#### THE COMPLETE WATER MAGAZINE

JULY/AUGUST 2015

# **WATERCANADA** Innovation in Action

Active Treatment Plants Put Wastewater Advancements to the Test

INSIDE: water's next awards 2015 WINNERS! page 15

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Social Innovation in the Water Sector (page 26)

Tracking Watershed Data (page 32)



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CEWA SONEIA



# Coming CleanAbout Wastewater

#### BY RACHEL PHAN

**AT THE ONEIA** business and policy forum on May 4, the water professionals in attendance were in general agreement: the wastewater conversation is changing and the current industry climate is ripe for wastewater innovation.

No longer seen as the oft-ignored and "disgusting" step-sibling of drinking water and stormwater, wastewater has come a long way since its "sewage" days. It is now talked about with language that has fewer negative connotations-"resource recovery" or "nutrient removal," for instance. And instead of using the words "recycled wastewater," which enforces the psychological ick factor of linking drinking water with wastewater, professionals are trying out terms like "reclaimed water" or "new water" to some success (see Singapore's beautiful NEWater facility for example).

The language change is vital, especially when droughts are becoming commonplace in many regions. For areas like California, wastewater is no longer an "out of sight, out of mind" matter; it's more important than ever to find a sustainable alternative water source, and recycling wastewater just might be the best, most efficient option moving forward.

Climate change aside, our aging infrastructure woes are also helping to drive change. According to the 2012 Canadian Infrastructure Report Card, 40 per cent of our nation's wastewater plants, pumping stations, and storage tanks were considered to be in fair to very poor condition. (We will see how this has changed when the 2015

Contact Rachel at 416-444-5842 ext. 116 or email rachel@watercanada.net Infrastructure Report Card is released later this year.)

"In the past 40 years in Canada, limited resources have been allocated to water and wastewater infrastructure, and the political climate has made wastewater and water a non-priority," said Irene Hassas, the chair of the ONEIA water subcommittee, before adding that this is slowly changing. "[The government is] recognizing, more than ever, the significance of robust water and wastewater infrastructure" and the significance of innovative approaches.

The introduction of the federally mandated Wastewater Systems Effluent Regulations also applies pressure to municipalities to upgrade their facilities and improve wastewater effluent quality. As a result, many cash-strapped municipalities are seeking costeffective and energy efficient technologies to smooth the transition. Hassas said this gradually changing regulatory environment, along with the modernization of the environmental approvals process, has helped to create space for wastewater and water innovations.

So while wastewater management has come a long way, innovators in Canada have an opportunity to capitalize on this momentum and position the country as a leader and technology hub for wastewater and water. Whether it's coming up with new ways to treat our wastewater or building facilities that do it all treatment, testing, research, and more—I know our water industry has the people and the expertise to make sanitation a sustainable and forward-thinking endeavour. wc

CanadianWater

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#### ABOUT THE COVER

While wastewater has historically taken a backseat to its more glamourous and visible counterparts—drinking water and stormwater—industry professionals are now noticing a shift in the spotlight. Wastewater treatment innovation is coming to the forefront, and facilities that merge treatment and research like the City of London's Greenway wastewater treatment plant have popped up across Canada from Ontario (see page 8) to Vancouver and Calgary (see page 12).

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# The foreign acquisition of water bottling operations escalates in British Columbia.

AS CHINA becomes more affluent and more desperately polluted, the door is being wedged open by wealthy offshore Chinese interests to secure the extraction of British Columbia groundwater for offshore shipment.

Media attention has been focused on Swiss-owned Nestlé's bottling operations in Hope, British Columbia. Meanwhile, little is said or known about Chinese interests that are actively seeking ownership of other water bottling operations in British Columbia (and Canada) for the purpose of shipping water to China. The fee in British Columbia for extracting groundwater has been set at the paltry rate of \$2.25 per million litres. That is one millionth of what you or I might pay for one litre of bottled water.

One such operation based in the agricultural area of Bridesville, British Columbia has recently made a deal which will purportedly supply bottled water wholesale to China. The amount of groundwater it will extract this year is expected to increase by 3,000 per cent—from 1.4 million litres to 42 million litres. This company, which used to be locally owned, now has major new shareholders with a controlling interest.

Offshore interest in access to B.C. water is nothing new. However, there appears to be a marked increase in Chinese businesses seeking to acquire control of existing British Columbia-based water bottling operations for the purpose of shipping water to China. My own company has recently been repeatedly contacted by agents seeking B.C. water bottling operations for acquisition by very wealthy Chinese clients.

These offshore interests are unlikely to have concerns for the consequences that their large water withdrawals will have on our invaluable resource. Vanishing glaciers and diminishing snow pack are signs of coming drought conditions for areas of British Columbia. Yet there is little in place in this province, despite British Columbia's new Water Sustainability Act, to properly value or maintain local control of our fresh water sources. There seems to be no public or political awareness of these deals that give aggressive, wealthy offshore interests easy access to our groundwater via the acquisition of existing water bottling operations.

Insult is added to injury by the current water extraction fee recently established (at least for Nestlé's operations in Hope) by the B.C. Ministry of Environment. Valuing our water upon extraction at \$2.25 per million litres leaves B.C. taxpayers financing the administration of the new act with nothing to prevent our own water resource being sucked away by profiteering foreign interests. How stupid and blind can we be to give away so much for so little?

We will have to share our water in this ever more water-challenged world. However, shipping bottled water to China at a net loss to British Columbia is something that should be (and is not) prohibited by British Columbia's new *Water Sustainability Act*.



Mary Johnston is the CEO of WaterMatters for Health & Hydration Inc.

# Panamania

The Pan Am/Parapan Am Games bring water to the forefront with a 35-day arts and culture festival.

### BY STUART FRINGS

AN ARTICLE IN Water Canada's May/ June 2014 issue called "Putting Water on Page 1" outlined the way art can be used to inspire the public to learn and think about water. One year later, with the start of the 2015 Pan Am and Parapan Am Games in July and August, Water Canada revisits Panamania, a 35-day arts and culture festival that will run alongside the games. The festival will include a section called AquaCulture, which will celebrate water through immersive art.

Meaghan Ogilvie, a photographer who was featured in last year's article, has put the finishing touches on Requiem of Water, a large-scale exhibition of photography and video that aims to remind the public of the innate relationship we have with water. "Our developed technological society has become indifferent to this source of life," Ogilvie said. "Our natural inheritance of rivers, seas, and oceans has been exploited, abused, and contaminated."

Ogilvie said AquaCulture will not only act as a celebration of water, but it will also "educate the public and focus on the serious side of water ecology." The majority of her pieces at the festival were shot in Canadian waters, including Georgian Bay and the Great Lakes.

"Art is a universal language that has the ability to bring people together and establishes a new place for them to communicate," Ogilvie said. "Works of art that are a call to action for water, inspire people to work together, and make the world a better place."

Another Panamania artist. Annabel Soutar, is the creator of The Watershed, a documentary play that focuses on the future of fresh water, which can be seen in Toronto's Distillery District. Prior to being approached by Don Shipley, the creative director of Panamania. Soutar said she didn't know whether or not "Canada suffered from any urgent problems with regards to the supply and quality of fresh water." She said she soon discovered that "many dynamic conflicts were playing out across the country that pitted the preservation of our environment against the success of our economy."

"The Watershed is a mere snapshot of Canada as it confronts the possibility of environmental crisis while trying to steward its economy through troubled waters," she said. "Toronto has a unique opportunity to start a potent conversation about how human beings can mobilize to preserve the most important resource for life on the planet—fresh water." wc

Stuart Frings is the communications assistant at Actual Media.

# Online at **WATERCANADA.NET**



**VIDEO:** Watch Ontario Power Generation's public service announcement titled The Power of Water—a 30-second TV spot illustrating the danger of water near hydroelectric dams and generating stations. *bit.ly/PowerH20* 



**BLOG:** A highly curious and enthusiastic eighth-grade class at Donview Middle Health and Wellness Academy in Ontario explored the science of water and reported their key findings to Water Canada. *bit.ly/Gr8Water* 



**BLOG:** Laura Brandes of the POLIS Water Sustainability Project writes about the lessons British Columbia could learn from California's drought and groundwater law reform. *bit.ly/BCPolis* 



# State-of-the-art wastewater facilities help set a new standard for research and innovation. BY EVELYN ALLEN AND DEIRDRE HEALEY

**ONE OF THE MOST** significant barriers to the advancement of wastewater technologies has been accessing municipal wastewater treatment plants in order to test innovations in real-life scenarios.

"Ten years ago, there wasn't too much available as far as access," said Linda Gowman, chief technology officer at Trojan Technologies. "It was extremely difficult to do testing in a municipal wastewater plant. You had to build a relationship, get ministry approvals, find space, find electrical, and get plumbing put in. The logistics were quite daunting and expensive. It took a lot of time and effort."

All this time and effort often slowed down the process of moving a technology to market, Gowman added.

Today that barrier to the advancement of wastewater technologies is shrinking thanks to a growth in the establishment of Canadian demonstration facilities with the infrastructure to provide industry and researchers access to wastewater in active treatment plants.

"Having these facilities has certainly helped us by allowing us to engage in more thoughtful and long-term research projects that we think have the potential to change the marketplace," Gowman said.

The Southern Ontario Water Consortium (SOWC) has two wastewater demonstration facilities-one in London and one in Guelph. The London Wastewater Facility is led by Western University and the City of London, and is located at London's Greenway Pollution Control Plant. The Guelph Wastewater Facility is led by the University of Guelph and is located adjacent to the City of Guelph's wastewater treatment plant. Within Canada, there are also accessible wastewater facilities in Calgary, Vancouver, and Edmonton.

Each site has its own strengths and focus. SOWC's two facilities are set up to allow users to access a broader range of wastewater scenarios. This is accomplished by providing real-time municipal wastewater at various flow rates and process streams, allowing users to install, test, demonstrate, and validate new wastewater treatment technologies from early-bench, pilot-scale to full-scale, ready-for-market products.

To ensure quick and efficient access to testing, the SOWC's facilities also have the Ministry of the Environment and Climate Change's pre-approval for water technology testing so there is no delay in waiting for approvals for projects.

