

WATER CANADA

TAKE BY STORM

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Changing
Role in Water
Management

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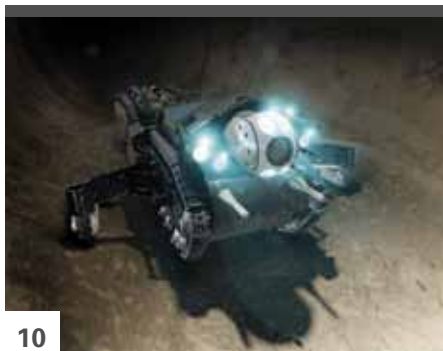
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EDITOR

Katherine Balpataky

ASSOCIATE PUBLISHER

Lee Scarlett

PUBLISHER

Todd Latham

ART DIRECTOR & DESIGNER

Donna Endacott

ASSOCIATE EDITOR

André Voschart

EDITORIAL INTERN

Tristan Simpson

CONTRIBUTING WRITERS

Oliver Brandes, Blair Carter, Vincent Cloutier, Bonnie Crombie, Anne-Marie Decelles, Miryane Ferlatte, Robert Haller, Grace Saunders-Hogberg, Karen Kun, Amy Lane, Marie Larocque, Brenda Lucas, Julie Ruiz, Sameer H. Shah, Tristan Simpson, Rosie Simms, Darren Sokoloski, Yohann Tremblay

ADVERTISING

Lee Scarlett lee@watercanada.net
Todd Latham todd@watercanada.net

ADVISORS

Nick Reid, James Sbrolla



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Uncertain Frontiers

BY KATHERINE BALPATAKY

THERE ARE MANY WAYS to classify the water challenges Canadians face, but whether they are related to aging infrastructure, knowledge gaps, climate change, or citizens' values, all are rooted in governance challenges. In this issue of Water Canada, we explore the changing role of government in water management. On the one hand, there are many water leaders rallying for renewed federal leadership and stronger provincial oversight. At the same time, a perhaps even larger body of citizens is advocating for community and municipal-level action, driven by homegrown values and collective action. There is room for both approaches. But what do they look like in practice?

Recently, Canadians have observed some fascinating examples of water governance playing out regionally, nationally, and internationally. In September 2015, heads of state from around the globe gathered in New York City to adopt the 2030 Agenda for Sustainable Development, with several goals focusing on drinking water and sanitation. Although binding commitments have not yet been set, our federal government has stated they would "commit to developing a comprehensive plan to make measurable progress toward achieving these goals." Meanwhile, across the Canada-U.S. border, a debate has been a mounting about a potential diversion of water from Lake Michigan to Waukesha, Michigan, with the International Joint Commission managing the process.

Exclusively within Canadian borders, British Columbia has passed its new *Water Sustainability Act* that brings into force modern provisions for managing groundwater, surface water takings, and environmental flows (see page 20). It is considered by many as a prototype of modern water legislation, yet there are questions about how it will be implemented. In Canada's sixth most populous city, Mississauga, mayor Bonnie Crombie is leading a new cost-recovery stormwater strategy that makes landowners accountable for the runoff they send to sewers (page 10). In an attempt to harmonize provincial and municipal planning strategies, the Quebec government has launched a program to integrate citizens' and scientists' knowledge about groundwater to establish land-use and groundwater decisions (page 22).

Over the course of my career, I have been privileged to work at both the federal and local levels on water management issues. I have observed how crucial the history and influence of people affected are to the decision-making process. I have also found that a bit of magic is necessary in the timing of major decisions, often tied to an opportunity or crisis. Either way, readiness and data to support the objectives are always precursors. Every new political cycle brings new surprises. I hope this issue will deliver some examples where the government's changing role aligns with the public interests and future demands. **WC**

Contact Katherine at
416-444-5842 ext. 116 or
[email katherine@watercanada.net](mailto:katherine@watercanada.net)

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GRACE SAUNDERS-HOLBERG
Grace is a graduate from the University of Waterloo Masters in Environmental Studies program with a focus on sustainable water management in the food and beverage industry.
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JULIE RUIZ
Julie is a professor of environmental sciences at the Université du Québec à Trois-Rivières.
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CORDELL SAMUELS
Cordell is a senior operations and training consultant; interview on
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BRENDA LUCAS
Brenda is the executive director of the Southern Ontario Water Consortium and chair of the 2016 Canadian Water Summit.
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ABOUT THE COVER

Mississauga Mayor Bonnie Crombie is tough on stormwater management. Standing firmly behind the council's decision to implement a new stormwater levy based on a calculation of each landowner's runoff, she is paving the way for other municipalities to consider equitable, cost-recovery models for stormwater more seriously.

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FRONT

Island River in the Northwest Territories.

Photo: Blair Carter

Source Protection

A community undertakes its own source water protection plan.

BY BLAIR CARTER



Blair Carter and Jessica Jumbo look for an abandoned gas well.

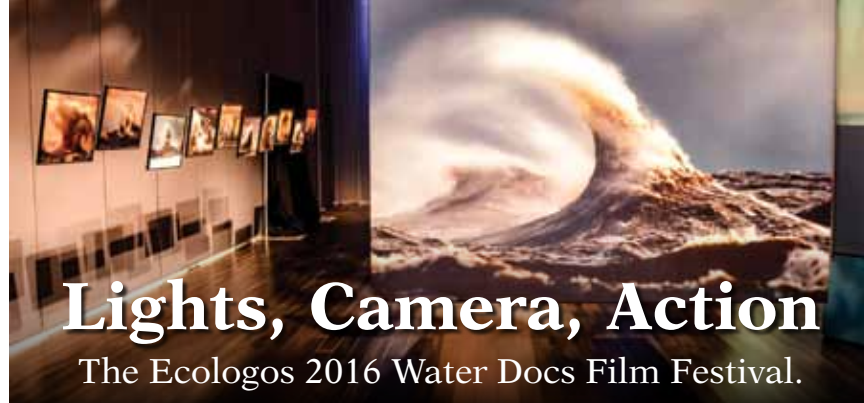
THE NEED TO DEVELOP local source-water protection plans is well recognized by the Government of the Northwest Territories through the NWT Water Stewardship Strategy. The community of Trout Lake—a remote Aboriginal community of approximately 100 people that is only accessible by charter plane and winter road—is proud to be the first and only community to have taken on source water protection planning in the Northwest Territories.

The initial project was undertaken between 2014 and 2015 through a collaborative partnership involving the Sambaa K'e First Nation (the designated authority for the community of Trout Lake), Ecology North (a Yellowknife-based environmental non-government organization), and the Environment and Natural Resources Department of the Government of the Northwest Territories (ENR), which provided both financial and technical support. The project was initiated in response to ongoing community concerns about the potential impacts

that industrial development, old industrial waste sites, community waste facilities, fuel storage, and climate change may be having on their source water body, Trout Lake.

The plan, which was completed in mid-2015, outlines potential source water contaminant sites in the Trout Lake watershed (an area of 5,694 square kilometers), and includes a risk assessment and checklist of management actions required to implement the plan. Blair Carter, the water program manager for Ecology North, said, "It has been very exciting to see more and more community members becoming engaged in the source water planning and implementation processes in the community. It has truly been a community-driven project, where community members set the goals, objectives, and direction for the plan, in addition to the priorities for implementing it."

Blair Carter is a water program specialist with Ecology North.



Lights, Camera, Action

The Ecologos 2016 Water Docs Film Festival.

Photo: Ecologos Institute

THE ORGANIZERS of the Ecologos 2016 Water Docs Film Festival assumed the event would be better than the previous year—but the results were unexpected. The annual festival started as a pilot in 2012, encapsulating Ecologos's mission to capitalize on the power of documentary filmmaking in order to evoke a sense of reverence for water; to inform about threats that imperil water; and to inspire citizen action to protect water.

Since 2012, Stan Gibson, executive director of Ecologos and the Water Docs Film Festival, said the festival audiences have grown by about 17 per cent, except this year when they grew by 30 per cent compared to 2015. "This was driven by our growing reputation and base of supporters, by a new and larger venue, and by the addition of three very fine exhibits."

Several exhibits were showcased at this year's festival: Dave Sandford's Liquid Mountain photographs of Lake Erie that demonstrate the strength of

wind and water; Montreal's Theatre Porte Parole's The Water Shed, a spiritual attraction that allowed guests to commune with water; and Pedal Power, which allows participants to experience how much energy is needed to get water from the source to their taps by pedalling a bicycle to generate electricity. The films displayed were selected by a voluntary team of experienced filmmakers and others knowledgeable about filmmaking.

On opening night, audiences were absorbed by the narrative of Fractured Land, which follows indigenous lawyer Caleb Behn whose people are at the middle of some of the largest fracking operations on Earth and are divided between a need for jobs and sacred duty. The film was enlightening, but maybe the best part of the night was at the end when audiences had the opportunity to speak with filmmakers, goers, and Behn in person. —Tristan Simpson

Early Education

OCWA teaches water literacy. BY AMY LANE

GRADE 8 STUDENTS from elementary schools in Wasaga Beach and Belleville, Ontario recently participated in Ontario Clean Water Agency's (OCWA) OneWater Education Program. Students did hands-on experiments that included a flocculation demonstration by adding coagulant to river water in a test jar and shaking it to observe how the particles clump together and settle at the bottom. The program, piloted last year in eight schools across the province, teaches students about how water and wastewater is treated in their local community and educates future generations about their local water system and how it works.

The result? Just over 80 per cent of the students reported they were better

informed about what should and should not be put down the toilets or drains after their classroom visit by the OCWA operator. "The OneWater education program is a flagship initiative for our agency," said Robin Kind, executive sponsor of corporate social responsibility at OCWA. "We see water literacy as an important way to support the health and sustainability of our communities."

OCWA is a provincial agency that operates and maintains more than 800 water and wastewater facilities. To watch the OneWater video, visit bit.ly/OneWaterEd.

Amy Lane is a marketing and community outreach specialist at OCWA.

