructure Plan understands the need for asset management as part of the community capacity building that will lead to sustainable communities.

The Canadian Network of Asset Managers, the Canadian Public Works Association, and others groups support Canadian municipalities to effectively manage water assets through a variety of programs. Most recently, support is coming from the Federation of Canadian Municipalities with their federally funded Municipal Asset Management Program. CWWA was an advisor to the last two Canadian Infrastructure Report Cards and has now partnered with Public Sector Digest and Canadian Water Network (CWN) to conduct a national survey and report on the status of asset management in Canada.

Extracting value from resources

Extracting the maximum value from

resources while in use is what we've been calling optimization. Canadian municipalities have been developing methodologies and sharing best practices to get the most out of their systems. This includes minimizing loss, system failures, or down time. I am always reminded that asset management is truly about service delivery, and so is optimization. For years we have strived to get better at leak detection and reduce water loss, which results in energy losses. We work to stabilize water pressure to reduce breakage and Canadian firms are winning awards for their system technologies. Other technologies are helping us to prolong the life of our pipes with more focused repairs or internal lining to avoid the need for expensive and disruptive replacement. Phase 1 of the federal government's Infrastructure Plan and the focus of the Canadian Water & Wastewater Fund was to support immediate optimization

first. Much of this was based on optimization philosophies presented by our partners at the Southern Ontario Water Consortium (SOWC), Canadian Water Network, and others.

Recovering materials

Recovering products and materials at the end of service life is what water utilities call resource recovery. Resource recovery may be the area in which the water utility centre demonstrates the greatest potential, treating waste and sludge to create heat, energy, fertilizer, and more. Canada's municipal wastewater is a valuable resource. Federal programs are now focusing on this potential and development is supported through the Federation of Canadian Municipalities' Climate Innovation Program. Canadian municipalities are encouraging industrial reuse and introducing purple pipe systems for homes. They are also forging ahead with new systems to

create energy from their waste. We are even seeing Canadian firms win awards for their innovation in this area.

This federal government is putting up over \$100 billion in infrastructure funding. These investments may be focused more on climate change mitigation than Canadian innovation, however some of the objectives of the circular economy will be achieved nonetheless. The circular economy harkens back to the three R's of reduce, reuse, recycle. Canadian municipalities demonstrated global leadership with the blue box recycling system in the 1980s and we can do it again with our water infrastructure. WC



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

POLLUTION PROBE
CLEAN AIR. CLEAN WATER.

LIVING IN THE PLASTIC AGE
THE 2018 POLLUTION PROBE *Gala*

**NETWORK.
SUPPORT.
CELEBRATE.**

Join the 2018 Pollution Probe Gala as we recognize the wave of effort curbing the tide of plastic pollution at home and around the world.

**FAIRMONT ROYAL YORK, TORONTO
NOVEMBER 20, 2018**

LEARN MORE AT WWW.POLLUTIONPROBE.ORG/GALA

APPOINTED



NANCY
GOUCHER

Nancy Goucher has been hired as the new Knowledge Mobilization Specialist at the University of Waterloo's Water Institute. In this role, she will be working under the Global Water Future's program, Canada's largest research initiative that will establish the country as a global hub of user-driven water science for the world's cold regions. Goucher has previously held positions at Freshwater Future, Environmental Defence, and the Forum for Leadership on Water (FLOW). Over the past ten years, she has played an important role in shaping water policy conversations across Canada and particularly in the Great Lakes region.



MARC DEVLIN

AECOM has announced that **Marc Devlin**, a material science engineer by training, has joined the company as executive vice president and region executive of AECOM's Design Consulting Services business in Canada. "Marc's broad experience and knowledge in multiple sectors in the region well positions him to lead an already strong AECOM team in Canada," said **Steve Morriss**, AECOM's president of its Design Consulting Services business in the Americas. Devlin joins AECOM from SNC-Lavalin Group where he was senior vice president and led a group specializing in providing operation and maintenance expertise to rail and transit, roads and infrastructure, and power generation business sectors. He will be based out of AECOM's Mississauga, Ont. office.

