

PFAS • DIGITAL TWINS • STORMWATER MITIGATION

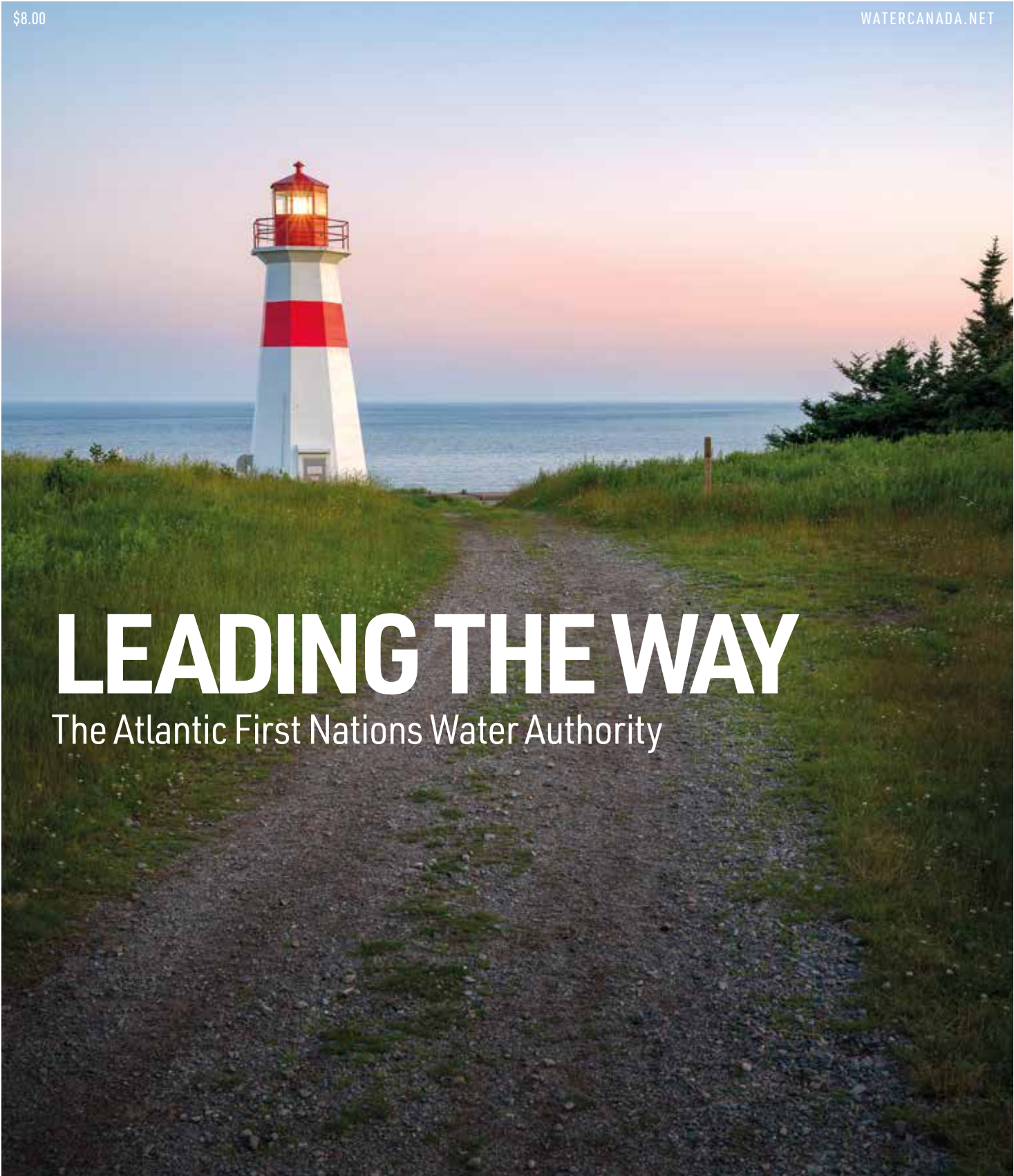
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“We adjusted our processes and looked for every opportunity to optimize our existing systems. We relied heavily on our wastewater team to adopt more efficient operating practices.”

Tim Roberston, division manager of Wastewater Services at the City of Guelph

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A multi-year, collaborative undertaking that will see multiple First Nations in Canada's Atlantic provinces steward their water and wastewater operations through a single entity is reaping benefits even before the agreement takes effect this December.

Photo credit: Getty Images



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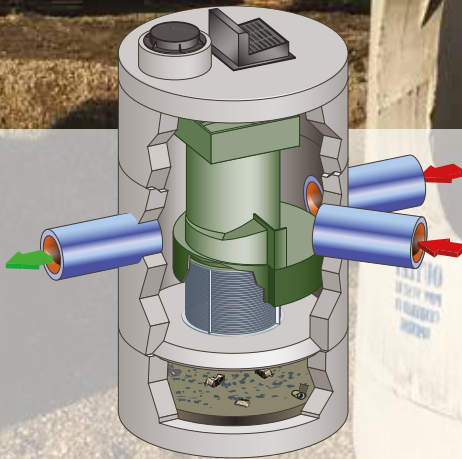
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By Paul Griss

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Cleaning up messes



A LOT OF WATER SECTOR WORK is cleaning up other people's messes. And I don't just mean the sewage.

It's the remediation—extracting toxins from stormwater runoff, bodies of freshwater, and watersheds. It's the focus on cleantech that promises to improve the way water is cleaned, used, and delivered. It's ensuring that what sneaks into our waterways doesn't make it to our taps. It's holding off a tsunami of chemicals and micro-and-nanoplastics that threaten to forever redefine the Canadian landscape.

It's a lot of mess-cleaning. And the reality is, most of the messes aren't necessarily made by those doing the cleaning. They are in many cases, as my high school English teacher would say, the sins of our fathers. Playing along the shores of this country in foam-encrusted eddies are the brilliant chemical-laden solutions generations-past invented to make life easier. They ebb and flow with the tide, seep into the ground, and swim up through the pipes. They creep into our bodies, into our blood, into our breast milk. They have turned on us. Invaded us.

And now we must clean up the mess.

We are in a race against time, mobilized, and pressing forward in a multi-pronged attack with the singular goal of preservation. We divide and conquer: Some eradicate the source, others neutralize the enemy, while others still ensure the safety of civilians. With exacting precision choices are made, legislations are passed, and next steps are debated in the bravest of hopes that we can prevent a dystopian future of parched, cracked earth, toxic fumes, and government-funded-and-enforced battles to the death. (Probably a little melodramatic, but nonetheless an accurate concern as I lie awake at night.)

It's a lot to worry about.

At the time of writing, the U.S. Supreme Court is hearing *Sackett v. EPA*—a case that threatens to strip federal protections under the Clean Water Act from over 45 million acres of U.S. wetlands. We know the significance of wetlands, and yet, almost shockingly, they are being put on trial under the guise of property rights issues. Wetlands are being forced to justify their hydrological connectivity, to prove just how adjacent their adjacency to navigable waters lies, and whether there are significant nexuses between their ephemeral delineations and traditional water ways. It's a direct attack, wrapped in the uncomfortable vagueness of jargon intentionally designed to stupefy, confound, and confuse. And if the Supreme Court rules in favour of *Sackett*, it will irreparably damage the scope of the Clean Water Act, creating a dangerous precedence that will put the entire ecosystem at risk.

Decisions aren't expected to be made until early spring, but it does raise significant concern. It's like we're all waiting, holding our collective breaths to see what the U.S. does, because what happens there won't only affect their environmental health, but ours as well. It will place a price tag on water and set perilous standards that will inevitably lead to more mess cleaning—a scary proposition. 

Jen Smith is the editor of Water Canada., jen@actualmedia.ca

COMING UP IN THE NEXT ISSUE: JAN/FEB

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from Canada and
around the world

Great Lakes restoration and protection project underway

"It is only through working together to conserve and restore the greater Great Lakes ecosystem that we can truly advance reconciliation."

*Patrick Madhabee,
former Grand Chief of
the Anishanabee.*

SUPPORTED BY RBC, *Biinaagami* is a partnership between *Canadian Geographic*, Royal Canadian Geographic Society, and Swim Drink Fish. Over the next three years, *Biinaagami* will bring together conservationists, maritime industrialists, Indigenous leaders, magazine editors, and documentary film producers to tell the story of the world's great freshwater oceans, their wider ecosystem, and the First Peoples who call them home through documentary films, interactive maps, educational materials, art and museum exhibits.

"It is only through working together to conserve and restore the greater Great Lakes ecosystem that we can truly advance reconciliation. Welcome to the shores of Niigaani-gichigami, the leading sea, Lake Ontario," said Patrick Madhabee, former Grand Chief of the Anishanabee.

Mark Mattson, noted freshwater conservationist and CEO of Swim Drink Fish says, "I am very excited to gather together with colleagues and friends to launch *Bii-naagami* and celebrate the Great Lakes and their Original peoples. We pledge to work together for a more swimmable, fishable and drinkable Great Lakes ecosystem."

