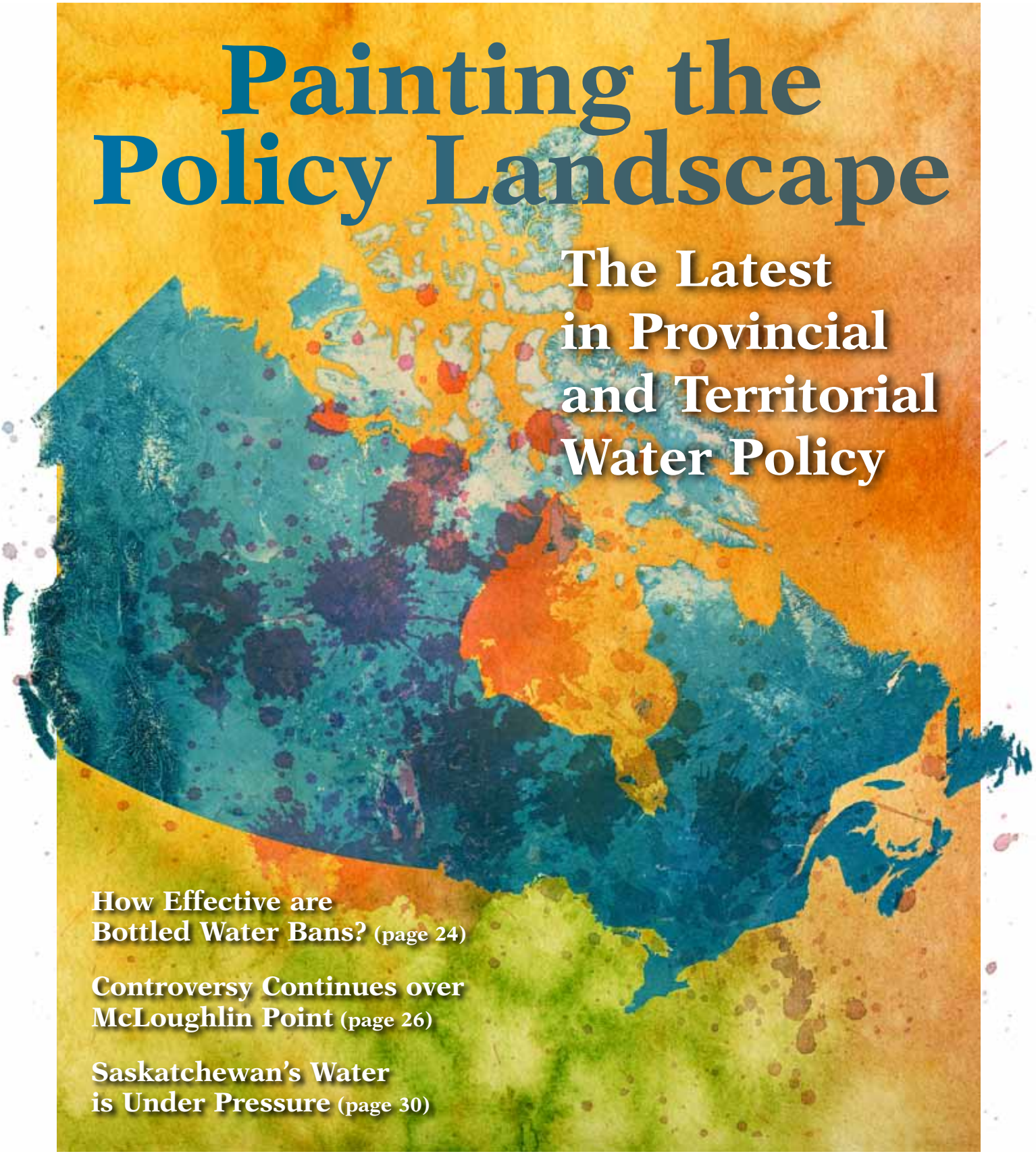
THE COMPLETE WATER MAGAZINE

JULY/AUGUST 2014

# WATER CANADA



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JULY/AUGUST 2014
VOLUME 14 NUMBER 4

WATERCANADA
THE COMPLETE WATER MAGAZINE



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# Work It Out

## Collaboration is the lifeblood of the water industry.

BY RACHEL PHAN

**WHEN THE WATER CANADA TEAM** began to plan for this July/August 2014 issue, we did so with two themes in mind: climate change and policy. But another—collaboration—quickly emerged as a third major theme.

This issue's Fine Print piece (*see page 30*) outlines ways stakeholders in Saskatchewan are navigating competing demands for the province's water resources. How can we cross over political, social, and economical lines to work together to make sure we manage and use our water effectively? How can we work in partnership to mitigate the impacts of climate change and to create sound, science-based policies (*see page 20*)? It is a no-brainer: without collaboration, we are already dead in the water.

It seemed incredibly appropriate then when Christine Hill of XCG and the Water Environment Association of Ontario said, "We need to work together in order to make sure our voices are heard," at the Canadian Water Resources Association's annual congress on June 3. The event kicked off a month where water professionals from all spheres—government, academia, business—frequently got together to discuss and celebrate successes and new partnerships, and to commiserate over shared challenges. Events like the well-attended Canadian Water Summit and Ryerson Urban Water Day, which included the inherently collaborative Wetskills Canada 2014 challenge, all highlighted the need for partnerships and knowledge sharing in the water and wastewater sectors.

But beyond just working together within the water industry, it is imperative we also work together with other water-intensive industries, such as Nestlé Waters Canada, which engaged with the Government of British Columbia six years ago when it was considering revamping its *Water Act* (*see page 42*). Any private-sector organization must participate in the water regulation process because they, too, might have something to bring to the table.

And most importantly, the water industry should collaborate with the largely disengaged public. As water professionals, we already know the major problems we are facing, and near the top of that list is the fact that the average Canadian citizen doesn't know and likely doesn't care about the state of water in our country. The need to galvanize the public into taking ownership of its water and supporting political parties who want to bring water issues forward was a recurring theme throughout many of June's water events.

As David Angus, president and CEO of the Winnipeg Chamber of Commerce, said during the Canadian Water Summit's opening panel, "We have not pushed the bar far enough or quick enough when it comes to water-related issues." There is no time to wait. We already know that water is the most pressing issue of our time. We must now come together to determine how we can make sure our voices are unified and on message enough to convince the uninitiated. WC

**Contact Rachel at 416-444-5842 ext. 116**
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**PG 32**

## ABOUT THE COVER

This issue's dynamic cover art demonstrates how water colours the latest policy developments across Canada. The feature (*see page 10*) paints quite the picture: Canada's provinces and territories all have unique water challenges. In this issue, Water Canada explores the regulations and policies each province and territory has placed as top priorities.

Design by Donna Endacott

## NEXT ISSUE: SEPTEMBER/OCTOBER

- **Rolling out WSER: What's the problem?**
- **"Lab in a pill" contamination detection**
- **Achieving sustainable and resilient water projects**

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



Credit: Colby Stoya via Flickr

COMMENT

# Is it Time for a National Water Policy?

BY STEPHEN BRAUN

**DESPITE THE BEST EFFORTS** of many dedicated people who care so much about our national water resources, Canada has no national water policy or strategy. Canada's creeks, rivers, lakes, and groundwater are governed by a patchwork of laws and regulations, though they cross provincial or territorial boundaries without restriction.

One thing is certain: coming up with a better definition of a national water policy is not going to make it spontaneously materialize. We have defined this issue well and have a good point of reference. What is required now is political will and recognition that such a policy is essential to Canada's self-interest—and nothing less.

For example, the Canadian Water Resources Association took the issue on in 2008 with the release of Toward a Canadian National Water Strategy, authored by well-known water policy expert Rob de Loe. Yet implementation remains elusive on this subject despite this and other high profile efforts.

More recently, Ralph Pentland and Chris Wood's 2013 book, Down the Drain: How We are Failing to Protect Our Water Resources, explained the unimplemented but ambitious 1987 Federal Water Policy, and that little progress has been seen since federally. Their arguments and facts that our water resources are an issue of national importance and cannot be left to the provinces are compelling. Pentland and Wood stated: "Legislation currently in force and Confederation's founding documents empower Canada's federal Crown to take robust action to defend water, waterways, and the life that inhabits them."

Canada's past approach to the contrary, the federal government absolutely does have the power to ensure our national water resources are kept healthy and sound. Canada could have an equivalent of the European Union's Water Framework Directive for our provinces if we wanted it. That power has been abdicated for some time now, but it remains there and can be reinstated.

Canadians might believe this country is advanced in its environmental policy, but we are lagging behind other jurisdictions. Even Republican U.S. President Richard Nixon recognized the importance of a national water policy. He founded the Environmental Protection Agency (EPA), which subsequently led to the Clean Water and Safe Drinking Water acts. Nixon facilitated some pretty ambitious national water protection in a country not known for its love of federal regulation.

Canada's more recent approach of discontinuing environmental roundtables, restricting scientists from speaking publicly, and shuttering cottages on certain lakes might seem like the time isn't ripe for a national water policy. Perhaps the time will never be right exactly, but as water professionals we must continue to advocate for it.

Desmond Tutu visited some of Canada's northern watersheds this spring. His famous quote, "I am not an optimist, I am a prisoner of hope," seemed to capture the mood up there. But he said something else too: "Magnanimity is not a river that flows in one direction only. It is a bridge built of reasonableness and the acceptance of others that enables human beings to navigate barriers that keep us apart."

If we apply this insight to a national water policy, it can be seen that the pillars of the bridge are largely in place. They are there as the result of excellent past work of many in this country and within other parts of the world. The reasonableness is in those pillars; it is up to us to build the rest of the bridge—hopefully with more magnanimity than realpolitik—but it must get built. WC

Stephen Braun is a principal and water resources engineer with GeoProcess Research Associates. He is a founding partner of RainGrid Inc. and is currently the Ontario branch president of the Canadian Water Resources Association.

# FEEDBACK

### Re: "A Watershed Moment," May/June 2014:

After reading the title and cutline, I anticipated learning about a truly innovative, unprecedented, and sophisticated new data-management and real-time monitoring implementation. However, I was struck by the fact that what was being presented had already been tested and perfected years ago. Having remote loggers collecting 15-minute monitoring data has been done since the 1980s. A host of logger manufacturing companies can currently boast the ability to perform event-based sampling, not to mention a number of software shops, including my own, have been capturing, managing, and analyzing real and near-real-time data from these same loggers for about the same amount of time.

Our company has played a leading role as one of the key supporters of the Open Geospatial Consortium-endorsed WaterML2 language that is now a global standard for exchanging time-series data from monitoring sensors. We have also been a key technology provider to the Global Earth Observation System of Systems (GEOSS) AIP 6 and 7 projects and GEOWOW project. From the early 2000s, companies, researchers, and the government have had access to real-time data streams using web technology from different vendors, including KISTERS.

Perhaps there is another aspect of the Southern Ontario Smart Computer Innovation Platform that I am missing in this article, which affords researchers the ability to define a "watershed moment in technological innovation." In its present form, regrettably, I find the article to be merely highlighting an attempt to re-invent the wheel with respect to data management and telemetry.

**Phil Stefanoff, KISTERS**

### Re: Water Canada's May/June 2014 Issue

"[I] had a chance to read the June edition on a plane this week and just wanted to congratulate you and your team on a great issue. Really important and well-presented content!"

**Rick VanSant, UV Pure**

# TWEETS

"Extremely informative for anyone who uses water in any way shape or form. [And] a very refreshing take on an Ed Note. I'm a big Phan of @CanadianWater!"

**Henry Flattery, @iibyebyeguy**

We love hearing from our readers!
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# SOUNDBITE

"The most important health-care provider in your community is the person who takes care of the water."

**Bernadette Conant** of the Canadian Water Network at the 2014 Canadian Water Summit (*see page 39*)

# Online at WATERCANADA.NET

Credit: Robert Johnson via Flickr

**BLOG:** David Zetland of Aguanomics argues that "ethical water" means Canada must protect the environment, jobs, and taxpayers in the face of oilsands exploitation. ***bit.ly/ethicalwater***

Credit: Canadian Water Network

**INTERVIEW:** Water Canada interviews Simon Courtenay of the Canadian Water Network about his work with the Canadian Watershed Research Consortium. ***bit.ly/simoncourtenay***

Credit: D. Jude, Univ. of Michigan via Flickr

**BLOG:** Why was potash chosen over chlorine to eliminate zebra mussels in Lake Winnipeg? We examine the benefits and applicability of both methods. ***bit.ly/chlorinepotash***

# The Great Lakes Need Adaptation Experiments

BY GAIL KRANTZBERG AND SOMMER ABDEL-FATTAH

**TO MITIGATE THE NEGATIVE IMPACTS** of climate change on the Great Lakes basin ecosystem, it is essential to plan for and adapt current programs and policies. Adaptive strategies need to be specific enough to address the driver of degradation. In the Great Lakes, temperature increases will be particularly important in shallow areas, so adaptation strategies are needed to protect, for example, wetland habitats and biodiversity.

With more intense precipitation events, adaptation strategies that address non-point source pollution are prudent. Precautionary actions should include measures to reduce soil erosion, address land and water quality degradation, anticipate infrastructure to avoid flooding, and avert infrastructure failure. Measures include the creation of riparian buffer strips, the manipulation of stormwater pathways, the increase of permeable surfaces, and erosion control on steep slopes. Further, attention should be paid to infrastructural changes to ensure the integrity of harbours, marinas, and piers as well as improvement of navigational aids and hydrographic charting.