Atlantic First Nations Chiefs have selected the first members to serve as the board of directors for the Atlantic First Nations Water Authority. Through the collective work of the Atlantic Chiefs, the Atlantic Policy Congress of First Nations Chiefs Secretariat (APC), in partnership with Dalhousie University, Halifax Water, Accelerator Inc., Ulnooweg Development Inc., and CBCL Limited, a preliminary five-year business plan for an Atlantic First Nations Water Authority to operate and maintain community water systems

has been developed. The first members to serve as the board directors for the Atlantic First Nations Water Authority are: Chief **Leroy Denny**, Eskasoni First Nation, Chief **Aaron Sock**, Elsipogtog First Nation, Chief **Matilda Ramjattan**, Lennox Island First Nation, Chief **Andrea Paul**, Pictou Landing First Nation, and Chief **Wilbert Marshall**, Potlotek First Nation.



The GMF Council with Mayor Alan DeSousa seated at the right.

Alan DeSousa, Mayor of Saint-Laurent, Québec, has been appointed to the Green Municipal Fund (GMF) Council, the flagship, \$625-million program of the Federation of Canadian Municipalities, funded by the Government of Canada. DeSousa will sit on this Council as a municipal elected official and will represent the province of Québec. The appointment reflects three of the six plans adopted by Saint-Laurent in August 2017, namely those devoted to mobility, greenhouse gas reduction, and sustainable development.

AWARDED



WILLIAM D.
TAYLOR

The International Association for Great Lakes Research (IAGLR) honoured **William D. Taylor** with its 2018 Lifetime Achievement Award. Presented at IAGLR's 61st Annual Conference on Great Lakes Research, the award recognizes important and continued contributions to the field of Great Lakes research over a period of 20 years or more. Taylor is a distinguished professor emeritus at the University of Waterloo, Ont., where he has spent 40 years generating critical knowledge essential for the long-term management of aquatic ecosystems. Taylor's research has greatly increased our understanding of phosphorus cycling in lakes and the importance of microzooplankton in nutrient cycling and food webs of lakes.

PASSED



BILL PARISH

The Town of Ajax announced the passing of one of its visionary founding leaders this summer. Mayor **Bill Parish** (1924-2018) was a member of the first Ajax Council and served six one-year terms as Mayor from 1958 to 1963. As one of the original protectors of the Ajax waterfront, he was truly an integral part of the Town's development and growth since incorporation. During his tenure as Mayor, he enacted the Town's first Official Plan, which designated the waterfront as publicly owned park space for the enjoyment of the entire community. He also established its first publicly owned water filtration plant and laid the foundation for the Town of Ajax. Parish remained active in political and community life until his passing. Bill was the father of current Mayor Steve Parish, who has carried forward his father's vision for an accessible, sustainable multi-use waterfront. William A. Parish died peacefully in the garden of his beloved home of 53 years at the age of 94.

EVENTS

WEAO Technical Symposium and OPCEA Exhibition London, Ont.

The 47th Annual Water Environment Association of Ontario Technical Symposium and Ontario Pollution Control Equipment Association Exhibition addressed the theme: One World, One Water Environment. The conference kicked off with a student design competition where student teams proposed creative strategies to solve the City of London's watershed phosphorus loading problem. The social hour and icebreaker receptions on Sunday night were a highlight of the conference. Day two opened with a passionate keynote delivered by **The Water Brothers**, followed by the awards luncheon where several outstanding water professionals were recognized for their contributions to the industry. The OPCEA Trade Show started on Monday afternoon and was well attended throughout both days.



Dr. Madjid Mohensi, CWS chair and RES'EAU WaterNET.



(L-R) Leila Harris, Chris Walder, Chief Harvey McLeod, Merrell-Ann Phare, Craig Paskin, Lynn Kriwoken.



Kalpna Solanki and Minister George Heyman.



Contributors of the Women In Water Workplace Diversity Workshop.



A group learns about how Nestlé Waters monitors the water balance in Hope, B.C.



The cast of SLIME.

Canadian Water Summit & Water's Next Awards Vancouver, BC

Knowledge to Practice: Applying Science, Policy, and Research to the Blue Economy was the theme of the 9th annual Canadian Water Summit, which took place over three days on June 20–22. Bringing together over 220 leaders from government, energy, finance, cleantech, academia, conservation, agri-food, and beverage, as well as Indigenous Canadians, CWS 2018 facilitated conversations about how organizations of varied interests can work together to improve water management.