"The greater Great Lakes watershed, the St. Lawrence and its mighty freshwater estuary are a world renowned and vital part of Canada's and the world's geography," said John Geiger, CEO of the Royal Canadian Geographical Society. "We are thrilled by RBC's support and very excited to partner with Swim Drink Fish and colleagues to advance cleaner waters, *Bii-naagami*, and to make the greater Great Lakes ecosystem better known to Canadians and the world." ^{WC}



Nature in the balance; but still not on the balance sheet

A new paper calling for recognition of the financial value of natural assets from the University of Waterloo's Intact Centre on Climate Adaptation, KPMG, and the Municipal Natural Assets Initiative argues for a revamp of accounting rules to safeguard natural resilience.

The services nature provides Canadians are not routinely valued in investment decisions, asset management, or financial reporting. As a result, economic decisions continue to lead to the degradation of natural assets, such as rivers, wetlands, and forests. To tackle the dual crises of climate change and biodiversity loss, the United Nations urges G20 countries to triple their investment in nature-based solutions by 2030.

"Wetlands, forests, saltmarshes, and grasslands aren't only vital to biodiversity," said Mike Pedersen, chair of Business Development Bank of Canada, corporate director and chair of Nature Conservancy of Canada. "They are our front-line allies in reducing the impacts of flooding and erosion, extreme heat and drought, as well as removing carbon emissions to slow down climate change. The value of these services makes nature a sound economic driver. We need an accounting system that recognizes this reality." ^{WC}



Next gen Indigenous water operators ready

WAABNOONG BEMJIWANG Association of First Nations (WBAFN), Gezhtoojig Employment & Training, Anishinabek Nation, and Water First Education & Training Inc. recently celebrated the graduation of 14 interns from the Georgian Bay Drinking Water Internship Program. The paid internship, which recruits young Indigenous adults to the drinking water field and helps them obtain entry-level certifications required to begin their careers in water treatment, also supports community access to clean and safe drinking water.

"New technology and a new generation of trained individuals will enrich the communities and provide advancement and growth within. Congratulations to all of the graduates, who have demonstrated a true dedication to learning, a passion for water, and a commitment to themselves and their communities. I know they will go on to

achieve more great things." – Theresa Teddy, Executive Director, Waabnoong Bemjiwang Association of First Nation.

During the 15-month program, each intern accumulated 1,800 hours of on-the-job experience in water treatment plants, which is a part of the water operator-in-training certification process. Interns also pursued additional water operator certification exams including water quality analyst and the entry-level course for drinking water operators, as well as environmental relevant training like GIS and water sampling which can lead to work in both drinking water treatment and the environmental water field. Following graduation, interns join the Water First Alumni Network to stay engaged, build local networks and access opportunities for ongoing professional development and peer support. ^{WC}



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"With an average of 90 per cent phosphorus reduction in the three SWMF's, eutrophication's negative impacts including harmful algal blooms, dead zones, and fish kills, are also reduced."



Brad Griko
vice president, sales and
marketing, Clearflow

Cost-effective Cleanup

Innisfil's Erosion and Advanced Sedimentation Pilot Project

BY BRAD GRIKO

MUNICIPALITIES HAVE LONG struggled with adequately funding stormwater management infrastructure and watershed protection. The ever-inflating costs of engineering, construction, and equipment have left a large gap between funding and potential projects. This has often resulted in poor quality water leaving our towns and cities and entering the natural environment. For decades industries like mining have had to meet water quality regulations for their sites' stormwater runoff and those standards continue to become increasingly stringent. Yet, many municipalities in Canada have largely been spared these regulations in part due to the costs required to meet this challenge.

Industry has been able to effectively comply with stormwater regulations by leveraging emerging technologies to protect the environment. In a recently completed study funded by the Federation of Canadian Municipalities, one such technology was piloted to treat municipal stormwater.

The project

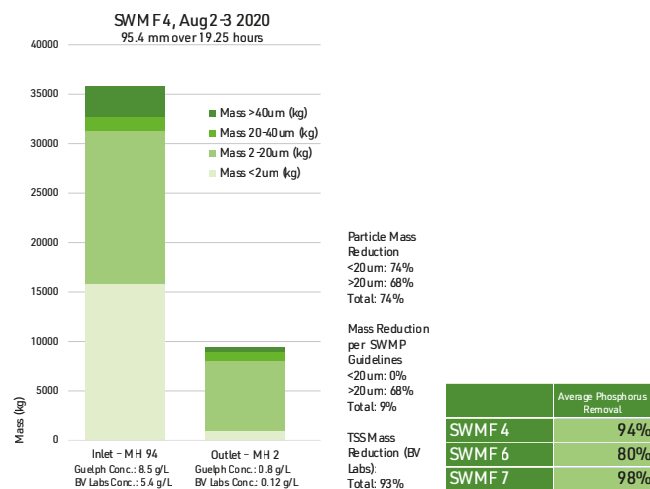
The Town of Innisfil (Ontario) and Greenland Consulting Engineers applied for and coordinated the Innisfil Erosion and Advanced Sedimentation Pilot Project. The project sought to assess advanced sedimentation technologies (ASTs) to reduce the sediment and nutrient loading rates to Lake Simcoe from runoff generated by development sites under various stages of construction, with the goals to:

- Demonstrate the effectiveness of ASTs using Clearflow products applied towards un-stabilized sites (construction)
- Reduce erosion and discharge of sediment (and associated nutrients) from new development to watercourses within the Town of Innisfil and tributaries to Lake Simcoe





Clearflow's Gel Flocculant Block in action.



Graph A: The data indicates that during a heavy rainfall event the size of the particulate below 40 microns was substantial.

● By achieving the previous two goals, directly contribute to a net reduction in future municipal liability when complying with Lake Simcoe Protection Plan (LSPP) requirements

Several water quality parameters were to be studied and included total suspended solids (TSS), total phosphorus (TP), and particle distribution analysis.

In conducting the study, it was important that the AST be safe for fish and invertebrates as well as be able to work with existing infrastructure. The Sleeping Lion Subdivision Development (Cortel Group) was the selected site and three stormwater management facilities (SWMFs) in their various stages of completion would be used in the pilot. Clearflow Group, an Alberta-based, Indigenous-owned company with a long history of assisting industry in meeting regulatory compliance was chosen to provide Gel Flocculant Block technology as a ready-to-use solution.

The tech

Unlike most current solutions which provide basic filtration, the gel blocks would provide an effective physiochemical solution called flocculation. The advantage being its ability to reduce TSS and phosphorus particles under both low and very high flow rates which is a challenge for most existing equipment. Eliminating the need to build new infrastructure and installing the blocks in existing large diameter mains was a simple and straightforward process. Once in place, they require little-to-no maintenance. Designed to be self-dosing and self-limiting, the anionic flocculant requires only the flow energy imparted by gravity in the collection system to work. Because they do not simply dissolve, the gel flocculants can be installed in pipes or open ditches prior to snow melt. Once spring flow begins, flocculant is released and treatment starts.

SWMF's are designed to capture particles larger than 40 microns using Stoke's Law where flow velocity and particle size determines settling over a given distance. During large flow events, a SWMF's ability to provide particles adequate settling time is greatly decreased.

The results

As part of the study, particle analysis was conducted to better understand the size and amount of TSS in the water. Results can be seen in *graph A* where MH 94 represents the inflow and MH 2 the flow leaving the pond. The data indicates that during a heavy rainfall event the size of the particulate below 40 microns was substantial. In this instance, without the gel flocculants it is likely that sediments carrying heavy metals and phosphorus that sorbed onto the suspended particles would have ended up in Lake Simcoe. Instead, that material was deposited in the SWMF, greatly improving downstream water quality.

With an average of 90 per cent phosphorus reduction in the three SWMF's, eutrophication's negative impacts including harmful algal blooms, dead zones, and fish kills, are also reduced.

According to Mark Palmer, president of Greenland Consulting Engineers, "This project has demonstrated what many practitioners in water resource engineering have thought for a long time: that there are large amounts of sediment being discharged to waterbodies from development under construction. The good news is, this project has also shown there are engineering solutions to this problem, including the use of ASTs available from the Clearflow Group that are easy to implement during the construction phase of development."

The Lake Simcoe Region Conservation Authority (LSRCA) has taken a strong role protecting Lake Simcoe and its surrounding watershed from sediment and nutrient loading. In 2018, with a first-of-its-kind in Canada policy, a plan was enacted requiring any new development in the watershed to control 100 per cent of the phosphorus leaving the property. A one-time offsetting fee was attached to the policy for instances where the zero-phosphorus goal could not be achieved.

A benefit to cost analysis of the AST implementation for the Innisfil project was completed and a ratio of at least 1.44 was determined. This did not factor in avoided costs from environmental degradation and restoration.

The outlook

Innisfil development engineer Glenn Switzer was also very pleased with the results and said that while "projects like these typically require substantial capital investment, using the Clearflow Gel flocculant [meant] we were able to optimize the use of our existing infrastructure. This saved time, money, and environmental impact. Treating stormwater has now become much more effective and affordable." ^{WC}

Levelling Up

How digital twins are helping water utilities

BY SANDRA DIMATTEO



OpenFlows WaterSight digital twin transforms data to actionable steps..

FROM AGING INFRASTRUCTURE and changing environmental regulations to funding gaps and climate-fueled natural disasters, water utilities around the globe face a range of problems in their effort to deliver reliable and affordable water to their communities. Their potential solutions are similarly wide-ranging, from stimulus grants and conservation programs to smart water technologies.