While recent efforts have focused on the capacity of practitioners to understand how the changing climate

impacts water quality and quantity, there are limited examples of adaptation being implemented. Challenges that explain why implementation is limited include:

1. A lack of funding to test and implement innovative technologies;
2. A lack of institutional capacity for adaptation planning and implementation;
3. Cuts to federal science in support of technical modelling of climate projections to reduce uncertainty in results;
4. Complexities of multi-sector coordination;
5. Fragmentation across agencies;
6. A lack of social and community involvement, with trends to an increasing lack of public concern or confidence in climate science;
7. A lack of adaptation policy and enforced policy; and
8. Few examples of adaptive studies that have demonstrated effective solutions.

At present, most Great Lakes states and provinces have adopted climate action plans that provide greenhouse-gas emission inventory data and make emission reduction recommendations. While there is a general emphasis on the environmental risks and the value of reducing emissions, much less attention has been given to adaptation. Where plans do exist, most of the focus has been placed on responses to changes in water availability and demand, and how to manage increases in demand for water, much less so to water quality and ecosystem integrity.

On the positive side, the Great Lakes and St. Lawrence Cities Initiative launched the Municipal Adaptation and Resiliency Service (MARS) in January 2014 to help municipalities accelerate and expand their adaptation activities. This initiative will provide a portal for municipal members to access climate and adaptation information and resources that will also serve as an interactive forum for information sharing.

The push for adaptation interventions comes from understanding the ramifications of climate-related changes to plausible ecosystem impacts through preventative action. Adaptation efforts must include capacity building, policy innovation, natural resource management actions, and engaging the Great Lakes community in the implementation and evaluation of those efforts. WC

Gail Krantzberg is the director of the Centre for Engineering and Public Policy at McMaster University. Sommer Abdel-Fattah is an NSERC post-doctoral government fellow and lecturer in the bachelor of engineering and technology program at McMaster University.

# Canada, In Brief

Your 2014 guide to the latest in provincial and territorial water policy.

BY ELIZABETH HENDRIKS AND LINDSAY TELFER

Canada's water challenges and the ways provinces and territories address those challenges can be so similar yet entirely unique. Each jurisdiction's positions on issues of supply, conservation, and management will determine what regulations and policies are priorities. While it may be difficult to keep track of the latest updates in every region, the Living Water Policy Project provides a snapshot of updates from across the country:

## British Columbia

### The new B.C. *Water Sustainability Act*

After six years of public consultations and government-led discussions on water management and policy reforms, the Government of British Columbia passed Bill 18-2014, the *Water Sustainability Act*, after being introduced in March 2014. The act updates more-than-100-year-old legislation that addressed relics like the gold rush and ranching. For this legislation to be effective, a number of critical regulations must be passed, including those related to groundwater licensing, defining use requirements, governance, and planning and protecting environmental flows. It is likely that over the next three years, those critical supporting regulations will be developed and finalized. **Oliver Brandes** from the University of Victoria's POLIS Water Sustainability Project said, "We have to stay vigilant, because there's lots of work ahead, but this is definitely a milestone worth celebrating." These regulations will be critical to ensuring that the framework set out in the *Water Sustainability Act* becomes fully and effectively implemented.

## Alberta

### A new wetlands policy comes into effect

In September 2013, the Alberta government introduced a new and much-awaited wetlands policy. The new policy made a shift from the previous principle of "no net loss" in settled or white regions of the province to a system of valuing wetlands to inform management, protection, and restoration provincewide. A wetland value seeks to reflect the relative importance of a wetland from both an ecological and anthropogenic perspective. It is determined by assessing various metrics, including biodiversity and ecological health, water quality improvement, hydrological function, human uses, and relative abundance. This value then determines appropriate ratios for wetland replacement should loss be unavoidable. According to **Thorsten Hebben**, the section head of Surface Water Policy for Alberta Environment and Sustainable Resource Development, the change was made to enhance the rigour around the application process as the relative value of the wetland increases. He described how the changes may work in practice: "The proponent would need to state a stronger case on the need for development activity to take place on a wetland where higher value is established." He added that, "In the event that development is approved, we would be getting a higher proportion of wetland replacement." This shift is more comprehensive than a simple 3:1 replacement ratio that was in effect in the previous no-net-loss policy. The policy will come into full effect in settled areas by late summer 2014 and in "green" areas by September 2015.

# Saskatchewan

## 25-year plan leading to new water legislation

The Government of Saskatchewan released the 25 Year Saskatchewan Water Security Plan in 2012 that seeks to ensure the sustainability and quality of the province's surface and ground water supplies while protecting drinking water supplies from the source to the tap. But the key to all of this is new water legislation, slated for release in 2014. **Dale Hjertaas**, executive director of the Saskatchewan Watershed Authority, said the current *Saskatchewan Watershed Authority Act* needs to be modernized to deal with policy changes identified in the new plan. "You need regulations and policy, but you can't go forward without changing the legislation," he explained. While the province begins the process of updating legislation, the Water Security Agency Plan for 2014-2015 outlines standard strategies and key actions.

# Ontario

# Manitoba

## Managing drainage to save an ailing lake

In 2013, Lake Winnipeg was named one of the most threatened lakes in the world by Global Nature Fund. As blue-green algae blooms continue to plague the fifth largest lake in Canada, the Manitoba government has announced new measures to curb nutrient loading in the lake caused by surface water drainage. In June 2014, the Surface Water Management Strategy was released, identifying 50 actions to control nutrient loading in the lake alongside management strategies to address drainage and flood control. "Manitoba's proposed regulatory process for drainage and water retention will improve wetland protection and help to mitigate the effects of climate change, flooding, and nutrient loading on our lakes," said **Scott Stephens**, director of regional operations in the Prairies at Ducks Unlimited Canada. "The Manitoba government's commitment to a no net loss of wetland benefits approach should be commended as it demonstrates their resolve to mitigate environmental problems that are costing Manitobans significantly." According to Ducks Unlimited, it is estimated the protection of Manitoba's 275,000 acres of seasonal wetlands would prevent more than 200 tonnes of phosphorus from entering waterways annually. *The strategy is open for public consultation. Visit gov.mb.ca/conservation for more information.*

## Stalling on the Great Lakes

The Great Lakes Protection Act is a piece of legislation that promises to establish targets and tools to protect and improve the health of the Great Lakes. The Ontario election has halted the process, and it is uncertain if the effort to pass the act will survive a new Ontario government. The comment period for the Ministry of the Environment closed June 9 for a proposed regulation that will limit the ability to make large water diversions from one Great Lake's watershed to another. The Ontario government committed to such regulations years ago and has not prioritized finalizing these new regulations, despite making changes to legislation in 2007 to allow for them. "It is imperative that Ontario finish these regulations and get the 2007 amendments to the *Ontario Water Resources Act* proclaimed. We are now the last to act of the eight states and two provinces who signed the agreement in 2005. All of them are waiting for us in order for that region-wide agreement that protects against large-scale diversions to take full effect," stated **Theresa McClenaghan** of the Canadian Environment and Law Association. This regulation would prevent new or increased intra-basin transfers that, if allowed, would provide little motivation for Ontario municipalities to seek to reduce existing intra-basin transfers.


## Implementation of a new governance structure

In 2002, the Government of Quebec released the politique nationale de l'eau (National Water Policy), and in the 12 years since, the government has made significant progress on implementing a watershed governance structure. The Regroupement des organismes de bassins versants du Quebec has been established and is making progress on regional water initiatives.

In June 2012, Quebec enacted a moratorium on fracking exploration and drilling to better understand the technology and the risks to groundwater. This moratorium is still in place while studies and research continue.

Also in 2012, Bill 71 was passed in the legislature requiring wetland compensation for projects affecting wetlands. Unique to this law is that the government made Bill 71 retroactive. Section 3, therefore, provides that any compensation measure imposed in an authorization or a certificate of authorization before March 12, 2012 is valid.

## Understanding and adapting to flooding

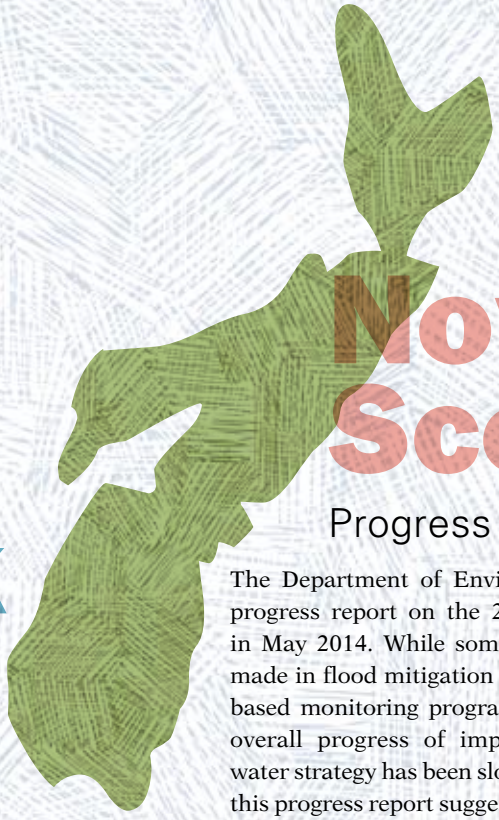
As part of the 2005 Climate Change Action Plan, flood-risk mapping was updated for the region around the City of St. John's. The completed study provides flood lines for the one-in-20-year and one-in-100-year annual exceedance probability (AEP) flood event, flood lines based on current climate change projections, and flood inundation depth mapping. While the study incorporated climate change scenarios, it did acknowledge the uncertainties around forecasting. For municipalities located within the study area, the adoption of the new flood lines into municipal planning and development regulations was recommended.

As per the government's commitment in the *Water Resources Act* (2002), there has been regular reporting on drinking water quality data and efforts to protect source to tap drinking water. Drinking water projects valued at nearly $9 million are currently underway in the province, including new watermains, portable water dispensing units, and other projects in six communities. This contributes to the $650 million spent on more than 1,200 water, wastewater, recreational, and municipal infrastructure projects invested in by the province since 2008.

# New Brunswick

## Wading into deep waters

Commitment on progress toward a completed provincial water strategy continues to stall under the current provincial government. Debate on fracking exploration and the west-east pipeline proposal has left many communities concerned about the vulnerability of their groundwater and aquifers. **Stephanie Merrill** of New Brunswick's Conservation Council said, "Groundwater monitoring and aquifer mapping [are] necessary fundamental knowledge to understanding the risks of energy production." After three years of a multi-stakeholder engagement process, there has yet to be a wetland conservation strategy produced. This comes after the 2011 release of a predictive wetland map generated huge public backlash. A longer-term wetland mapping solution was promised by then-Environment Minister **Margaret-Ann Blaney**, but no results have been released yet. Finally, a newly released provincial forestry management strategy, which increases harvesting and decreases forest conservation, could impact stream and waterway buffers currently protected in the *Clean Water Act*. Details on the strategy's implementation have yet to be released by the provincial government.



# Nova Scotia

## Progress delay

The Department of Environment released a progress report on the 2010 Water Strategy in May 2014. While some progress has been made in flood mitigation and the community-based monitoring program, it is felt that the overall progress of implementation of the water strategy has been slow. The sparseness of this progress report suggests the province is no longer committed to making water a priority. **Jocelyne Rankin**, water coordinator at the Ecology Action Centre, said that, "After committing so many provincial resources to developing the strategy, including comprehensive public consultations beginning in 2008 and the release of multiple reports, we should be reporting on great progress toward cleaner, safer water." Yet serious concerns are increasingly coming to the forefront for Nova Scotians. Challenges include an effluent spill and the toxic legacy of the Abercrombie Point pulp and paper mill, runoff from mink farms causing blue-green algae pollution, and the risks posed by fracking developments.



**The past year** has seen a number of significant changes to laws that govern Canada's waters at the federal level. Here are some examples:

***The Fisheries Act*** was changed to remove fish habitat protections, placing increasing priority on the economic opportunity of fisheries and First Nations' cultural significance.

***The Navigable Waters Protection Act*** was renamed the *Navigation Protection Act*. Changes also redefined "navigable" to exclude "minor waters" and "minor works" and reduce the number of waterways that would be protected under the act.

***The Safe Drinking Water for First Nations Act*** was approved as an enabling piece of legislation that will allow the government to develop, in partnership with First Nations, enforceable federal regulations to ensure access to safe, clean, and reliable drinking water; the effective treatment of wastewater; and the protection of sources of water on First Nations lands.

# Prince Edward Island

## New ways to extract

On June 18, Environment, Labour and Justice Minister **Janice Sherry** announced that, "The Prince Edward Island government will be introducing a water act to provide a modern, comprehensive legislative and policy framework to ensure the sustainable management of our water resources." She added in the press release that, "The implementation of a water act will demonstrate government's commitment to managing water resources in a sustainable manner for present and future generations. There will be broad consultations with Islanders and experts in the development of the new act."

The proposed act will create new legislation for areas such as groundwater allocation, discharges into fresh and marine water environments, and mandate targets for water quality. The act comes on the heels of furious debate over whether the province should lift a moratorium on high-capacity wells for irrigation that has been in place since 2002 (*bit.ly/peipotato*).