CWS chair **Madjid Mohseni** of the University of British Columbia and RES'EAU-WaterNET, program chair **Katherine Balpataky**, and **Jim Brown**, Lytton First Nation welcomed participants to the main event. Executive Deputy Mayor of Cape Town, South Africa, **Ian Neilson** delivered a thought-provoking opening keynote. Neilson was followed by an inspired plenary panel led by Alberta WaterSMART's **Kim Sturgess** and featuring **Eva Busza** of Asia Pacific Foundation of Canada; **Nadja Kunz** of University of British Columbia; **Marv DeVries** formerly of Trojan Technologies; and Chief **Judy Wilson** of UBCIC/ Neskonlith Band, discussing how Canada is growing its water cleantech presence globally and how can we leverage our collective efforts to help achieve the UN's 2030 Sustainable Development Goals.

The Canadian Water and Wastewater Association's **Robert Haller** led a panel on the role of the private sector in responding to changes in the global water cycle, how business can harness data to elevate decision making and planning. **Andreanne Simard** of Nestlé Waters Canada, **Jon Radtke** of Coca-Cola North America, **Alexis Morgan** of the World Wildlife Fund International, and **Lara Ellis** of ALUS Canada were featured speakers on this panel. Participants networked with exhibitors and found their lunch before an inspiring presentation by **Jill Heinerth**, explorer-in-residence at the Royal Canadian Geographical Society guided on a journey into the depths of underground and previously unexplored water systems across the world.

Afternoon breakouts included a wide range of topics, examining leadership in resource development; the impacts of disruptive technology and innovation on the water sector; and shared water governance models with First Nations and other multi-jurisdictional participants. The second round of breakout sessions addressed managing small and remote water systems and the future of Canada's water workforce; and innovative platforms to support natural resource development.

The Honourable **George Heyman**,

B.C. Minister of Environment and Climate Change Strategy, delivered the closing keynote on the provincial government's evolving mandate on water and the environment. Day 1 concluded with a networking reception followed by the annual Water's Next Awards Gala where 114 water leaders celebrated the accomplishments of this year's finalists and award winners.

Day two of the Summit engaged smaller groups with the Women in Water Workplace Diversity Brunch & Workshop and World Premier of SLIME. Building upon the success of 2017, CWS partnered with Canada's leading water industry associations from to explore knowledge and best practices for increasing diversity in the water sector; this workshop fused the two activities. Demonstrating that art is a powerful engagement tool, CWS shared a potent mix of audio assemblage, live-performance, and beautiful reclaimed plastic puppetry, through an exclusive presentation of SLIME—a new production by Tony-nominated playwright, **Bryony Lavery**, directed by CWS artist-in-residence, **Kendra Fanconi**.

Programming concluded with a fun run around the beautiful Stanley Park led by CWS director **Todd Latham** and an exclusive tour of the Nestlé Waters Hope Bottling Plant and Natural Spring in Hope, B.C. watersummit.ca

PHOTO: RYERSON UNIVERSITY



Implementing Green Infrastructure: Building a Community of Practice Toronto, Ont.

On June 18 and 19, 2018, Ryerson Urban Water hosted the Implementing Green Infrastructure: Building a Community of Practice workshop. This workshop aims to advance green infrastructure and low impact development (LID) by gathering interdisciplinary groups to collaborate and resolve obstacles to implementation. In response to new initiatives and policies being implemented by the Ministry of Municipal Affairs and Housing, Conservation Authorities, and cities, the workshop was designed to gather interdisciplinary groups to educate, collaborate, and resolve obstacles to implementation.