At the London Wastewater Facility, users have access to seven process streams, including primary influent, primary and secondary sludge, and final effluent.

This site is also the only demonstration facility in North America with a full-scale flow rate. At the facility, researchers and companies can access flow rates as high as 4,500 cubic metres per day, which allows them to test and demonstrate

#### WASTEWATER



systems in a municipal environment at full capacity.

Users at the London site will also have outdoor access to some process streams with flows ranging from 1,000 to an impressive 90,000 cubic metres per day.

"The ability to access a 90,000 cubic metre flow rate is hugely important for us and it's very hard to come by," Gowman

Canadian demonstration facilities provide industry and researchers access to wastewater in active treatment plants.

said. "It's like having a real-life test track. Being able to test on such a full range of capacity is ideal because it means we don't have to go anywhere else."

In addition to the wide range of flow rates, the London facility also has four large fully enclosed bays. This allows for users to work independently of one another and have complete privacy. Two of the bays are explosion proof so researchers and companies can work safely with sludge in these spaces.

Like London, the Guelph Wastewater Facility also has private workspaces. The facility houses five separate bays that companies can rent out and be totally independent for product development or client demonstrations.

> For a company like Newterra, having access to real-time wastewater and a testing facility where they can do client demonstrations is integral to product development, clients' education, and marketing their products.

"We are hoping to do some testing and demonstrating at the Guelph facility in the near future," said Irene Hassas, Newterra's director of strategic partnerships and government relations. "It will really benefit our research and development and product development divisions to have a separate area where we can bring in engineering and consulting firms, our municipal clients, as well as land developers to see the systems in action."

At the Guelph site, researchers and companies have access to six process streams with a maximum flow rate of 275 cubic metres per day. Having access to the variety of streams is essential for collecting a broad range of data on the performance of systems, Hassas said.

"It makes retrofitting and modernizing systems more efficient if we can know the performance of the system in any given scenario. It's also helpful to have access to a variety of process streams for an unlimited amount of time," she added.

The company has had the opportunity to test and demonstrate at a municipal plant in the past and received excellent collaboration and support. However, there were time constraints due to seasonal changes and the plant's commitment to other projects.

"With the Guelph facility, we can do continuous monitoring of how our system is performing," she said. "This

#### WASTEWATER

enables us to put a system in place that has been retrofitted or requires testing and monitoring and determine how it performs throughout different seasons and with different process streams and

# "We have started to see a surge in wastewater technology advancements in Canada." —Linda Gowman

changing parameters, such as a rise in temperature or level of contaminants."

Another beneficial component of the Guelph facility is the ability for researchers and companies to do on-site parameter testing. The facility has an equipped lab and sample preparation area within the building so companies and researchers can immediately analyze the performance of a system. There is also staff on hand to assist researchers and companies in monitoring and testing.

"This is ideal for us because we need continuous monitoring with our new generation of systems so we can do any necessary tweaking," Hassas said.

"Having staff at the site who can help us is great because it will mean we don't have to be there every day."

Users also have access to a trove of analytical equipment in a high-tech lab located

at the University of Guelph. There is also specialized lab infrastructure on site, including a dedicated sludge room with explosion-proof lights, fume hood, methane gas detector, and additional ventilation. This is helpful for companies looking to do work with sludge at the wastewater treatment plant.

"This type of specialized space is needed right now because there has been a real shift in wastewater treatment toward biosolids reduction and processes like nutrient and biogas recovery," Gowman said. "Today wastewater isn't just seen as waste, it's also seen as a resource."

The Guelph site also has infrastructure in place for companies and researchers interested in testing and demonstrating systems related to wastewater and the impact on biotic life. There is an ecotoxicology bioassay lab within the facility, and SOWC's mobile field trailers are fully equipped and can be taken to any site for ecotoxicology testing. This mobile equipment allows for researchers and companies to do on-site testing of the water flowing out of a treatment plant, for example, and assess the impact on the biotic life downstream.

Established in 2014, SOWC's London and Guelph facilities are fairly new. However, the newest addition to the Canadian landscape of wastewater facilities is the Advancing Canadian Wastewater Assets Research Wastewater Treatment Plant in Calgary, which



www.aecom.ca

opened its doors this year (see Moving Forward on page 12).

With a flow rate of up to 500 cubic metres per day—split among up to three parallel lines—the Calgary facility provides the flexibility to install treatment systems independently or in tandem for comparative studies. The facility also has a set of 12 man-made streams on site that allows users to study the effects of actual wastewater effluent on living ecosystems in real time. Additional laboratory facilities are available to measure chemical and biological parameters around wastewater research.

Another facility, the Annacis Research Centre in Vancouver, has five process streams with a flow rate of up to 820 cubic metres per day. Established in 2011, this facility is equipped with laboratory facilities for research, education, and training. The site is currently focused on a number of projects, including using anammox bacteria to manage ammonia levels in wastewater, reclaiming water from treated sewage using membrane systems, and using the microwave peroxide process to disintegrate solids in wastewater and release nutrients.

Finally, one of the longeststanding facilities in Canada is the Edmonton Waste Management Centre of Excellence, which was up and running in 2003. This site is focused on research studies related to biological nutrient removal, nutrient recovery, wastewater treatments, such as advanced oxidization, removal of emerging trace contaminants, re-use membrane-filtered wastewater and anaerobic digestion, and biogas capture and utilization. The facility also caters to technology development in the areas of wastewater treatment, water re-use, solid waste management, and solid waste re-use.

It houses a Biological Nutrient Removal Pilot Plant that contains two parallel process units, allowing researchers to mimic actual plant operations and compare various treatment processes. Users also have access to a Hollow Fibre Membrane Pilot Plant, which is a demonstrationscale facility assessing the filtration of effluent using a hollow fibre membrane ultrafiltration system.

By providing this cutting-edge infrastructure and equipment, SOWC's facilities, along with the other sites, are helping to ensure Canada continues to be a leader in water technology innovation.

"We have started to see a surge in wastewater technology advancements

in Canada," Gowman said. "The development of these research, testing, and demonstration facilities will definitely propel these technologies forward and keep us at the head of the pack." wc

Evelyn Allen is SOWC's manager of industry partnerships. Deirdre Healey is a freelance writer.



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#### CONVEYANCE







This full-scale municipal wastewater treatment plant realistically replicates environmental situations allowing scientists and municipal water providers to answer remediation questions.



Naheed Nenshi, mayor of Calgary (second from left), Michelle Rempel, MP for Calgary Centre-North (third from right) and Pierre Normand, CFI's VP of external relations and communications (second from right) officially open the University of Calgary's ACWA facility.

# **Moving Forward**

## University researchers work within municipal facilities to advance wastewater treatment technologies and knowledge. BY SEAN MYERS

CANADA'S WATER is among the safest in the world. This level of assurance has been achieved through quality analysis, but there is much more to learn about what exactly is in our wastewater and how that may impact public health.

Enter the Advancing Canadian Wastewater Assets (ACWA) research facility. Embedded within the City of Calgary's Pine Creek Wastewater Treatment Plant, the University of Calgary's ACWA facility is a fully integrated, fully contained university research facility located within an industrial wastewater operating treatment plant. University researchers

are working side by side with municipal operators to advance wastewater treatment technologies and knowledge that will lead to cleaner water, a better protected ecosystem, and improved public health.

Later this summer, innovative work will be done that could lead to improved regulations and safety standards for not only Canadian water but for countries right across the globe.

"We will realize many direct benefits [...] from this research including more effective watershed stewardship and environmental protection practices that others around the world can learn from," said Lee Jackson, ACWA scientific director and professor at the University of Calgary. "Working within an operational wastewater treatment facility, and partnering with industry, is vital to ensure our research leads to tangible improvements in solving important problems facing cities everywhere."

One of those problems is assessing and neutralizing the impact of chemicals and pharmaceuticals entering the water system in greater quantities as our population increases. Jackson said researchers don't really know everything that is in our wastewater or how these chemicals may be affecting people.

#### CONVEYANCE

ACWA has established 12 experimental streams onsite (more than 3.8 kilometres in total) to replicate natural conditions and to which any number of known effluents can be added to test the effects they have on the fish and plant life present in the water. Experimental streams on this scale do not exist anywhere else in the world.

"Measuring contaminants in animal tissues to see what effect chemicals in effluents have will give us vital insight into the broader impact they might have on public health and the environment," Jackson said. "Our findings could lead to tougher regulations to make the water safer. Our research facilities will allow us to become a world leader in this area."

To determine the long-term impacts of these effluents, it is key to look at the generational effects of pollutants on fish growth and development. Can these changes be tracked through successive generations of fish? This is a question a team of biologists is exploring, including Matt Vijayan, a Tier I Canada Research Chair and professor at the University of Calgary.

"We're looking at contaminants in the water and how these are affecting fish physiology," Vijayan said. "The idea is to use molecular markers in fish to tell us if the animal is being affected by chemicals in the water. This is a big problem right now because there are a lot of pharmaceuticals going into the wastewater and we don't know what it's doing to the animals and which ones are going to experience multigenerational effects. It's important to start somewhere, and that's what we're trying to do in a natural setting."

While biology researchers study the fish, chemists and veterinary medicine researchers at ACWA are looking at the bacteria in the water being processed by the treatment plant. A DNA library is being created of all the bacteria and pathogens found in wastewater, a task similar to the human genome project.

Bacteria present in wastewater can be a bellwether for emerging public health issues. With all the pharmaceuticals ending up in wastewater, a concern is the emergence of antibiotic resident strains of pathogens.

"ACWA is a leading-edge research





#### CONVEYANCE

facility in the world for studying how antibiotic resistance chains may be transmitted in environmental bacteria that come into the water treatment facility," said Glen Armstrong, a professor in the Department of Microbiology, Immunology and Infectious Diseases at the University of Calgary. "We need

"One person's wastewater is another person's drinking water. We better know what's going into it and what kind of impact it's having so we can have safe water for everyone."—Lee Jackson

to know if these are creating bacteria that are becoming resistant to those drugs and, if they are, are those bacteria capable of passing those resistant genes on to serious pathogens, such as the ones I work with, like E. coli. Hopefully we can stay a step ahead of potential superbugs."