Online at
WATERCANADA.NET



BLOG: Matt Howard, director of the Alliance for Water Stewardship-North America, talks about Obama's commitment to a global standard for industrial water use.

bit.ly/HowardAWS



NEWS: Munk School of Global Affairs' Program on Water Issues (POWI) shuts down. bit.ly/POWIsunset



BLOG: Waukesha mayor Shawn Reilly defends his city's controversial bid to divert water from Lake Michigan.

bit.ly/WaukeshaMayor



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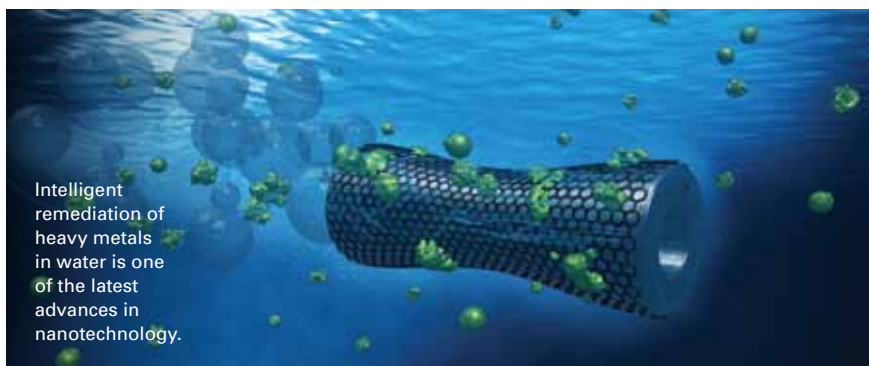
The engineer of the PureRobotics crawler took images of World War I tanks as inspiration for the robot.

Intelligent Machines

Will a robot replace your water job in the future?

BY TRISTAN SIMPSON AND KATHERINE BALPATAKY

THERE IS A POPULAR THEORY among North Americans that, in the future, robots might replace people in the workplace. Given self-driving cars are a reality and artificially intelligent robots are beating humans in complex logic games, such a future might not be so far off. A 2016 survey found that a quarter of Canadians believe a computer program could perform better than their human boss. Why not in water management?



Intelligent remediation of heavy metals in water is one of the latest advances in nanotechnology.

PureRobotics Crawler

Resembling a 250-kilogram miniature tank that moves at nearly half a metre per second, Pure Technologies' latest version of the PureRobotics crawler is designed to navigate, inspect, and monitor water infrastructure pipes. The robotic inspection system is equipped with a rotating head, modular feet, and measurement tools like a 3-D LIDAR scanner and 2-D laser that measures pipes size and corrosion level. The Calgary-based company said the pipe inspection system can provide real-time comprehensive data and video of pipes using high-definition, closed-circuit television. The crawler has been used to inspect water pipes in cities like Oshawa, Ontario; Louisville, Kentucky; Miami, Florida; and Austin and El Paso, Texas. Although it can't repair a watermain break, it provides a safe and accurate inspection.

Pb Eater

The international research team led by the Max-Planck Institute for Intelligent Systems (MPI-IS) has designed a proof-of-concept graphene-based microbot capable of removing lead from wastewater. A team of hundreds of the robots—each about 15 to 20 microns in length—are said to clean water containing 1,000 ppb of lead down to below 50 ppb in 60 minutes. The tubular microbots are designed with three layers: an outer layer made of graphene oxide that captures the lead contaminants, a middle layer made of nickel that allows the microbots to be controlled and retrieved using a magnetic field, and an inner layer made of platinum that breaks down hydrogen peroxide added to the contaminated water. The produced water is ejected out of the back of the bot to propel it through the water.

Catfish Scare-Bot

In 2001, Louisiana State University professors Steven Hall and Randy Price identified a problem of bird predation on catfish farms in the state. Fish numbers were dwindling and farmers were taking extreme measures like shooting and poison to stop birds. "We felt a friendlier and low-maintenance approach was best," Hall said. The pair developed an automated solar-powered boat that is equipped cameras, GPS, and a microcontroller that operate on a software program that detects the birds and moves accordingly. The boats are also capable of tracking water temperatures and dissolved oxygen, two factors that have a direct effect on aquatic life. The boats are currently used in several bodies of water in Louisiana and Arkansas.



Zhuhai Yunzhou Intelligence Technology surface vehicles are popular for spill response situations.



Swarm-Bots

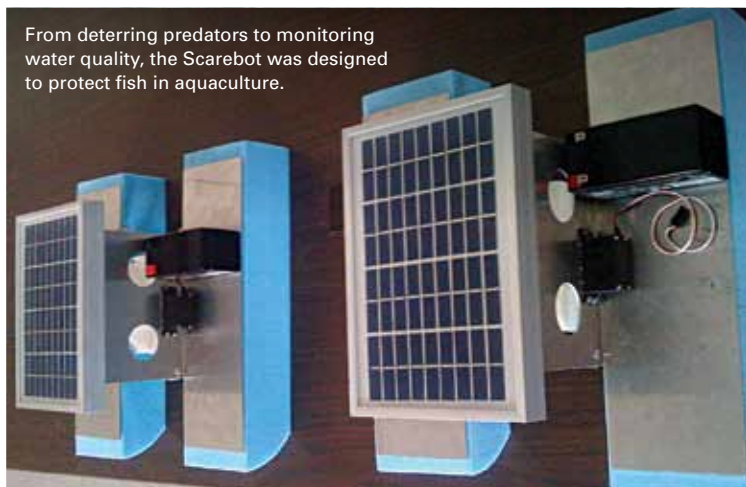
Scientists in Europe are developing a long-term system of automated “swarm robots” to monitor Venice’s polluted waterways. The swarm will consist of three types of robots: aMUSSELS, which resemble mussels (molluscs) that lay on the sea floor and aFISH, designed to mimic the hydrodynamics of fish. Together, these robots will collect temperature, salinity, pH and particle data. The swarm will also include an aPADS robot, which acts as the nest or docking station, allowing the aMUSSELS and aFISH to dock, recharge, and communicate findings. Thomas Schmickl, a zoology professor at the University of Graz in Austria who lead the project, said, “Nature has evolved animals to be efficient in their natural habitats, so taking inspiration from them is good design for robots that operate in the water.” A swarm’s inherently robust nature makes it the best option for tackling Venice’s harsh environment, he added. Even if one robot gets damaged, the swarm will continue to perform its duty.

Unmanned Surface Vehicles

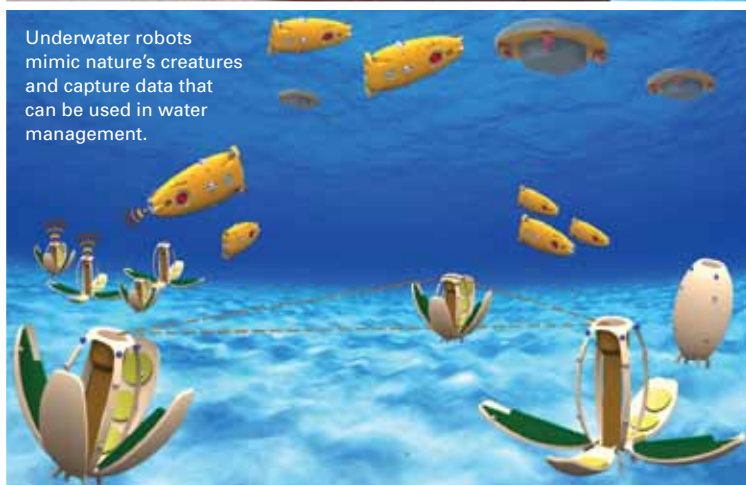
Chinese company Zhuhai Yunzhou Intelligence Technology Ltd. has developed an unmanned surface vehicle (USV) to monitor water quality. Like most devices in the field, the USVs are equipped with various probes and ultrasonic sensors to detect physical obstacles. The USVs are powered by a high-capacity lithium polymer battery, which last about six hours, and can track water quality in real time and produce a water-quality map after the mission is complete. Given its small size—only 20 centimetres—the USV is safer than most boats, especially when responding to emergency spill accidents or inclement weather (the model can handle ocean waves of 2.4 metres). **wc**



From deterring predators to monitoring water quality, the Scarebot was designed to protect fish in aquaculture.



Underwater robots mimic nature’s creatures and capture data that can be used in water management.



Tristan Simpson is Water Canada’s editorial intern and a freelance writer based in Toronto. Katherine Balpataky is the editor of Water Canada.



Mississauga Mayor Bonnie Crombie speaks up on why landowners must now pay for water they send to the sewer. BY BONNIE CROMBIE

THE CITY OF MISSISSAUGA in Ontario owns nearly \$2 billion in stormwater infrastructure that must be properly maintained if we are to build a stronger and more reliable future for Canada's sixth largest city. Our stormwater drainage system protects water quality and reduces the risk of flooding that can damage homes, businesses, and our environment.

Mississauga is a growing city. We are planning new intensified developments, consistent with the requirements in the Ontario government's *Places to Grow Act*—legislation that maps out municipal growth in a coordinated and strategic way. Over the next two decades, Peel Region will need to accommodate approximately 150,000 jobs and more than 300,000 people, many of which will locate in Mississauga.

To give you a better idea of where

Mississauga is headed, in 2015, the city issued \$1.3 billion in building permits. That's a 10-per-cent increase from the year before. Mississauga also issued an additional \$250 million in conditional permits to help get construction underway. We are a city in demand. As a result, there are increasing pressures on our aging infrastructure. We must take urgent action now.

Our rapid growth has become a catalyst for how our municipality meets our stormwater management needs. Intensified development means the amount of water running off hard surfaces like buildings and parking lots is increasing. Changes to our climate can also bring heavier rainfalls and rapidly melting snow. These changes mean more stormwater is entering our system than ever before, causing costly wear and tear on aging infrastructure.

In 2009 and 2013, Mississauga was severely hammered by storms. According to some media reports, Mississauga was perhaps the hardest-hit part of the Greater Toronto Area following the July 2013 downpour that devastated neighbourhoods. We cannot ignore the effects of climate change.