# Yukon

## Vast landscapes on ice

In June 2014, after a year of public consultation and input, the Government of Yukon released its Yukon Water Strategy and Action Plan. The strategy sets a foundation for making complex water-management decisions while laying a path for immediate progress on the priorities established. The plan details a number of concrete activities, organized around six strategic priorities. Actions range from educational activities to concrete measures, such as developing a regulatory framework to manage groundwater and ensuring adequate monitoring across the territory. The government has further allocated $2.7 million to support the plan's implementation over the next three years.

In addition to the water strategy, a landmark example of a watershed plan in the region was completed in 2013. Members of First Nations and tribes of the Yukon River Inter-Tribal Watershed Council approved a Yukon River Watershed Plan. It combines modern science and policy with the traditional knowledge of the Indigenous governments and people of the Yukon River. The plan also includes specific objectives and standards to protect the quality, quantity, and flow of the water in the river.

# Northwest Territories

## Governments negotiating devolution

On April 1, 2014, the administration and control of rights to water transferred from the federal government to the Government of the Northwest Territories. In the devolution process, many laws and regulations that govern lands, water, and resources were mirrored with previous federal legislation. The primary water legislation in the Northwest Territories is now the *Waters Act*. The *Mackenzie Valley Resource Management Act* continues to be administered by the federal government; the government has been delegated certain responsibilities under this act. Water continues to be regulated by institutions of public government with federal, territorial, and Aboriginal government members.

# Nunavut

## Finding a new vision

The Nunavut Water Board (NWB) is an arm's-length institution of public government. It is the regulator with the jurisdiction over any use of freshwaters and deposit of waste in the territory. The NWB also holds the larger mandate of managing Nunavut's freshwater resources. Building on the jurisdictional framework consisting of a land claims agreement, federal statutes, and associated regulations, the NWB is currently exploring the potential for the development of a territory-wide water management strategy. The hope is that this strategy will act as a compass for water management in Canada's largest jurisdiction. The NWB is reaching out to expertise found in Nunavut and elsewhere across the country.

Elizabeth Hendriks is a member of the Living Water Policy Project's national steering committee and director of freshwater for WWF-Canada. Lindsay Telfer is the project director for the Canadian Freshwater Alliance and is a member of the Living Water Policy Project's national steering committee.

For up-to-date information on water policy across Canada, visit The Living Water Policy Project at **waterpolicy.ca**

# On the Level

Do drinking water guidelines get watered down when science and politics mix?

BY SAUL CHERNOS

**WINTER WAS AT FULL THROTTLE** in 1993 when Colleen Cooney opened her daily newspaper and learned the City of Orillia closed one of its wells after tests revealed high levels of tetrachloroethylene. The degreasing agent—also known as perchloroethylene, PCE, and perc—was common in automotive, metalworking, and dry-cleaning operations yet was becoming increasingly recognized as carcinogenic and harmful to the central nervous system. Scientists were already on the case and, by the 1970s, were correlating contamination in Woburn, Massachusetts with a spike in childhood leukemia and other illnesses. So when Orillia officials preemptively shut the well so adjustments could be made, Cooney reflected on her own brush with cancer a decade earlier and decided to investigate the colourless chlorocarbon and its impact on human and environmental health.

Dispatching inquiries to multiple government agencies, Cooney noticed something that troubled her: guidelines for permissible levels varied from regulator to regulator. Health Canada didn't have a level of its own for perc at the time, relying instead on the U.S. Environmental Protection Agency (EPA) regulatory standard of 5 parts per billion (ppb) in drinking water, while other agencies maintained more relaxed standards. With Orillia's concentrations well in excess, Cooney tracked the numbers. She learned Health and Welfare Canada, as the department was then known, had only the previous year issued a "guidance value" of 65 ppb in response to several instances of contamination, yet the EPA was alarmed enough about perc as a potential carcinogen that it believed its goal should be zero concentration.

Orillia now has air strippers in place to avoid a repeat occurrence, but this isn't a story about perc—it's about how governments decide what concentrations should be permitted in drinking water. Cooney's venture to understand tetrachloroethylene, and her subsequent entanglement with assorted and sundry guidelines and standards, wasn't an isolated experience, and she expressed disillusionment with "a numbers game" where officials "are not out to protect peoples' health, they're out to protect the status quo." Ultimately, the setting of numbers is a complicated, bureaucratic affair influenced, not only by science, but also by realpolitik, where assorted considerations have a seat at the table.

## A complex process

The U.S. *Safe Drinking Water Act*, passed in 1974, now governs more than 90 substances. Eric Burneson, the EPA's director of drinking water standards, said the agency's limit of 5 ppb for perc—which works out to 5 micrograms per litre—dates back to 1991, two years prior to the Orillia incident, and remains in effect to this day.

Delve into the level-setting process, however, and the complexities begin to

emerge. The EPA, in fact, maintains two sets of numbers. The standard that limits perc at 5 ppb is a maximum contaminant level and carries full regulatory clout. A public utility exceeding allowed concentrations could potentially be ordered into compliance or, in some cases, even fined. But the agency also maintains maximum contaminant level goals. Unlike standards, goals are unenforced targets—a wish list of sorts. Burneson said the EPA's goal for perc has been zero since 1991 because the chemical is classified as carcinogenic and no level of exposure is considered entirely free of risk.

> "[Officials] are not out to protect peoples' health, they're out to protect the status quo." —Colleen Cooney

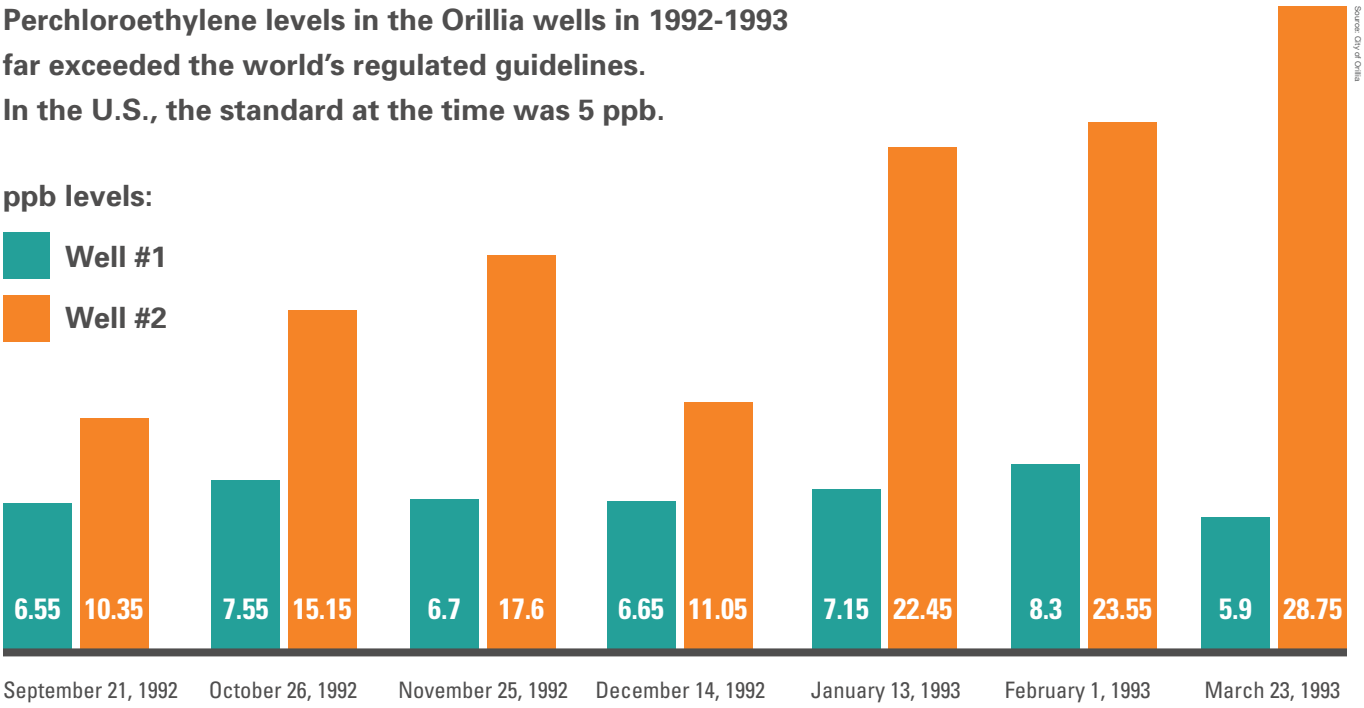
Goals are almost purely based on the interpretation of scientific health data, whereas standards are subject to additional pressures. For instance, compliance with a number depends on the availability of accurate measurement tools. "We refer to that as analytical feasibility—the lowest level to which you can reliably predict the actual concentration of the contaminant in the water," Burneson explained. He said methods for detecting perc at minute concentrations have improved considerably in recent years, and the EPA will likely acknowledge this if and when a standards review announced in 2010 for perc and other volatile organic compounds actually happens.

Competing interests also influence standards. Environmental activists, industry lobbyists, and anyone else can potentially influence the outcome through a public comment process. "Whenever anybody, be they industry or a consumer group, gives us new science we hadn't previously considered, we obviously have to take some time to evaluate that and then make a judgment about whether or not this represents the best available science for purposes of setting the standard," Burneson said, adding that the science in this case extends to the efficacy of treatment systems. Asked if economic impacts are ever weighed against toxicological data, Burneson said the Safe Drinking Water Act requires a cost-benefit analysis, and EPA administrator Gina McCarthy has discretion to raise the level to one where the health risk reduction benefits are maximized at a cost justified by the benefits.

## "Sometimes the decisions are quite difficult"

North of the border, Health Canada is less forthcoming. Citing the lack of a "media-trained spokesperson on the topic," media relations officer Sara Lauer turned

**Perchloroethylene levels in the Orillia wells in 1992-1993 far exceeded the world's regulated guidelines. In the U.S., the standard at the time was 5 ppb.**




down an interview request and instead replied to a set of questions by e-mail. According to Lauer, Health Canada works with the provinces and territories to develop and maintain drinking water quality guidelines. "For each drinking water contaminant, a comprehensive systematic literature review is conducted, which includes all available relevant peer-reviewed, published scientific studies and approaches, incorporating the latest information and research into the health effects associated with the contaminant," Lauer wrote, describing a process akin to the EPA's. Reviews in other jurisdictions are considered, and there's a web-based public consultation.

Colleen Cooney said Health and Welfare Canada told her in 1993 it followed U.S. EPA guidelines for perc. Then, two years later, the department set the standard at 30 ppb, six times the EPA number. Sara Lauer wrote, however, that this standard is currently being updated. "The consultation document is being prepared for publication on the web, expected to be posted over the summer," she explained. "Advances in science […] are allowing for more precise understanding of the health effects and levels of exposure which will likely affect the guideline value."

Canada's provinces and territories largely use federal drinking water quality guidelines since they've helped to produce the documents. In Ontario, once the guidelines are published, they're reviewed by the Ontario Drinking Water Advisory Council (ODWAC), a body created in 2002 following the Walkerton tragedy. ODWAC then makes a recommendation to the minister on whether Ontario should adopt the guideline as is or set a more stringent standard. The Ministry also consults with the Ministry of Health and Long Term Care and with municipalities prior to proposing a standard, and the process undergoes further public consultation through Ontario's Environmental Bill of Rights. Tim Fletcher, acting manager of water standards with Ontario's Ministry of the Environment, said the province embeds the numbers into its own rules and procedures, including the Safe Drinking Water Act, and has never loosened guideline numbers.

As for the interim guidance value of 65 ppb for perc, which the Ontario environment ministry requested and Health and Welfare Canada approved in 1992, a Ministry of the Environment memo dated February 27 of that year noted the guidance value "is based on the most recent information and is the most appropriate guideline for assessing the acceptability of tetrachloroethylene-contaminated drinking water supplies in Ontario." Tim Fletcher said interim guidance values are occasionally used to "provide quick advice, usually in an emergency situation such as a spill, to the jurisdiction so that immediate decisions can be made."

> "There are some substances which should be zero—and I mean zero—and we should ban those substances because they're already causing too much damage." —Michael Gilbertson

John Fawell of the World Health Organization (WHO), which Cooney also contacted in 1993, said decisions about standards are complicated and the agency expects jurisdictions to adapt its own numbers—40 ppb currently for perc—to their own unique circumstances. "Sometimes the decisions are quite difficult because if you have existing

pollution or a problem with a particular factory you may not be able to do anything straight away," said Fawell, a scientist who specializes in chemical risk assessment and sits on WHO's drinking water quality guidelines committee. He said jurisdictions adopting guidelines that can't be immediately attained actually risk creating a false sense of security. Fawell added he's satisfied WHO standards err on the conservative side and believes a few micrograms don't necessarily make a huge difference toxicologically.

Michael Gilbertson, a retired biologist who used to oversee work on Great Lakes water quality objectives, took a different view, characterizing the inclusion of non-scientific considerations in determining safety standards as horse trading. "It's a negotiation in which the economic impacts of a particular number are negotiated against the toxicological evidence," he said. "The big implication that comes from all of this is there are some substances which should be zero—and I mean zero—and we should ban those substances because they're already causing too much damage."