Utilities are employing a variety of digital strategies to address urgent risks as well as meet the requirements for digital transformation aligned to strategic investments in water systems. One very compelling digital strategy that water utilities are adopting is a digital twin. Digital twins of water infrastructure can help utilities get the most out of their data to improve their decision-making. Most utilities have the key building blocks in place to make digital twins economically feasible as a short-term strategy with long-term benefits.

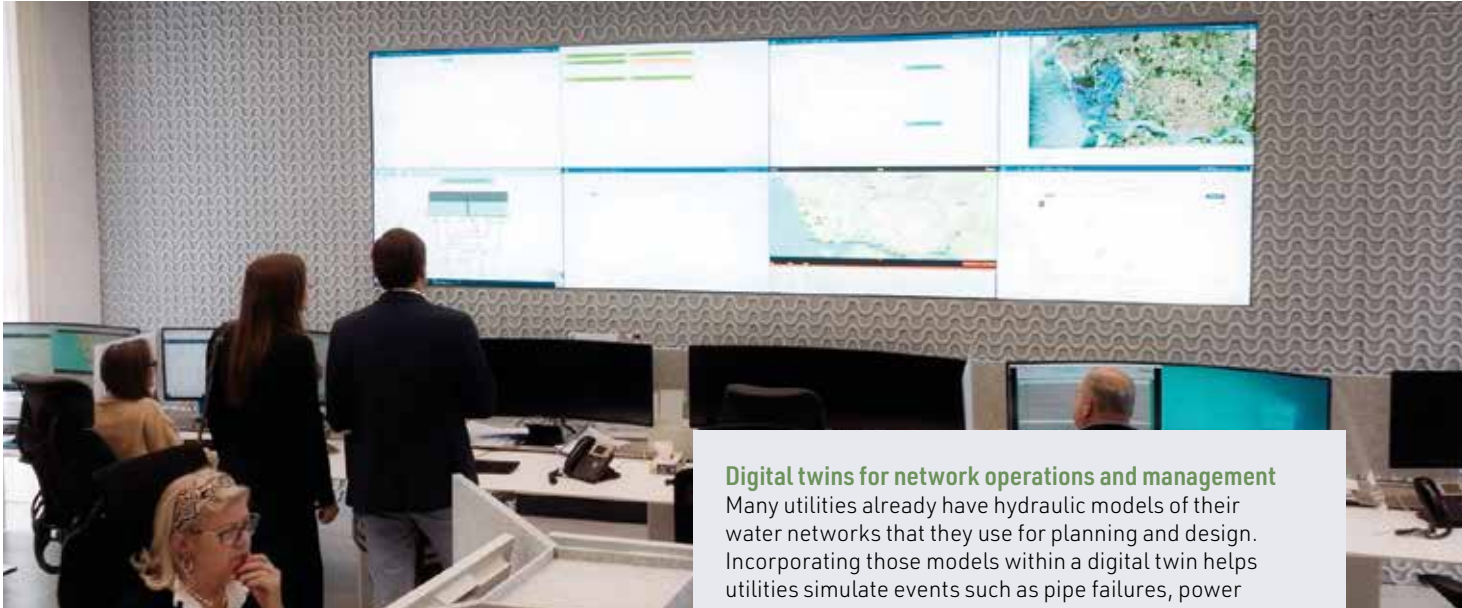
What is a digital twin?

A digital twin is a realistic and dynamic virtual representation of a physical asset, process, or system. Creating a digital twin for a water system involves integrating existing models and data. This could include engineering models (hydraulic models of the water network and 3D models of the water treatment plant and pumping stations), new virtual reality models (if 3D models are inadequate, outdated, or non-existent), and GIS, asset management and customer data. Additionally, digital twins are continuously updated with operational data from SCADA systems, sensors, meters,

The end result is an information-rich digital infrastructure model that supports engineering, operations, and maintenance, and capital planning for smart water networks.



Sandra DiMatteo
industry marketing
director, Bentley
Systems



Bentley integrated water management platform in action.

and other measured sources—creating a real-time model that can be used in operations and maintenance.

The integration of isolated, disparate data into a unified view provides a unique collaborative and connected digital twin environment that water utility personnel can use to gain insights from their data for better decision-making, enabling utilities to see what's happening in real-time or review any moment in time, while also providing a definitive ledger of change of the water systems and assets as they evolve. This dynamic aspect is also what differentiates digital twins from the static 3D models typically used for design and construction.

The end result is an information-rich digital infrastructure model that supports engineering, operations, and maintenance, and capital planning for smart water networks. With digital twins, utilities can perform “what-if” analyses and simulations to make informed decisions throughout the lifecycle of a water system—from long-term system vulnerability and capacity planning to immediate performance monitoring and emergency response. The process enables utilities to better understand the past and current performance of their water systems while helping them predict future performance and simulate the impact of potential changes in the virtual world before funds are committed.

Digital twins help develop smart sustainable water management platforms and powerful decision support frameworks for the modern workforce. In particular, digital twins that are cloud-based enable the remote sharing of data, dashboards, and situational intelligence, effectively overcoming the limitations of legacy water control rooms since it interoperates with systems and real-time data, SCADA, and data historians.

Digital twins for network operations and management

Many utilities already have hydraulic models of their water networks that they use for planning and design. Incorporating those models within a digital twin helps utilities simulate events such as pipe failures, power outages, and so on, to analyze the resilience of their water network systems and assess their risk. Furthermore, integrating those models with SCADA data provides an accurate assessment of how a water system is currently behaving. This enables utilities to simulate and test different ways that their water systems could be operated to improve emergency response, increase efficiency, or save energy.

Continuously updating digital twins with measured operational data also helps a utility determine the location of potential leaks and reduce water loss. And a digital twin can leverage data from existing work management and asset management systems, as well as other enterprise systems, to support risk-based asset management—informing their decisions such as repair vs. replace and helping them prioritize capital improvement projects.

Digital twins for plant operations and management

Digital twins of water and wastewater treatment plants are particularly useful for improving plant efficiency, reliability, and resilience as well as for training and safety compliance. Virtual walkthroughs, communications, and simulations give personnel enhanced visibility to plant data and insights for better decision-making. For example, reliability engineers can simulate hypothetical events such as a multiple screening system or pump failure to evaluate the severity and consequences of the failures and take preventative actions.

Digital twins can also be used to flag real problems, such as equipment that is not operating properly—enabling virtual exploration and quick access to pertinent data. For example, operators can zoom into the equipment area and pull up data related to that particular item (such as manufacturers' specifications or repair manuals). This gives personnel immediate access to information without wasting time digging through file cabinets or hunting through document libraries.

With digital twins, utilities can perform “what-if” analyses and simulations to make informed decisions throughout the lifecycle of a water system—from long-term system vulnerability and capacity planning to immediate performance monitoring and emergency response.

Bricks and mortar

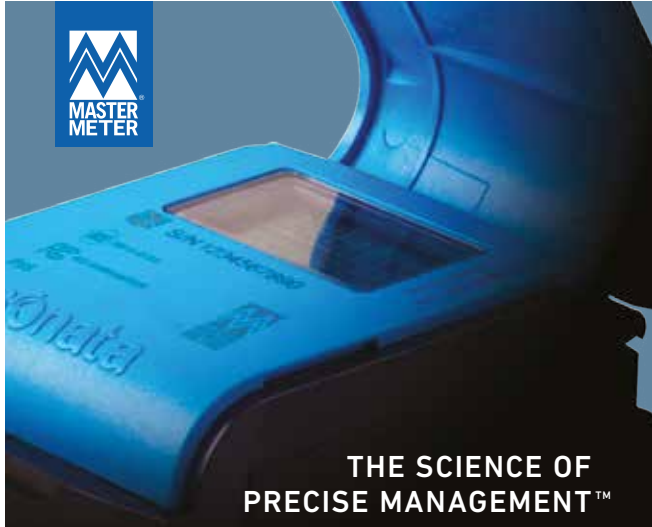
Moving toward a digital twin may seem daunting, but in reality, most water utilities have already started. They have in place a variety of systems that they use in their day-to-day operations: sensors, SCADA, automated metering, asset registry, hydraulic modeling, and so on. And since the fundamental purpose of a digital twin is to unite the data from those different sources and provide a unified view, utilities have already done the difficult work of implementing systems that generate digital data: aka the building blocks of their digital twin.

The next step involves the mortar that connects that data. And for a smooth journey, the mortar-slash-technology underpinning a digital twin must be open. Digital twin technology is not off-the-shelf software. Instead, every digital twin is assembled, built, customized, and advanced using pieces from many sources that will change over time. To ensure that a utility controls their digital twin and can include the systems and data important to them, they need to rely on technology that is open-sourced. This ‘openness’ signifies that the digital twin can connect smoothly with other technologies.

The technology within that mortar must also include these other key features—decision-making tools and scalability. The importance of digital twins rests on the ability to use data to make informed decisions. This implies the use of built-in decision-making software that can link current status or conditions data with a robust, mature portfolio of tools for analyses and simulations. And scalability means that a digital twin can see and analyze at the scale of (for example) a city or a treatment plant, all the way down to an individual pump or valve.

Digital twin technologies (such as Bentley’s OpenFlows powered by the Bentley iTwin platform) are smart integration solutions that connect information technology, operational technology, and engineering technology. These connections are helping water utilities exploit the potential of their data in a way that was economically unfeasible just a few years ago—uniting legacy data with operational and engineering data to provide a wider view of a utility’s water system and enable data-driven decision-making.