Safe, reliable stormwater infrastructure is crucial to city building

Based on extensive research and consultations, Mississauga city council decided a stormwater charge to be a fair, dedicated, and responsible source of funding that is needed to manage stormwater now and in the future. Starting this year, the stormwater charge has been added to the Region of Peel water bill for Mississauga properties. The stormwater charge is expected to raise \$37 million in

2016, allowing for new, unprecedented, and necessary investments in this essential infrastructure. The funds cannot be used for other services and programs as stated in the Stormwater Fees and Charges By-law.

charged for the area of hard surface—such as buildings and parking lots—covering the property. Residential properties will be put into one of five tiers, using rooftop area as the indicator of hard surface. In 2016, 80 per cent

residential property owners and developers to implement best practices in green development. Additionally, education and outreach programs are offered to help residents understand drainage and related risks on their property, as well as strategies for managing those risks while protecting their home and the environment.

Mississauga is one of many Canadian municipalities experiencing rapid growth. Other cities can learn from what we have done to ensure their own stormwater infrastructure is in good working order. We cannot predict when the next major storm will hit but we can be prepared for when it does. WC

Accountability is fundamental to getting this right.

Accountability is fundamental to getting this right. A property owner's contribution to the funding of the stormwater program will no longer be based on the value of their property. Instead, it will be based on the extent of hard surfaces. This is fairer, since the impact a property has on the stormwater system is unrelated to land value. Commercial, industrial, institutional, and multi-residential buildings will be

of residential property owners will pay \$100 or less. The city is also introducing additional programs that engage landowners in stormwater management.

A credit program is also available for multi-residential and non-residential properties that demonstrate efforts to significantly reduce the impact of stormwater run-off from their property. This program motivates commercial, industrial, institutional, and multi-



Bonnie Crombie is the mayor of Mississauga.



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SHARED WATERS

PUBLIC OPINIONS ABOUT THE GREAT LAKES AND SOURCE WATER

In April, the International Joint Commission (IJC) published the results of one of the largest surveys ever conducted on public perceptions of the Great Lakes. Almost 4,000 basin residents responded. The results provide valuable picture of public perceptions of the world's largest freshwater system and also their drinking water. A snapshot of the results illustrates some interesting opinions concerning drinking water sources. WC

Can you tell me where your drinking water comes from?

In your opinion, is the environmental health of the Great Lakes improving, deteriorating, or staying about the same?



WHO IN YOUR OPINION IS CURRENTLY RESPONSIBLE FOR PROTECTING THE HEALTH OF THE GREAT LAKES BASIN?

Everyone Federal governments State / Provincial governments Don't know Residents City / local government

35%

23%

20%

7%

6%

4%

OTHER (INCLUDES: ENVIRONMENTAL PROTECTION AGENCY, INDUSTRY, GREAT LAKES COMMISSION)

5%



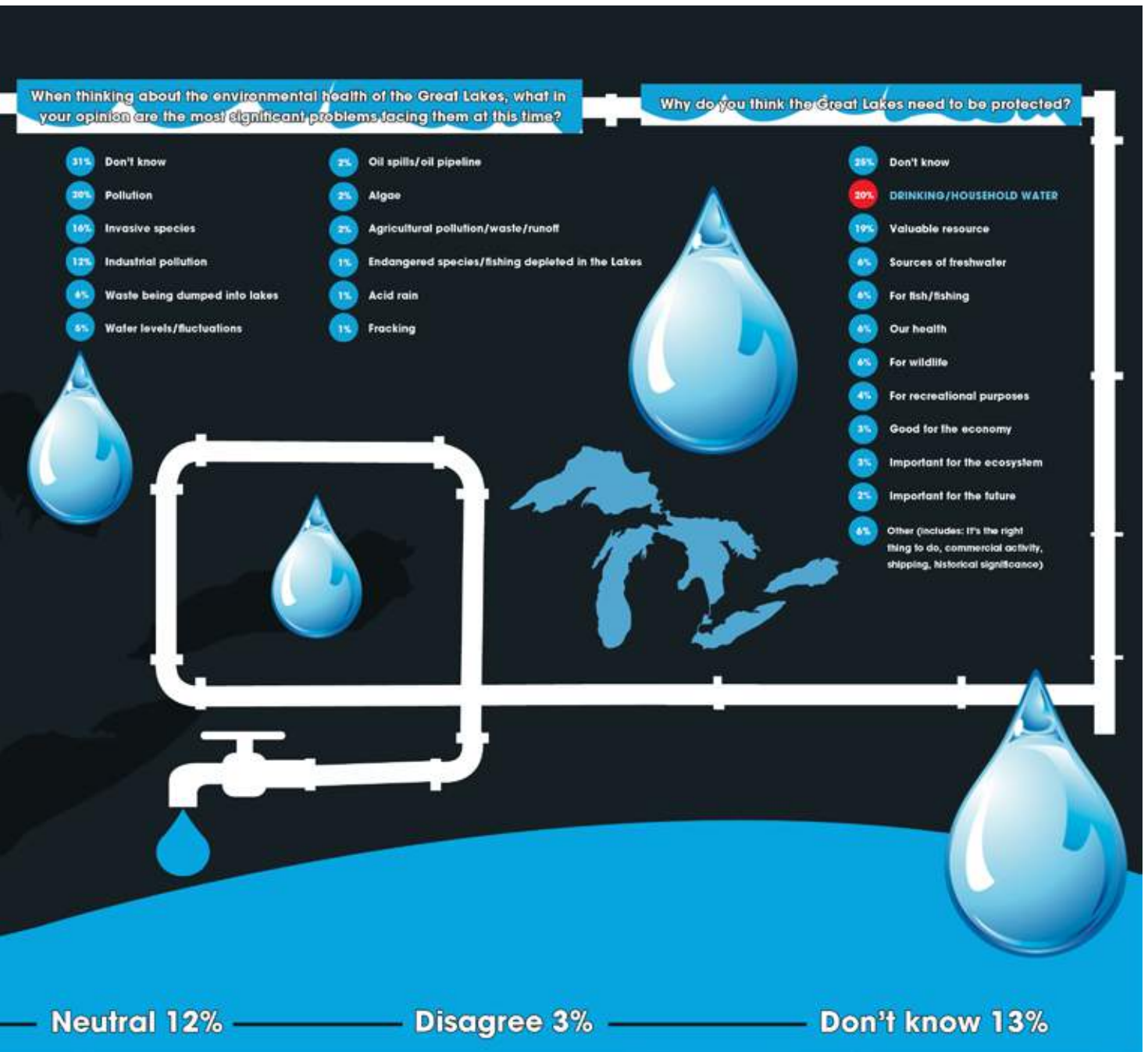
Value statement: the health of residents in the region will suffer without healthy Great Lakes

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Kevin Thomas and Hugues Létourneau of the Shareholder Association for Research and Education work with investors to identify and mitigate water risks.



Kevin Ranney works with asset managers, mutual funds, and pension funds on responsible investment.



Jamie Bonham of NEI Investments screens companies against performance criteria including the company's water impacts.



David Henderson is the managing director of XPV Capital Corporation, a private equity fund that invests exclusively in water.



Deltares and Utrecht University in the Netherlands are working together on a new water data information service that will feed into the World Resources Institute Aqueduct tool.

Risky Business

How financial actors are responding to and driving water sustainability.

BY GRACE SAUNDERS-HOGBERG

IN RECENT YEARS, investors have become more aware of the impact catalysts like climate change, population growth, and declines in freshwater availability have on the global economy. A dramatic example of this occurred in March 2011 when the price of cotton surged 167 per cent after years of floods and drought in the world's key cotton-growing regions, coupled with an increased demand for cotton in Asia. This price surge prompted U.S. retail chain The Gap to cut its full-year profit forecast by 22 per cent.

Among the range of factors investors are encouraged to include in their evaluation of a company's financial prospects, water risks have emerged as an area requiring attention. This fact was underscored this past year when the World Economic Forum placed water insecurity as the biggest threat facing the global economy over the next decade. Even in water-rich Canada, these risks have become increasingly important.

Kevin Thomas, the director of shareholder engagement at the Shareholder Association for Research and Education, said water is a key area of interest for investors. "Companies can potentially be exposed to real financial risks in terms of pollution or availability."

According to David Henderson, managing director with XPV Water Partners—an investment firm focused on high-growth water and environmental businesses

globally, “the main economic activities in Canada according to GDP are based on water-intensive industries [...] food and beverage processing, manufacturing, oil and gas.” This past year, institutional

extractives research and engagement at NEI Investments, water risk management is an important consideration when deciding whether or not to invest in a company. NEI Investments is a national investment firm with more than 25 years’ expertise in socially responsible investing. NEI uses a rigorous screening process to assess companies against a baseline of performance criteria,

and Bonham said companies that fail to meet these measures are dropped. This includes the company’s water impacts relative to other local users. “We are looking at water within the greater watershed; the societal use of shared resources.” Bonham said assessing and managing impacts for downstream users ensures the social licence for a company to operate.

If a company fails to acknowledge

growing risks, it could become a material matter for the investor. This is often the case when it comes to relations with First Nations. “Relationships with indigenous peoples are often not expressed as a water problem,” Thomas said. “But threats to drinking water, ecosystems, or hunting and trapping rights are all intertwined.”

In a truly holistic approach to assessing water risks, it goes beyond the direct operations. Kevin Ranney, the director of advisory services at Sustainalytics, said “supply chain issues are very important to any risk assessment of a company.” The food and beverage industry is a good example of this, given its dependence on agricultural inputs—that are highly susceptible to a range of water risks. “It is important for companies to engage with their suppliers regarding their management of such risks,” he said. Mapping tools, such as the World Resources Institute’s Aqueduct, have been developed to help investors identify vulnerable water basins across the globe.

The key for investors is seeing how well a company understands and manages their water risk.

investors requested further disclosure on water management from 11 Canadian companies through the Carbon Disclosure Program’s water program. Of these, four (or 36 per cent) reported a detrimental water-related business impact in 2014.