What makes ACWA stand out is the ability to eliminate the distance

between the lab bench and field testing. And by combining the research efforts of biologists, chemists, engineers, veterinarians, and medical doctors who are working alongside wastewater treatment plant operators, applicable real-world solutions can be arrived at much more quickly than ever before.

> At the same time scientists are studying what is in the water, a team of engineers at ACWA is working on improving the filtration systems that stop pollutants from

continuing downstream. ACWA has also partnered with industry, including IBM and Agilent Technologies, to implement comprehensive analytical tools and software designed to help researchers more fully analyze their data.

Processes refined through ACWA will have application far beyond municipal wastewater treatment. For example, they could be used to monitor water activity and quality remotely in isolated communities and they could also lead to the development of "smart sewers" that live-monitor effluent before it reaches the treatment plant. In the energy industry, the technologies could be applied to test and treat wastewater at remote extraction or processing sites.

"As safe as our water is in Canada, there are still many unknowns regarding what controls rates of processes in treatment plants," Jackson said. "We need to learn more so we can establish more safety nets.

"One person's wastewater is another person's drinking water. We better know what's going into it and what kind of impact it's having so we can have safe water for everyone." WC



Sean Myers is a media relations advisor at the University of Calgary.



# water's next awards 2015

Celebrating Canadian water leaders and champions

# Welcome to Water's Next 2015.

When Water Canada decided to relaunch the Water's Next national awards program, we wanted to make sure it was bigger and better than ever. We introduced eight new award categories, a selection committee of 16 well-respected water experts from across the country, and the first ever Water's Next awards gala dinner to honour and celebrate our winners and finalists.

Water Canada started Water's Next in 2010 as a way to help strengthen and celebrate the thriving national water community by showcasing Canada's water leaders, champions, and innovations. It is our hope that Water's Next winners will inspire new ideas and encourage water professionals from coast to coast to continue doing great work. The Water Canada team is excited to share the achievements and ideas of our eight well-deserved winners. These eight winners were carefully chosen by our esteemed selection committee, whom we thank for their time and wisdom throughout the entire selection process. Heartfelt thanks also go out to the people who submitted more than 80 nominations this year and to the generous sponsors of the inaugural Water's Next awards dinner. You all helped to make the Water's Next relaunch an incredible success.

And lastly, we say thank you to our incredible winners and finalists. With your achievements and ideas, you are successfully working to change the Canadian water culture while also providing guidance and inspiring others in the local, national, and international water communities. We proudly celebrate you in these pages.



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# water's next awards 🍪 People



# **Business:** BLOOM Centre for Sustainability

**BETWEEN STRUGGLING** to make products with limited resources and making ends meet, small businesses don't often have time to think about the best ways to conserve water. But Kevin Jones and his team at BLOOM have stepped in to build a "connecting bridge" between innovative solutions and market demand for better water management practices.

"Many small food and beverage companies realize they could be using water and other resources more efficiently, but they don't know where to start," said Jones, who serves as the company's president and CEO. "We provide advice, information, and tools that make it easier for these companies to improve their water management performance."

One of these solutions includes their website Water & Wine (waterandwine.ca). The online platform gives Ontario wineries guidance on how to reduce risk exposure and operating costs based on the way they manage their water. The platform was the result of BLOOM collaborating with the Wine Council of Ontario, government agencies, service and equipment providers, and dozens of wineries to build "why, what, and how" learning modules about water management, according to Jay Mullin, technical project manager at BLOOM. The platform is also equipped with videos, stories of real experiences, and worksheets to help wineries improve their water woes.

Players in the wine industry have responded with praise for the platform. J-L. Groux, winemaker of Stratus Vineyards in Niagara-on-the-Lake, said if BLOOM's water monitoring module had been available earlier, he "could have saved a lot of time and money."

But improving water management isn't always easy. Mullin said they face a major challenge in getting companies to understand the "complete picture" of water use in their operations. "They do not know the full cost of water, where and how much water is being used, and how water is linked to energy, waste by-products, and most importantly, the bottomline," he said. But BLOOM overcomes this by explaining holistically how to improve water use performance and mitigate the impacts.

Part of the recipe for BLOOM's success with wineries and other businesses and agencies comes down to their status as a trusted, impartial third party. This allows them to "work with a number of different stakeholders to lay out a vision of a sustainable water-use future, and a transition plan on how to get there," Jones said.

**Our panel said:** "BLOOM produces tailored, accessible solutions rooted in simple behavioural changes and innovative applications of technology that equip wineries with the confidence to improve."

And it isn't only wine. While BLOOM continues to work on the rollout of the Water & Wine project, Jones said the company is also working with other sectors of the Ontario food and beverage industry, such as craft brewing and cheese and dairy processing.

"In the longer term, we would like to replicate and apply our sector approach in other industries and potentially other jurisdictions," he said. —Joshua Rapp Learn

# People 🛞 water's next awards



**SMALL, RURAL, AND FIRST NATIONS COMMUNITIES** face a litany of challenges when trying to provide adequate water services to their populations, as the majority of those engaged with the Canadian water sector understand. While the approximately 80 per cent of us who live in urban areas enjoy a relatively stress-free relationship with our water supply and treatment systems, economic, technological, and social factors make providing even basic services much more difficult for remote communities.

Enter University of British Columbia professor, Madjid Mohseni (Ph.D., P.Eng.), who serves as scientific director of the RES'EAU-WaterNET Strategic Network. The network unites technology engineers, scientists, economists, science policy experts, industry partners, and key stakeholders to leverage resources, people, and knowledge to provide innovative solutions for drinking water treatment in vulnerable communities. Mohseni and his colleagues initiated the creation of the network in 2006, and he has played an integral role from its launch in 2009 to the present day.

"The network's investigators focus on areas that have the potential to offer the most significant return on investment in terms of value for these communities," Mohseni explained. "Along these lines, there are two strategic areas that stand out: collaborative technology roadmapping and collaborative innovation."

Improving community engagement in small rural communities (SRCs) is a point of emphasis for Mohseni and the RES'EAU Network. In the case of many First Nations communities, a lack of coordination between stakeholders has compounded issues like under-funding and inadequate source protection. When concepts of community wellbeing are divergent from those of the general population,

# Academia: Madjid Mohseni

Our panel said: "Mohseni dedicates his energies to serving the unique sociocultural, economic, and technological challenges faced by Canada's small, rural, and First Nations communities when it comes to producing clean drinking water."

communication and collaboration becomes all the more vital.

"Any solutions must allow for sustainable development and the concurrent promotion of community health," Mohseni said. "Traditional values toward water are holistic and spiritual. The pervasiveness of this traditional view of the value of water and the related stewardship role for First Nations gives a strong sense of how the goal of achieving safe drinking water on reserves should be pursued."

To address shortcomings in community engagement and communication, RES'EAU-WaterNET has developed the Community Circle approach, which involves all stakeholders, including user communities, throughout the process of defining challenges and finding, implementing, and evaluating solutions. Mohseni described it as "a vibrant market space for innovative solutions" involving "direct input from the community, and in collaboration with both public and private sector partners." The approach aims to create an inclusive and proactive space which solicits feedback from and dialogue with the involved communities.

RES'EAU has also created a Youth Outreach Program to help educate First Nations youth on the importance of water quality and water professionals. Retention of water treatment operators at plants in First Nations communities is an ongoing challenge, and Mohseni said he believes education can raise "awareness of and respect for those who are charged with maintaining all aspects of water quality."

While the difficulties of SRCs and First Nations communities remain a looming concern for members of the Canadian water industry, Mohseni's work with RES'EAU-WaterNET represents a vital step toward healthier communication and engagement with affected municipalities. —Clark Kingsbury

# water's next awards 🍪 People

# Young Professional:

# Megan Kot

Our panel said: "Megan's research has increased the awareness of drinking water safety plans as a risk assessment tool that municipalities can use to manage drinking water treatment and distribution risks."

WHEN IT COMES TO KNOWING what's going on with your water, Megan Kot is the woman with the Drinking Water Safety Plan (DWSP).

The interdisciplinary PhD student has worked tirelessly to increase public awareness of where drinking water comes from and how it arrives at the tap, both through her academic work and her regular social media updates on water-related news.

"Communities need water to survive, but everyone doesn't always see it that way. Exploring that disconnect is really the crux of why I'm passionate about this area of the water world," Kot said.

Some of her research has involved travel throughout Canada, where she has conducted interviews in communities from the Northwest Territories to British Columbia to Newfoundland. In Ulukhaktok, Northwest Territories, she recalled residents chipping away at blocks of sea ice and putting the pieces into plastic containers to use as drinking water.

"It was August, and there were other water sources around, including the community's trucked water supply, but up north, many communities have this narrative about and connection to their drinking water that is so powerful," Kot said.

Experiences like this gave her a unique perspective on drinking water and how it is intrinsically tied to the surrounding land and community. "I've been an advocate of water treatment plant tourism," she said, half joking. "You want to know something about a place? Ask about the water."

While she's now working on finishing her PhD at Dalhousie University, her master's research at the university looked into the challenges water operators using small water systems face when trying to carry out their responsibilities in a community.



"Operators don't get a lot of attention; people turn on the tap and they expect water," she said. "So I got to learn a lot about the challenges they were facing trying to make water safe for their community, while also feeling this pressure to keep it affordable."

More recently, her work has been focused in Alberta, which is the first province to require public water systems to adopt DWSPs that are based on the World Health Organization's Water Safety Plan initiative. Although Alberta is the first jurisdiction in North America to require this type of approach, Kot said this type of framework for water management has helped to decrease water quality violations and save communities money, among other things, in locations around the world.

To understand how small communities in Alberta were responding to this new requirement, Kot and others at Dalhousie conducted a series of interviews with operators and decision-makers across the province. Focusing her work specifically on community readiness for change, she wanted to understand what factors are necessary in a small community setting to ensure new water policies can be implemented and supported over the long term. "These findings would then be valuable to other jurisdictions in Canada who might be interested in adopting similar approaches," she said.

One of the problems is that the people who rely on drinking water often don't know what water operators in their own community do to ensure its quality.