In the coming years, digital twins will become an ingrained part of every aspect of the water utility control room. Utilities can start building digital twins overnight with the data and systems they already use. As they become the new normal for water utilities, digital twins will improve the reliability of water systems, reduce utilities’ capital and operating expenditures, lessen their environmental footprints, and provide their customers with safe and efficient services. [IWC](#)



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With so-called “forever chemicals” – per- and polyfluoroalkyl (PFAS) substances – now found in rainwater all over the planet, one could say that water-related risk literally falls from the sky.

Rain Delay

'Wet coast' weather may be holding back water tech growth

BY LEJLA UZICANIN, GREGORY FREEMAN, MEGAN GERRYTS

FOR HALF OF THE MONTH of June Vancouver was pelted with rain, prompting the usual grumblings and “Juneuary” jokes in the city. As economic researchers, we found a common reaction to water tech in Metro Vancouver has been: “*Why? It rains all the time here*”.

Abundant freshwater and a long track record of reliable water service in most of the country are an enviable combination that make it easy to be complacent about water in Canada. But when it comes to appreciating and developing water tech expertise, our damp climate may be our biggest disadvantage. Persistent droughts, overdrawn aquifers, and the potential for international disputes over shared water systems—familiar problems in the arid regions of the world—may seem so far removed from daily life for a majority of residents on the rainy west coast of British Columbia. Indeed, the water sector, which many see as limited to drinking water provision and wastewater disposal, can feel downright boring.

B.C is on the cusp of being the centre of water tech for a growing global market.



Lejla Uzicanin
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Megan Gerryts
Senior Policy Advisor,
Invest Vancouver

Invest Vancouver is the Metro Vancouver region's economic development leadership service. Its data, research, and policy function offers independent, objective research, analysis, and economic development and policy recommendations to position the region for success in a rapidly evolving global economy.



Photo: Getty Images

Even in soggy Vancouver, however, there are myriad water-related risks linked to climate change, emerging contaminants of concern, and requirements for greater water sector sustainability and resilience. Our research revealed that many of these risks are being tackled by a disparate collection of local firms that have emerged (almost entirely unnoticed) from the region's burgeoning technology innovation sector and resource extraction industries. The Metro Vancouver region has underappreciated strengths in industrial wastewater treatment, resource recovery, decentralized treatment, and digital solutions and sensor technologies, and has the potential to become a significant global supplier of water technology solutions.

'Wet coast' water-related risks

Water-related risks encompass much more than scarcity, and many of these risks are present in Vancouver. To illustrate, construction sites need to keep silt and contaminants out of riparian habitats; wastewater treatment is complicated by the presence of pharmaceuticals; and clothes made from synthetic fibres shed microplastics when they are washed, adding another pollutant to the wastewater. With so-called "forever chemicals"



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Areas like resource recovery and advanced drinking water treatment are large, growing markets driven by factors such as the response to climate change, environmental and human health regulations, and circular economy objectives.

B.C.'s damp climate may be the biggest disadvantage when it comes to developing water tech on the 'wet coast.'



— per- and polyfluoroalkyl (PFAS) substances—now found in rainwater all over the planet, one could say that water-related risk literally falls from the sky.

These risks are not unique to coastal British Columbia and addressing them will create business, investment, and export opportunities.

Addressing water-based risk

Water tech is a loosely connected subset of the broader clean technology industry (i.e. firms developing solutions that result, for example, in lower carbon intensity, more efficient use of resources, and reduced environmental impact, including fewer pollutants and less waste). Export-oriented firms in water tech will enjoy economic tailwinds from rising global demand. Areas like resource recovery and advanced drinking water treatment are large, growing markets driven by factors such as the response to climate change, environmental and human health regulations, and circular economy objectives.

The Metro Vancouver water tech sector

Despite the rain and an apparent abundance of water, there is a high level of extremely varied activity in the water tech sector in the Metro Vancouver region. There are just shy of 60 firms involved in exportable, water-related innovation, research, design and development in some capacity. (Our report, *Water Tech: The Metro Vancouver Region's Untapped Clean Tech Opportunity*, published in July 2022, has the complete list.) The presence of these firms reflects the twin influences of the region's innovation ecosystem, including the regional hydrogen cluster (as some hydrogen technologies, notably membranes, have applications in resource recovery and desalination), and the region's supporting role in the province's resource extraction activities. Thus, local water tech firms benefit from both the constellation of firms pro-

viding services to the mining, oil and gas, and pulp and paper sectors, as well as the region's research universities, accelerators, and testing facilities.

The largest functional area is industrial wastewater treatment, where, for example, Axine Water Technologies Inc. is developing a wireless and remotely monitored industrial wastewater treatment system that utilizes catalysts and electricity to oxidize pollutants. The second largest area is resource recovery where, for example, Ostara Nutrient Recovery Technologies, Inc. is recovering phosphorus and nitrogen from industrial, agricultural, and municipal water treatment facilities for use as inputs in fertilizer.

Looking to the future

So as economic developers seeking to build on our region's strengths and competitive advantages, where do we go from here? To imagine what was possible, we looked to the Netherlands' WaterCampus Leeuwarden where the Dutch have invested almost 20 years of effort in creating a centre of water technology innovation, education, and entrepreneurship based on collaboration among businesses, universities, and governments. In the Metro Vancouver region, we have many components that could be used to build our own water tech hub with the requisite coordination, collaboration, investment, and promotion.

If we are going to build a water tech hub on the 'wet coast', we first need to look past the sea of umbrellas. Frequent rainfall creates an impression of plenty that dulls our appreciation for this precious resource and puts a damper on economic development. Water tech is about so much more than addressing water scarcity and should be celebrated as part of B.C.'s burgeoning clean tech sector. With growing global demand, and multiple addressable markets worth in excess of a billion dollars each, the water tech sector could become an economic driver for the region. [WVC](#)

Optimal Conditions

Guelph's water and wastewater optimization

BY SCOTT MCNAIR

NESTLED WITHIN SPRAWLING farmland roughly 100 kilometres west of downtown Toronto, the city of Guelph is idyllically intersected by two rivers. From the north flows the Speed River and to the east, the Eramosa River.

Both waterways meet just below the downtown core and continue on southwest to merge with the Grand River—the largest watershed in southern Ontario.

Guelph is the largest Canadian city to rely almost exclusively on groundwater for its drinking water supply. “About a million people live within the Grand River Watershed including 39 municipalities and two First Nations Territories,” says Tim Roberston, division manager of Wastewater Services at the City of Guelph. “Several municipalities pull water from the Grand River. Our treated wastewater is pumped into the Speed River and eventually makes its way into the Grand River Watershed. That’s why it’s important for us to protect and sustain our river systems for our residents as well as the millions who live within the watershed.”



Scott McNair

is a strategic communications advisor for the City of Guelph. He works with senior leaders to help craft and share their teams' stories.

Guelph: The City of Guelph

The City of Guelph is idyllically situated where two rivers, the Speed and the Eramosa, meet.



"We have two options: spend money to build additional wastewater treatment facilities that can handle more capacity, or look at how we can optimize our current facilities to meet the increased demand."

-Tim Roberston, division manager of Wastewater Services, City of Guelph

To ensure that the water supply can meet the demands of its population, the City pumps water from the Eramosa River into an engineered infiltration pond and trench where it soaks into the ground to replenish groundwater supplies.

Guelph has 21 operational groundwater wells and a shallow groundwater collector system that pulls shallow groundwater from the Arkell Spring grounds in the nearby Township of Puslinch through a process that includes a series of underground perforated pipes.

Something in the water

People in Guelph are fiercely protective of the environment and proud of waste diversion efforts, energy management, and groundwater conservation. In fact, the City of Guelph has a long history of promoting water conservation. The first conservation targeted program was initiated in 1998 and included active water conservation engagement and programming for reducing per capita consumption of potable water, and by association, wastewater generation.

However, conserving water can only go so far. The population is expanding and the City is constantly monitoring how wastewater is treated to ensure they meet the demand of a growing community, as well as monitoring the impacts of an increased population on the Speed River and its capacity for wastewater intake.

"It all comes down to optimization," says Robertson. "By that I mean, we have two options: spend money to build additional wastewater treatment facilities that can handle more capacity, or look at how we can optimize our current facilities to meet the increased demand."

Hypothesize and optimize

Robertson explains that in and around the 80 per cent capacity mark (roughly 55,000 cubic metres per day), the City needs to proactively plan for how it will manage any increase in wastewater. And in the early 2000s, Guelph was approaching that number. To meet the growing demands of an expanding population, they had to find a way to process more than their current capacity without the need for costly wastewater facility expansion.

"We adjusted our processes and looked for every opportunity to optimize our existing systems. We relied heavily on our wastewater team to adopt more efficient operating practices," shares



Speed River, Guelph, Ontario, Canada

Robertson. "Additional data was gathered and used by the team to make informed process control decisions which in turn led to maximizing the efficiency of each part of the process unit."

Through team commitment, collaboration, and innovation, system optimization succeeded setting Guelph up as an early adopter in wastewater management optimization in the Grand River Watershed.