The key for investors when assessing a company is seeing how well a company understands and manages their water risk. For Jamie Bonham, manager of



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According to Thomas, financial investors can also be drivers of change to achieve outcomes that protect water and ecosystems by requiring disclosure of practices. Investors can ask companies about how they manage water risks and

It's not just a matter of being socially and environmentally conscious—it's a matter of doing sound analysis for long-term investments.

their strategies to minimize impacts, which provides an incentive to perform well. They can also engage companies in adopting better water management practices.

By focusing on the catalysts that affect global water supplies, Toronto-based XPV Capital has become the largest company in the world of its kind dedicated to

water. XPV is a private equity investment firm that specializes in sub-scale emerging companies solving various water issues. It currently manages \$400 million in assets on behalf of institutional investors, including pension funds, endowments, and banks. "Institutional investors are attracted to us because we are highly specialized," Henderson said. Investing in technologies to improve water efficiency and water treatment drives

the solutions to many water challenges.

Bonham also agrees with the notion of an investors' role in bringing environmental, social, and governance issues to the forefront: "It's not just a matter of being socially and environmentally conscious, but it is also a matter of doing sound analysis for long-term investments."

At the end of the day, water is just one aspect that may affect a company's growth. Yet as water challenges globally increase, so do the fiduciary responsibilities that come with caring for investments of their asset owners. **WC**

Grace Saunders-Hogberg is a graduate from the University of Waterloo Masters in Environmental Studies program with a focus on sustainable water management in the food and beverage industry.



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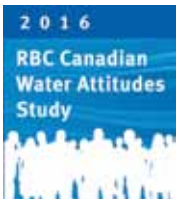
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Public-private partnerships can be an effective model for renewing critical water infrastructure despite challenges. BY DARREN SOKOLOSKI

THERE IS WIDESPREAD CONSENSUS that Canada's water systems are in urgent need of investment, replacement, and renewal. For many cities and communities, however, the upfront costs are prohibitive. Public-private partnerships (P3s) are gaining ground as a means for governments to achieve their infrastructure renewal goals; yet when it comes to water, there is still limited adoption of this financing model. Despite perceptual and structural challenges inherent to the sector, P3s can be a viable and desirable model for water and wastewater projects.

A recent example is the Safe Clean Drinking Water Project (SCDWP) in the City of Saint John, New Brunswick, where Port City Water Partners has been awarded a contract to design, build, finance, operate, and maintain (DBFOM) a new water treatment plant. As part of this consortium, ACCIONA will be responsible for the design, construction, and operation of a

75-million-litre-per-day water treatment plant, a 33-million-litre storage tank, and for making improvements to the city's water reservoirs, transmission system, and pipelines. The completed project will provide services to around 70,000 people.

The most well-publicized feature of the P3 model is the transfer of capital investment obligations from the public to the private sector; governments

are then able to pay for the infrastructure over time versus making a single large upfront capital investment. While the cost of private versus public sector capital can be a point of contention among citizens opposed to private sector involvement in water services, the value of the P3 model is derived from the more fundamental principles of efficient risk transfer; integrated development of

design, construction, and operational plans; and a more effective matching of asset investment profiles to the natural life cycle and renewal requirements of the asset. This approach is particularly

The most well-publicized feature of the P3 model is the transfer of capital investment obligations from the public to the private sector.

beneficial in the water sector where process design and operational efficiency play a significant role in the total life-cycle cost of the asset.

Life-cycle driven procurement

Under the P3 model, the complete cost of providing, maintaining, and operating the asset is priced over the contract term (typically 30 years). When the asset or

The Mundaring Water Treatment Plant in Australia is an example of the type of treatment plant planned for Saint John, New Brunswick.



Credit: ACCIONA

utility is handed back to the client at the end of that term, it must meet the condition specifications set out in the contract. The proponents support these delivery and hand-back commitments with financial guarantees. This alignment of performance and financial risk over the contract term ensures the life-cycle cost is optimized.

To achieve this within a competitive procurement process, the P3 proponents consider both the capital investment and operating cost profiles to achieve a low overall cost for the public sector. For water projects, the starting point is process design, selecting a treatment approach that is compatible with the raw water chemistry, meets client requirements, and minimizes operating costs in terms of chemical and power consumption. Design of the plant is also reviewed for efficiency of construction methodologies, ease of physical operations, best use

of locally available resources, and optimal balance between capital and maintenance cost requirements.

Harnessing expertise

It's difficult for every municipality to have the specialized array of expertise needed to manage a complete suite of infrastructure assets—roads, sewers, wastewater, drinking water, garbage collection, recycling, *et cetera*. Transferring some of this management to the private sector allows municipalities to benefit from the expertise of a private-sector entity that manages a large number of these assets in aggregate. During construction, sufficiently large private entities are also able to leverage their global supply relationships to reduce equipment and component costs.

The P3 model also allows municipalities to harness the wide breadth of experience of global companies who are up to date on the latest proven technologies. ACCIONA,

for example, is one of Spain's largest corporations, operating in infrastructure, energy, water, and services in more than 30 countries. For the design of the Saint John drinking water treatment plant, its team drew on the company's exposure to different types of plants around the world and its knowledge of how those plants operate over time.

Perceptual challenges

Despite the benefits of P3s, there are some important challenges specific to the water sector. The biggest is public perception as it relates to safety, ownership, and loss of jobs.

The change from a publicly managed to a privately managed drinking water facility always engenders concerns about the maintenance of safety standards. It's important to recognize that the required standards, permits, and procedures apply equally to all operators and systems, whether they are run by a municipality, a private company, or a special-purpose

entity like a P3. They allow no margin for reducing quality of service as a way of cutting costs—nor would it be in an operator's interest to do so. Companies look to deliver high-quality service because this is the foundation for their business growth.

Many people also fear losing control over publicly held assets, particularly when it comes to water and when multinational companies are involved. In this regard, it is important to clarify that P3 concession contracts do not confer ownership rights; rather, they are simply long-term contracts to build, operate, and maintain the assets. The contracts include numerous remedies the clients can implement if the private partner fails

Many people fear losing control
over publicly held assets,
particularly when it comes to water.

to provide services to the standards the client has specified. The contracts also generally prevent the private partner from arbitrarily setting rates or from selling derived services to third parties.

Finally, while multinational companies may bring in their own management models, structures, and capital, they inevitably need to hire local resources to perform the work. For example, the plant operators still need to be certified in their local jurisdiction and, for reasons of practicality, need to live in the local area.

Improving the model

In the water sector, assets tend to be smaller—often costing significantly less than \$100 million to build, and even less to refit and upgrade. For these smaller asset sizes, it can be a challenge for the P3 model to be cost-effective while bearing the fixed costs of developing the procurement materials and running a detailed procurement process. Fortunately, as more P3 procurements are closed, the model is becoming more clearly established and the upfront cost of running a P3 procurement is being reduced, both for clients and bidders. On this front, industry and clients each have

a role to play in working to standardize the process. Further experiments, such as removing the need for committed third-party financing until after a preferred proponent is selected, may lead to further reductions in procurement costs. Working examples of this approach are available for study in the United Kingdom and Australia.

A shortage of in-house expertise is also a material barrier to implementing a P3 procurement. While many provincial governments have acquired expertise with this model, effectively supporting a large number of transactions at a municipal level remains a challenge. At present, there is a strong cadre of consultants who fill this gap and competition for these advisory roles remains high, helping to manage costs. These consultants often have the benefit of working on both the private and public

sector sides of transactions and can bring practical and effective solutions to the table to help resolve problematic risk allocations. Over time, and with the support of the existing provincial procurement agencies and departments, it is reasonable to assume the P3 model will become more widely understood and more easily implemented at the municipal level.

There is a huge need for renewal in the water and wastewater sector, but it is a sector that often gets ignored. Safe drinking water is a critical requirement for our society, yet it rarely receives the same level of attention as big highway or transit projects because it is geographically dispersed, composed of smaller-value assets, and delegated to often under-resourced municipalities to manage. P3s can bring valuable expertise and capital to municipalities and communities to help renew this infrastructure. WC



Darren Sokoloski is the country director and president of ACCIONA Infrastructure Canada Inc.