"Right now, many people want to pay for more cell phones and TV and bottled water than they do for safe tap water and that needs to change," she said. —Joshua Rapp Learn

# People 🍪 water's next awards



THE LOCAL MEDIA in London, Ontario know him as the city's "sewer czar"—and for good reason. Over the past 20 years, Barry Orr has dedicated his life to protecting sewer system infrastructure and the environment as a member of London's Environmental and Engineering Services Division. While the murky world of toilets and sewer lines might not spark the imagination of most Canadians, Barry's enthusiasm has seen his influence expand well beyond his own municipality, and today, he is regarded as an international authority on sewer system health.

After graduating from the University of Western Ontario, Orr's career began simply enough. "As a licensed wastewater operator, I would routinely have to unplug pumps full of garbage material. It was all just part of the job," he said. "Then I was given an opportunity to look more closely at our sewer use bylaw and develop a program that would protect our sewer systems including both the sanitary and the storm sewers."

Since then, Orr has been involved in the development of numerous programs and initiatives, and has had an impact far beyond the City of London's limits. As spokesperson for the Municipal Enforcement Sewer Use Group (MESUG), his rallying cry—"Toilets are not garbage cans"—has reached across Canada. Additionally, his leading role in an International Standards Organization (ISO) task group working to define the term "flushable" has expanded his influence to the United States, Asia, and Europe.

Products improperly labeled as "flushable" are a major issue in sewer infrastructure maintenance around the world. The build-up of these products in sewer systems

# Government: Barry Orr

**Our panel said:** "Barry is both a leading voice and tireless advocate within the wastewater and water treatment sector, creating positive change and identifying clear and costly problems and then advancing very practical and doable solutions."

accounts for an increase in treatment equipment and sewer line blockages, inflated risks to operator safety, and higher likelihoods of equipment failure, blocked private drain connections, and environmental impacts. To counter these risks, MESUG aims to implement standards requiring stringent testing before a product is labeled "flushable." The tests would replicate sewer conditions, and would be performed by a third party. Ultimately, Orr would like to see the standards drafted into law and adopted by Industry Canada and the Competition Bureau.

While flushables are a major issue in sewer system maintenance, they do not account for all damages to sewer infrastructure. Fats, oils, and greases (FOGs) account for 40 per cent of sewer blockages in London. To address this challenge, Orr and the City of London developed the "Your Turn" cup—a printable, degradable receptacle for residential FOGs.

"We have seen immediate cost savings when FOG is properly disposed of," Orr said. "We have handed out over 15,000 cups and now have cups available at our EnviroDepots."

Orr's tireless efforts on the policy and innovation fronts have contributed to his global reputation, but his ability to reach the public and communicate the importance of sewerrelated issues is perhaps his greatest strength. His passion for the subject was detailed over and over in his Water's Next nominations.

"Recently, Barry was asked to speak at the CWWA's conference in Ottawa," one nomination reads. "Unfortunately he could not attend, but that didn't stop him from speaking. He spoke from the side of the 401 highway in a blizzard to make sure the 'toilets are not garbage cans' update was heard."

# water's next awards 🍪 Technology



# Water Resources: WaterTrax Electronic Reporting Tool

WHEN WATER UTILITIES AND MUNICIPALITIES report to government regulatory agencies, it usually means long hours of paperwork. The WaterTrax electronic reporting tool automates this process. "WaterTrax allows the people who maintain water quality to put the data from their labs, hand-held instruments, SCADA system, or anywhere they're collecting data from, into one place," said Sheena Graham, WaterTrax marketing specialist. Configured with the specific requirements of the relevant jurisdiction, the system organizes the data and allows users to submit reports electronically at the click of a mouse.

WaterTrax then compares the data collected with a built-in parameter database, and alerts the utility immediately if a sample exceeds acceptable limits.

"There's been a huge push toward electronic reporting in the industry," Graham said. WaterTrax initially cut its teeth in California, developing an electronic format that utilities could use to upload their data directly into the state's water resources control board database and later with the EPA to develop an electronic reporting tool for its NetDMR system.

More recently, WaterTrax has worked with the City of Kelowna and the British Columbia Ministry of the Environment (MOE) to develop an electronic reporting tool that municipalities can use to submit their Environment Management System (EMS) reports.

Previously, these reports were produced manually: utilities would spend hours pulling data from spreadsheets or lab reports, before preparing and sending the report. MOE staff then had to enter the data into the EMS database. Now, with a one-time set-up of the electronic EMS reporting tool in WaterTrax, users can configure, assign, and save EMS attributes to automate the output of required information. Users can also save their own templates to quickly generate reports as needed, and they can access the cloud-based system from anywhere. Not only does WaterTrax offer huge savings in terms of time and labour, it also helps utilities better manage their water systems and deliver water safely to their communities and back into the environment.

"Utilities that don't have WaterTrax generally get a lot of paper copies from their labs; the report sits on someone's desk and may not get checked immediately," Graham said. "With WaterTrax, the data is uploaded directly into a database. Our built-in alerting mechanism compares the results to that region's specific regulations. If any results are outside of the acceptable limits, the utility is alerted right away." The municipality can then take immediate action.

Our panel said: "With WaterTrax, users save a lot of time usually spent on data entry, data reviewing, and water quality reports. This allows utilities to focus on collecting data critical to water system optimization."

The B.C.-based company continues to work with clients and regulators across North America to develop these electronic formats—not only to save time, but to reduce the risk of error associated with manual data entry.

The next project in the works is a mobile application for collecting data in the field. As well, to increase their strength in compliance management, WaterTrax recently acquired Linko Technology Inc., which offers software solutions for pretreatment; fats, oils, and grease; and liquid hauled waste. —Eve Krakow

# Technology 🍪 water's next awards

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# **CONVEYANCE:** Model Predictive Pressure Control

THE DRINKING WATER INDUSTRY relies on Standard Proportional-Integral-Derivative (PID) control for conveyance, which has a limited ability to simultaneously control multivariable inputs and outputs. Due to this control approach, water pressure fluctuates during water pump starts and stops, which makes utility infrastructure vulnerable to damage, as significant variations in pressure can lead to watermain breaks. The Windsor Utilities Commission (WUC) set out to find a more efficient control methodology that could counteract these pressure deviations, reducing damage to the system and ultimately providing end users with consistent water flow and pressure.

Through a collaborative research and development project with Rockwell Automation, WUC concluded that Model Predictive Control (MPC) technology was ideal for these purposes. WUC began beta testing a new onboard MPC controller for Rockwell, which was applied to its high-lift pumping control strategy; this was the first use of this product across any industry. "Our utility was addressing inconsistency of supply pressure in varying areas within our distribution system," said Garry Rossi, director of water production at EnWin Utilities. The MPC controller was extremely successful; its "exceptionally quick response time" of half a second allows WUC to "enable controls that virtually eliminate pump start and stop pressure fluctuations, one of the major causes of main breaks." It is also very flexible and can be used in any SCADA control environment.

The WUC's main goals were to reduce overall pressure on the water distribution system by 1 psi, which would lower operational costs, as well as maintaining consistent pressure throughout the entire system and reducing watermain breaks, ultimately extending the life of their infrastructure assets. "It is always a challenge implementing changes that [have] a high potential [to affect] customer water quality," Rossi said. Impressively, by installing the technology, WUC was able to successfully reduce main breaks by more than 20 per cent, saving approximately \$125,000 in repairs.

Rossi highlighted the significance of these kinds of savings in a country where many utilities have deteriorating infrastructure, increased repair and electricity costs, and system inconsistencies during periods of peak demand. "[There] is opportunity to become more efficient through the implementation of this technology, which in turn will improve chemical treatment and energy efficiency to produce and distribute the highest quality drinking water for future generations," he said.

**Our panel said:** "This is a great project that will reduce main breaks and reduce the risk of collateral damage, which—depending on location—can be very significant."

By reducing main breaks, the technology will extend the life of water infrastructure and optimize water conveyance efficiency, and could be replicated in other communities. WUC is examining the possibility of applying MPC to other aspects of the water treatment process, including daily production management, chemical dosing and filter backwash cycles. —Katie Yantzi

# water's next awards 🍪 Technology



**MUNICIPALITIES OFTEN FIND** repair and preemptive maintenance to be one of the toughest aspects of asset management. There is a need for a screening tool that can evaluate the condition of lengthy metallic pipelines, said Reid McDougall, VP of Pure Technologies' Canadian region. Typically, this has been a costly and labourious endeavour, leading many utility owners to forego thorough inspections of less critical watermains until they reach a state of significant damage. In response to this need, Pure developed pipe wall assessment (PWA) technology.

"The PWA platform is unique because it is the first inline condition screening tool for metallic pipelines," McDougall said. The SmartBall PWA tool is capable of inspecting long stretches of pipeline in a single deployment, and the lowresolution data it yields is effective in pinpointing the location of air pockets, leaks, and pipe wall stress. The Sahara PWA is tethered to the surface and covers shorter distances, making it ideal for assessments that require more precision and control, such as in densely-populated urban areas. Both tools provide a fast, affordable initial screening that allows operators to identify areas of potential damage. As a result, more detailed, expensive assessment can be prioritized accordingly.

Pure has funded dedicated research and development of metallic pipe assessment technology since 2011 through the Metallic Pipe Initiative. Since most of Canada's pipelines are metal, improving the effectiveness of metallic inspection tools is important in maintaining Canada's utilities infrastructure because early damage detection can pay big financial dividends. "This screening survey allows utilities to prioritize capital spending, and to manage their assets more effectively by

# Drinking Water: Pipe Wall Assessment Technology

determining which areas of a pipeline may require further evaluation with higher-resolution tools," McDougall explained.

The technology has the potential to assist municipalities budget more effectively for publicly-funded capital and operating costs, which can soar as high as \$8 million in the event of a large-diameter watermain failure. Additionally, every litre of water lost through a pipeline leak represents sunk costs, and some leaks can go undetected for up to 10 years.

**Our panel said:** "Pure Technologies' innovative approach is a true leader in remote sensing for leak detection that also provides substantial cost savings."

Both the SmartBall and Sahara PWA platforms were commercialized in 2014. McDougall said, "Having a solution that can provide this level of data on such an operationally friendly and proven technology platform [...] is something that has the industry very excited since it allows for the screening of large networks in a relatively short time." He added that PWA's ability to proactively detect pipe wall stress and leaks, and thus selectively replace damaged pipelines, makes it "an important part of the long-term, sustainable management of water and wastewater networks."