So, is external pressure unduly influencing the setting of standards? Gilbertson worried about impacts on fetal and child development and the onset of puberty, and also on older people, and saw "enormous pushback to try to disprove that these effects are actually occurring." For his part, John Fawell noted that "sometimes there's an inappropriate influence to get lower numbers because politicians have an axe to grind, and you'll also find you've got pressure from the other side if it's going to damage their industry." On the whole, though, Fawell said governments generally understand that putting undue pressure to produce higher or lower numbers "is not a good idea because sooner or later they're going to get found out." WC

Saul Chernos is a Toronto-based writer and frequent Water Canada contributor.

# Mobilizing Knowledge

How can we make strong, relevant policies if decision-makers don't truly understand the science? BY ERIN MURPHY-MILLS

**IMAGINE YOURSELF** in a foreign country, trying to find your way around a city, all the while not being able to speak the local dialect. Because of this, everything about your trip becomes that much more difficult. Even if you could cobble together a simple question, how could you understand someone's answer well enough to actually find your way around? It would be easier if you had someone with you—someone fluent in the language and, in fact, so familiar with the travel destination that you wouldn't even need a map to guide you.

What does this have to do with policy and decision-making? Everything. The secret to having a good time on that vacation is having someone with you who can act as an in-between between you and the unknown. In the same vein, the secret to having science-based, informed decision-making relies on having someone who can move easily between scientists and policy-makers. This person not only has to be able to speak the language of both groups, they must also be able to mobilize the knowledge so it can be used by the people who need it.

According to Alex Bielak, the founder and chief knowledge broker at Alex Bielak Communications, the most widely accepted definition of knowledge mobilization is "a two-way process [between groups] that makes use of the existing stock of knowledge and co-creates new knowledge to help foster change." Katrina Hitchman, manager of knowledge mobilization and training at the Canadian Water Network (CWN), added that it's about "making research more applicable and accessible to decision-making and end users' needs." In short, knowledge generators and knowledge users are brought together in order to support science-based decision-making.

The secret to having science-based, informed decision-making relies on having someone who can move easily between scientists and policy-makers.

Sounds simple enough, doesn't it? The CWN certainly believes so, which is why they incorporate knowledge mobilization into all their research projects. From the beginning to the end of their projects, researchers collaborate with end users, whether they are members of industry, community groups, or governmental leaders. This process ensures the outcomes of research projects are meeting an end-user need and that people outside the research field can understand and use the information produced from these projects. Simon Courtenay, CWN's scientific director, gave the example of when new sampling protocols and programs were developed after a research project demonstrated

lead levels in drinking water could impact human health. He emphasized that this was just one example among many where "research has had major impacts on how we do things in Canada."

But Janet Ivey from the Grand River Conservation Authority cautioned that, although some organizations are doing their best to link researchers and end users, there are still challenges when it comes to impacting decision-making. "The average person would be scandalized to know how infrequently that actually might be the case," she said about how often policy reflects the best of what scientific research has to say. Part of the disconnect can be attributed to the competing social and economic factors that impact decisions about the environment, but an underlying issue is the language and medium in which scientific research is being communicated.

There are a number of ways to overcome these challenges. According to Bielak and Hitchman, knowledge mobilization is a burgeoning field, full of potential and interested young graduates. Perhaps the solution lies in the growing acknowledgement of the importance of knowledge mobilization as people become more aware of the services knowledge professionals can provide.

In previous years, knowledge mobilization was something done "off the side of people's desks," if it was done at all, but now organizations are including it as part of their research projects, giving incentives to move beyond academic journals and onto a broader audience base. After all, as Ivey noted, practitioners in the environmental and water sectors often don't have a lot of access to academic journals or the time and resources to stay on top of the literature. It's important to produce shorter, simpler summaries of research, which make the information easier to understand and use.

The current system isn't perfect, but the industry is slowly working toward a more informed decision-making process. As Courtenay pointed out, research isn't always about making big sweeping changes or discoveries—it's often incremental modification as scientists continue to learn and move forward.

"Each research project isn't about building a wall. It's about putting in one solid brick that we won't have to replace," Courtenay said. This is a modest contribution on its own and something that can act as a building block for future growth. Knowledge mobilization is also moving upward, building on one successful research project and partnership at a time. WC

Erin Murphy-Mills is a masters of environmental studies candidate at Queen's University, studying community-based water monitoring on the Oak Ridges Moraine in Ontario.


Microtunnelling under an environmentally sensitive area in south Mississauga.

Credits: Gerrie Woodbridge


Horizontal directional drilling crossing the environmentally sensitive Holland River.


Directional drilling through a high-traffic corridor north of Toronto.

# Smart Excavation

## There should be no competition between open-cut and trenchless technology.

BY GIOVANNI CAUTILLO

**THE DEBATE** over the best form of excavation—open-cut versus trenchless technology—rages on. This debate is perplexing because an electrician is never asked which screwdriver they prefer. With excavations, open cut and trenchless are both tools. Similar in function, yet different in their utilization, their effectiveness is measured in direct relation to the task at hand and, depending on the complexity of the project, both may need to be employed.

Say you have a project where a contractor is installing new water and wastewater pipes that span a number of kilometres. The topography varies over the length of the project with areas of easy access and areas of complexity. At some points in the project, it is logical to utilize open-cut technology because access may be unencumbered and the use of this tool would be the most efficient and cost effective to the customer.

The contractor will always incorporate the most logical, time sensitive, and cost-effective method within their arsenal. They will select the right tool for the job.

During the same project, the land suddenly encroaches upon a river that requires expert circumvention on the part of the contractor. In this portion of the project, trenchless technology is the better tool to use since it will leave the river undisturbed, allow the project to proceed without delay, and at this point, will be the most cost-effective alternative.

To add more confusion over the debate, there is also a third option. Depending on the width and depth of the river in the scenario described above, as well as the diameter size of the pipes to be installed, the contractor

may decide that tunnelling this portion may be the preferable solution.

Ultimately, the contractor will always incorporate the most logical, time-sensitive, and cost-effective method within their arsenal. They will select the right tool for the job.

## Know your options

Since joining the Ontario Sewer and Watermain Construction Association (OSWCA), I am frequently asked, "Which is the best method?" Those who are inquiring actually view the situation as a "this" versus "that" type scenario. As indicated by the previous example, all the forms of excavation performed by sewer and watermain contractors incorporate our tools of the trade.

The debate exists because there are customers who will always gravitate to what they know as a trusted method of excavation—regardless of the technique. Their rationale tends to always lean toward the notion of "because we've always done it that way." This may be because they have not had the proper exposure to the alternatives, or perhaps they have not yet been informed of the technical differences that all the forms of excavation can provide. They may not even know they actually have alternatives to begin with.

The contractor must work within the specific confines of a project as prescribed by the customer. The customer is the key in the equation and the excavator is not allowed the luxury of deviation from the scope of work, unless they are part of the planning and development of that project.

It is important to provide information and education on all the methods contractors can employ to successfully complete a project. Depending on the excavator, there are those who have particular expertise in one, some, or all of the methods indicated. We endorse no one particular method over another since all may be required to successfully complete a project, which is always our priority. WC

Giovanni Cautillo is the executive director of the Ontario Sewer and Watermain Construction Association.

# Tapping In

Are municipal bans on bottled water effective in driving sustainable behaviours around drinking water?

BY ASHLEE JOLLYMORE

**DEPENDING ON WHERE YOU ARE,** it may be getting harder to buy a bottle of water.

In response to concerns over the environmental, economic, and social impacts of bottled water, local governments in many parts of North America have enacted or considered restrictions on bottled water sales. Most notably, the City of San Francisco banned bottled water sales on most city-owned properties, making it the largest local government in North America to do so. But are outright bans the best way to promote sustainable choices?

The most common argument for restricting the sale of bottled water stems from its environmental footprint. The average Canadian drinks nearly 70 litres of bottled water a year, an increase of 107.3 per cent since 1999. Canadians dispose of at least a billion plastic water bottles per year. The best case scenario for disposal is recycling and, although rates in Canada are relatively high, recycling is energy intensive and can result in down-cycled materials. Bottles not recycled are diverted to landfills, and in the worst case, become litter in natural environments like oceans, lakes, and rivers.

Opponents to bottled water restrictions highlight the recyclability of plastic bottles and say campaigns to increase recycling are effective at decreasing waste. Opponents also cite the protection of individual freedoms and note that it should be up to the consumer to decide.

## Shifting to tap

While bottled water is far from the only type of packaged beverage available to consumers, its impacts are singled out because of concerns over selling water as a product for large corporate profit. Our societal indecision over how to think about water, alternating between water as a commodity and public resource critical for life, "spurs an emotional response that is not seen for other types of packaged beverages," said Elizabeth Griswold, the executive director of the Canadian Bottled Water Association.

In 2009, bottled water sales comprised only 10 per cent of the Canadian non-alcoholic beverage market (with carbonated soft drinks comprising 17 per cent). "Bottled water doesn't compete with tap water—it competes with other bottled beverages," Griswold said. "Consumers who are drinking bottled water are replacing it with soft drinks, juice, coffee, all of which come in packaging." So, how can a ban ensure consumers drink tap water rather than buy a soda?

The logistical challenge around implementing bottled water bans is convincing the public to drink tap water as well as ensuring convenient access through fountains, refilling stations, and taps. Consumer perception surveys show that convenience is the most cited reason people drink bottled water, followed by quality preferences (including concerns over health impacts as well as taste and aesthetic preferences). Other surveys have shown Canadians tend to trust their municipalities to provide water services and are, for the most part, satisfied with the quality of tap water.

Local governments considering or enacting bans take both points seriously. For a ban to be successful, "Students have to be educated in order to reduce demand for bottled water while also improving infrastructure and access to tap water," according to Veronika Bylicki of Tap That!, a University of British Columbia group advocating for water alternatives on campus.

In 2009, the City of Toronto banned the sale of plastic bottles in its parks and facilities, including those with business tenants such as civic squares. It

focused on a social media and marketing campaign highlighting its motivations and the high quality of municipal water. This helped reduce opposition from citizens, businesses, and vendors affected.

> "Ending the sale of bottled water is necessary to change habits. We can educate for years, and there will still be people who otherwise won't change to more sustainable habits."
>
> —Veronika Bylicki

"Once they understood what we were trying to do, which was of course environmental, and that our tap water is at least as good as bottled, then it was just business as usual," said Douglas Reid, manager of facilities for the City of Toronto. "It's all been pretty positive, really." He also added there has a been a decrease in the city's recycling load.

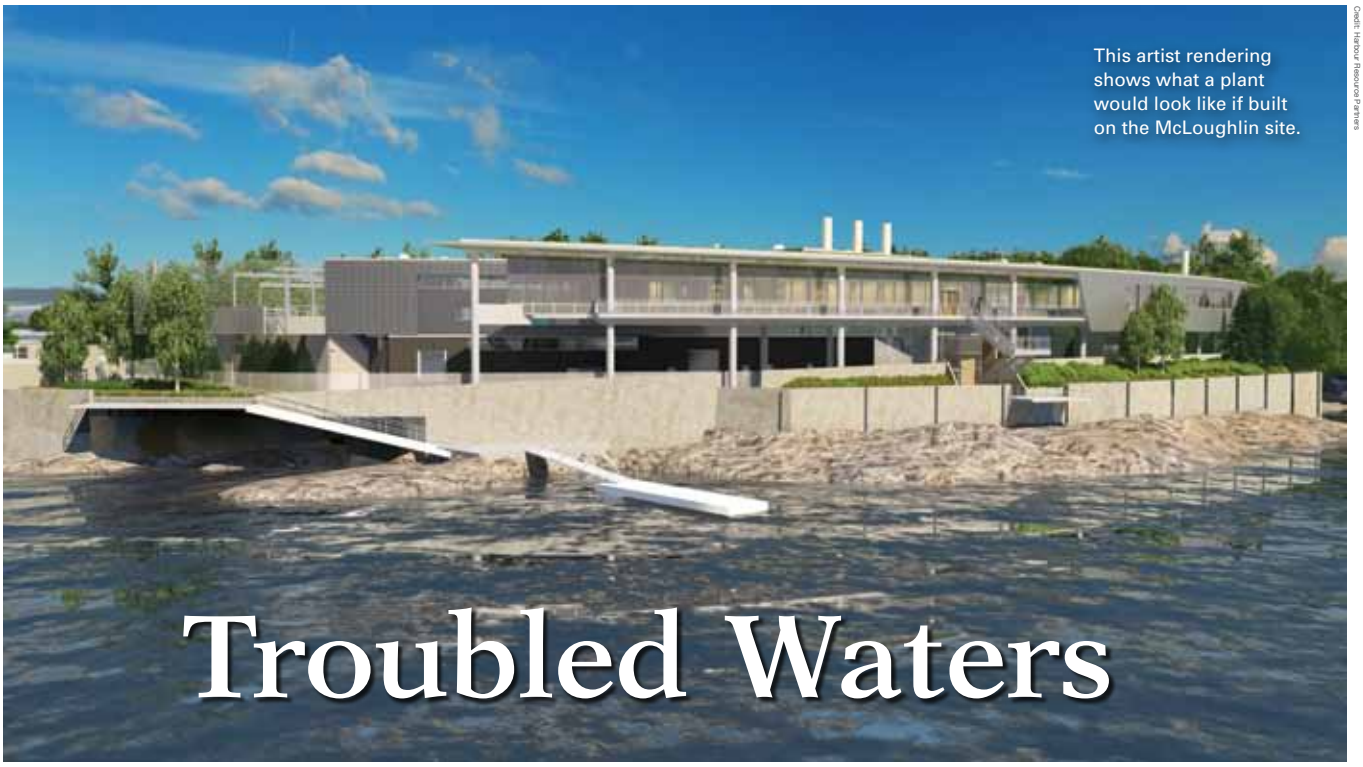
Given that bottled water is extensively marketed to consumers, bans also send a strong message about its cultural acceptability. But altering behaviours and getting people to choose tap water even if they have other choices is a more difficult undertaking.