A (bio)solid plan

Efficiency and optimization philosophy is built into Guelph's wastewater staff culture, which is clearly demonstrated in the City's recently updated Wastewater Treatment and Biosolid Management Master Plan. The plan, which is designed to meet the demands of Guelph's growing population through to 2051, aims to ensure that wastewater is managed in a sustainable way that protects the environment including local rivers, wetlands, and other waterways. Optimization is embedded throughout the plan, from maximizing building use, treatment processes, and other infrastructure, to improving filtration to increase capacity in the third stage of the wastewater treatment process (i.e., using sand filters) while taking fiscally responsible approaches to meet the City's increasing needs.



Optimization is contagious

Guelph's optimization partnerships with the Grand River Conservation Authority and nearby Haldimand County got the ball rolling for what is now called the Ontario Optimization Demonstration Team. This group of municipal wastewater treatment practitioners work together to promote and increase uptake of wastewater treatment optimization in plants across Ontario. They test new optimization methods at member treatment plants, host workshops on best practices, and collect data for benchmarking to share with other municipalities.

The knowledge and best practices shared through the Ontario Optimization Demonstration Team has saved participating members millions of dollars by optimizing existing facilities and avoiding or deferring costly wastewater treatment plant expansions and upgrades.

Looking ahead

Wastewater optimization continues to be an important philosophy for regular operations in Guelph. "We're proud to be associated with the many like-minded municipalities in the Grand River Watershed and beyond," says Robertson. "We recently renamed our wastewater treatment plant to emphasize our focus



Protecting water resources is top of mind for many Guelph residents.

on maximizing resource recovery: It's now called the Guelph Water Resource Recovery Centre."

For Robertson and his team of dedicated staff, renaming the facility is more than just a symbolic gesture; it truly encapsulates the optimization philosophy, and how Guelph strives to innovatively go above and beyond as stewards of their natural resources.

By 2050, the City of Guelph plans on using 100 per cent renewable energy sources. The way drinking water is conserved, and the way wastewater is treated and managed will contribute to the success of this goal, and they're already well on their way. In 2021, the Ontario Water Works Association honoured the City with an Award of Excellence in the Water Efficiency category and, earlier this year, Water Canada recognized the City of Guelph with a Water's Next award in the water resources category.

Whether it's something in the water or not, one thing is clear, Guelph is ready and excited about leading innovation in water resource management for their future. WVC

HEJ!

Young Water Professionals unite in Copenhagen

BY LINDA LI, MASC, P.ENG.

STROLLING DOWN THE cobbled streets of Old Town Copenhagen, my heart is filled with optimism and pride as I reflect on my week spent at the International Water Association (IWA)'s World Water Congress. Since 2019, I have been working alongside 24 passionate water leaders from 16 different countries to develop the technical programme for this congress. Three full years of collaboration and one pandemic later, the congress finally took place in person to bring together over 4,000 delegates and 300 exhibitors from 102 countries. A total of 160 technical sessions were delivered across six themes including city scale planning and operations, water utility management, wastewater treatment and resource recovery, drinking water and potable reuse, communities and partnerships, and water resources and large-scale management. Ideas were exchanged to explore smart, holistic and liveable city solutions and initiatives were introduced to improve the quality of life in communities that need the most support.

As a young water professional, I have been given an incredibly rewarding opportunity to contribute to the development of a global culture of innovation that will enable the radical transformations required. In the last two years, many of us have felt the impact of COVID-19 pandemic on the issues facing the water sector. The world now faces a triple crisis: the lack of progress toward the sustainable development goals (SDGs), the tragedy of the pandemic, and the threat of climate change. There is an added urgency to mobilize water professionals, and especially young and emerging water leaders, to step up as a team to fight this triple crisis. The friendships I built with my fellow young water professionals at this congress have given me so much confidence and optimism that I'm not in this fight alone. Although the type of water problems faced by each region and country may differ, the ultimate goal we all



Linda Li

is an environmental engineer at Dillon Consulting. She serves on the International Water Association's Programme Committee and Water's Next Selection Committee for the Water Canada Summit.





Supporting the Region of Durham Sludgehammers at the Ops Challenge with William Fernandes from the City of Toronto and the IWA Canadian National Council.

L to R: Fellow young professional Audrey Béganton from the Quebec Water Management Research Centre (CentrEau). Audrey represented Canadian Partner Institutions at the Canadian Pavilion, IWA Copenhagen Congress Programme Committee Members.

have is to ensure secure access to the very limited water resources we have left on this planet. Through learning about each other's challenges and brainstorming solutions to problems bigger than us, we felt encouragement and consolation. Hearing my fellow young water professionals from resource-challenged regions of the world describe their ambitions of bringing clean water and adequate sanitation to their people, I can't help but wonder what can I do to help?

When I first started my career in the water sector, an insightful mentor, Matt Murdock from Dillon Consulting, asked me to always remind myself of "why we do what we do, and whom we do this for." As engineers and scientists, we tend to solve water problems through a technical lens. To empower the future generations of water professionals to find the right solutions for technical problems, it is perhaps the most crucial to remind them the whys before the hows. All young water professionals

should be encouraged to have a seat at the table, to be involved in open, supportive, and respectful knowledge-exchange with peers from their own communities as well as opposite parts of the world. It was exciting to see participation from other Canadian young professionals, such as Alex Tsitouras from Illumina, whose favorite part of the congress was "the keynote speech by Professor Dawn Martin-Hill, where she spoke about the importance of Indigenous culture and knowledge." Alex was "thrilled that the conference focused on bringing in voices of young people and from Indigenous communities and inspired to see more diversity in the water sector."

Diversity and inclusion have been two of the top priorities of the 21st century. Yet a significant number of delegates from developing and under-developed countries were not able to attend the World Water Congress this year due to visa issues. To truly drive change and empower global communities where help is needed the most, water professionals from under-represented countries need a seat at the table. It has become clear to the programme committee that we have work cut out for us in preparation for the upcoming 2024 World Water Congress. We will work on identifying and removing barriers to full participation from diverse global communities, so we can continue the dialogue with those who have not been heard, and look at strategies to encourage global participation, such as how to better support delegates' visa applications and how to live stream the congress for those that cannot attend in person.

Thanks to the hard work of the Canadian Water and Wastewater Association and support from the IWA Canadian National Committee as well as the City of Toronto, the upcoming 2024 World Water Congress will be held in Toronto, a city that many of us proudly call home. The Copenhagen Congress set an extremely high bar for us, but it also gave us an opportunity to take away lessons learned so we can put forth the effort required to show the world of water what Canada has to offer. [wc](#)

Proud Canadians, Eh?

Canadian Coalition invites the world's water experts to IWA 2024 in Toronto

BY CORINNE LYND

A coalition of Canadian water industry leaders, led by Robert Haller, executive director of the Canadian Water and Wastewater Association trekked to Copenhagen from September 11 to 15 to take part in the IWA's World Water Congress and Exhibition and promote IWA 2024 in Toronto. On a mission to attract exhibitors, delegates, and attendees, the Canadian team rolled out the red carpet at its Canada Pavilion, served poutine, organized a brisk plunge in the harbour and turned the IWA show floor red with a sea of Canada ball caps.





- 1 The Canadian Coalition Dream Team: Audrey Béganton, Robert Haller, Adam Lawrence, Michele Grenier, Corinne Lynds, Mike Lywood, and William Fernandes. Missing from this picture is Elsayed Elbeshbishy, Richard Higginson, and Peter Vanrolleghem.
- 2 The Downstream #waternerd t-shirts were officially debuted at IWA 2022. Water Canada Content Director Corinne Lynds wears it proudly. Get involved with Downstream to get the shirt!
- 3 Long-time friend to Water Canada Banu Ormeci, director of the Global Water Institute at Carleton University stopped by for a little cheer with Canadian colleagues.
- 4 Poutine!
- 5 Canadian Ambassador Denis Robert and CWWA's Robert Haller shake hands during opening remarks at Canada Pavilion reception hosted on the show floor.
- 6 Team Canada (left to right) Kirk Gonsalves, Kevin Round, and Mathew Moffatt from the City of Durham took 2nd place at the Operations Challenge. Seven teams competed in three categories: Maintenance, Collection Systems, and Safety. Pictured is the Collection Systems event where competitors repair a leak on an 8-inch PVC sewer pipe.
- 7 Mike Lywood of Wood Environment & Infrastructure Solutions who claims to be retired not only represented Canada at the booth, but also provided critical poutine assistance at the Canada party where 100 portions of poutine were devoured by curious guests in no time flat!
- 8 What more Canadian way is there to celebrate the clear, crisp waters of Denmark than a salty plunge in the harbor led by Captain Canada himself, Robert Haller.

Canadian Coalition Partner Organizations

Canadian Water and Wastewater Association
 Water Environment Federation
 American Water Works Association
 CAWQ
 Water Canada
 Canadian University Research Partnership
 Canada Trade Commission

TURNING ON THE TAPS

Atlantic First Nations team up for water and wastewater services

BY SAUL CERNOS

A multi-year, collaborative undertaking that will see multiple First Nations in Canada's Atlantic provinces steward their water and wastewater operations through a single entity is reaping benefits even before the agreement takes effect this December.



Saul Chernos
is a freelance writer
with Water Canada.