Pure continues to work on improving the PWA analysis algorithm and will continue to add new capabilities, such as pipeline mapping. —Katie Yantzi

# Technology 🍪 water's next awards



# Wastewater: Mantech Inc. PeCOD

LABORATORY STAFF have long known the potential negative health impacts associated with chemical oxygen demand (COD) testing using the traditional dichromate method. Mantech's new PeCOD technology not only eliminates the need for hazardous chemicals, but delivers results within 15 minutes, allowing industrial and municipal wastewater facilities to make immediate adjustments to their processes.

"At Mantech, we're always looking for ways to make things greener, safer, and faster without sacrificing accuracy or quality of results," said Robert Menegotto, president and CEO.

To measure organic contaminants in their wastewater, in addition to the five-day biological oxygen demand test generally required by regulatory agencies, many facilities do COD testing. Yet conventional COD analysis, which takes about three hours, uses potassium dichromate and mercury. In Europe, potassium dichromate is listed as a "substance of very high concern" found to be carcinogenic, mutagenic, and toxic for reproduction. As of September 2017, producers of COD tests will need special authorization to sell in Europe. Other regions are also working on banning or limiting the use of dichromate and mercury.

Mantech's PeCOD is a nanotechnology-based approach that uses UV-activated titanium dioxide to measure COD. It measures the photocurrent from the oxidization of the organic contamination in the sample. "The user obtains accurate measurement of organic pollution, in just 15 minutes, with no use of dichromate or other hazardous chemicals."

The Ontario-based company recently responded to a call for bids in Sweden. With the coming European ban on potassium dichromate, and with Sweden set to ban mercury completely by 2016, a Swedish wastewater association was seeking alternative COD analysis methods. "They were hoping to find a few to test and validate," Menegotto said. "We were the only ones selected." In Canada, the BLOOM Centre for Sustainability, the Southern Ontario Water Consortium, and WaterTAP have all played vital roles in testing and validating the technology. The Ontario Ministry of the Environment and Climate Change also conducted an in-depth, 20-month trial, and has since validated PeCOD as an approved testing method.

In addition to the health and environmental benefits, the speed of the PeCOD method can generate substantial chemical and energy savings. Quick results mean wastewater treatment operators can make adjustments to their system immediately, avoiding fines or the costs of having to run aeration unnecessarily high "just in case."

Our panel said: "The PeCOD is a 'game changer' with potential for global application in the wastewater field."

One international pulp and paper company that adopted PeCOD technology in 2014 estimates savings of US\$6,341 a day in operational costs. The immediate feedback allows the plant to react quickly across the system, from production to wastewater treatment and discharge.

While most early adopters have been industrial sites, the City of Guelph, Ontario, is also on board. Menegotto said PeCOD technology will help the facility move to 24/7 testing. "Now if a big storm comes in the middle of night, they have immediate results and can react accordingly. Or, if an industrial company discharges a load of raw sewage into the system, they'll know. —Eve Krakow



# Is California a harbinger of things to come?

BY JON FENNELL AND OKSANA KIELBASINSKI

**IT IS OBVIOUS** that the production of food requires a sufficient and reliable supply of quality water. Given the plentiful nature of this resource in some parts of the world like Canada, gaining access to fresh, potable water is less of an issue than in others.

However, the availability of water is ultimately controlled by factors like human development, climate variability, and climate change. These factors influence or control where, when, and how water exists in the hydrological cycle. The ramifications of water excess are obvious from the images of floodravaged areas around the world, and Canada is not immune to the devastating effects of such events with the recurring floods in the Red River Valley of Manitoba and the flooding of Calgary in 2013 and southern Saskatchewan in 2014.

On the flip side, prolonged deficits of water (such as droughts) are by far the more costly of climate-related events, specifically in terms of gross domestic product (GDP) dollars generated by the food industry. The unfortunate fact about droughts is that they are insidious events, and one is typically not aware that they are in one until it is too late, as successive years of moisture deficits deplete soil water storage to the point of collapsing food production capability.

Now, a shift in climatic patterns has been one of the factors blamed for the

severe four-year drought currently affecting California, where recordbreaking high temperatures and a smaller-than-average snowpack have turned previously full reservoirs into mud-cracked ponds. Although things could return to normal patterns in the coming years, it is equally possible a shift may have occurred to a similar type of mega-drought condition that struck the American southwest hundreds of years ago. Time will tell, but the impacts are beginning to manifest in many parts of the North American food system.

California has a vibrant agricultural

industry that produces as much as 20 per cent of America's food. Being the largest exporter of food in world (next to China, who surpassed the United States in 2014 due to the droughts in California, Texas, and Oklahoma), this places

the United States in a very precarious position regarding their agricultural contribution to the national GDP. As noted in a recent GlobalNews article, there is a perception that the unfortunate situation in California may be an advantage to Canada, as it may provide more at-home opportunities for our food production system. Products like tomato paste, garlic, and berry production have been identified as potential new market opportunities in terms of being able to produce these products at home to service a market that California will be unable to. However, considering the amount of money that Canadians spend on exports from California (about \$1.2 billion in 2013 according to Statistics Canada), and the likely rise in costs associated with those commodities due to supply and demand forces, any advantage will likely be local in scale and not transcend to the average Canadian.

Our food systems in North America and abroad are inextricably connected—

By conducting comprehensive water inventories and dynamics analysis, we can deploy management strategies to circumvent the negative effects of drought.

> and we are not immune to the effects. Given these connections, an adverse effect somewhere in the system can ultimately result in an adverse effect elsewhere. Therefore, it is not as simple as who will be the winners and who will be the losers, but what the ultimate effect will be. For example, a recent article produced by the Calgary Herald noted that cattle production in





D0 Abnormally Dry
D1 Drought – Moderate
D2 Drought – Severe
D3 Drought – Extreme
D4 Drought – Exceptional

#### Drought Impact Types:

- Delineates dominant impacts
   S = Short-term, typically <6 months</li>
- (e.g. agriculture, grasslands)
- L = Long-term, typically >6 months (e.g. hydrology, ecology)

Canada is currently being threatened by moisture deficits, leading to a decrease in pasturing and an increase of feed prices.

"The situation is a contrast to the U.S., the world's largest beef producer, where the wettest May on record has boosted pasture conditions in Texas and is prompting ranchers to expand their herds," the article stated. "Drought conditions that shrunk herds to the smallest since 1952 are easing and the U.S. Department of Agriculture forecasts domestic beef output will halt its fouryear slide in 2015 and increase next year."

Climate influences in California and other U.S. states can directly affect Canada's position on the world stage of food production, whether it is positive or negative. It is clear that a lot of this centres on the availability of water. As indicated previously, Canada is not immune to extended drought events. Even as we head into the 2015 growing season, significantly below normal precipitation is being noted in areas of our country, and the thought of a potential drought is on people's minds (*see Figure 1*).

Therefore, in contrast to the question of "What advantages does the drought in California offer Canada?" the questions that really need to be asked are "What connectivity exists between our climate and our food production system in North America?" and "What are the ripple effects to other areas when droughts are experienced elsewhere on the continent, or even across the globe?" If we are unable to answer these questions, we then exist at a state of elevated risk regarding the security of our food production system and the overall benefits it provides.

The ultimate question then becomes "What can we do to address this threat, over which we have little to no control?" A good start to answering this question is to understand what water we have, when we have it, how it changes over time, its environmental, social, and economic value, how we use it, and more importantly, how best to use it. By conducting comprehensive water inventories (to identify where the water is) and dynamics analysis (to understand when the water is), we can deploy management strategies to circumvent the negative effects of drought. In fact, we have done this in the Palliser's Triangle of the southern Prairie provinces with the introduction of irrigation districts and associated storage and conveyance infrastructure in the early 1900s.

Although not a panacea to address shortfalls in water availability, the storage of large volumes of water can alleviate the immediate challenges associated with drought. However, if sustained for a long enough period of time, these "water banks" can become depleted, much like what is currently happening in California.

The leveraging of groundwater supplies, given the vast amounts beneath our landscape, and the deployment of conjunctive use strategies (such as

using groundwater and surface water in a balanced manner) also exist as potential opportunities to mitigate the adverse effects of drought. However, the sustainability of groundwater can be threatened if not properly managed. An example of this is playing itself out in the American Midwest, where water levels in the High Plains Aquifer have been in steady decline since the 1940s due to over-pumping for food production and energy extraction. In some areas, water levels have dropped as much as 90 metres or more leading to land subsidence and reduced storage capacity of the very aquifers that have sustained that region.

This too could be Canada's future if we are not careful. With a world heading toward nine billion people by the middle of this century, and Canada's role in the global food production system, taking a shortsighted view to this may lead to unintended consequences.

In the end, it will be the proper, and coordinated, monitoring and management of our water resources that will dictate its ability to sustain Canada's food production system, and provide the benefits to society that are almost an expectation now rather than an outcome. Therefore, you should ask yourself the following:

- How literate are we regarding water?
- Do we understand where it comes from and how much we have, its importance to what we do, the vulnerabilities it faces with respect to climate variability and climate change, and its connectivity to our landscapes and economic system?
- Are we using it wisely, and how prepared are we for the next mega-drought?

It is likely that many Californians are asking themselves these very questions, but the answers are likely just as elusive as they are to us Canadians. If that is the case, then we are in bigger trouble then we think. wc



Jon Fennell and Oksana Kielbasinski are with Integrated Sustainability Consultants Ltd. in Calgary.



# Idea Generator

How to accelerate social innovation in the water sector.

#### BY JOSÉE MÉTHOT

**NOWADAYS**, buzzwords like "complexity," "systems thinking," and "resilience" come up frequently in watershed management discussions. This is good news, of course. Our shifting vocabularies reflect a growing recognition that watershed management requires systems-based and integrated approaches. But, for many, going beyond the buzzwords to actually walk the walk remains a challenge.

Planning is important, of course. Integrated watershed management planning, in particular, can help communities to identify issues, recommend broad-based solutions, and take coordinated action. But planning is a means to an end, not the end in itself. Insights from the field of social innovation—a way of initiating and navigating social change—suggest that planning-based approaches to our most complex social-ecological challenges (like climate change, water management, and biodiversity loss) are falling short.