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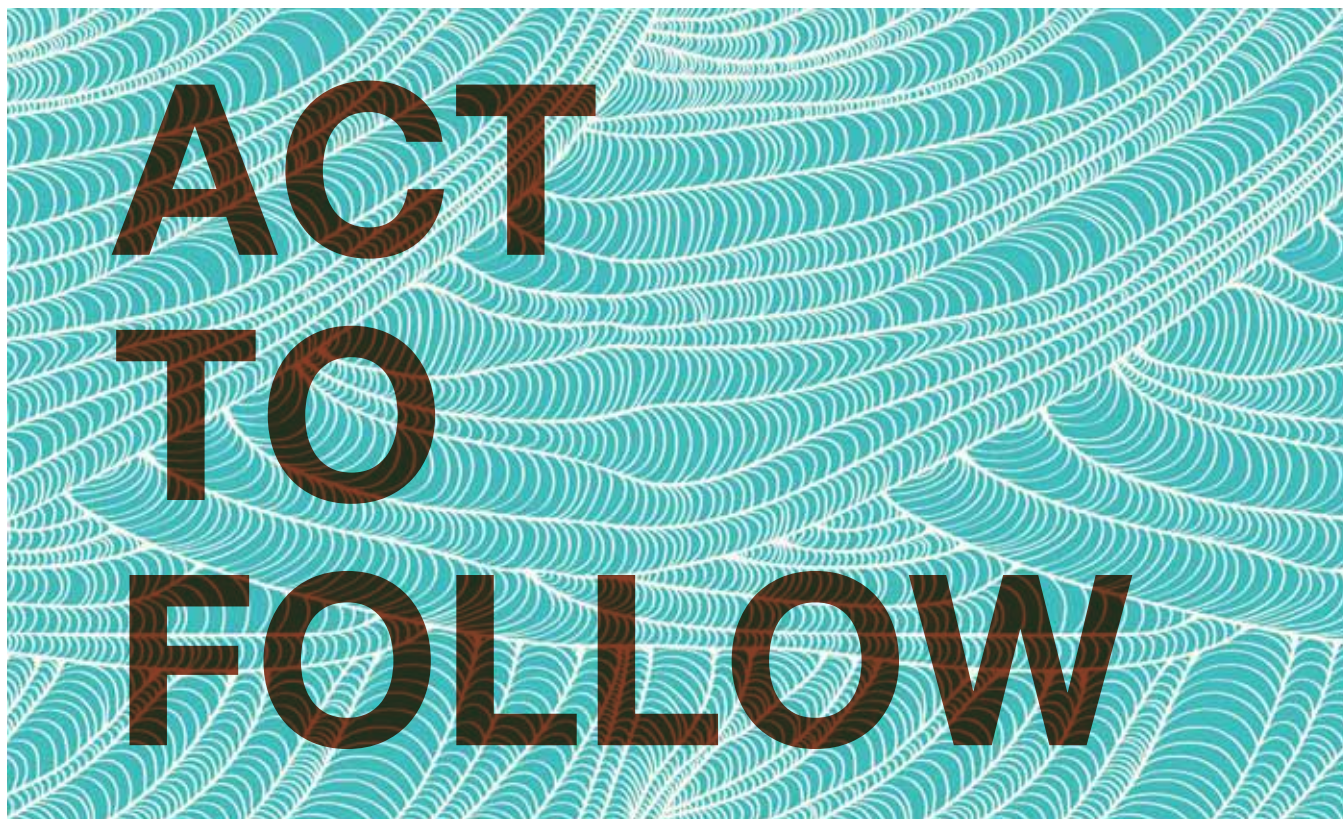
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British Columbia's new water legislation is designed for the future.

BY OLIVER M. BRANDES AND ROSIE SIMMS

BRITISH COLUMBIA'S long-awaited *Water Sustainability Act* (WSA) came into force on February 29, 2016, replacing the 107-year-old *Water Act*. The new legislation has a number of promising features with the potential to better protect British Columbia's freshwater. Coming into force after a 10-year law reform process, the WSA is an important milestone. While several of its provisions are now in force, many of the act's most critical features have yet to be developed in future supporting regulations.

Modern provisions

Among the various changes introduced in the Phase 1 WSA regulations, there are two key areas significant to how water is managed in the province: groundwater regulation and initiation of the first mechanisms in the WSA's suite of possible tools to protect environmental flows.

For the first time in British Columbia, groundwater is now regulated, starting with non-domestic groundwater users, who must hold a licence and pay fees

and rentals for their water use. This is a major step forward for British Columbia, as the province will now be managing surface and groundwater as one interconnected resource.

Second, there are some initial new legal provisions to better protect environmental flows. Key features now in force include protections for critical flows that prioritize the minimum flow needs of streams and connected aquifers when significant water shortages exist and fish and ecosystem values are threatened. There is also now a requirement for decision-makers to consider environmental flow needs in future (non-domestic) licencing decisions to ensure aquatic ecosystems can thrive over the longer run.

British Columbia's freshwater

community is raising an immediate problem with the initial regulations. While the province works to bring the existing 20,000 or so groundwater users into the legislative regime, requirements to consider environmental flows on these

According to the Brisbane Declaration, the term environmental flows refers to the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and wellbeing that depend on these ecosystems.

licences are being waived. While there are many practical reasons to try to fast-track this process, the current exemption creates the threat of locking in existing

and potentially unsustainable levels of groundwater use, leading to over-allocation and conflicts in some already stressed regions like the Okanagan, the lower mainland, and south-eastern Vancouver Island.

The next phase

Many of the WSA's core features—the pieces that actually change and potentially improve patterns of water use—are still to come in Phase 2 regulations. Follow-through in regulation development and implementation in the following three areas is critical to making the act truly sustainable:

1 Additional protections for environmental flows: The WSA offers a complex web of potential mechanisms for environmental flows protection, including water sustainability plans that can be developed to address risks to environmental flows, and water

objectives that can improve land-water linkages. Together, these features can better protect water over the long term.

2 Water sustainability plans: The WSA enables the creation of water sustainability plans for areas where such plans can help prevent or address conflicts between water users or between water users and environmental flow needs; or to address risks to water quality or aquatic ecosystem health. These plans can be made binding through regulation and will allow for customized regional solutions that can impose a variety of requirements on water users and decision-makers.

3 Water objectives: The WSA creates new authority to set water objectives, which establish criteria for water quality and quantity that land and resource use decision-makers can be required to consider when making

decisions about activities on land that will affect water. Water objectives will be established in regulations and will have the force of law—they are a powerful tool to better integrate water issues into land-use decisions.

Fully implementing the WSA is an important step toward improving water stewardship and governance in British Columbia. The province must continue to engage key stakeholders, rights holders, and the public in a transparent, ongoing process as future regulations are developed. wc



Oliver M. Brandes is the co-director and Rosie Simms is the water law and policy researcher and coordinator at the POLIS Water Sustainability Project.

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All images are courtesy of the Quebec Groundwater Network



Photos left: Workshop participants learn relevant information about groundwater in their region and how it relates to land use planning.



A hydrogeologist explains the circulation of groundwater using a hydrological model.



Participants discuss ways that hydrogeological knowledge can be used in decision-making.

Groundwork

Quebec uses science and knowledge transfer to manage its groundwater.

BY JULIE RUIZ, MARIE LAROCQUE, VINCENT CLOUTIER, ANNE-MARIE DECELLES, MIRYANE FERLATTE, AND YOHANN TREMBLAY

ALTHOUGH GROUNDWATER has long been neglected in water management, Canadian provinces are becoming increasingly aware of the importance of its sustainable management. To achieve this, it is essential to understand the resource, and then to ensure that knowledge generated will be useful to managers and decision-makers. Since 2008, the provincial government and the Quebec Groundwater Network (QGN) have worked together to pave the way for a science-based management of groundwater resources.

Workshop A

- Develop a basic knowledge on groundwater
- Acquire a basic vocabulary to communicate with a hydrogeologist
- Understand regional hydrogeological characteristics
- Use alone, at a first level, the documents and data generated with the groundwater characterization project.

Workshop B

- Promote the appropriation of groundwater geospatial databases
- Understand the specific hydrogeological characteristics of its own territory
- Incorporate hydrogeological knowledge in the decision making process in land use planning

Workshop C

- Clarify the roles and responsibilities of each stakeholder for GPM
- Know the regulatory and non-regulatory tools for GPM
- Make a diagnosis on regional capacities for GPM
- Strengthen stakeholders capacities to develop a regional GPM strategy



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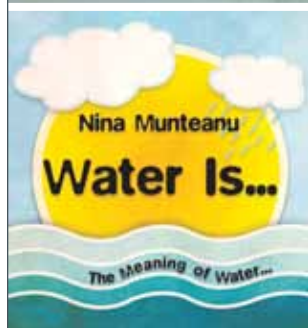
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Ensuring knowledge is relevant

To address the knowledge gap in groundwater resources across Quebec, the government launched a program to characterize its regional groundwater. This program was designed to answer crucial questions regarding the resource's sustainability:

- ❶ Where does the water come from and where does it go?
- ❷ Is the water safe, and what is its quality?
- ❸ What is the nature of the aquifer that contains it?
- ❹ How much groundwater is there?
- ❺ Is it vulnerable to human activity?

By 2015, researchers at Quebec universities had completed aquifer characterization of 13 regions, covering 80 per cent of southern Quebec's municipal territories. Two factors helped to ensure the knowledge generated within this program would be useful to water managers. First, university researchers rapidly took the initiative to coordinate their efforts, establishing common protocols for

Knowledge dissemination alone does not guarantee its use by managers.

data acquisition. This ensured data consistency across the province and facilitated their distribution by the Ministry of Environment through an online map navigator. Secondly, in order to obtain government resources, the groups carrying out the work were required to secure financial resources by water stakeholders. A total of \$16 million was invested by the provincial government and regional partners. Such funding enhanced the interest of water managers in groundwater. It also helped integrate their knowledge needs into the scientific program.

Understanding the needs of water managers

Multiple meetings were held in each region with stakeholders throughout the process, followed by the distribution of plain language reports and presentation of results at conferences. These events established the foundation of a groundwater knowledge exchange strategy. However, knowledge dissemination alone does not guarantee its use by managers.

The Ministry of Environment financed a social science research program on land-use planning and groundwater. From 2009 to 2013, surveys of 50 water managers revealed that the lack of hydrogeological knowledge was the principal obstacle

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to the implementation of groundwater protection and management measures. Survey results also highlighted three key challenges to ensuring the knowledge generated contributes to the resource's sustainable management:

- Because of the specialized nature of hydrogeological information, assist managers to use knowledge beyond the initial release of the information;
- Ensure an understanding of the limits, scope, and complementarity of regulatory and non-regulatory measures available to stakeholders for groundwater protection and management; and
- Develop the collaborative capacity of water stakeholders to coordinate regional actions.

To address these challenges, the QGN pursued the knowledge exchange strategy initiated by researchers.

Integrating knowledge into decision-making

So far, the QGN strategy has been deployed in approximately three workshops per region, as well as through a web-based platform. Together, they promote the progressive learning of aquifer understanding and groundwater management issues relevant to the context of each region. Since 2009, 21 full-day workshops were held in seven regions, bringing together 21 scientists and more than 200 water managers. They rely on the interaction of scientists and managers through active learning methods. Regional groundwater information handling, as well as the challenges to implementing groundwater protection and management measures, are at the core of the events.