FOR MANY INDIGENOUS communities across Canada, water and wastewater systems tend to be relatively modest in size, geographically isolated, and underfunded. In recent issues, *Water Canada* has outlined some of the challenges operators face keeping these systems up and running, often for pay barely exceeding minimum wage, and almost permanently on call. Systems frequently operate on threadbare budgets, and some communities have been on boil water advisories for decades as band councils juggle multiple, equally urgent priorities.

As a water and wastewater technician with Pictou Landing First Nation near New Glasgow, Nova Scotia, Corbin Stevens has worked long hours for little more than minimum wage since he started as a summer student in 2015 after graduating from high school. “I was just doing simple stuff like cutting grass, painting hydrants, checking a manhole here and there, and helping the other operators from time to time,” Stevens recalls.

When summer ended, the Pictou Landing Band Council invited Stevens to stay on as a water and wastewater operator. He accepted the offer, and quickly undertook to study for his Level 1 Water Distribution certification so he would be fully qualified. He aced the exam, and while his salary climbed from minimum wage, \$12.55 an hour at the time, to \$17, he hasn’t had an increase since 2000.

Over the next few years, Stevens studied for several additional certifications to boost his knowledge of water and wastewater systems but stopped short of writing the exams. “It wasn’t mandatory to acquire the wastewater certification back then,” Stevens says, adding that Indigenous Services Canada, and not the provinces, oversees First Nations water and wastewater services and only within the last five or six years has begun to emphasize wastewater upgrades to conform to national standards.



Corbin Stevens, water and wastewater operator with Pictou Landing First Nation

Stevens has flourished on the job as a water and wastewater operator, checking for leaks and maintaining a variety of systems. “I do a lot of record keeping, such as the flow per day for wells and a lot of chlorine and turbidity testing as well as regular temperature checks.”

While Pictou Landing has had at least one other operator, Stevens found himself called upon almost constantly when alarms went off or issues arose. “I’ve never taken a sick day and I’ve never taken any week-long vacation or anything like that since 2019,” he says. “The phone’s going off constantly about something or other.”

This coming December, the landscape stands to change dramatically. There had been discussion for nearly 20 years about forming a First Nations water and wastewater utility, but Stevens says he was pleasantly surprised when a representative from the Atlantic First Nations Water Authority (AFNWA) approached him last year and told him Pictou Landing and other First Nations from Nova Scotia, New Brunswick, and Prince Edward Island were on the verge of a formal agreement for AFNWA to collectively administer and manage their water and wastewater operations. “They wanted to look at our system, so they would know more about it, and they told me they would be hiring me to look after the system (pending final ratification of the deal),” Stevens says.

The benefits have become immediately apparent for Stevens. The AFNWA’s stated pay scale will in some cases double current operator wages, and the Authority has already helped shepherd many operators to achieve higher levels of certification for both water and wastewater. AFNWA has covered course costs up front and provided expense reimbursement after they have passed their exams.

“I’m certified Level 2 across the board as we speak,” Stevens says, adding that he is slated to write his Level 3 exams in December. Most significantly for Stevens, however, is that the AFNWA has him on track for a career to not only oversee operations in Pictou Landing but also to provide his expertise to support operations for other member First Nations.

First Nations ownership

While nearly a dozen First Nations are set to join the AFNWA at its launch, with additional ones transitioning over the next couple of years, the Authority’s organization harkens back to the turn of the century. Carl Yates, who was lured to the role of interim CEO after 25 years as general manager of Halifax Water to help guide the AFNWA’s formation, says leaders from the region’s Mi’kmaq and Wolastoqiyik communities were acutely aware of the deadly E. coli outbreak involving the municipal water supply in Walkerton, Ontario in 2000. AFNWA Chiefs in Atlantic Canada took notice of this event as being typical of the situation faced in their communities and decided that First Nations ownership and control of the water and wastewater operations they depend upon would help ensure their health and wellbeing.



Carl Yates, interim CEO of AFNWA, and Gary West, operations superintendent, speaking with operators Dylan Bernard and Noel Doucette at a workshop for operators.

Community leaders worked through multiple studies, reviewed a patchwork of regulations in place across Canada, and assessed the condition of their water and wastewater assets as they considered what they would need to do to meet evolving guidelines and standards. Drawing on cultural and traditional values, the group considered potential governance and management structures, settled on a not-for-profit model, and engaged Halifax Water in a joint venture with Accelerator Inc. to steer the project through extensive consultations with community members, technical specialists, and federal government officials.

In July 2018, the AFNWA incorporated formally as a utility, worked to refine its business case, and in June 2020 reached a framework agreement with the federal government that served as a catalyst to make the whole enterprise possible. Under Yates’ guidance, the AFNWA prepared a ten-year business plan, complete with capital and operating budgets, and submitted it to the federal government with a request for long-term funding. “The understanding is to get away from the year-to-year ask for capital budgets,” Yates explains.

This long-term thinking quickly paid dividends, with the government allocating the fledgling authority \$172 million in funding in the 2022-23 federal budget, announced last spring. “It was a line item unto itself and was a huge win for us,” Yates says, noting that, together with funds already earmarked by Indigenous Services Canada, the AFNWA currently has \$257 million allocated for the ten years ending in March 2032.

Planned expenditures include a \$13 million supervisory control and data acquisition (SCADA) system designed to collect, analyze,



John Lam, manager of engineering with the AFNWA and a director with the Atlantic Canada Water & Wastewater Association, presents Corbin Stevens with the ACWWA's Silent Hero award.

and visualize data pertaining to every water and wastewater system, from reservoirs and pumping stations to pressure reducing valve chambers and treatment plants. “It will monitor pressure, flow, chlorine residual, turbidity—all the physical and chemical parameters—across every facility in real time,” Yates says. “We’ve got quite a range of systems in our communities. Some have absolutely nothing in place for SCADA; others have modern systems but might not be fully utilizing the tools in front of them.” A key goal is to bring all member communities up to par so they meet the same recognized service and treatment standards and regulations. The funding will allow for improvements and upgrades to multiple facilities, including transitioning from wastewater lagoons to more mechanical systems.

Bringing multiple systems into a single organization also introduces economies of scale that enable bulk purchasing and coordinated planning. “We’re now more than the sum of our parts,” Yates says. “We can start to bundle projects like leakage control into programs to get better prices, more efficient implementation, and move more expeditiously with a longer-term view.”

The people who keep the systems running are also a priority. AFNWA’s compensation policy, included in its budget, is designed to offer pay rates and other terms that are competitive with regional municipal markets. “In a lot of cases, operators are making approximately 60 per cent of that wage today, on average,” Yates says. “In other words, they’re underpaid. So, we’re bringing in a formal pay structure. We’re going to pay time and a half for overtime and double time on statutory holidays, just like everybody else does.”

Operators will also receive badly needed time off. “One of the challenges not only with First Nations communities but with other small towns across the country is they often only have one or two operators,” Yates says. “If something happens to them, they’ve got no relief. If they want to take time off for training, they’ve got to find somebody to fill in. Sometimes they can’t even take a vacation. One community

on its own doesn’t have the capacity, but put 17 together and you’ve got a different picture.”

As well, operators will receive the training they need to do their jobs effectively. Even though the AFNWA won’t formally employ its personnel until December 1, the utility is holding training workshops for operators who will be joining the utility and is rewarding those who attain certification. “Our compensation is based on skills-based pay. The more certification you get, the more we pay you, and we’ve got a few operators who are determined to get to the top of our pay scale before we even hire them.”

Looking on

While the AFNWA turns on its tap, Indigenous communities across Canada are watching, eager to see how things unfold. Deon Hassler, a circuit rider with the File Hills Qu’appelle Tribal Council, trains and mentors First Nations water and wastewater system operators across Saskatchewan. He says operators in the prairie province have organized informally as the Saskatchewan First Nations Water Association with a view to developing guidelines and eventually building some kind of over-arching structure to manage their own systems.

Hassler says the AFNWA’s early success provides a roadmap of sorts, but his group has opted for a decidedly grassroots approach. While the Saskatchewan association is liaising with water technicians, biologists, chemists, Health Canada, and even a few chiefs who have been water operators at one time or another, the intent at least initially is to bring front-line operator experience to the fore.

In British Columbia, Warren Brown has struggled with many of the same issues. As operations and maintenance manager with Lytton First Nation, he appreciates the time and effort it takes to put a structure like AFNWA into place. “It’s something we’ve discussed for this area as well, but we haven’t been able to get it working,” Brown says. “I’m hoping that they’ll make the booklet and blaze the path for us to follow.”

Kerry Black, assistant professor and Canada Research Chair in civil engineering in the Schulich School of Engineering at the University of Calgary, has spent considerable time working with Indigenous communities. She says comparable discussions are underway across Canada but points out that communities and regions vary considerably and so likely, too, will solutions.

“Atlantic Canada has 34 First Nations across several coastal provinces,” Black says. “This is different than Saskatchewan or Alberta, which have a higher number of remote and fly-in Nations. A water authority is going to look and feel different in Alberta than in Atlantic Canada or in Ontario or in British Columbia. The AFNWA is a really great example of how it can work within a regionalized context, though it’s not necessarily something that can work in all regions. We still need to look at different models and governance that can support locally relevant water solutions.” WCC

What's up with PFAS?