## Addressing complexity

In recent years, social innovation labs



have emerged as a promising alternative to planning-based approaches. Social labs are rooted in the premise that overcoming complex and shared societal challenges requires approaches that are participatory, systemic, and creative. Similar to how research labs are used to incubate and experiment with new ideas in the realms of science, medicine, and technology, a social lab aims to generate and implement new ideas in the social realm.

Social labs are knowledge, relationship, and action accelerators. In essence, a lab is a diverse group of committed people who gather regularly to develop a common understanding of a problem and then work together to actively design and test solutions through prototyping. Intended to be long-term platforms for collaboration, the world's longest running social lab, the global Sustainable Food Lab, is in its 11th year, whereas other labs frequently run for two to three years. Importantly, social labs aren't just about learning or brainstorming. There is a clear focus on implementation and "learning by doing."

Experience in other global contexts indicates that social labs are more than just the new kid on the block. They deliver results too. Research by the Rockefeller Foundation, for example, indicates that social labs tend to produce four key outcomes: 1) they support knowledge creation and dissemination; 2) they build capacity for implementation among participants; 3) they foster networks and relationships; and 4) they create and accelerate solutions with a deeper understanding of system dynamics. Internationally, social labs are increasingly popular and have been used to tackle challenges ranging from sustainable food production to child malnutrition to climate change.

#### A social lab in Alberta

In fall 2014, inspired by the potential of social labs to advance work in watershed management, the Red Deer River Watershed Alliance and Alberta Ecotrust partnered to launch a social lab in central Alberta. Called Project Blue Thumb: Action on Water Quality Issues, the lab brings together a diverse group of stakeholders to tackle surface water and groundwater quality issues in the Red Deer River watershed. This watershed occupies about eight per cent of Alberta's total land area, is home to around 300,000 people, and faces a range of water quality challenges, ranging from non-point source pollution to groundwater contamination.

Pat Letizia, executive director of Alberta Ecotrust, said, "To us, a lab is an opportunity to rethink the basics of how we collaborate in watershed management circles. We want to design solutions, test them, iterate as we learn, and actively implement them."

Project Blue Thumb marks the first time a social lab approach has been applied to water quality issues in Alberta. "This is an experiment," said Jeffrey Hanger, executive director of the Red Deer River Watershed Alliance, "but it is an opportunity to reimagine how we work together to accelerate progress." Project Blue Thumb is also helping to advance the Red Deer River Watershed Alliance's efforts to develop an integrated watershed management plan. While the forthcoming plan is an important blueprint for action, the social lab brings together people with the know-how, passion, and tools required to effect real positive change. This hybrid approach to watershed management seeks to get the better of two worlds: a focused plan, supported by strong relationships, and ongoing, adaptive implementation.

The Project Blue Thumb lab team includes invited participants from municipal and provincial governments, the non-profit sector, academia, forestry, and agriculture, who have come together with a common interest in protecting water quality. A two-day launch workshop marked the official kick-off of Project Blue Thumb in April 2015 and was followed by another two-day workshop in June. The lab team is now working on five prototype initiatives, testing their ideas in areas related to, for example, wetland protection and the power of storytelling. The lab team will continue to meet through 2015 and into 2016 and is supported by a team of world-class facilitators from Reos Partners, recognized internationally as pioneers of the social lab approach.

At the close of the second Project Blue Thumb workshop, one lab team member exclaimed, "I feel like I have been to a 'How to change the world' boot camp." To address the root causes driving water quality challenges, perhaps we need a little less planning and a little more changing the world. If plans can't cut it on their own, then maybe social innovation labs can lend a helping hand. wc



Josée Méthot is the watershed planner with the Red Deer River Watershed Alliance.





WASTEWATER TREATMENT is approaching the practical limits of technology for phosphorus removal. Future watershed protection will require alternative measures-as advanced levels of treatment provide marginal water quality improvement and have increasingly negative sustainability impacts-and will need to address phosphorus loads from non-wastewater treatment sources, such as urban stormwater and rural non-point sources. The challenge is that control of these other sources is typically outside the traditional regulatory framework that governs wastewater treatment facilities, so innovative approaches are needed to implement a functional watershed protection program.

The Town of New Tecumseth has developed an integrated watershed approach for wastewater servicing that is one of the first of its kind in southwestern Ontario to receive approval from the Ministry of the Environment and Climate Change. While the new Tottenham wastewater treatment plant (WWTP) will be an advanced treatment facility with twostage tertiary treatment, a phosphorus offsets program will be implemented to reduce other phosphorus loads so the total annual load into Beeton Creek and the broader Innisfil Creek subwatershed will not exceed the receiver loading limit. The implementation of the phosphorus

# **Figure 1:** Percentage of Total Existing Phosphorus Load by Source in the Innisfil Creek Subwatershed

		kg/yr	%
	Hay/Pasture	487	7
	Crop Land	4687	66
	Other	572	8
$\bigcirc$	Stream Bank Erosion	7	0
	Groundwater	998	14
	Development	112	2
	Point Source	69	1
	Septic System	172	2
	Total	7104	100

# Overloaded

An Ontario town implements a watershed management approach using a phosphorus offsets program with advanced wastewater treatment.

## BY HEATHER BREWER

offsets program is stipulated as one condition in the Environmental Compliance Approval (ECA) for the new Tottenham WWTP.

# **Reduction of phosphorus loads**

Beeton Creek is part of the Innisfil Creek subwatershed, which is identified by the Nottawasaga Valley Conservation Authority (NVCA) as the most degraded watercourse in the watershed. Average total phosphorus concentrations for two water quality monitoring stations located in the Innisfil Creek subwatershed are considerably higher than the Provincial Water Quality Objective for streams and rivers. The Innisfil Creek subwatershed is dominated by agricultural (78 per cent) and forested land (18 per cent), and urban areas account for only three per cent of the subwatershed land use. Approximately 73 per cent of the yearly phosphorus load is attributable to agricultural operations with approximately one per cent attributed to point source (such as wastewater treatment) discharges (Figure 1).

The new Tottenham WWTP is designed for an annual average day flow capacity of 4,082 cubic metres per day and will produce an annual total phosphorus (TP) loading of 104 kilograms per year at its rated capacity. The facility will include two-stage tertiary treatment using ballasted clarification and shallow-bed sand filtration to achieve this stringent effluent TP requirement. While this is still much lower than what can be achieved by conventional treatment, a detailed Water Quality Impact Assessment stipulates that the phosphorus loading to Beeton Creek from the WWTP cannot exceed 65 kilograms per year-putting it over its receiver loading limit by 39 kilograms per year. Since the new facility will achieve

the upper limit of phosphorus removal possible by advanced treatment, the ministry considered an offset program as a way to achieve an equivalent annual reduction. This was achieved through the use of urban stormwater management phosphorus offsets, to be credited on a two-to-one ratio, and through rural best management phosphorus offsets, to be credited on a four-to-one ratio.

The offset potential from the improvement of existing stormwater management facilities in the watershed was estimated at approximately 30 kilograms per year. The potential reduction associated with rural "Tier 1 projects," such as improved manure storage facilities for farming operations, was estimated to be 70 to 135 kilograms per year, assuming a 50-per-cent uptake by eligible farming operations under a directed outreach and funding program. Together, these urban and rural non-point source controls should achieve a phosphorus credit of 33 to 49 kilograms per year when the applicable credit ratios are applied.

#### **Regulatory implementation**

The challenge with incorporating offsets from private farm operations is that, unlike offsets generated by retrofit or improved treatment of municipal stormwater, private farm operations are not subject to approval by the *Ontario Water Resources Act*.

To address this, New Tecumseth entered into a partnership with the NVCA, which has a broad mandate to manage the natural resources of the watershed in which it has jurisdiction, including protecting and restoring the health of local watercourses. This enabled the town to leverage the NVCA's directive to address the unregulated watershed loading sources with measures as needed to provide sufficient wastewater servicing based on an advanced tertiary treatment facility.

"This approach resulted in an acceptable regulatory mechanism to address TP loading to the stressed watershed from sources other than the wastewater treatment facility, including both urban stormwater management

and rural non-point source control," said Emil Rafanan, a process engineer at XCG Consultants Ltd., who identified the watershed phosphorus offset opportunities. "Going forward, the town will be initially required under the ECA to submit yearly status and progress reports on the TP offset program. After two consecutive years of sufficient offset projects implemented to achieve the required TP load equivalent, the frequency of reporting will be reduced to once every three years."

The new Tottenham WWTP and the associated TP offset program specified as part of the facility's approval are an exemplary approach to watershed protection for Ontario's phosphorus-limited receiving waters. WC



Heather Brewer is a wastewater treatment process specialist with CRA, which changed its name to GHD on July 1.



#### DRINKING WATER





# **Linking Pipes**

A not-for-profit organization aims to connect the world with clean drinking water.

#### BY STUART FRINGS

**JOIN THE PIPE** has a lofty goal: build the longest drinking water pipe in the world.

The fledgling not-for-profit grassroots operation—which is run entirely by volunteers—was created in the Netherlands in 2009 with the intention of bringing awareness to local and global water issues, the importance of tap water drinking, and the environmental impact of plastic water bottle waste. The organization's mandate is to become the first social network of tap water drinkers, and since its inception, the initiative has installed 600 pipes worldwide and has expanded to Vancouver, with operations recently beginning in Toronto.

Join the Pipe's original premise was to design a set of pipe-shaped water bottles made with BPA-free plastic that could be sold to help fund projects in Africa and Asia. Now, Join the Pipe works with companies, governments, sports teams, large events, and individuals to install tap water stations in local communities to help fund projects in a variety of developing nations. These projects are largely funded by money from the donors who pay to install pipes in their local communities, and Join the Pipe also contributes 30 per cent of their proceeds from the sale of their refillable bottles to the water projects.

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#### DRINKING WATER



tap stations are easily installed in any location. "[Since] we provide everything above and below ground, this ensures

district, municipality, or private owner is then responsible for selecting the station's location and connecting it to a

"Every water-related situation is different. [Water problems] do not only exist in developing countries."
—Yasmeen van Bylandt

an easy installation process that could be done anywhere," said Yasmeen van Bylandt, the executive director of Join the Pipe Canada.