Our experience demonstrates that knowledge exchange is a complex and dynamic process. A close partnership

among scientists, local managers, and governments plays a major role in the widely acknowledged success of this program. An important ongoing challenge will be to maintain the network of stakeholders that produces and uses scientific knowledge in order to ensure the sustainable management of groundwater into the future. WC

Julie Ruiz is a professor of environmental sciences at the Université du Québec à Trois-Rivières; Marie Larocque is a professor of earth and atmospheric sciences at the Université du Québec à Montréal; Vincent Cloutier is a professor of mining and environment research at the Université du Québec en Abitibi-Témiscamingue; Miryane Ferlatte is a coordinator for the Quebec Groundwater Network; and Yohann Tremblay and Anne-Marie Decelles are knowledge brokers for the Quebec Groundwater Network.

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Get The Lead Out



The exterior of the Flint Water Plant in Michigan. Flint is in the spotlight as concerns over its water quality and lead content have made national headlines.

If Walkerton was the wake-up call for contamination, Flint was the wake-up call for lead. BY TRISTAN SIMPSON

THE PUBLIC HEALTH TRAGEDY that occurred in Flint, Michigan was a wake-up call for governments, public health authorities, and municipalities of the worst-case scenario of aging infrastructure. Flint failed to treat its water with corrosion inhibitors and its water pipes began leaching lead into drinking water. Like Flint, many Canadian cities still use lead pipes to bring water to homes, schools, and businesses.

Lead has historically been the material of choice for many service pipes because of its malleability. Until scientific developments highlighted the element's toxicity, lead was commonly used in service pipes, solders, and faucets for most of the 20th century. The City of Montreal reports that houses built before 1970 could have lead service lines, and in Toronto, lead city-service pipes were used before the mid-1950s.

Many Canadian municipalities offer free lead testing for residents in older homes

who are concerned about their drinking water. However, when it comes to replacing service pipes within the property line, the responsibility rests with the property owner. Depending on the rates and property size, the cost to upgrade pipes could range between \$1,000 and \$6,000 per household. Some municipalities offer free faucet filters, and a few offer financial assistance to residents who wish to replace their pipes. However, this kind of incentive program is not available in the majority of municipalities, and many homeowners are not aware of their responsibilities or the pipes. In Pemberton, British Columbia, Edmonton, and Toronto, it has been the actions of residents—taking to the media and writing open letters to the government—that have made lead pipes a priority.

Some municipalities have made an aggressive effort to remove and replace their lead pipe assets. Toronto, for example,

has been changing city-owned water infrastructure on a street-by-street basis. Approximately 65,000 city-owned service pipes were estimated to be lead in 2007. By 2015, that figure was almost cut in half. Even when municipalities inform citizens and offset some of the costs, there is the added risk of exposure resulting from the lead service replacement process. To prevent pH levels from dropping, the city added phosphate residual to treated water two years ago, but it will take another two years before the city will know if this type of corrosion control is effective, said Frank Quarisa, director of wastewater treatment at Toronto Water.

Michèle Prévost, a professor and national industrial chair on drinking water in the department of civil, geological, and mining engineering at the École Polytechnique de Montréal, has been looking at the lead situation in Canadian municipalities for years.

In a study and supporting survey data funded by the Canadian Water Network, Prévost and a team of researchers monitored the short and long-term impact of partial lead line service replacements on lead release in drinking water. They sampled lead levels in 69,000 households across five participating municipalities.

"The research shows how the number of LSLs [lead service lines] varies across Canadian municipalities, and more importantly, how unsuccessful current initiative to get them replaced are," Prévost said. She said the level of financial and logistic support a municipality provides to consumers to ensure both the property owners' lines and the city's are replaced properly is crucial to eliminating exposure. "Without a serious program with incentives and logistic support to the owner, LSLs will not be replaced," she said.

The study also shows that extreme lead concentrations can end up in drinking water immediately after a partial or complete replacement is completed. Lead scales that build up over time are destabilized when pipes are excavated or adjusted and end up being flushed into the home as soon as water service is restored. "Municipalities must put in place a procedure and education program to avoid acute exposure during that key period," Prévost said.

Health Canada is set to release a new guideline for lead in drinking water later this year, based on new research and priorities established by the Federal-Provincial-Territorial Committee on Drinking Water. "I am sure that they [Health Canada] will put more pressure on provinces and utilities to address this issue," Prévost said. Until then, Canadians need to continue to stay vigilant about addressing lead in drinking water, and municipalities must ensure what happened in Flint doesn't happen in Canada. **wc**



Tristan Simpson is Water Canada's editorial intern and a freelance writer in Toronto.



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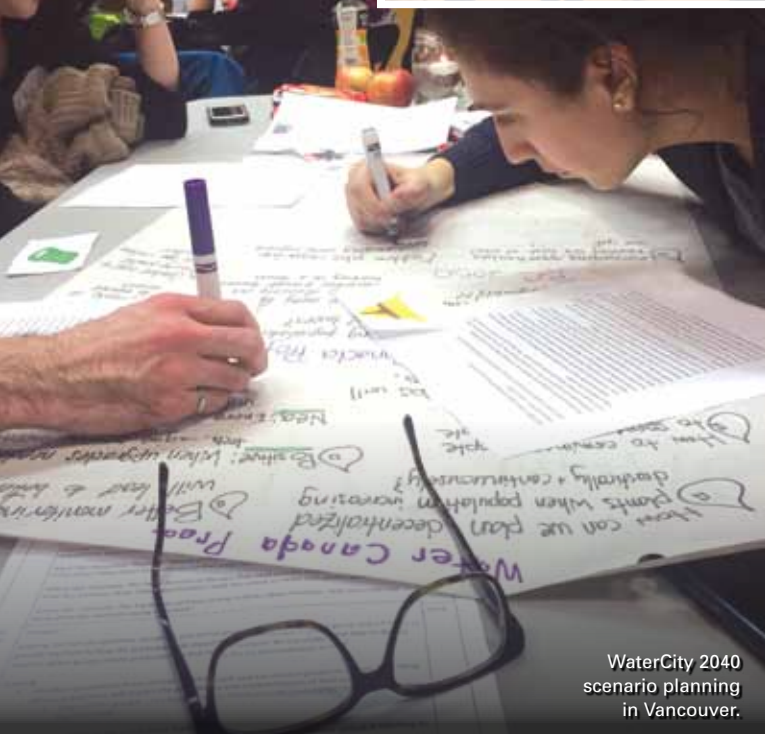
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Participants of the WaterCity event in Vancouver focused heavily on the climate impacts on water.



WaterCity 2040 scenario planning in Vancouver.



Vancouver's scenario plan included floodplain development regulations, green infrastructure, and the use of common spaces to collect floodwaters.

In the Year 2040

Canadians weigh in on the water future that they want.

BY SAMEER H. SHAH AND KAREN KUN

THE CANADIAN PUBLIC wants to be more than just “consulted” in long-term water planning. We learned this from WaterCity 2040, the first Canada-wide exercise in scenario planning that built collaborative spaces to enable the public to explore what could happen to our water infrastructure, environments, and relationships with water by 2040. From autumn 2014 to spring 2015, 450 workshop participants—including regular Canadians, government employees, and industry representatives—created 38 forward-looking scenarios across 10 major Canadian cities that captured their desired water futures, inclusive of strong public leadership and collective action.

These 10 months overwhelmingly confirmed to us the public’s desire to engage with and contribute to creative visions policy-makers can use to address regional water challenges.

Vancouver’s vision

By 2040, stormwater infrastructure is integrated with green spaces to manage excessive water flows, but the Greater Vancouver Region has its natural spaces compromised by urban sprawl of less affluent residents from the downtown. Local management for agriculture and drinking water provisions have become responsive to climate unpredictability and the region is prepared for hazards by way of control infrastructure, emergency response plans, and decentralized water systems. This “climate resilient Vancouver” sees citizens on social media sharing ideas about climate adaptation and promoting the wise use and value of water, helping to spawn a new water-use ethic.

Calgary's stampede

A thousand-kilometre drive away, Calgary oscillates between droughts and floods. Despite this, much was learned from the 2013 flood, and city leaders pushed for the adoption of homeowner incentives to mitigate flooding effects. During drought, Calgarians collect rainwater and greywater made possible through upgraded building and health codes. Tradable water consumption credits and debits exist for industries. Such adaptation ideas have come from communities themselves who experienced first hand the shocks these natural hazards bring. Looking forward, the city faces decisions around transforming to a low-carbon energy economy or continuing on a carbon-intensive route, with the latter posing risks for real estate devaluation, out-migration, and water infrastructure deterioration.

Waterloo's way forward

In 2040, the Region of Waterloo in Ontario is a place where households and businesses are aware of their water sources and uses. The region advanced campaigns around the 3 "Rs" of water. Water use reduction is encouraged by effective and equitable pricing, and re-use and recycling have grown because of access to water treatment technologies that allow wastewater and rainwater to be recycled for drinking and irrigation use. A more holistic relationship with water is furthered through "mini-cities," or personal community-scale decision-making bodies and grassroots movements. The Mini cities have each signed on to an agreement, to "adopt" or take responsibility for the Grand River, with citizens integrating the river with communities in ways that foster stewardship and continued support ecosystem-related benefits.

These cross-Canada stories emerged because WaterCity engaged and pushed communities to create and imagine. But stepping back, the public showed us they could meaningfully contribute to long-term planning in three specific ways—all of which government should note.

① They—the public—emphasized their concerns over how water-related impacts could affect things of value. Through the public's eye, policy-makers can see which things of value—from shoreline parks to seasonal sources of employment—are items of concern, some of which could have been missed without the public's perspective.

② They gave insight into how those same valued things could be affected in the future. We aren't suggesting citizens could take the same information—like rainfall projections or sea-level rise estimates—and arrive at the same conclusions as experts. Rather, the public has inside knowledge and memories of how certain past events have affected their communities. This was clear in Calgary, where the 2013 flood helped identify specific policy measures that could protect against those experienced impacts in the future.

③ The public is the arbiter of which solutions do and do not carry value. Their narratives provide policy-makers information on avenues that are appealing to communities. Overall, the public can provide value-laden solutions to mitigate possible impacts to things or areas of value.