"People probably do switch to other beverages," Reid said, adding that "the ban is doing what it is supposed to. If people are drinking water, they are drinking tap water, so environmentally we are doing better. But are we getting people to drink more tap water? That we just don't know."

A ban's greatest strength may be the potency of the message it sends around drinking tap water as the best option. Since the City of Toronto enacted its ban in 2012, Reid said he sees a lot more reusable water bottles around. "It's one of a number of tools, but it certainly hammers home the point in an effective way," he said. WC

Ashlee Jollymore is a biogeochemist and PhD candidate in the ecohydrology group at the University of British Columbia.

Have an opinion on bottled water bans? Sound off on our LinkedIn page!



This artist rendering shows what a plant would look like if built on the McLoughlin site.

Credit: Harbour Resource Partners

# Troubled Waters

## The debate continues over McLoughlin Point and the Capital Regional District's Core Area wastewater treatment facility.

BY KATIE YANTZI

**THE CAPITAL REGIONAL DISTRICT'S** (CRD) attempt to build a Vancouver Island wastewater treatment plant has become a bureaucratic debacle as messy as the sewage it is trying to clean up.

In 2006, the province of British Columbia mandated the Core Area Liquid Waste Management Committee to oversee waste management and make recommendations to the board. Since then, local residents, politicians, academics, and climate scientists have been sharply divided over the CRD's course of action regarding Greater Victoria's sewage. The CRD voted in favour of a centralized system of secondary sewage treatment, but critics insist other options need to be investigated, with greater consideration for climate change and resource recovery. Some B.C. oceanographers argue that treatment itself is an unnecessary expense. The region's sewage is currently diluted and funnelled, untreated, into the deep, fast-flowing currents of the Juan de Fuca Strait.

After the final selection of McLoughlin Point as the location of a future facility, the CRD's plans came to a standstill with Esquimalt's refusal to rezone the area so a wastewater facility could be built. The CRD reached out to the provincial government to seek enforcement of the rezoning, but Environment Minister Mary Polak and Community, Sport, and Cultural Development Minister Coralee Oakes refused to get involved. Polak said municipal consensus on wastewater treatment is "not something for the provincial government to dictate."

Plans for sewage treatment in the region have a long history of political gridlock. Vic Derman, Saanich councillor and CRD director, said that throughout the eight-year process, limited options were considered and seemingly only those that were centralized and built on top of existing CRD pipes. "I made a big push at the start, saying, 'This should be a wide-open process,'" he said. "We should be looking at maximizing environmental gain and resource recovery in particular, and responding to climate change, and that all ideas should be able to come forward. I don't think that ever happened in the process." A preliminary study of the benefits of a decentralized system was conducted in 2009, but Derman insisted that the costs it projected were "way out of line" compared to the actual cost of similar projects in other North American cities.

Many sources close to the project declined to comment or wished to remain anonymous, though supporters of the CRD's original secondary treatment plan are equally frustrated with the project's stagnation. "No plan is perfect," said Thomas Tiedje, dean of engineering at the University of Victoria. "Improvements are always possible, but if you need to treat sewage, you have to make a decision and get on with it. You also need to trust the people you hire."

> "If you need to treat sewage, you have to make a decision and get on with it. You also need to trust the people you hire." —Thomas Tiedje

Some suggest the political indecision over Greater Victoria's wastewater management points to issues within the CRD itself. Supporters and critics of the board's plan spoke to the CRD's loss of credibility in the public eye. Tiedje believes that bureaucracy is part of the problem. "The CRD has too many small municipalities, too many politicians," he said, adding that perhaps amalgamation of the Greater Victoria region could help. A source who wished to remain anonymous countered that, regardless of amalgamation, the location of the wastewater treatment plant would still be controversial.

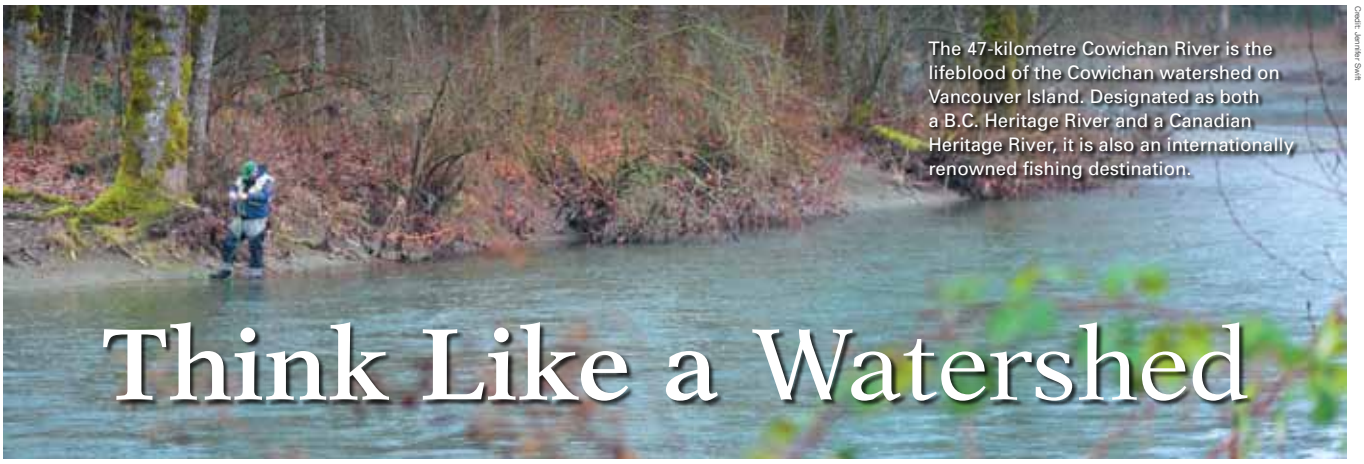
Each municipality is represented in the CRD proportionate to its population, though Derman points out this sometimes results in decisions unfavourable to smaller municipalities. "At times, the majority of municipalities comprising the core area have been against it, but representation on the committee is based on population, and Saanich and Victoria have, between them, nine members. So they can pretty much vote something through just by themselves," he explained.

"Essentially, most of the members from Victoria and most of the members from Saanich consistently voted in favour of the [McLoughlin Point] project."

The current plan, as it stands, is back to the drawing board, with the aim of finding a solution that area residents and politicians can agree on. At a CRD meeting mid-June, the decision was made to pursue a multi-pronged approach in finding a solution to Victoria's wastewater dilemma. The CRD intends to continue to pursue McLoughlin Point through discussions with Esquimalt residents, offering greater compensation and tax breaks in exchange for the site. At the same time, a study has been commissioned to explore other treatment options, such as a decentralized system and tertiary treatment. Seaterra, the body mandated by the province to oversee the sewage treatment plant's implementation, has put procurement processes on hold, though a spokesperson said they will continue to assist the CRD in planning and siting for the project.

It remains to be seen whether these efforts will bring forth an agreeable option. Esquimalt mayor Barb Desjardins has already told the Times Colonist that the CRD's recent tax break offer is "insulting." Derman, however, is hopeful about the prospects of these measures. "It's a chance for the CRD to regain credibility," he said. "I'm hoping this is an opportunity for the CRD to get on track [...] and do this proposal justice." WC

Katie Yantzi is a freelancer and publishing professional living in Toronto.



The 47-kilometre Cowichan River is the lifeblood of the Cowichan watershed on Vancouver Island. Designated as both a B.C. Heritage River and a Canadian Heritage River, it is also an internationally renowned fishing destination.

Credit: Jennifer Swift

# Think Like a Watershed

## It's time for a fresh perspective on watershed governance.

BY LAURA BRANDES, OLIVER BRANDES, AND MICHELE-LEE MOORE

**THE INCREASING PRESSURES** of population growth, pollution, and a changing climate, coupled with strong demands for more local control, are making it increasingly apparent that fresh water must be governed in new ways. Across the country, governments at all levels are responding to these pressures by implementing new decision-making arrangements. Collaborative watershed governance is a potentially powerful and innovative model. It involves reorganizing decision-making to create more inclusive processes that better align with the ecological boundaries of watersheds rather than arbitrary political borders. It also involves addressing watershed health and function as a priority.

Although transformative change at this scale is an inevitably slow process, change is clearly occurring. Recent research and an ever-expanding conversation at the local level reveal a strong and, most importantly, growing interest in watershed-based governance.

Governments are maxed out in terms of their capacities to deliver on existing commitments, let alone being able to take on new governing activities, and new priorities and challenges are always emerging. At the same time, people from diverse backgrounds—including academia, practitioners, grassroots groups, and government at all levels, including First Nations—are reimagining how decisions about both water and watersheds are made and, critically, who makes them.

### From theory to implementation

Despite this interest in shifting toward watershed-based decision-making, practitioners acknowledge that their organizations do not currently have sufficient skills, funding, or capacity to widely adopt a comprehensive watershed governance model.

This theme of capacity building was the central thrust at the national Watersheds 2014 forum, which was held January 2014 on Cowichan Tribes territory in Duncan, British Columbia. The event was designed to build capacity for freshwater protection, with an explicit focus on watershed governance. Nearly 200 delegates from across Canada—plus 75 virtual participants—re-envisioned the way we collectively use, share, and respect our freshwater and watershed resources. It initiated discussion about who needs to be part of the decision-making fabric, what additional skills and knowledge are needed going forward, and which new approaches and institutions are required to guide communities through the 21st century of water management and governance.

Coming out of the forum, the message was clear: mounting concern about the sustainability of our water future, coupled with a growing interest from communities and citizens, is driving the demand for more local engagement and for stronger First Nations involvement in decisions. Following up on the event, a Watersheds 2014 Forum Consensus summary document (*bit.ly/watershed2014*) was developed and captures a common sentiment about these issues. One important complexion of the collaborative watershed-based approach is the integration of notions of resilience (the ability to deal with crises and change) into planning and governance processes at all levels of government and community action.

### Winning conditions

Developing new institutions and

## The Movement

**IN WATERSHEDS** across the country, a shift toward basin-wide collaborative governance is underway. This increasingly apparent movement exists around a range of critical waterways: from thundering heritage rivers and mighty lakes to clusters of streams and creeks and all types of water bodies in between.

Specific examples include watershed-scale governance initiatives in the Cowichan watershed on Vancouver Island; in British Columbia's interior mountain basins, such as the Okanagan and the Columbia; in the mighty Mackenzie Basin in Canada's North; across the Prairies and around Lake Winnipeg; in Ontario as part of the well-established legacy of the conservation authorities; in the Great Lakes and St. Lawrence River; and all the way to the East Coast in the St. John River watershed.

embedding watershed governance is neither a quick nor an easy process. For watershed governance to function effectively, our research has identified nine winning conditions that, when implemented together, increase the likelihood of achieving the goal of protecting and, in some cases, restoring watersheds:

1. Enabling powers in legislation;
2. Co-governance with First Nations;
3. Support from and partnership with local government;
4. Sustainable long-term funding;
5. A functioning legal framework for sustainable water and watershed management;
6. Availability of data, information, and monitoring;
7. Independent oversight and public reporting;
8. Assessing cumulative impacts; and
9. Continuous peer-to-peer learning and capacity building.

A critical conclusion from the January 2014 policy and governance report A Blueprint for Watershed Governance in British Columbia (*poliswaterproject.org/blueprint*)—published by the University of Victoria's POLIS Project on Ecological Governance—is that beginning the process requires collaboration between key stakeholders, rights holders, and all governments, including local First Nations or other indigenous governments. Whatever form these new governing bodies might take, they must be designed to be accountable, financially sustainable, and nimble in their ability to respond to the emerging challenges and shifting priorities they will inevitably face. Ensuring these cornerstones are in place will help build the local legitimacy needed for these bodies to make decisions that will impact the ecological, social, and economic health of their watersheds.

## Looking forward

The challenge lies in not being afraid to embark on reforms of policies and decision-making structures that ensure critical attention to ecological health and function. Watershed governance is a long-term process that will take a collective effort. But an increasingly wide range of individuals are already rolling up their sleeves and getting to work. Nothing less than the future of our water is at stake. WC

Laura Brandes is the communications director at the POLIS Water Sustainability Project at the University of Victoria. Oliver Brandes is the co-director of the POLIS Project on Ecological Governance at the University of Victoria (UVic) and leads the POLIS Water Sustainability Project. Michele-Lee Moore is an assistant professor in the University of Victoria Department of Geography and leads the Water, Innovation, and Global Governance Lab at UVic's Centre for Global Studies.