Once the parts are delivered, the

sponsible for selecting the cation and connecting it to a water source. In total, sponsors pay \$6,500 to have a water tap station installed in their local community. Sponsors

receive recognition for

their donation with

a plaque placed on the tap water station, and they are also provided the Google coordinates of the project their donation assisted abroad.

Van Bylandt said that, since every water project is different, there isn't just one broad-brush way to approach every situation. Some projects may require more work than others, and "precautions need to be taken while working in developing countries because water can be quite political," she added. As a result, Join the Pipe often makes an effort to work with schools, which are usually considered to be politically neutral, to ensure children are able to attend and have access to clean, drinkable water.

"Every water-related situation is different," van Bylandt said. More than 800 million people worldwide live without access to safe water and sanitation, and "they do not only exist in developing countries." In Canada, Join the Pipe's work could address many of the country's water-related issues, including the welldocumented struggles in First Nations communities for potable water.

The first of Canada's pipes are being installed throughout West Vancouver, University of British Columbia, and Richmond, and the organization hopes other places in the country will follow suit.

To this date, Join the Pipe, has completed 250 projects in Kenya, Tanzania, Congo, Mozambique, Gambia, Benin, and Bangladesh. Van Bylandt said the organization ultimately wants "to bring social responsibility to the forefront while working to bridge what is happening locally with what is happening with water issues globally." WC



Stuart Frings is the communications assistant at Actual Media.

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# Do you know how healthy your watershed is? BY JAMES SNIDER

**IT'S A TOUGH QUESTION TO ANSWER**, even for those who work in freshwater. What indicators do you use to measure freshwater health? Even more, how have those indicators changed over time, and what's causing these changes?

Since 2011, WWF-Canada has been working with scientific advisors across the country to gather the data necessary to create that picture, and we're happy to report we're halfway there. Using a wide range of data sources, we assessed these watersheds based on four indicators of water health: water flow, water quality, benthic invertebrates (such as bugs), and fish.

More recently, we have worked to create a science-based approach to evaluating the key threats to Canada's watersheds. We have built a framework to evaluate seven indicators of threats to aquatic ecosystems: pollution, climate change, habitat loss and fragmentation, overuse of water, alteration of water flows, and invasive species. This new assessment provides a key new source of knowledge, helping identify the key factors underlying the health of Canada's rivers and watersheds, and together an approach to prioritize how and where to arrange needed water stewardship, well as priorities for water as

policy development.

The results of this detailed analysis will be made public on July 7, 2015, through a new interactive web platform (*watershedreports.wwf.ca*). Hopefully, this user-friendly tool will become a core resource to help guide watershed management, and the development of new policies and programs—and help Canadians get to know, and care about, the watershed they live in.

#### **Rivers at risk**

The results of our assessments indicate that Canada's watersheds are confronted with significant

threats which, if left unaddressed, will put at risk the invaluable water resources that Canadians rely

upon for drinking water, industry, and recreation.

Watersheds assessed to date face overall threat levels ranging from "low" (the Lower Mackenzie) to "very high" (the Great Lakes watershed and South Saskatchewan), with more than half of the watersheds assessed so far reporting "high" threat or above.

Not surprisingly, pollution is one

of the most significant threats to Canada's rivers. This threat is highest in the North Saskatchewan, South Saskatchewan, Great Lakes watershed, Ottawa, St. Lawrence, and Saint John– St. Croix rivers.

Along with pollution, habitat fragmentation is a big threat facing Canada's rivers today. The lowest score reported as yet in this threat category is "moderate," for the North Shore-Gaspé and Peace-Athabasca rivers.

These threats are already leading to changes in the ecological condition of Canada's rivers and watersheds. Where

Perhaps the biggest cause for the concern is the lack of data available to assess the health of these watersheds.

watershed health can confidently be determined based on available data, the majority fall below the threshold of good condition. Every watershed we fully assessed to date shows some degree of health impairment, with the majority scoring "fair" or worse. Only the St. John and St. Lawrence watersheds achieved a score of good health. Not one watershed is deemed to be in "very good" condition.

## Data dilemma

But perhaps the biggest cause for the concern is the lack of data available to assess the health of these watersheds. In some cases, monitoring of these key health indicators simply does not exist, and in others the challenge is a lack of public accessibility to relevant monitoring data.

Even in some of Canada's most densely populated and highly developed watersheds, such as the Great Lakes watershed, we don't know the health of the rivers that underpin our wellbeing and our economies. Due to a lack of available or accessible data in five of the eight sub-watersheds in the Great Lakes watershed, no overall health score was assigned, while as a whole, the threats in this decidedly urbanized area, are "very high."

In fact, for half of the 12 watersheds assessed, there wasn't enough publicly available information to confidently assign a score.

### Canada lags behind

Another gap to be filled is education. Does the average Canadian understand what the word "watershed" means? Do they know what makes a river different from a wetland, and how all these different parts contribute to a watershed-and our collective healthas a whole? One-fifth of the world's freshwater lies between our shores, which makes Canadians natural water stewards. The information available on the interactive web platform is accessible to everyone, from municipal water quality specialists and government engineers, to kayakers, canoeists, cottagers, and homeowners.

But there is still plenty of work to do. By 2017, WWF-Canada will have assessed all of Canada's watersheds, in support of the larger goal of maintaining all of Canada's waters in good ecological health by 2025. And once we have a clear picture of the state of every major watershed in the country, the real work begins. wc



James Snider is the VP of WWF-Canada's freshwater program.



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RULES & REGS

# Don't Panic

Water professionals must keep calm and carry on.

BY ROBERT HALLER

"KEEP CALM AND CARRY ON" has become a popular slogan for a lot of things lately, but it is still wise advice. As we prepare to receive the latest results from the Federation of Canadian Municipalities' (FCM) Infrastructure Report Card this fall, our key message will be, "Don't panic. We can do this." When we see the estimate for what it might cost to deal with our infrastructure needs, the first reaction might be to think the task is too overwhelming and cannot be done. But like any great journey, there are alternate ways to go and it's best to just take one step at a time.

Our two greatest friends for this journey will be priority-setting and innovation. We already know this latest report card has a much greater participation rate than the 2012 version because more municipalities have adopted asset management programs that allow them to answer the report card questions. Full asset management plans also help you to see where your priorities lie: what needs immediate attention and what can wait awhile? There are many risk assessment tools out there that can help you fine tune a long-term infrastructure plan. You can't do it all at once, so do the most critical projects first.

I believe the answer to handling this infrastructure challenge is through innovation. We cannot afford to just dig up every street or replace an old treatment plant with a newer version of the same. The old methods don't necessarily address all the other challenges we face with climate change, storm management, and new regulations. Innovation can usually lead to significant cost savings and can also address a lot of other concerns too. Going back to the use of asset management, we now look at the entire life cycle of an asset, not just the initial capital cost. New technologies can allow for much more efficient operation with lower energy consumption and/or maintenance and can allow greater ease for expansion.

Canada has no shortage of innovative solutions! In fact, Canada is being recognized as a world leader in water innovation. Yet many of these Canadian firms are still finding it difficult to be selected for projects here in Canada. While our provincial and federal governments work to export our technologies and products to the world, we in Canada are one of the toughest markets to move from old school thinking. Canada's trade commissioner in Chicago is coordinating major efforts to expose Canadian firms to the potential of the American market during this fall's WEFTEC event. Perhaps we need to do something similar to introduce these firms to buyers right here at home.

Canada is being recognized as a world leader in water innovation.

The Canadian Water and Wastewater Association (CWWA) is working with the FCM to secure more federal funding to help us while we try to influence public opinions to support the investments that need to be made in water and wastewater systems. We need you to do your part in developing an asset management plan with identified priorities, working on your own council or board to select water and wastewater projects, and then opening your minds to all the innovative solutions that are available to you. wc



Robert Haller is the executive director of the CWWA.

#### HIRED



announced the hiring of **Alex Mazurewicz** as communications manager.

BLOOM

Alex Mazurewicz

## ANNOUNCED

The Simon Fraser University Faculty of Environment announced the creation of the faculty's new Pacific Water Research Centre at the SFU Blue event on June 24 and the Canadian Water Summit on June 25. The centre will be a mecca of cross-disciplinary collaborative research applied to mitigating real world water crises globally; its research agenda will be driven by community concerns.

#### APPOINTED



**Peter Gallant** was announced as WaterTAP's new president and CEO. He has served on WaterTAP's board since the organization's inception, and held the position of vice chair until early 2015. He is the founding

president and CEO of Pathogen Detection Systems Inc. and VP of business development and regulatory affairs for ENDETEC.

WaterTAP named entrepreneur **Rick VanSant** as the new vice chair of its board. VanSant, the president and CEO of UV Pure Technologies, has been a WaterTAP director since September 2014



the appointment of **Randall Moore** as VP of market development North America. He has more than 30 years of experience in the water industry specializing in distribution

Pure Technologies announced

system asset management and water quality management.

#### RELEASED

The Canadian Water and Wastewater Association, with the help of Water Canada and the Actual Media team, completed and released a report titled Public Attitudes 2015. The report acts as a guidebook for communities developing communications plans around their water and wastewater services and will help bridge the gap between public opinion and the reality of Canada's water infrastructure challenges. *Download the report at bit.ly/PublicAttitudes2015*.

Canadian Water Network's Canadian Municipal Water Consortium recently issued the 2015 Municipal Water Priorities Report. The report focuses on four key national priorities: integrated risk management, full cost recovery and financing, wastewater recovery and beneficial use of biosolids, and resiliency to storms and extreme weather. *The report is now available at cwn-rce.ca.* 







Above: Sunita Narain, director general of the Centre for Science and Environment, India, was the 2015 Water Institute RBC Distinguished Lecturer.

Above, Right (L-R): David Rudolph, University of Waterloo; Paul Martin, Matrix Solutions; Patricia Meyer, Matrix Solutions; Emil Frind, University of Waterloo; Greg Padusenko, Golder Associates; and David Smyth, Golder Associates.