CWRA National Conference Victoria, BC

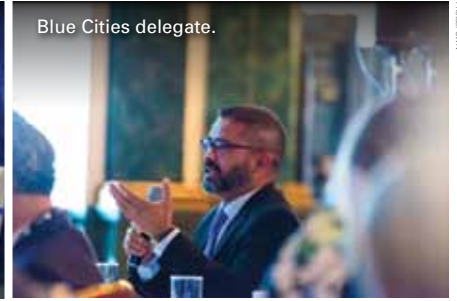
At the 71st Canadian Water Resources Association (CWRA) national conference, delegates convened over five days at the Delta Hotels in Victoria under the banner Our Common Water Future: Building Resilience through Innovation. The program featured workshops, field trips, keynote speakers, panel discussions, poster presentations, and over forty technical sessions covering a wide range of water resources management topics. Monday, May 28 featured a day-long Columbia River Treaty Symposium that was supported by a live webcast. CWRA was also joined by the Canadian Society for Hydrological Sciences (CSHS), Canadian National Committee on Irrigation and Drainage (CANCID), Students and Young Professionals (SYP), and Project WET Canada.



(L-R) Carl Yates, Alicia Fraser, Nancy Stalker, Louise Bradette

Blue Cities 2018 Toronto, Ont.

Canadian Water Network (CWN) hosted the 2018 Blue Cities conference from May 1–2, where municipal decision-makers met to share ongoing conversations with all levels of government, the private sector, researchers, and knowledge and technology providers. The program focused on high-level strategic issues of importance across the country related to municipal water management. **Bernadette Conant**, CEO, CWN delivered the opening welcome along



Blue Cities delegate.

with **Jonathan Wilkinson**, Parliamentary Secretary to the Minister of Environment and Climate Change. The program featured a special presentation on the findings of the National Expert Advisory Panel on Contaminants in Wastewater, a breakfast session hosted by WaterTAP to describe the LIFT program, and a networking session hosted by CWN's Student and Young Professional Committee at Goose Island Brewhouse.

U.S. Canada Shared Priorities for A Sustainable Future Washington, DC

Ahead of the 44th G7 Summit to be held in Québec, Meridian International Center and The Coca-Cola Company co-hosted a working summit of 40 predominately U.S. and Canadian leaders to explore cross-border opportunities to protect our planet's waterways from the threat of plastics. An underlining theme of the working summit was the call for more frequent and cohesive communication across sectors and geographies to catalyze sustainable change on a global scale. Communication is already underway between the U.S. and

Canada and continued at the following G7 Summit. With dialogue already established, these two great powers must set the tone of the global conversation. Those assembled for the working summit, including **Mark Fisher**, Council of the Great Lake Economic Region, and **Christopher Hilken**, Pollution Probe, were united in their belief that the G7 Summit presents world leaders with an opportunity to strengthen and reinvent multinational environmental governance with tangible and actionable outcomes.

Window On Ottawa Ottawa, Ont.

The Canadian Water and Wastewater Association's annual Window on Ottawa was held June 5-6 at the Lord Elgin Hotel as a forum for CWWA members to engage the federal government and strengthen municipal advocacy. The event opened with a snapshot of federal infrastructure funding with presentations by Infrastructure Canada, the Federation of Canadian Municipalities, and **Robert Haller**, executive director of CWWA. A session focused on biosolids issues in Canada explored the implications of the

move to universal secondary wastewater treatment and the various beneficial uses. During lunch, Mr. **Hakan Cengiz**, Counsellor Turkish Embassy, who spoke about water management in Turkey. The afternoon session focused on climate flooding and adaptation. Delegates also received updates on CWWA's Climate Change technical committee involvement in the National Research Council's (NRC) project, Great Lakes Protection Act, the Guidelines for Drinking Water Quality, and the *Fisheries Act*.



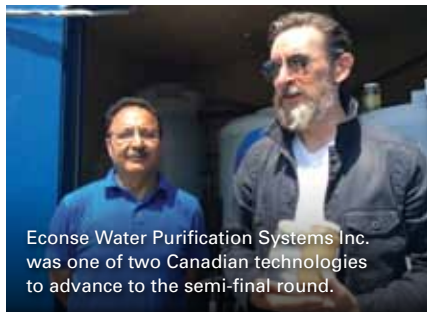
Photo of teams competing at the Semi-Finals.

AquaHacking Semi-Finals Toronto, Ont.