# Water Under Pressure

Navigating competing demands between agriculture and natural resource development. BY CHAD EGGERMAN

**SASKATCHEWAN'S ECONOMY** has been growing at a feverish pace the past few years on the pillars of agriculture, mining, and oil-and-gas development. Although growth has recently settled at more sustainable levels, recent discussion in the province has centred around how to best use water resources in future development. This is an ongoing discussion in jurisdictions in Canada where both agriculture and natural resource development coexist, most prominently British Columbia, Alberta, Ontario, and Quebec.

The agriculture sector is traditionally the largest user of water in Saskatchewan, particularly for irrigation in the West Central region of the province around Lake Diefenbaker. By some estimates, there is the potential to expand as much as 500,000 additional acres of land to irrigation around the lake. The Government of Saskatchewan views this expansion as a major opportunity for economic growth and to attract investment. There are a number of irrigation districts in Saskatchewan that are administered by the Ministry of Agriculture under *The Irrigation Act*, 1996.

Saskatchewan has been mining natural resources for many years but recent multibillion-dollar expansions and greenfield projects have raised the profile of mining in the province. The most established resources are uranium in the north and potash in the south.

The potash-producing region in Saskatchewan directly overlaps prime agricultural land as well as considerable oil-and-gas reserves. There are two methods to mine potash: solution mining and conventional shaft mining. The solution-mining process involves the construction of a well field composed of at least two drill holes—one to send hot water down to the potash-bearing zones of rock, and another to bring the potash-laden brine up to the surface after percolating in an underground cavern.

Solution mining uses vast quantities of water. Currently, Vale proposes to build a 70-kilometre water pipeline to Katepwa Lake in the Qu'Appelle Valley to pump more than 40 million litres per day for their Kronau project (the equivalent of 15 Olympic-sized swimming pools). K+S Potash Canada is currently building a new solution potash mine and is planning on using up to 60 million litres of water per day. Different regulations in Saskatchewan apply depending on whether the water comes from the surface or the ground, the type of mining (for potash, solution or conventional), and the location (uranium in the north is regulated differently than potash in the south).

The oil-and-gas industry in Saskatchewan has experienced rapid growth recently due largely to continued expansion of the use of hydraulic fracturing (or fracking), which involves pumping pressurized water underground

to fracture rock to extract oil or gas. There were 3,200 horizontally fracked wells sunk in Saskatchewan from 1990 to 2013. On average, there are about 3,000 new oil wells (both vertical and horizontal) drilled in Saskatchewan each year. Any fresh water to be used in Saskatchewan for fracking is subject to appropriate approvals from various provincial water agencies. Residual fracking fluids are recycled and disposed of at provincially approved waste processing facilities or stored. The discharge or storage of used fluids into the surface environment is prohibited in Saskatchewan.

The risk of water availability for farmers, miners, and oil-and-gas companies is becoming evident. Water supply agreements between miners and water suppliers, like SaskWater or a municipality, are becoming increasingly difficult to negotiate. The water supply agreement is a critical agreement to provide a certain amount of water at a set price. There are very significant risks for potash solution mines, which use water to operate if water supply is curtailed or discontinued. Oil companies are having to travel further and pay more for water for fracking. Intensive livestock and increased spraying (which uses fresh water) in Saskatchewan are also putting pressure on water supplies.

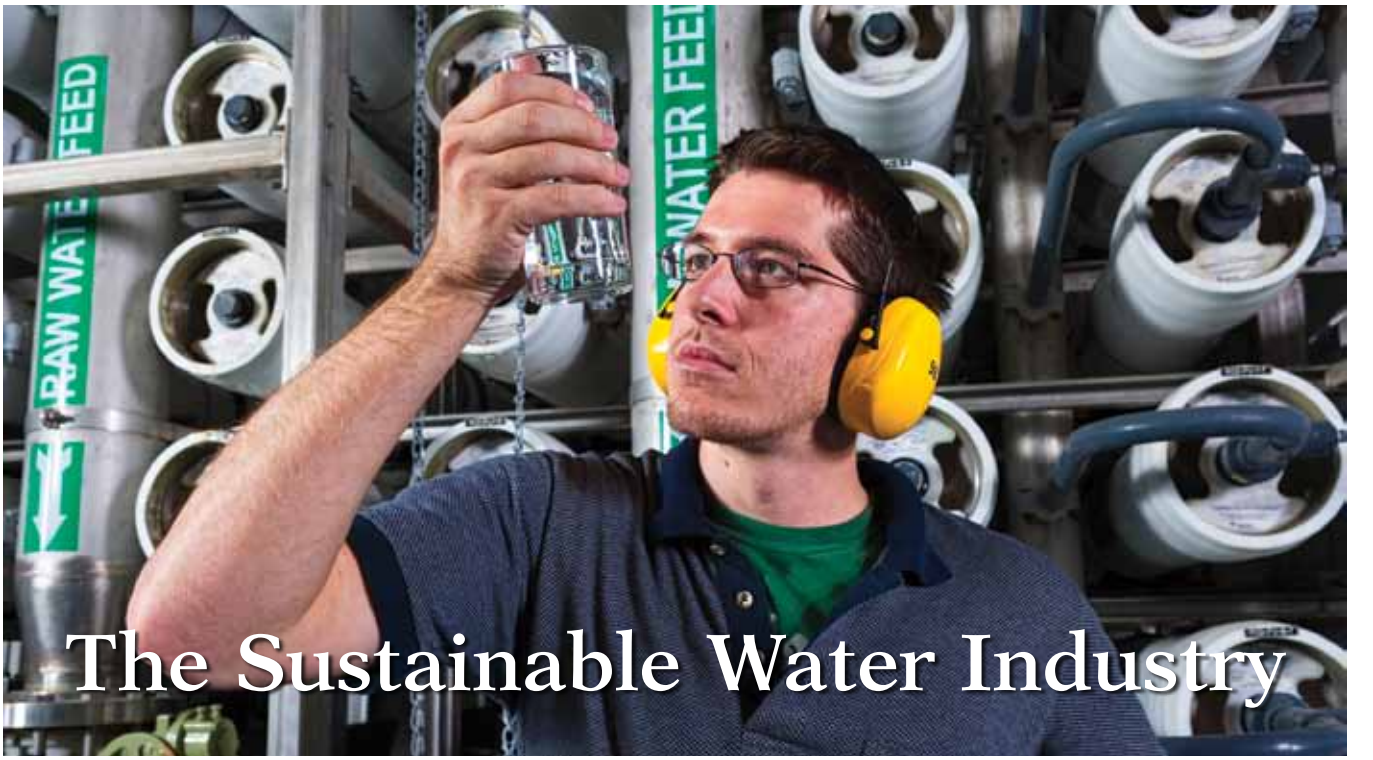
> There are about 3,000 new oil wells drilled in Saskatchewan each year.

There are a number of innovative projects in the province to mitigate these risks. Oil-and-gas companies are starting to use treated wastewater for their fracking operations. Municipalities in Alberta and Saskatchewan are now selling treated wastewater to oil companies. The treated wastewater can come from lagoons or from greywater discharge. This is a new revenue stream for municipalities and increases the certainty of water supply for oil-and-gas companies.

Western Potash Corp.'s new potash mine in Milestone, Saskatchewan recently received environmental assessment approval for the facility, including the use of City of Regina treated effluent as the industrial water source for its solution mining process. The water is purified to prevent foaming or scaling. This is the first potash mine in the world to use treated water.

It is expected the discussion between farmers and extractors of natural resources will continue in Saskatchewan and across Canada, with innovative technologies and agreements providing a way forward. WC

Chad Eggerman is a partner in the Saskatoon office of Miller Thomson LLP and assists owners and contractors to develop projects in the natural resource industry.




# The Sustainable Water Industry

The 2008 financial crisis didn't crush water companies—it made them stronger.

BY MATT SHELDON

**IT HAS BEEN A TOUGH FIVE YEARS** for the water industry. Prior to 2008's financial crisis, the companies providing water technologies and services were flying high on the back of flush government funds as well as strong real-estate and other construction markets. While temporary stimulus helped to dull the pain (and some would argue it added to it), much of the growth on which these companies relied had disappeared. According to the U.S. Census Bureau, spending on water and wastewater peaked in late 2008 and subsequently fell 30 per cent, with no sign of sustained recovery evident on the municipal side. Even worse, U.S. residential construction spending fell 65 per cent and spending on non-residential buildings fell 42 per cent from peak to trough.

Remarkably, however, this experience has not crushed water companies—it has made them stronger. From the bottom, water stocks (as measured by the S-Network Global Water Index, in American dollars) are up 170 per cent and sit about 25 per cent above their 2007 peak. But why? As investors and companies increasingly focus on what it means to be resilient and sustainable, the reasons offer a glimpse into a remarkable industry.

Firstly, water companies are durable. Built on strong, long-lasting relationships, water suppliers provide a core product or service, whose sales can only decline so much until they are backstopped by the break-and-fix level of demand. Whether the product is consumed in the process or naturally succumbs to its inevitable end of life, the criticality of water both in life and in industry means the product will be replaced one way or another. And as infrastructure ages, these failures and replacements occur more often.

> [The] combination of durability, flexibility, and customer orientation has made the industry resilient and sustainable.

As an incompressible fluid, when squeezed, water flows to where there are empty spaces. The same could be said for water companies themselves, which typically supply several end markets at the same time. These range from various construction markets to a broad list of industrial markets as diverse as food and beverage to semiconductors to mining. Over the past several years, fortunately, there have been at least a couple of pockets of strength to help offset the weakness, and companies have flowed resources there to meet those needs. Companies have also changed the shape of their workforces and product portfolios through mergers and acquisitions to increase their focus on these better-available opportunities.

In addition to right-sizing organizations, water companies have embarked on transformational culture changes, such as lean manufacturing, which leads to less waste in their processes and a closer alignment with the voice of the customer. Serving customers well is a hallmark of the industry; customers require reliability, strong service, and solutions to their technological and budgetary problems.

The water industry has stepped up to these challenges. An example of this is how, during this period of tight budgets, Canadian company Pure Technologies has grown by helping utilities lower their costs through identification of water leakages and predicting which large-diameter pipes will break prior to them actually breaking. It is a much cheaper approach for utilities to "assess and address" rather than "fail and fix."

The industry has also had a role in solving other industries' problems. For example, many of the environmental concerns associated with fracking are related to water treatment, testing, and transportation. With a wealth of expertise in these areas, water companies have stepped in to provide solutions. Companies involved in the oilsands have also relied on the water industry to provide both clean steam for steam-assisted gravity drainage and for dealing with the complex issues related to tailings ponds. As well, as food and beverage companies seek to reduce operational and reputational risks around water supply, the water industry has supplied technology to reuse their wastewater. Finally, as shipping companies prepare for ballast water treatment systems to be retrofitted on nearly 50,000 ships worldwide, who did they turn to for help? They reached out to companies already making water separation and disinfection systems, such as Trojan Technologies, a subsidiary of Danaher, based in Ontario.

Water companies are in better shape now than before the financial crisis, which should not be surprising. The industry is an old one that has been through a lot of economic environments. For perspective, in our portfolio, the average company can trace its roots back nearly 80 years—that is, right in the middle of the Great Depression. This combination of durability, flexibility, and customer orientation has made the industry resilient and sustainable. WC

Matt Sheldon is a portfolio manager for the Kleinwort Benson Investors Water Strategy.

# No Time to Lose

## Canadian water and wastewater sectors must adapt to climate change.

BY HIRAN SANDANAYAKE

**A FEW YEARS AGO,** Canadian Water and Wastewater Association (CWWA) staff asked its members a simple question: "How prepared are the Canadian water and wastewater sectors for climate change and extreme events?" After discussions, meetings, and a poll, the CWWA developed a quick snapshot.

There was some good news: some municipalities saw climate change as a risk worth addressing. Some of them were establishing climate-change policies and strategies, quantifying climate-change risk, and developing adaptation programs for climate change and extreme events.

Unfortunately, there were warning signs, too. There appeared to be a wide range in levels of preparedness across the country. As the national voice for the water and wastewater sector, CWWA felt it urgent to advocate for climate-change adaptation and provide guidance.

CWWA created a new national technical committee for climate change. Since then, it has been bringing early adaptation adopters and champions together to spark a dialogue, learn from each other's experiences, and learn about data and technical tools available for water and wastewater managers and utilities.

Through my role as chair of the climate-change committee, I have had the privilege of learning from and working with a broad range of professionals from water and wastewater utilities, the private sector, government departments, and academia. During this time, some themes have become apparent to me:

- Adaptation to climate change often requires multi-disciplinary approaches.
- Climate-change planning is founded on many existing municipal planning processes.
- Incremental approaches to climate-change adaptation may not be sufficient.
- Local climate-change risk assessments and proper data are critical to making informed decisions. Without these, proposed solutions may result in monies not being spent on the true priorities or, worse, may result in maladaption (unintentional exacerbation of vulnerabilities).
- Applying a true climate-change lens to water and wastewater planning may result in different solutions; place new emphasis on non-traditional or non-infrastructure intensive approaches to water management and protection during extreme events; force us to re-examine traditional approaches to uncertainty, risk, vulnerability, and level of service; and require changes now to increase resiliency.

Lessons from extreme events can be instructive for climate-change planning. These events sometimes highlight linkages not readily apparent during normal operations (for example, the limitations of municipal human resources, municipal cash flow/financing, public preparedness, et cetera). In some cases, the lack of mandates and efforts coordinated between jurisdictions can also further complicate adaptation efforts.