A closer look at the forever chemical

BY JEN SMITH

PER- AND POLYFLUOROALKYL substances, or PFAS, are a huge group of manmade chemicals that have been used in industry and in consumer products since the 1940s. Thanks to their incredibly strong carbon-fluorine bond, PFAS degrade quite slowly and resist heat, grease, and water making them seemingly perfect for cookware and popcorn bags, firefighting foam and textiles, and everything in between. Sounds too good to be true?

They are.

Along with the ability to keep your sandwich warm and grease-free all the way home from the deli, PFAS also brings with them a host of potential health effects, including cancer, liver damage, and decreased fertility. PFAS are everywhere which makes it challenging to study and assess both human and environmental risks. Even in remote locations where PFAS-based products are generally unheard of, traces of the chemical are being found. In the soil. In the water. And yes, even in our blood.

According to Begum, "When the site is already contaminated, it's a loss of huge effort. When PFAS is already in the lake, there's a huge effort to clean."

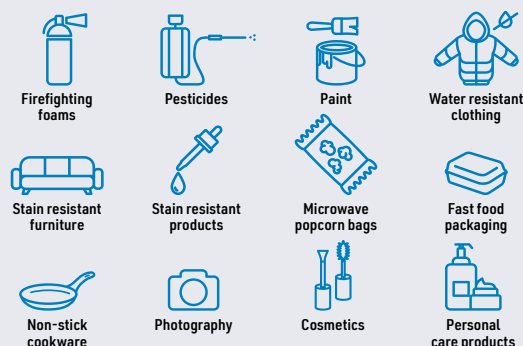


Jen Smith
is the editor of
Water Canada

What Are PFAS?

Per- and polyfluoroalkyl substances (PFAS) are chemicals that have been used in a wide range of consumer and industrial products including, stain- and water-resistant fabrics and carpeting, cleaning products, paints, and fire-fighting foams. PFAS do not easily breakdown and some types have been shown to accumulate in the environment and in our bodies.

Source: FDA



If we know that these chemicals exist and we also know that they are harmful, why isn't there more information out there about them?

According to Bharat Chandramouli, senior scientist with SGS, PFAS' definition itself hasn't been settled. "The EPA has different definitions for PFAS than the OECD. And the definitions matter, because what you regulate depends on how you define them." Luxmy Begum, senior project manager with MTE Consultants adds, "the health effect is not yet clearly understood," saying that we don't fully understand the impacts or how much PFAS is safe.

This lack of fulsome definition fosters an attitude of uncertainty, which may be at the crux of inaction. But as Maureen Dooley, vice president, Industrial Sector, with REGENESIS points out, "PFAS aren't going away, neither are the regulators. And I think it's just a matter of time and how much."

The possible implications of PFAS don't end there. Fe de Leon, a researcher and paralegal at the Canadian Environmental Law Association, notes that some studies are showing that exposure to PFAS may affect women and children differently, while others point to "possible implications for the effectiveness of vaccines." This is further complicated by the general lack of information for Canadians. This means that "many of the communities that are affected by PFAS don't know that they are affected."

Why should we be concerned?

Dooley points to the siloing of roles as one of the big problems at play. She finds that "oftentimes there's a division between the roles of the government," which can result in a lack of information sharing and responsiveness—something she feels makes things "very reactive."

Chandramouli agrees with Dooley's



"The definitions matter, because what you regulate depends on how you define them," says Chandramouli.

assessment. And when it comes to where the U.S. and Canada are on the roadmap of PFAS, the difference is stark: "Canadian work is typically remediation-focused" whereas in the U.S. "it is all over the place. So much drinking water testing, so much well water testing. It's so much response litigation, in addition to all the remediation investigation."

He points to Canada's lack of source information as a culprit holding them back. "The U.S. has the toxic release inventory. We don't really have anything similar to that in Canada. So, a lot of people are in the dark." To attempt to fight the war on PFAS, Chandramouli believes that "information and communication are key."

Martin Bureau, vice president of Innovation with SANEXEN has experienced the effects of the lack of definitive information on PFAS in Canada firsthand. "We reached out to many Ministers of Environment in Canada and they simply don't know about the issue at all, because it's not on their radar."

This doesn't just affect larger corporations, it also affects individuals. Citing a lack of regulatory framework, de Leon calls for more accountability. "Until we start to share the data that is supposed to be accessible through open-source data on monitoring of some of these facilities, the concerns by regular Canadians who may not know to ask those questions [can't be answered]."

What we need to do?

While conversations calling for an all-hands-on-deck approach are becoming more common, to get governmental buy-in on

change, Bureau calls for a need to develop ways to address the issue that are both successful and cost effective.

Dooley also recognizes the need to get to the source of the issue, to eliminate the problem before it gets into the environment. "How do we deal with these sources, and how can we eliminate this?" Bureau agrees, looking at the process of eradicating these forever chemicals holistically: "It's really complimentary approaches."

Begum points out that "when the site is already contaminated, it's a loss of huge effort. When PFAS is already in the lake, there's a huge effort to clean. The best approach is to stop them right at the source." Or simply put, "separate, concentrate, and destroy."

De Leon emphasizes the need to address "what's possible now?" and "go up the pipe and figure out why the sources are still coming." Bureau agrees, offering a starting point: "addressing the source point where it hurts the most, depending on what's downstream, whether it's a village, or a lake where people pump their water out."

Begum sums up the next steps: Be ready. "We have to know how to treat either at the source or at the municipal level at the treatment plant. Be ready, be flexible, be able to answer questions to the public. Start preparing a technological solution. You have to answer to the public."

This was a big topic with a power panel of passionate experts with the shared goal of eradicating this forever chemical, for, well, *forever*. To hear the lively conversation in full, visit watercanada.net/blue-economy-webinar-series. 

High Water Mark

The value of water is determined by risk

BY PAUL GRISS

FLOODS ARE DEVASTATING Pakistan. Europe is experiencing drought conditions, as are other parts of the globe. Jackson, Mississippi, is suffering a drinking water crisis. Yet we continue to struggle to convey the value of water to the world.

Many things that humans cherish (air, water, food security, democracy, to name a few) receive little thought or attention when times are good but quickly escalate into crisis if there are real or perceived threats. As philosopher Arthur Schopenhauer stated, “Mostly it is loss which teaches us about the worth of things.” And as Joni Mitchell paraphrased, “You don’t know what you’ve got til it’s gone.” Given our nature, it is highly unlikely that we can develop a universal value proposition for water that will win over the masses, and spur greater government action, particularly as its “value” is situational.

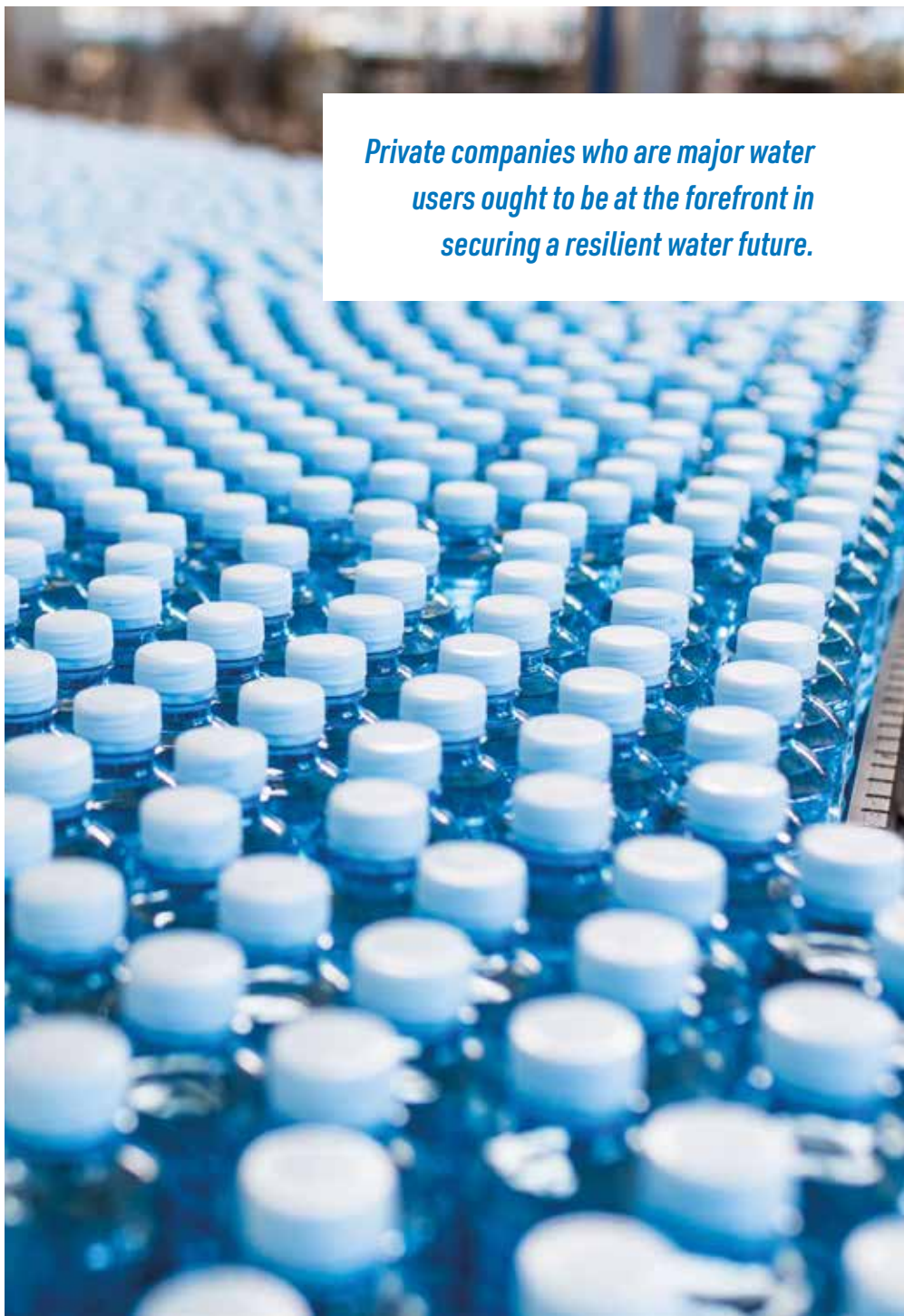
It's not so much what water is worth, it's what inaction or inattention to water will cost.