Given the engagement benefits, and the rich scenarios produced, the role for government is to experiment with new forms of public engagement to add depth to the policy-making process. Perhaps then can the public really transform Canada's water future. *wc*



Sameer H. Shah is a PhD student at the Institute for Resources, Environment, and Sustainability at the University of British Columbia. He was one of 54 Canada-wide facilitators of the WaterCity program. Karen Kun is the executive director and co-founder of Waterlution.

These 10 months overwhelmingly confirmed to us the public's desire to engage with and contribute to creative visions policy-makers can use to address regional water challenges.





Young professional on site at a Cole Engineering project.

The Long Game

What are the biggest challenges facing local water utilities?

BY CHRISTINA ANTO

THE LOCAL WATER UTILITIES INDUSTRY is facing major challenges in management, design, and public interest. While some of these issues have clear solutions, many do not.

“One of the things we now know is that you never waste an opportunity,” said Cordell Samuels, former president

of the Water Environment Federation (WEF) and a water consultant at Cole Engineering. “Where they’re making huge strides [in water management] are the places that have huge issues with drought that we don’t have here. They have a crisis that pushes them.”

The California drought, the legacy

of Walkerton, and more recently, Flint’s water crisis have put water and wastewater management at the forefront of public scrutiny. Water is unfortunately one of those things nobody thinks about until there isn’t enough of it to go around. Lynn Patterson, the director of corporate



Sometimes the solution to an industrial problem is as simple as a yet-to-be discovered chemical process

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responsibility for RBC, said, “For me, the biggest challenge has been getting people to understand the ‘so what.’” In Canada, we haven’t seen the effects of long-term drought, such as in California, so getting people to understand the importance of water quality and water delivery remains a hurdle.

Water is unfortunately one of those things nobody thinks about until there isn’t enough of it to go around.

Talent gap

Turnover is a large component of the industry’s difficulties. Highly skilled field workers who have been working in the industry for more than 40 years are retiring, leaving less experienced new hires to keep up with aging systems. In decades past, when Ontario’s facilities were built, procedures were not documented in manuals. Samuels said a lot of the information regarding the system sits in people’s heads. “When employees leave, they take it with them.” While one solution is ensuring standardization and training protocols are followed, another is to try something completely different—to focus on new design, innovation, and creation in the water industry.

Designed to last

Funding isn’t necessarily the issue when it comes to aging infrastructure. Many utilities are run “close to the line” financially, but funding itself isn’t prohibitive to new and innovative design. Facilities and systems need to last. Because of this, innovation sometimes takes a backseat to durability. In Ontario, it has been done well, but it is now time for Ontarians to look at design differently. Samuels said recommended incorporating what

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- ⑤ **#83** Annacis Island Wastewater Treatment Plant Expansion



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The 2004 flood in downtown Peterborough is an example of why operators need proactively prepare for the worst case scenario.



other parts of the world are doing—borrowing from California or Singapore, or even creating a unique system. Canada has some of the best engineering programs in the world, and some of the most innovative minds are now entering the industry. Allowing room for new design, innovation, and unique perspectives can help generate public interest and create new systems for an old problem.

Disaster management

Proactively preparing for the worst-case scenarios is necessary in an era of increasingly unpredictable weather. Can our water system handle sudden volume increases, extreme shortages, or as many Canadians experience every winter, prolonged freezing temperatures?

Samuels believes a piece of the puzzle is in altering our approach to wastewater. “We need to look at this industry as a resource industry, not a waste industry.” The possibilities for filtration and re-use, energy reclamation, or using waste streams as nutrient inputs for things like urban farming all make much more sense than simply dumping the waste.

There is huge potential for using wastewater beneficially at lower costs and a lighter environment footprint than traditional methods. Disaster preparedness means preparing for worst-case events but also for the long-term inevitability of water difficulties. By creating innovative design and getting excited about water’s possibilities now, we can ensure we have strong wastewater infrastructure for generations to come. **wc**

Christina Anto is an allied commander at Arke Marketing Group. Anto interviewed Cordell Samuels from Cole Engineering Group.

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The growing national role for water. BY ROBERT HALLER

IN MORE THAN 20 YEARS of attending water conferences across Canada, I still meet professionals at every event who seem surprised there is a national association for water and wastewater. After all, isn't everything regulated at the provincial level? Aren't the national Guidelines for Canadian Drinking Water Quality only guidelines? But most of us know that there is a lot going at the national level.

With the Liberal government's stated commitment to the environment, innovation, and a clean-tech economy, we can expect to see an expanding role for the federal government with regard to all things water. Water issues are addressed by multiple federal departments and agencies. At a quick count, I can see water issues in the portfolios of 17 of the cabinet's 30 ministers. With an issue like water divided in so many directions, we would propose the government appoint one point person from their caucus as a water champion to keep an eye on the bigger picture and work to facilitate communication and cooperation between the ministries and agencies.

We can start with the national Guidelines for Canadian Drinking

Water Quality developed by Health Canada and the dedicated regulators from every province and territory. This forum for national dialogue has been the leadership for safe drinking water in Canada with guidelines that have been adopted by every province and territory. Health Canada is also leading national discussions on climate change adaptation with regard to water quality, while other departments address water quantity issues, groundwater mapping, storm events, and infrastructure.

And, there are other national programs are underway, such as the Chemical Management Plan, and Regulations on Potable Water on Board Trains, Vessels, Aircrafts and Buses. Of course, we're all keeping an eye on progress of the implementation of the Wastewater Systems Effluent Regulations from Environment Canada and Fisheries and Oceans to determine how to harmonize with provincial efforts, how will it be enforced, and how will we pay for the upgrades. Recent storm events have also emphasized the need for new national floodplain mapping.

Canadians have voiced concerns over

pharmaceuticals and personal care products, and we have seen concerns leading to action on the microbead issue. Health Canada is increasing its reach by working on non-regulatory initiatives. The Canadian Water and Wastewater Association (CWWA) has been working closely with Public Safety Canada for a few years now on issues of security and emergency management. In addition to representing our sector at the National Cross-Sector Forum and Multi-Sector Network meetings, we have initiated a national survey with Public Safety Canada and are hosting a series of workshops for our members.

While some other initiatives had gone quiet over the last few years—such as biosolids, statistics/data collection, WaterSense, *et cetera*—we expect that the Liberal government's commitment to developing a clean-tech economy should spark new activity in these areas. Their "innovation agenda" clearly states support for science and research

and for developing and promoting new technologies in Canada. I cannot recall a government talking so much about the importance of water to the health of our communities and the potential of water infrastructure and technologies to our economy. Even their focus on energy systems and conservation will impact our water industry. Of course this most recent budget demonstrates the government's commitment to investing in water and wastewater infrastructure. This is a good time to be in the water sector.

Meanwhile, outside of the federal government's affairs, we are working on several issues at a national level—on issues that are of common interest to all municipalities in every province and territory. We are focusing on public attitudes and recognizing the value of water. CWWA, with our partners at the Municipal Enforcement Sewer Use Group (MESUG), is leading the efforts to address the negative impact of flushable wipes as we work toward an international standard

for use of the term "flushable." CWWA members are representing us on several ISO committees and other national and international efforts. We are looking at how we might facilitate a national level discussion on operator certification to support standardization, harmonization, or at least more reciprocity. Finally, we are developing central resources for all municipalities to access. Working with other associations like the American Water Works Association (AWWA), Water Environment Federation (WEF), Alliance for Water Efficiency (AWE), and Canadian Association for Water Quality (CAWQ), we hope to create tools to support our utility leaders across Canada. WC



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

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HIRED



Marcus
Henderson

KSB Pumps Inc., based in Mississauga, Ontario, has appointed **Marcus Henderson** as its new business development manager.

His marketing strategy experience will help support the company's national sales teams in Montreal, Calgary, Edmonton, and the Maritimes. He is an engineer from Queen's University and brings experience in pump sales and aftermarket services.



Matthew
Kuzma

Anaergia has hired **Matthew Kuzma** as to lead its technology commercialization group in the wastewater resource recovery sector. He

has more than 20 years' experience in the wastewater industry, with a

primary focus on advanced technologies like membrane bioreactors, nutrient management and recovery, and advanced biological wastewater process. He will be responsible for leading technology commercialization, distribution channels, and ad marketing of Anaergia technologies for the company's global operations from Burlington.



Muthu
Chandrasekaran

Pure Technologies has appointed **Muthu Chandrasekaran** as senior VP of energy pipelines. Chandrasekaran formerly held the role of VP of corporate strategy and marketing. "Muthu has been a key member of the Pure team since he joined the company in 2000 following his graduation from the University of Alberta," Pure president and CEO **Jack Elliott** said. "He was instrumental in the acquisition of the Hunter McDonnell Pipeline Services business and he has worked closely with the Pure team to grow the business rapidly over the past year."

APPOINTED

BluMetric Environment Inc. has elected **Geoff Simonett** to its board of directors. He is an entrepreneur with more than two decades of experience starting, operating, and financing companies in the clean-tech, IT, and financial sectors. BluMetric CEO **Roger Woeller** said, "Geoff's appointment adds capital markets experience to our board. His involvement is integral to the company's growth in both services and systems."



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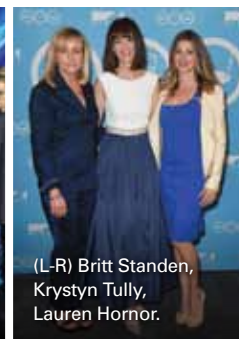
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Stephen Ranger takes bids on Burtynsky's Mount Edizwa print.



Riverkeeper Mark Mattson joins the stage with Choir! Choir! Choir!



(L-R) Britt Standen, Krystyn Tully, Lauren Hornor.

Lake Ontario Waterkeeper Gala Toronto, ON

"Swimmable, drinkable, fishable" was the vision behind the 15th annual Waterkeeper gala at the Canadian Broadcasting Corporation on April 21. More than 400 Canadian philanthropists, business leaders, art collectors, and water lovers sipped cocktails and enjoyed music, art, and special guests, including author **Joseph Boyden**, Ontario Environment and Climate Change Minister **Glen Murray**, Lieutenant

Governor **Elizabeth Dowdeswell**, radio host **Terry O'Reilly**, and musical acts Harrow Fair and Choir! Choir! Choir!