Funding for climate-change adaptation is needed, not only by the municipal utilities but also by the regional, provincial, and federal departments that are providing research, technical guidance, and coordination.

Though we have already seen successes in climate change adaptation and collaboration, we are still in the early days of this process. For our part, the CWWA climate-change committee will be polling municipalities to get an updated survey of the state of climate-change adaptation. We are also creating an electronic resource databank and have other technical and coordination initiatives in the early planning stages.

The time is now to begin the adaptation process. Quantifying local risks and increasing resiliency now is the best and most cost-effective strategy. WC

Hiran Sandanayake, P.Eng., is a senior water resources engineer with the City of Ottawa and chair of the CWWA's climate-change committee.


Credit: Alison Chan

# Tools of Engagement

One young professional understands the value of networking and community involvement within the water industry.

**ALISON CHAN** talked to Water Canada about being chair of the Water Environment Association of Ontario's (WEAO) Young Professional (YP) committee, her current position as a junior engineer at Black & Veatch, and an unusual hobby she picked up during her extensive travels.

**WC: What is your role as chair of the WEAO YP committee?**

**Alison Chan:** I've been chair of the WEAO YP committee since April 2014, and my term will finish at the beginning of April 2015. The chair of the committee is part of the steering committee—chair, vice chair, treasurer—who work together to provide leadership and vision to the overall operations of the committee. With the help of the steering committee, the chair is responsible for ensuring industry and geographic representation on the committee, succession planning for the committee, and placing volunteers. The chair also interacts with the committee's members, WEAO staff, and other WEAO committee members to execute a variety of events to both WEAO members and non-members, provide input and articles to our quarterly magazine, Influents, coordinate within the YP committee's eight sub-committees, and provide bold leadership to the water environment industry. The passion and enthusiasm of the WEAO YPs is off charts, which makes it very easy to be the chair!

**WC: What role did the WEAO play in helping you find your job at Bleach & Veatch?**

**AC:** The WEAO connected me with industry professionals through an array of events, which provided an easy and casual platform to engage with professionals face to face. I met one of my colleagues and friends, current vice chair of the WEAO YP committee, Nancy Afonso, at a social event, and she encouraged me to pass along my CV to Black & Veatch, who were considering hiring a junior engineer. I had the opportunity to meet one of our project managers at the WEAO conference a month later, and he invited me to the office later that week to meet everybody. By that point, I had a good sense of the office culture and was given promising feedback after the interview. The rest, as they say, is history!

**WC: Talk a little bit about your tradition of photographing interesting manhole covers when you travel.**

**AC:** This began a couple of years ago when I visited a friend in New Orleans. I noticed a nicely designed sewer manhole in the cobblestone labelled "SEWER." What captured my attention was its bold use of the word sewer. I find myself talking about wastewater, often to the discontent of my company, and have learned it's not exactly a hot dinner topic. It's hidden and not spoken about, so I didn't think much about it when I snapped the photo, besides the fact it represented the work I'm passionate about. As I visited other places, it became more obvious that every place has its own interesting manhole designs. I took a photo of a sewer manhole in the old town area of Split, Croatia, for instance, where some of the original city walls are still intact. I'd like to take the photos and learn about the infrastructure servicing water and wastewater in each of the places I travel to, and make a photobook with that information as a travel memoir. I'd also like to start a blog, perhaps, where others can post their shots of interesting manholes and stories. —Staff

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## APPOINTED

Sinclair Garner

GHD has announced **Sinclair Garner** as senior project manager with the company's water and wastewater group. Garner has more than 30 years of project, design, and construction management experience in water and wastewater design and implementation.

Mia Dockter

**Mia Dockter** has been named NeoLogic Solutions' filtration division international sales manager. She has 15 years of experience in the international industrial and high purity filtration industries, and had previously been the international sales manager for a high purity microfiltration manufacturer.

## CONTRACTS

Credit: Rachel Pleun

AECOM Technology Corporation has been awarded a $2.3-million contract by the Region of Peel for improvements to the region's Lakeview Water Treatment Plant in Mississauga, Ontario. AECOM is responsible for design and contract administration services. Design of the project is underway, with construction expected to be completed by mid-2016.

## AWARDED

The American Public Works Association (APWA) will recognize upgrades to the Keswick Water Pollution Control plant in the Region of York in Ontario as one of its 2014 Projects of the Year at the upcoming APWA annual conference in Toronto. The Keswick Effluent Outfall project was carried out by Hatch Mott MacDonald on behalf of the Regional Municipality of York.

The Consulting Engineers of Ontario presented two Awards of Merit to Hatch Mott MacDonald on April 12. The King Road Grade Separation project, separating King Road from rail tracks serving Metrolinx, VIA, Amtrak, and CN trains, and the Niagara Tunnel project, which saw the world's largest hard-rock tunnel boring machine working 140 metres below the City of Niagara Falls, were both recognized.

## CELEBRATED

The City of Kelowna, British Columbia won the inaugural British Columbia Water & Waste Association's (BCWWA) "Best of the Best" tap water taste test challenge at the association's annual conference. Kelowna bested nearly a dozen other entrants.

## EVENTS


David Rudolph, University of Waterloo and SOWC member, addresses a gathering of stakeholders.

Credit: SOWC

### IBM and SOWC Symposium Markham, ON

At IBM's and the Southern Ontario Water Consortium's (SOWC) International Water and Environmental Management Knowledge Symposium, international water and environment experts participated in a day-long exchange focused around integrated water and environment management challenges, solutions, best practice, and innovative partnerships. Topics included flood mitigation, harnessing complex data and technology systems for environmental monitoring, and the need for novel partnerships.

Presenters included: **David Rudolph**, professor of earth and environmental sciences at University of Waterloo and SOWC member; **Mario Schirmer**, professor at the Swiss Federal Institute of Aquatic Science and Technology; **Joost de Hann**, strategy advisor at Digital Delta, Regional Water Authority Delfland; and **Raymond Feron**, Dutch Ministry of Water and Infrastructure, Digital Delta program director.

### 2014 Canada Water Resources Congress Hamilton, ON

This year's CWRA annual congress revolved around the theme of "Water: What is the Future We Want? Our Environmental, Socioeconomic, and Political Agendas." The three-day conference offered attendees a scientific program organized around a number of topics including water in cities, the water and food nexus, the water and natural environment nexus, irrigation and drainage, and hydrologic sciences.

More than 300 delegates attended the congress along with a large group of informed exhibitors.

Opening plenary speaker **Ralph Pentland** delivered a timely message on the state of water resources in Canada. He talked about Canadians having options—they can muddle along and try to adapt or they can make some corrections. "Canadians need a dialogue on market economy versus the market society," he said.

The Great Lakes panel plenary held on the second day included prestigious and diverse panelists from both Canada and the United States, including **Kathleen Padulo**, Chiefs of Ontario; **Joel Barmeier**, Alliance for the Great Lakes, and **Gord Walker**, the Canadian chair of the International Joint Commission.

CWRA will hold next year's event in Winnipeg in June.

Credits: Canadian Water Summit

David Miller opens the fifth Annual Canadian Water Summit.

L-R: Todd Latham, Actual Media and David Miller, WWF-Canada.

L-R: Rachel Phan, Water Canada; Hans van Duijne, Deltares; Kendra FitzRandolph.

L-R: David Moran, Coca-Cola Canada; David Main, AECOM; Mike Nemeth, Alberta WaterSMART; Ramona Doyle, City of Charlottetown; and Bernadette Conant, Canadian Water Network on the Canadian Scene panel.

Imogen Coe, dean of science at Ryerson University (far left) and Anne van Leeuwen of the Consul General of the Kingdom of the Netherlands (far right) present awards to the winning Wetskills Canada 2014 team.

L-R: Lynn Patterson, RBC; Krystyn Tully, Lake Ontario Waterkeeper; and Alex and Tyler Mifflin of The Water Brothers on the Putting Water on Page One panel.

L-R: Alex Mifflin, The Water Brothers; Kerry Freek, WaterTAP; and Tyler Mifflin, The Water Brothers.

L-R: Steven van Haren, MMM Group; Stephen Braun, GeoProcess Research Associates; and Paul Marsh.

Bob Sandford closed the Canadian Water Summit with his keynote speech.

# Canadian Water Summit 2014 Toronto, ON

More than 200 delegates attended the fifth annual Canadian Water Summit on June 18th, which focused on urban water issues. The summit featured major players in the industry, including chair **David Miller** of WWF-Canada, water expert **Bob Sandford**, and photographer **Edward Burtynsky**. Highlights included panels on global cities and water and the Canadian water scene.

The Putting Water on Page One breakout session brought together **Lynn Patterson** of RBC, **Krystyn Tully** of Lake Ontario Waterkeeper, and **Alex** and **Tyler Mifflin** of TVO's The Water Brothers. "There isn't a traditional 'front page' anymore," Tully said. "We have to engage people wherever, whenever, and however it works for them." The panel emphasized the need for humour in water coverage, which tends to be negative, and to find unique, "seductive" angles to engage and inspire audiences.

The Urban Emergency: Managing Extreme Water Crises in Cities breakout session focused on how Canadian cities are responding to an influx of water crises resulting from increased extreme weather events. The Southern Ontario Water Consortium's **Brenda Lucas** moderated the session, which featured the University of Toronto's **Bryan Karney**, the University of Waterloo's **Blair Feltmate**, and CPWA president **Darwin Durnie**.

The Financing Urban Water breakout session focused on challenging conventions when it comes to clamoring for infrastructure money. WaterTAP CEO **Brian Mergelas** addressed how provincial and federal governments are not designed to fund smaller-scale projects. "In many cases, the solution isn't to build a big new plan—sometimes the solution is optimization." He said scalability (spending a bit now, and another bit later) is ideal, but "our system isn't designed for that." He was joined on the panel by Newterra CEO **Bruce Lounsbury** and WatrHub CEO **Ahmed Badruddin**.

*For more photos of the 2014 event, or to find out more about CWS 2015, visit watersummit.ca*

Credits: Niall Ta

Berta Krichker, City of London; Ryan Ness, TRCA; and Fabio Tonto, TRCA

Zoran Postic, GHD; Heather Auld, Risk Sciences International; Fabio Tonto, Toronto Region Conservation Authority; Berta Krichker, City of London; Marcus Weeks, GHD; Ryan Ness, Toronto Region Conservation Authority; Ivano Labricciosa, Toronto Hydro.

## GHD Seminar Toronto, ON

At a seminar hosted by GHD in May, municipalities and conservation authorities gathered to discuss how they can adapt to changing weather, and to understand what it means for investing in new infrastructure or repairing or upgrading existing assets.

Speakers included **Heather Auld**, who has spent more than two decades developing climate design values for Canadian building codes and infrastructure standards, **Ivano Labricciosa** from Toronto Hydro, **Berta Krichker** from the City of London, and **Ryan Ness** and **Fabio Tonto** from the Toronto Region Conservation Alliance.

Some common themes that emerged from both the presentations and the discussion after were around the need for regional coordination, the obligation to advocate for public safety, and finding the balance between investing in capital assets and preventative maintenance.

"We need to be innovative and we need to think about the future when we address some of these questions, " said **Marcus Weeks**, GHD's manager of infrastructure.

*To view the seminar presentations, visit ghd.com/resilient-infrastructure*

Credit: Wetskills Canada 2014

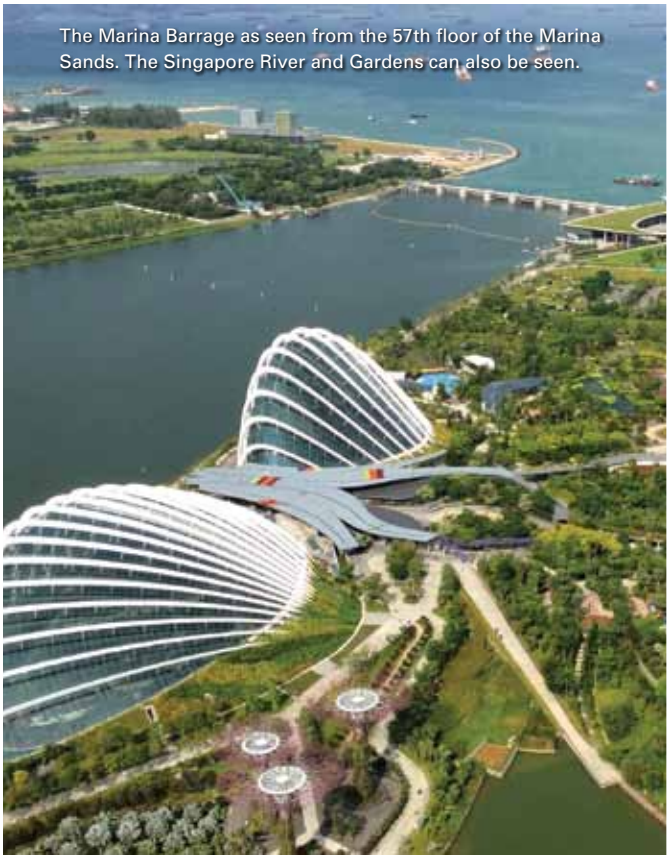
The Wetskills Canada 2014 team included students and professionals from Canada, the Netherlands, and the United States.