On Saturday, June 9, a group of tech-savvy students presented solutions to Great Lakes water challenges at the 2018 AquaHacking Semi-Finals Challenge at RBC WaterPark Place. A jury of experts selected five finalists to compete in the 2018 AquaHacking Challenge Semi-finals. Finalists included team M Power Software, who designed an Internet of Things (IoT) solution used to detect water overflow in sewers and send real-time data to a cloud service to process and analyze; Team EGC Labs who developed an early detection and notification system for sewage overflow (CSOs); and Team SWIM that created a drone-assisted infrared camera solution to detect decentralized sewage overflow. Teams will compete for \$25,000 in the AquaHacking Challenge Finals on October 25 during Ontario's Water Innovation Week.

Grey to Green Toronto, Ont.

Green Roofs for Healthy Cities hosted the 2018 Grey to Green conference in downtown Toronto from May 15–16 highlighting new policy, design practices, and innovative products in the green infrastructure sector. Across Ontario the sector employs more than 150,000 designers, manufacturers, conservation officers, engineers, contractors and maintenance professionals who work on urban forests, bioswales, green roofs and walls, and wetlands. The conference brought together people in the industry to learn from expert designers in the green infrastructure industry. Intimate sessions, training courses, and workshops covered a wide range of topics from how to run a successful business to specific design challenges.



Econse Water Purification Systems Inc. was one of two Canadian technologies to advance to the semi-final round.

George Barley Water Prize Pilot Tour Bradford West Gwillumbury, Ont.

Since its launch in 2016, The George Barley Water Prize has received 104 applications from 13 countries presenting technologies to address phosphorus pollution. The Ontario Ministry of the Environment and Climate Change partnered with the Everglades Foundation on the George Barley Water Prize because of the multitude of opportunities it presented for Ontario's water cleantech sector, the environment, and building capacity. The Prize outcomes are also consistent with the commitments made in the Lake Erie Action Plan and Lake Simcoe Protection Plan. On May 22 and 23, water practitioners were invited to meet the ten Stage 3 Pilot Phase teams, including two from Ontario, to learn about their progress testing their technologies in the harshest coldwater climates of Bradford West Gwillumbury, Ontario. The top four teams will be awarded \$125,000 in October and will move on to the Stage 3 competition for a \$10 million grand prize.

Ontario's Water Conference and Tradeshow Niagara Falls, Ont.

From April 29–May 2, members of the Ontario Water and Wastewater Association and its partners descended on Niagara Falls, Ont. to participate in the largest-ever Ontario Water Conference and Trade Show. The program offered eight concurrent program streams focused on asset management, construction, emerging issues, groundwater, small systems, water efficiency, treatment, and new technologies. The program was also designed to highlight the work of OWWA's young professionals.



Participants of RiverFest enjoyed a unique paddling experience.



RiverFest 2018 Edmonton, AB

Designed to connect Edmontonians to their water source, the North Saskatchewan River, the second annual EPCOR RiverFest was a success, attracting 3,000 people to get out on the water. The festival, organized by the River Valley Alliance (RVA) and with EPCOR as lead sponsor, featured a signature river experience, which got participants out on the water safely in hundreds of rafts and canoes.

"The North Saskatchewan River is our best kept secret. EPCOR RiverFest gives people the chance to find out why by providing raft and canoe experiences, and by highlighting the important role the river plays as a life source to our communities," said **Stuart Lee**, EPCOR president and CEO. "EPCOR's water operations touch every aspect of the river, as does our deep commitment to protecting it for future generations."

"What we're hoping people will experience at EPCOR RiverFest is connection," said RVA executive director **Brent Collingwood**. "Connection to the river valley and to nature, and a human connection with others over a shared love for this natural wonder that's right here in our backyard."

EPCOR RiverFest will repeat this summer on August 11 in Edmonton and August 12 in Devon and Fort Saskatchewan.

Wasted Time

It's time to get serious about resource recovery.

BY KEVIN LITWILLER



IN 2007, only 2.6 percent of the nearly 29.2 million metric tons of organic “waste” generated in North America was recovered, due to inefficient collection processes. Through heightened awareness and improved practices, progress has certainly been made since then. However, as populations continue to expand, so too does the sheer volume of residual material we have to deal with. Unfortunately, our current model is still predominantly based on a linear approach of production to consumption to disposal. This continues to contribute and stress our existence, both environmentally and economically.