Paul Griss

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Private companies who are major water users ought to be at the forefront in securing a resilient water future.





Regrettably, too few companies really understand their impact on water because, like the rest of us, they don't recognize the problem until there is one.

How can we ensure that water receives the attention it deserves? One strategy is to leverage the self-interests of major water users. The overwhelming majority of water use is by the private sector, including agriculture. And a large percentage of this water use is connected to major companies in industry sectors like food and beverage, textiles, and electronics, who rely on and consume large quantities of water in their direct operations and supply chains, and this often takes place within cities and their catchment areas.

Municipalities faced with threats to the quality and quantity of their water supply respond by imposing restrictions on use, such as regulating the timing and extent of watering lawns, or distributing bottled or trucked water to residents. Private companies don't always do their part. We've all seen pictures of sprinklers going full blast on golf courses during drought conditions. Yet private companies who are major water users ought to be at the forefront in securing a resilient water future.

Why would we expect private companies to take the lead in ensuring the effective management of a public good? Schopenhauer offers part of the answer. If you need to use a lot of water in your operations then losing access to that water is a significant business risk. Further, if you continue to use (and even waste) large quantities of water while those around you are doing without then there is significant reputational risk. And if you are planning a new

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project that will impact water, poor attention to those impacts will foster opposition and conflict affecting you both financially and reputationally. Valuing water in this context is simply about managing risk. Should stresses on water continue or increase as the growing impacts of climate change are felt, those who place the greatest demands on water will face increasing public pressure. Trying to argue your case at that stage is both too late and very expensive. If your company lost access to water, how would it impact you? And what would you do to prevent that from happening?

Regrettably, too few companies really understand their impact on water because, like the rest of us, they don't recognize the problem until there is one. I'd argue that this is a problem you don't want. Let's take what some might claim is a heretical approach. The direct greenhouse gas emissions from most individual companies or facilities, while important, are relatively trivial in the grand scheme of things. They are an infinitesimally small contribution to a global issue with the impacts associated with the emissions perhaps a long way off and likely far away. Yet look how much attention is being paid to monitoring and reducing greenhouse gas emissions at facilities across Canada.

Contrast that to water, where the impacts of overuse of water or emissions into it can be immediate, significant, and local, impacting communities where the company operates. Yet very few companies devote a comparable level of attention and resources to being good stewards of water. And this exposes them to risk.

We don't fully appreciate that water underpins most environmental issues that draw public attention and outrage. Think of Canada's oil sands and the immediate association is with greenhouse gas emissions and climate change. But it didn't start out that way. Early opposition to the development of the oil sands region focused on water—images of deformed fish in the Athabasca River

and claims of elevated cancer rates in communities downstream from oil sands mines. As a result, oil sands operators are currently not allowed to release treated tailings pond water into the river. Companies want this changed as they are required to reclaim their tailings ponds, which means the water must go somewhere and the only somewhere is the Athabasca River. Gaining the trust of potentially impacted communities will not be easy.

In a similar vein, opposition to the canceled Keystone XL pipeline between Canada and the U.S. began over concerns that a leak from the pipeline could compromise the Oglalla aquifer, long before the proposed pipeline became a proxy for the climate change battle.

Further, one of the triggers for protests over forest management practices in British Columbia was erosion associated with logging on steep slopes which was causing waterways to silt up affecting water quality and habitat for aquatic species.

These examples demonstrate the importance of valuing water to a company. It's not so much what water is worth, it's what inaction or inattention to water will cost. To mitigate that risk, build trust with local stakeholders, and insulate themselves against public criticism, companies need to get ahead of water issues. They need to do this by *demonstrably* practicing water stewardship.

A first step is determining the importance of water to your organization or how you impact the broader basin. Companies that use large quantities of water in their operations or along their supply chains need to conduct a fulsome evaluation of the risks they may be facing. How much water are you using? How much of that is necessary and can you find efficiencies? Are you recycling water to the greatest extent possible? How do your demands on water impact your neighbours, both other companies as well as communities and individuals?

Companies don't need to walk this path alone. Many businesses are already showing leadership by joining organizations like the Alliance for Water Stewardship and adopting best practice as set out in the AWS Standard, which requires genuine collaboration at a catchment level. And unless a company is in a situation where it is the only user of water in a basin or catchment area (unlikely) collaboration with others is key. The technical and financial resources of a company, or companies, can enable others in the basin to engage constructively and generate a truly shared approach to water stewardship. As long as stewardship is the objective, such initiatives can go a long way to building trust in the company and reducing its financial and reputational risks should water in the region come under threat.

We are not there yet in Canada. If we truly want to value water then positive engagement by major water using companies needs to become the norm rather than the exception. If not, they will find out what water is really worth. When something goes wrong, ^{WCC}

**Dr. Christopher Corwin**

Brown and Caldwell announced that Dr. Christopher Corwin has joined the company as national drinking water leader. Bringing over 20 years of experience, Corwin will grow the firm's drinking water practice, aligning its technical and R&D experts with clients to deliver solutions to safeguard water supplies.

**Katina Tam**

Katina Tam has joined the CWN team as their new senior program advisor. Katina will lead and implement initiatives supporting the Municipal Consortium and other CWN programs. Prior to joining CWN, Katina worked as an environmental program specialist at the City of Red Deer, where she led the development of the city's water conservation, efficiency, and productivity plan.

**Joanna Eyquem, Chris Chen, Bailey Church**

The Municipal National Assets Initiative welcomes three new members to their board: Joanna Eyquem, managing director of climate-resilient infrastructure at the Intact Centre on Climate Adaptation, University of Waterloo; Chris Chen, executive director at Asset Management Ontario; and Bailey Church, leader of National Public Sector Accounting Advisory, Public Sector ESG, and Climate Reporting Centre of Expertise at KPMG. "We are absolutely delighted that MNAI can attract, and will benefit from, this incredibly high calibre of board members," said Roy Brooke, MNAI's Executive Director. "These members, together with existing ones, will help MNAI make the leap to the next phase of its evolution and deliver on its Strategic Plan."

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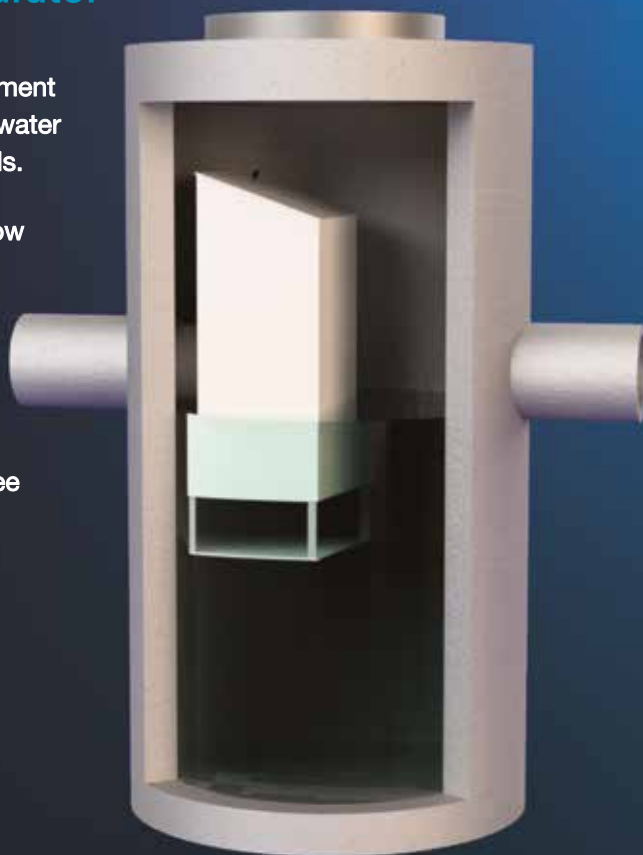
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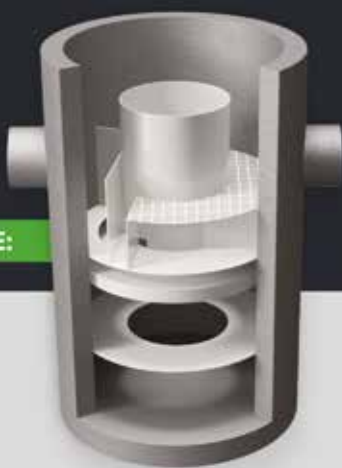
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