Water Institute Research Symposium 2015 Waterloo, ON

On April 30, the Water Institute at the University of Waterloo hosted its third annual research symposium. The event was a resounding success, setting a new milestone for participants. The event touched on several areas of water research at the University of Waterloo, and was organized into the topics of Cold Regions Research, Water Sustainability in Waterloo Region, Urbanization Impacts on Water, and Nanotechnology and the Water Sector. The day began with an insightful session on Water Security



for First Nations in Canada with invited presentations from **Steve Hrudey** (University of Alberta), **Irving Leblanc** (Assembly of First Nations), and **Merrell-Ann Phare** (Centre for Indigenous Environmental Resources). A graduate student poster exhibition showcased the broad range of water research occurring at the University of Waterloo and provided an opportunity to discuss the research interests and endeavours of the students. Many of the Water Institute's external partners attended the symposium and appreciated the chance to network with water researchers and students.

The research symposium was followed by the Water Institute RBC Distinguished Lecture, delivered by **Sunita Narain**, director general for the Centre of Science and Environment in New Delhi. Narain's talk, "Challenges for Water Security in the Poor's World," was very engaging and relevant to Canadian water research and education. Her lecture can be viewed on the Water Institute YouTube channel.



# Public Attitudes Project 2015

Changing Public Attitudes on the Value of Canada's Water System Infrastructure Download this report at bit.ly/ PublicAttitudes2015



Canadian Water and Wastewater Association canadienne des eaux potables et usées



Participants attend a series of off-the-record policy roundtables in the afternoon.

# **ONEIA Business and Policy Forum** Toronto, ON

A capacity crowd discussed opportunities, investment, and policies at the annual ONEIA business and policy forum in downtown Toronto on May 4. More than 160 professionals from across the environment and cleantech field gathered for a day of panels, guest speakers, roundtables, and networking.

Participants heard an opening keynote from Janet de Silva, president and CEO of the Toronto and Region Board of Trade, who discussed the growing importance of Toronto as a global cleantech hub. Two morning panels on investment and market opportunities included James Sbrolla with Cleantech Capital and speakers from KPMG, the TSX, AECOM, Metrolinx, and RWDI. The afternoon was taken up with a series of off-therecord policy roundtables that featured dozens of industry leaders in a frank dialogue with senior officials from provincial ministries and agencies.



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Above, L-R: Carl Bodimeade, senior VP with Hatch Mott MacDonald; Glen Murray, Ontario's minister of environment and climate change; Water Canada publisher Todd Latham; and Darla Campbell, executive director of the Ontario Coalition for Sustainable Infrastructure.

# **OCSI Infrastructure Forum** Toronto, ON

The Ontario Coalition for Sustainable Infrastructure (OCSI) hosted the second annual Infrastructure Forum on May 26, a half-day think tank that brought together municipal decision makers and stakeholders to address building sustainable communities. The event kicked off with keynote speakers who served as provocateurs, followed by breakout sessions. *The summary report will be available soon at on-csi.ca* 







# **WIN Leadership Awards** Vancouver, Calgary, Toronto & Montreal

The Women's Infrastructure Network hosted the inaugural WIN Leadership Awards on April 17. The objective was to celebrate excellence in Canada's infrastructure sector and further support the network's mission to recognize women as leaders in this growing field in which women have historically been underrepresented. A gala dinner was held in Toronto, with simultaneous events occurring in Montreal, Calgary, and Vancouver. Award winners were chosen from an exceptional group of shortlisted female leaders. The Outstanding Leader winner was **Leslie Woo**, Metrolinx's chief planning officer, and the Emerging Leader winner was **Tricia Curmi** with Kiewit. **André Voshart**, editor of Water Canada's sister publication, ReNew Canada, was among the panel of judges.

"Thank you to my fellow talented, smart, and strong nominees," Curmi said when accepting the award in Calgary. "It is through leaders like you that things change and equality becomes a reality. Thanks for all you do to lead us into into a new chapter of women in infrastructure."

"Ladies, through your collective leadership, we are moving an industry into the future," Woo said at the gala event in Toronto. "Although that industry might be entering the 21st century kicking and screaming at times, we have to keep up or get left behind."



L-R: Lake Ontario Waterkeeper board member Gord Downie of Canadian rock band The Tragically Hip and Mark Mattson, president of Lake Ontario Waterkeeper.



photographer and artist; Tanya Tagaq, Inuit throat singer; Ingrid Mattson, professor and activist; and Mark Mattson, Lake Ontario Waterkeeper.





L-R: Joseph Boyden, Canadian novelist and short story writer, and Ontario Environment Minister Glen Murray.

#### L-R: Avant garde artist Michael Adamson with Krystyn Tully, VP of Lake Ontario Waterkeeper.

# Waterkeeper Gala Toronto Toronto, ON

On April 23, 2015, Canadian artists and leaders gathered at the CBC for the Waterkeeper Gala Toronto, which The National Post calls "the gold standard" for water and awareness. Since 2012, the event has raised \$1.7-million and attracts a who's who of icons from the world of water and culture.

"When the water breaks, life or death happens," Inuit throat singer **Tanya Tagaq** told the audience before delivering a powerful performance backed by violinist **Jesse Zubot**.

Cultural icons including **Dave Bidini**, Joseph Boyden, Gord Downie, and **Ingrid Mattson** shared their "watermarks"—short stories about the way a body of water has influenced them.

Bass **Robert Pomakov** with members of the Gryphon Trio delivered a breathtaking rendition of "Old Man River" and renowned anthropologist and professor **Wade Davis** spoke about the influence of water on the Canadian identity.

"Your life has been shaped by water, whether you realize it or not," said **Mark Mattson**, Lake Ontario Waterkeeper founder and host for the evening. "That's the power of water. Through these stories, we get to the heart of the Canadian experience and culture."

Waterkeeper will use some of the event proceeds to develop an archive for capturing and sharing these "watermarks." The group has already initiated partnerships with Fraser Riverkeeper and Ottawa Riverkeeper to begin collecting water stories from across Canada.

"We are deeply honoured by the community's support," Mattson said. "The gala's success is a testament to just how important water is to our communities. It bodes well for everyone in our sector." —Krystyn Tully



# It's time to incorporate innovation into climate change adaptation. BY CARL BODIMEADE

**IN THE CONTEXT OF** Hurricane Katrina, Superstorm Sandy, the Calgary flood, and extreme rainfall events and ice storms in southern Ontario, who could argue that we need to make our cities and communities more resilient? Add the uncertainty of how our weather will be affected as climate change continues and it is no wonder that there is much discussion on this important topic.

On May 26, the Ontario Coalition for Sustainable Infrastructure's (OCSI) held its second annual Infrastructure Forum—Eco-Fiscal Challenges to Building Resilient Communities in Toronto. Leaders from more than 20 organizations from the municipal and public works sectors in Ontario, along with representatives from the province, discussed the subject with three provocateurs sharing their ideas to stimulate courageous conversations.

Glen Murray, Ontario Minister of the Environment and Climate Change, raised thought-provoking points regarding the significant impact of increasing temperatures. Minister Murray also shared what Ontario is doing to reduce such impacts while at the same time creating value for its citizens, such as Metrolinx's Rapid Express Rail (RER) program. Mel Cappe of the University of Toronto, representing Canada's Ecofiscal Commission, noted that the Commission advocates for the inclusion of all impacts of resource use, including climate change adaptation, in the costs of those resources. Gerry Lashley from Intact Insurance told participants that the World Bank is predicting a 10-fold increase in weather damage, largely due to climate change. If the insurance industry increased premiums 10-fold then insurance coverage would not be affordable in many cases.

So what is to be done? One of the big ideas identified in group discussions at the forum was the need for innovation in the way governments—and the public recognize and incorporate the value of climate change mitigation and adaptation.

Recently the University of Waterloo, on behalf of two major insurance companies, carried out a survey of 15 Canadian cities to evaluate their preparedness to limit flood damage (bit.ly/FloodReady). Grades for the cities surveyed ranged from Ato D. To increase those grades, and the resiliency of our cities in general, funds will be required for projects and other measures. Accordingly, the public works profession needs to build compelling business cases to rationalize the cost of climate change adaptation and show clearly the return on investment. It needs to be clearly communicated to the public that the status quo presents significant long-term risks and that incorporating mitigation measures now, rather than dealing with the likely impacts of climate change in the future, makes good economic sense. Bold leaders are required to advocate for the measures required, but for the expenditures to be acceptable to the elected officials and the public, there needs to be explanation and transparency as to why and how those funds are being spent. The individual homeowner must also accept his or her own responsibility, take steps to protect their home, and so reduce the overall impact on their community during extreme events.

During the forum discussions, it was appreciated that technical and technological innovation will certainly be part of the solution, but the greatest need for innovation is in the way that municipalities go about their "business" in areas such as procurement, policy, and implementation. Existing municipal procurement processes will need to be modified to facilitate this-for example, by focusing on long-term value rather than short-term cost. Other levels of government and, in particular, regulators must remove any roadblocks and constraints in achieving that innovation. You will have noticed that I have not mentioned the private sector so far; in my opinion, engineers, contractors, suppliers, et cetera, are frequently looking at innovative ways to play their role, as long as the "rules of the game" permit them to do so. wc

Carl Bodimeade is the senior VP of Hatch Mott MacDonald.

Latornell Conservation Symposium | November 17-19, 2015 Nottawasaga Inn Resort & Convention Centre • Alliston, Ontario

# Weathering Change

There is no longer a debate about whether or not climate change is happening but rather what actions we can take to navigate the new normal. This year's Latornell Conservation Symposium will explore the climate change impacts we are seeing in Ontario 's watersheds as well as current and emerging best management practices that are underway or can be used to build environmental, economic and social resilience.

# 2015 Keynote Speakers

Blair Feltmate Chair, Climate Change Adaptation Project Canada

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# save on energy FOR BUSINESS

# Once he reduced his energy costs by 55% after installing a VFD, savings in other parts of his business went into overdrive.

Once you start seeing the benefits from our incentives for installing premium efficiency motors and VFDs, you'll want to look into making other parts of your business like lighting, HVAC and compressed air systems more efficient too. When you do, you'll be joining thousands of organizations across Ontario who are already enjoying the savings that our programs deliver.

Take a look at their stories and our incentives a saveonenergy.ca/business