Many of us have taken steps to reduce, reuse, and recycle in our own homes and communities including proper recycling and through other methods of waste diversion but what about on a larger scale? Can we can implement the three R's more effectively to reduce our impact on the natural environment and even benefit from it? Recent studies by the Commission for Environmental Cooperation, Ontario Waste Management Association (OWMA), Environmental Commissioner of Ontario, and others point to the fact that we can.

Implementing changes to our waste management system and modelling it more like a natural, circular ecological system is the key to unlocking many major benefits by allowing us to view

“waste” as less of a problem and more of a valuable resource with vast, potential opportunity.

Strides towards a more circular economy

The list of challenges that result from a linear approach to waste management is long. The linear model results in decreased productive farmland, increased disposal costs, increased use of finite resources, increased organic waste, and increased social, environmental, and economic pressures—to name a few. However, if we can recapture a significant proportion of these materials, and effectively reuse them, some of these stressors can be alleviated.

One example of organic “waste” is biosolids—and we produce a lot of it. Every year, over 10 million dry tonnes of biosolids are generated in Canada and the United States alone. Wastewater from the drains and toilets in our homes has two components: water and solids. At the treatment plant, the solids are separated using various processing methods. This is where the opportunity to beneficially utilize this organic, energy-rich material lies.

Innovative advancements in biosolids and organics management technology, are allowing us to recapture, transform, and repurpose these valuable resources. Utilizing a combination of heat, alkali, and high shear mixing to break down


the biological material in these materials. My company, Lystek, also uses a patented thermal hydrolysis system to convert wastewater treatment plants into Resource Recovery Centres. The multi-purpose system creates an end product with multiple uses, such as the creation of a Class A quality, liquid biofertilizer.

This unique material, which is ideal for use in agriculture, horticulture, sod farming, golf courses, composting (and more) is helping to close the loop and contribute to a more circular economy.

In the end, methodologies and approaches (such as the recycling of biosolids and organics) that allow us to mimic nature and implement a more sustainable system of production to resource recovery will also help to create jobs and stimulate our economy. In Ontario alone, it is estimated that a circular economy that recycles and reuses “waste” resources could support up to 13,000 new jobs and result in a subsequent rise to Ontario’s GDP of \$1.5 billion. By closing the loop, we can reroute these materials and create new sources of revenue to the benefit both today’s communities as well as for generations to come. **wc**

Kevin Litwiller is the director of marketing and communications for Lystek International.

Question today *Imagine tomorrow* Create for the future



We must all hold ourselves accountable for tomorrow. For us, that means engineering innovative solutions to the challenges the future will bring. Can we design a place where our communities can thrive?

We think we can.



wsp.com

Stormwater Bioretention Systems



LID Packaged Treatment

FEATURES & BENEFITS

- **Verified Performance** – Multiple third-party field tests with verified pollutant (TSS, nutrients & metals) removal following TAPE & TARP protocols
- **High Flow Rate** – Filtererra Media operates at high flow rates (2.5 to 3.5 m/hour)
- **Small Footprint** – Applicable on highly developed sites such as urban streets, parking lots, retrofits, and residential developments
- **Aesthetics** – Enhances your site's appearance, making it functionally attractive while removing pollutants
- **Flexible** – Multiple unit sizes, with shallow profile (1.3 m), and a variety of configurations
- **Easy Installation** – Delivered assembled, ready to lift and place
- **Activation** – Performed by certified providers to ensure effective performance from the start
- **Maintenance** – Simple and safe (no confined space access), and the first year of maintenance is included with the purchase of every system



IMBRIUM SYSTEMS – info@imbriumsystems.com | (416) 960-9900

Stormceptor is manufactured and sold under license:

Alberta to W. Ontario – Lafarge (403) 292-9502

British Columbia – Langley Concrete Group (604) 533-1656

Ontario – Forterra Pipe & Precast Inc. (519) 622-7574

Quebec – Lécuyer et Fil Ltée (514) 861-5623

Maritimes - Strescon Limited (506) 633-8877