## Wetskills Canada 2014

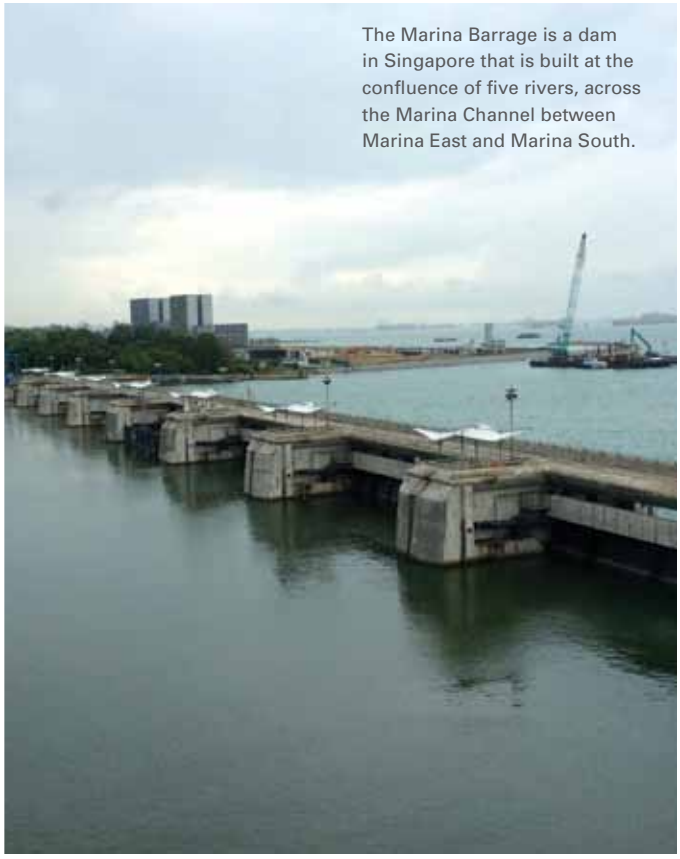
The Consulate General of the Kingdom of the Netherlands and Ryerson Urban Water Centre teamed up during the month of June to develop and host a number of water sector events including Wetskills Canada 2014, Ryerson Urban Water Day, and an invite-only phosphorus workshop. Students and experts from the Netherlands, United States, and Canada collaborated on pressing water issues. Ryerson and the Consulate General are working together to take collaboration between Ontario and the Netherlands to a whole new level.

—Jeanine de Vos and Angela Murphy

Credit: J. Chowaniec, ESAA



The Marina Barrage as seen from the 57th floor of the Marina Sands. The Singapore River and Gardens can also be seen.



The Marina Barrage is a dam in Singapore that is built at the confluence of five rivers, across the Marina Channel between Marina East and Marina South.

# Singapore International Water Week 2014 Singapore

As part of the Singapore International Water Week events, the Environmental Services Association of Alberta participated in a session held on Sentosa Island, which gathered scientists, local educators, business leaders and consultants to help brainstorm new ideas for the future of water conservation in Singapore. Three key areas were identified as barriers to water conservation:

1. Lack of information, especially to the general public, targeted groups, and youths;
2. Lack of experience for citizens to understand basic principles and methods; and
3. Lack of incentives/motivation to encourage people to proactively conserve water.

For each key area, strategies were brainstormed and voted on by all of the delegates. Following the event, the Friends of the Water Networking Session compiled the strategies, distributed them to the delegates, and will be working on incorporating these strategies, as feasible, within Singapore's Public Utilities Board (PUB).

Unlike Canada, Singapore does not use the term "wastewater." It instead uses the term "used water" because Singaporeans do not actually waste water. More than 30 years ago, Singapore was not the global leader in water and used water management that it is today. There are 14 rivers in Singapore, and the country reports an estimated 2,500 millimetres of annual precipitation. Of the 14 rivers, many of them were treated like open sewers chocked with sediment and debris. In addition, the city was prone to flooding, further pressuring the sewers and damaging the city.

In the late 1970s, visionary leaders in government embarked on an aggressive strategy to clean and remediate the contaminated soil, erect barriers and systems to prevent and protect from flooding, conserve the current stores of freshwater, and to create healthy ecosystems on its waterways. Squatters and factories were relocated out of the riparian areas. Sophisticated water and used water systems were constructed including 17 reservoirs and more than 7,000 kilometres of drainage channels. Trees and gardens were planted, and a barrage was created to help manage water flow in the freshwater reservoir, enabling the city to open the gates to purge water in times of high level.

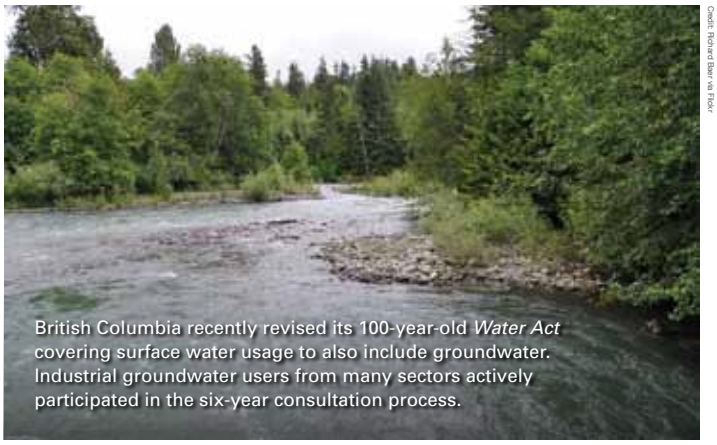
Prime Minister Lee Kuan Yew and the PUB created the "Active, Beautiful Clean Waters" program with a mandate for "Water For All–Conserve, Value and Enjoy." The success of the program is due to rigid environmental regulations that are enforced with strict penalties coupled with smart planning always geared to using one strategy to tackle at least two or more problems at a time. This past February, the worst drought in 150 years of recorded history occurred, with no precipitation, and reservoirs approached record lows.

With their forward thinking practices, innovative technologies and action, and proactive strategies, Singapore truly deserves the title "global leader." The success of this year's Singapore Water Week is evidence of that. *For extended coverage of these events, go to bit.ly/JulAug2014*

—Jennifer Keller and Joe Chowaniec

# Industry's Role in Water Sustainability Policy

BY JOHN CHALLINOR II



Credit: Richard Barr via Flickr

British Columbia recently revised its 100-year-old *Water Act* covering surface water usage to also include groundwater. Industrial groundwater users from many sectors actively participated in the six-year consultation process.

**WHILE CANADIANS** quite rightly look to their governments to regulate water use and maintain the country's related infrastructure, industry also has an obligation to participate in all aspects of water sustainability, including policy development and resource management.

Agriculture, electric power generation, mining, and other industries use a minimum of 70 per cent of Canada's freshwater resources in a given year. Many individual operators are investing millions of dollars annually in their businesses, making the sustainable management of water—a vital component in almost every stage of manufacturing and production—critical to their continued economic viability.

It was on this basis that Nestlé Waters Canada engaged with the Government of British Columbia six years ago when the province's Ministry of Environment signaled it was considering revamping its 100-year-old *Water Act* to include regulation of groundwater use.

We indicated our support, in principle, for the sustainable management of groundwater across the province through reasonable regulation. When the province published its white paper in 2009 on the subject of future groundwater management policies, we actively participated in the public consultation process.

While we were—and are—confident that our water management practices are sustainable because our internal stewardship policies require it, we weren't knowledgeable about the practices of other groundwater drawers in our sub-watershed. Their practices may have been responsible, but we simply didn't know that. And there was little or no way to find out.

Without the proper regulation of groundwater in British Columbia, the sustainability of the aquifer we draw from—and the continued viability of our business—were in the hands of others who drew water from that same aquifer. If they chose to be irresponsible in their water-drawing activities, there was no provincial policy in place to protect us.

Any thoughtful regulated, de-regulated, or unregulated private-sector organization that wants government at any level to establish reasonable new legislation must participate in this process, supported by strategies that effectively position their concerns in a concise, factual way.

Industry must know precisely what it wants to achieve and be able to state that succinctly in writing or verbally, as well as fully understand the consequences of its request.

We found ourselves in general agreement with the government's direction on the proposed *Water Sustainability Act* almost from the get-go. Over the six years that followed, until the legislation was approved in April 2014, we provided a series of minor amendments. Some were incorporated. Others were not. Still others may be as the final legislative requirements, including pricing, were still being determined as of press time.

As the only member of the Canadian beverage industry to employ a full-time hydrogeologist in its operations, we were able to provide technical information to the government in an economical fashion, founded on in-depth, in-house knowledge about water resource management, generally, and groundwater in British Columbia, specifically. This was critical. While broad legislative brush strokes are important, as the old German proverb states, "the devil is in the details."

For that reason, our final submission delved into the intricacies of the legislation, such as groundwater and surface water connection, well construction standards, well abandonment practices, emergency allotments, and metering and reporting requirements. From our experiences in other jurisdictions, we knew that groundwater-dependent industries like ours must operate to the letter of the law. We and our industry partners had experienced challenges in the past because of poorly written legislation that was interpreted and applied inconsistently by our regulator. We wanted to help this government approve legislation that, to the best of our mutual ability, had been properly ground-proofed.

Specifics aside, we are confident that generally, when fully enacted a year from now, British Columbia's revised *Water Sustainability Act* will be one of the better pieces of water resource management legislation in Canada. WC

John Challinor II is director of corporate affairs at Nestlé Waters Canada.

Have a response? Send your letters to the editor to **rachel@watercanada.net**

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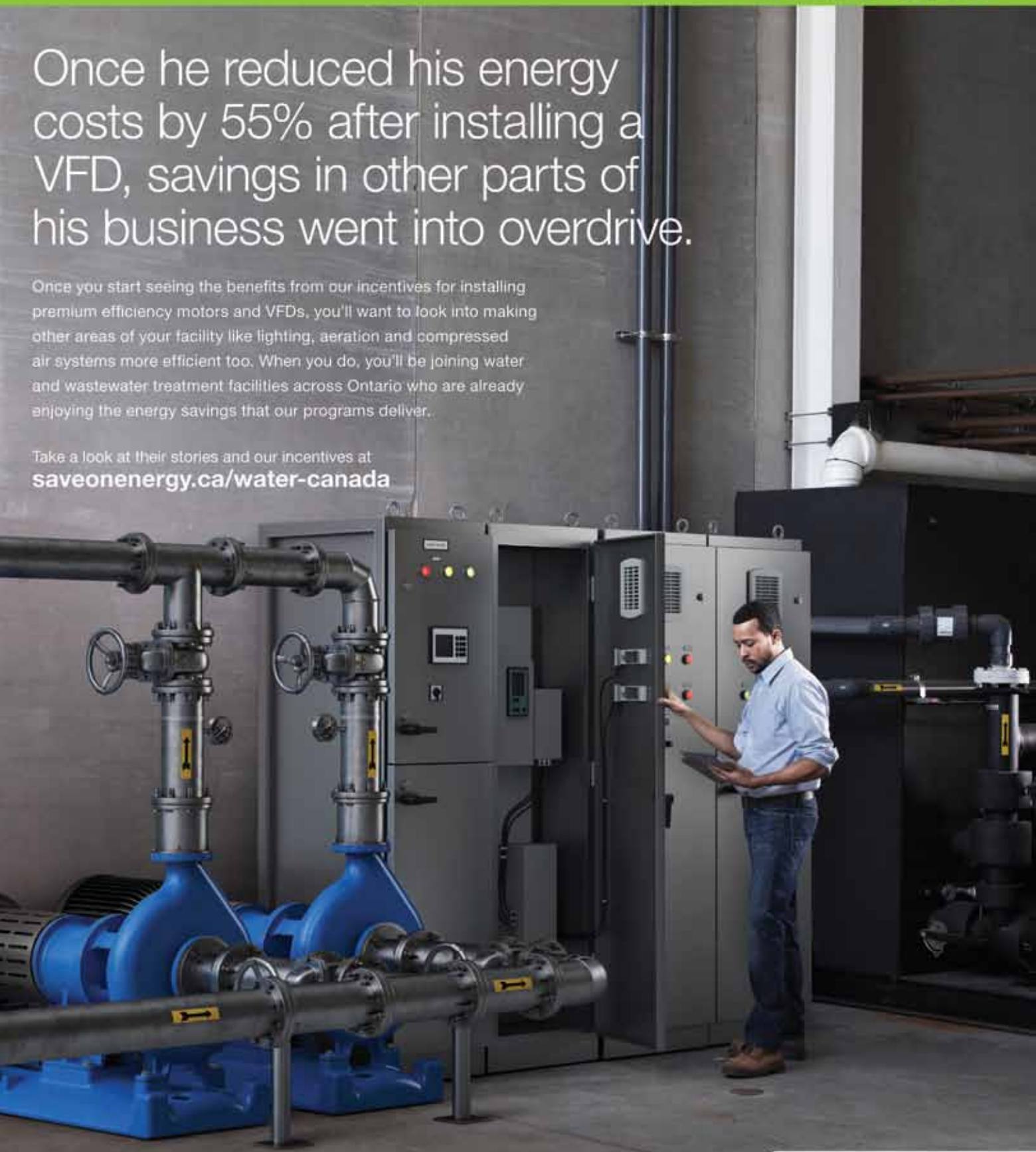

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