Lake Ontario Waterkeeper co-founder and VP **Krystyn Tully** said, "You can tell a lot about a society by the state of its waters—how people live, what they do, what they value. We started Waterkeeper in 2001 because we did not like what the state of our waters said about us."

Waterkeeper **Mark Mattson** shared

personal reflections on how the Swim, Drink, Fish mission came to be about and how his experiences on Wolfe Island motivated him to dedicate his career to the Great Lakes. A sensational art auction featuring the work of **Victoria Piersig**, **Michael Adamson**, **Edward Burtynski**, and others, led by auctioneer and Waddington's Auction House VP **Stephen Ranger**, capped the evening. The event raised more than \$50,000.



The winning team, the "Water Savers" pose with Her Honour Elizabeth Dowdeswell, Ontario's Lieutenant Governor. (L-R): Nitharsan, Henry, Chris Bentley, Jalen; Her Honour, Eugenia Duodu, and Sadia; Aisha.

SCInnovation 2016 Toronto, ON

In celebration of Earth Day, Grade 8 students from Nelson Mandela Park Public School and Winchester Junior and Senior Public School in Toronto gathered to discuss climate change and the Great Lakes. The Ontario Clean Water Agency was a lead sponsor, providing expert mentors to help small groups of students develop and pitch community project ideas to tackle real issues relating to climate change. The winning project was a rain capture system to be fitted onto a Toronto stadium (e.g., the Air Canada Centre). The project will be implemented with help from university-level students from Ryerson's Social Venture Zone using prize money funded by IBM. Ontario Environment and Climate Change Minister **Glen Murray**, Lieutenant Governor **Elizabeth Dowdeswell**, Ryerson Urban Water's **Nick Reid**, and WaterTap's **Kerry Freck** participated in the event.

TRIECA 2016 Toronto, ON

The largest event to focus on stormwater, erosion, and sediment control in Canada, TRIECA 2016 was a huge success, convening almost 700 people March 23 to 24. "We always get pretty good feedback, but this year it was exceptional," said Toronto and Region Conservation Authority event coordinator **Alanna Fair**. The two-day conference included some of North America's foremost experts and technological innovators working on the ground to improve water quality. TRIECA 2017 will take place from March 22 to 23.



Toronto Police provide support while TK name, TK name, and Water Canada publisher Todd Latham walk down Yonge Street.

Walk4Water Toronto, ON

Participants of the walk walked six kilometers from Yonge Street and St. Clair Avenue to Corus Quay in Toronto to celebrate World Water Day 2016. This walk was organized by Ecoloodi and Ryerson Urban Water with financial support from CH2M. Water Canada, WaterTap, Water Brothers **Alex** and **Tyler Mifflin**, and many others took part. Some participants carried a water jug to demonstrate the average distance a person living in Africa or Asia may travel each day to collect water for their families.

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GLOBE 2016 Vancouver, BC

Since 1990, the GLOBE Foundation has hosted its iconic biannual event in Vancouver to bring industry and thought leaders together to discuss current trends and innovative technology solutions for the world's most challenging environmental problems. The 2016 event was an impressive week that included a women's networking lunch featuring federal Environment and Climate Change Minister **Catherine McKenna**, an expansive exhibition space that included an Ontario pavilion, armchair discussion of premiers immediately following the first ministers meeting on climate change, and a keynote speech from Prime Minister **Justin Trudeau**. Close to 3,000 people attended.



Prime Minister Justin Trudeau addressed a crowd of over 1,000 as the keynote.



Minister Navdeep Bains and Minister Catherine McKenna attended the Prime Minister's speech.



Federal environment minister Catherine McKenna and TELUS' senior VP, Andrea Goertz, joined the GLOBE women's networking lunch.



Innovolve Group CEO, Anthony Watanabe and GLOBE Chief Operating Officer Nancy Wright at GLOBE After Dark.



A member of the General Fusion team explains how the new "disruptive" technology generates energy.



(L-R) Premiers from Alberta, Ontario, Quebec, and Montreal discussed climate action and its opportunity to further economic development.

Sarnia-Lambton Water Symposium Toronto, ON

About 150 people attended the second annual Sarnia-Lambton Water Symposium on April 14 at Lambton College on the shores of Lake Huron. The one-day symposium focused on drinking water and wastewater technologies and regulatory developments in Ontario. Presenters included **Linda Gowman** from Trojan Technologies, **Monica Emelko** from the University of Waterloo, and **Ted Roberts** from the University of Calgary.

Water and Jobs Toronto, ON

The Ontario branch of the Canadian Water Resource Association hosted a panel and networking event to mark World Water Day on the theme of, Water and Jobs: Historical Perspectives and Future Directions at the Textile Museum of Canada. The panel, hosted by **Nancy Davy** of the Grand River Conservation Authority and moderated by Water Canada editor **Katherine Balpataky**, included **Jack Imhof** of Trout Unlimited, **Barry Strachan** of Keewatynook Okimakanak, and **Julie Abouchar** of Willms & Shier. **John G. Payne** who contributed to the 2016 United Nations report, Water and Jobs, participated.



Comedian Rick Mercer was the keynote at WaterTech 2016.



ESAA's Joe Chowanec (kneeling, front) with the WaterTech team in Banff, Alberta.

WaterTech 2016 Banff, AB

The sun was shining for the ninth annual WaterTech Symposium, held April 6 to 8 at the Fairmont Banff Springs Hotel in Alberta. Hosted by the Environmental Services Association of Alberta (ESSA), the event drew close to 300 people with an interest in the technical aspects of industrial water and wastewater management. The event included conservation photographer and naturalist **Mac Stone**, political comedian **Rick Mercer**, and the head of the United Nations think tank on water, **Zafar Adeel**.

Down Payment on the Future

The case for federal investments in water innovation and technology.

BY BRENDA LUCAS

THE FEDERAL GOVERNMENT delivered its 2016 budget on World Water Day. Tabled on March 22, 2016, it included welcome water-related commitments, including funding to rebuild freshwater science capacity, address Great Lakes phosphorus loadings, and ensure clean drinking water in indigenous communities. However, the main focus was on infrastructure. The government's infrastructure plan includes \$5 billion for investments in water, wastewater, and green infrastructure projects to support Canada's "ongoing transition to a clean growth economy." Of this, \$2 billion over four years is earmarked for a new Clean Water and Wastewater Fund. Additionally, the Federation of Canadian Municipalities will receive \$50 million for a new capacity-building fund to support asset management best practices, along with a reinvestment in Green Municipal Funds and a new program to help local communities address climate change.

The framing of these funding commitments is important. The budget noted there is "an urgent need in many Canadian communities to modernize water and wastewater infrastructure" and committed the government to "seek out new partnerships on innovative green infrastructure projects and capacity-building programs." It's also worth noting that clean technology has been a major focus of the government's climate change agenda.

The budget priorities are also consistent with the pre-budget messaging that emphasized "investment" rather than "spending." The new asset

management planning program is offered in the context of helping smaller communities in particular achieve longer-term planning, support strategic investments, and maximize the use of public dollars. The early stages of the plan also indicate investment in existing infrastructure. It's exactly the right direction—we need to invest in the non-capital projects and training that will deliver savings in the form of deferred (or completely avoided) capital spends. And we need to make investments in the innovative approaches and technologies that will deliver the services that we need for generations to come.

Setting a high bar

Other jurisdictions are quickly moving to set modern expectations for water efficiency and reuse, net zero energy use, and enhanced resource recovery. To realize the opportunity for improved water management and the economic benefits of a successful water technology sector (and the jobs that will result), Canada's water sector must play a leadership role in helping shape and actively support a progressive water agenda. We can do this by demonstrating what's possible and asking the government to set a high bar for public investments and regulatory requirements.

The new funding is characterized as "an immediate down payment" on longer term commitments, and it should be designed as a bridge to environmentally and financially sustainable systems. Infrastructure funding programs should set conditions on funding to

require municipalities have a strategic asset management plan in place and implement optimization programs like composite correction. New strategic support for asset management planning could help smaller municipalities in particular uncover options that can save them money in the long run.

Good data will be critical to identify opportunities for optimization, for comparing relative performance, for setting expectations, and for quantifying the financial and greenhouse-gas-reduction benefits of new approaches. Interestingly, there is also a commitment in the budget for Infrastructure Canada to work with Statistics Canada "to improve infrastructure-related data. This will support better information on the state and performance of core public infrastructure assets for all levels of government."

Canada is home to a thriving water sector. Not only can it contribute to solving the country's water challenges, it can bring those solutions to the world and create jobs in the process. Let's prove investments in water innovation and technology are sound economic investments and a path to modern and truly sustainable infrastructure.

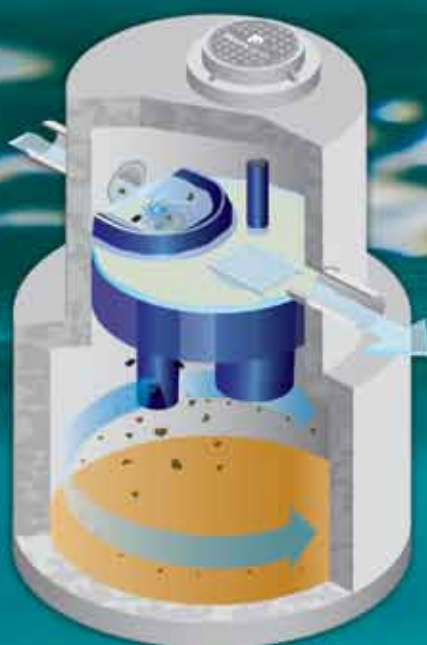
Brenda Lucas is the executive director of the Southern Ontario Water Consortium and chair of the 2016 Canadian Water Summit.



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