



FEATURE CONTRIBUTORS

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PG 6

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ABOUT THE COVER

Deep frost and extreme temperature changes put stress on water pipes, causing cracks, water geysers, road closures, service disruption to customers. Band-aid repairs can have dramatic economic consequences for municipalities.

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Ground Control

New research on recharge rates of global groundwater.

BY SCOTT JASECHKO AND TOM GLEESON

OF ALL THE VOLUMES of fresh and unfrozen water, groundwater is the greatest. Groundwater is the water sitting between sand grains, sandwiched by clay layers, and flowing through cracks in rock. Every day, billions of humans use groundwater pumped from wells to drink and water crops. In spite of humanity's reliance on groundwater, we haven't really known just how much groundwater there is.

Our research project confirmed that the global volume of groundwater is immense. Groundwater makes up more than 99 per cent of all fresh and unfrozen water on the planet. For perspective, if one was to extract all of Earth's groundwater (we don't suggest doing this) and pool it on top of the land like a flood, the height of that pool would cover all the continents with 180 meters of water.

But there's a problem: it takes a long time for rain and melting snow to replenish this resource. Until recently, we didn't know just how much groundwater is replenished on human time scales. We've learned that less than six per cent of global groundwater is recharged in one human lifetime, and this renewal is greatest in places where lots of rain falls and in areas surrounded by steep mountains.

Unfortunately, many people that depend on groundwater to sustain their livelihoods also live in regions where groundwater is renewed very slowly or not at all. There are several implications of this ongoing body of groundwater research.

① We know groundwater is a critical resource, and we need to set long-term goals to successfully manage it. The best goals would ensure aquatic ecosystems and future generations are allocated a share of global groundwater.

② Groundwater is vulnerable to pollution and to climate change. Current climate warming driven by fossil fuel burning by humans is changing precipitation patterns in many regions. Changing precipitation is likely to impact groundwater renewal rates in many regions.

③ Nearly all of us depend on groundwater—for drinking water, to grow food, to produce energy, and to manufacture building materials. It sustains the flows of many rivers and the levels of many lakes. This invisible water resource deserves our attention.



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

TWEETS #Flushgate

The social media outfall of Montreal's wastewater discharge.

When news of Montreal's plans to discharge eight billion litres of wastewater into the St. Lawrence River broke, social media exploded. Baptized as #flushgate, the issue impelled tens of thousands of Canadians to publish their opinions online. Political grandstanding between the Montreal Mayor and former federal Environment Minister may have triggered the public's interest, but it evolved into a discussion about Canada's aging infrastructure and whether secondary treatment of wastewater good enough. —Staff

A timeline of some of the #flushgate Twitter posts:

Oct. 13

Save The River! @savetheriver

Surfers, kayakers show their love for the St. Lawrence ahead of sewage-dump plans #flushgate #NotASewer <http://www.cbc.ca/1.3266851>

Oct. 17

Sarah M. Comtois @sarahmcomtois

When even the conservatives order to halt plan to dump raw sewage in the St. Lawrence <http://fw.to/6JmEwZe> #flushgate #lowpoint

Oct. 19

Dominic Tremblay @Dominic_Tremb

Résultat final de l'élection ! #Elxn42 #Trudeau #flushgate #polmtl

Oct. 17

Élyse Caron-Beaudoin @ElyseCaronB

Since when is Harper concerned with St-Lawrence River? Playing his last cards with #flushgate <http://globalnews.ca/news/2264516/aglukkaq-says-she-just-learnt-about-montreals-plan-to-dump-wastewater/> ...

Oct. 21

#FlushGate @SauvonsLeFleuve

The Protectors of the St-Lawrence River: https://m.youtube.com/watch?v=mn_0EY5URUA ... Have you watched this, @DenisCoderre? #FlushGate #EauxUsées #PoIMTL

Oct. 22

Sarah Dorner @sarahdorner

19. But maybe now after #flushgate, there will be a willingness to pay.

Oct. 25

#FlushGate @SauvonsLeFleuve

100 municipalities that dump sewage into the river ! <http://www.cbc.ca/m/news/canada/montreal/all-the-quebec-municipalities-that-dump-sewage-in-rivers-1.3286562> ... | #FlushGate #EauxUsées #SaveOurRiver #polMTL #MTLpoli

Oct. 23

#FlushGate @FlushGate

68% des Québécois se disent inquiets ! #flushgate #eauxusées <http://www.journaldemontreal.com/2015/10/23/68-des-quebecois-craignent-le-deversement-des-eaux-usees-de-montreal-dans-le-fleuve> ...

Oct. 29

Sarah Dorner @sarahdorner

@KevinMirise to answer that question, one must first ask why we don't have biological treatment normally now.

Oct. 30

Kevin Mirise @KevinMirise

@SarahDorner #archaea microbes would attach to the #flushgate contaminants & continue metabolizing them in the waste plume in the river

Nov 9

Korice Moir @WaterPuppetry

Retweeted Thomas Daigle Hold up. A wee correction. None of this should be flushed. Not now, not later. #flushgate

Nov 7

Bernadette Conant @bconantcwn

So. Who says #sewage stories aren't audience grabbers. #Montreal's #flushgate was actually trending in Canada this evening....

Online at WATERCANADA.NET



BLOG: Water Canada speaks to acclaimed author Marq de Villiers about his new book Back to the Well. bit.ly/deVilliersWELL



BLOG: Citizens in Vancouver set out to shame water hogs through the "Don't Be a Grasshopper" Facebook group. bit.ly/GrasshopperBlog



VIDEO: Christiaan Weizel's Earth Porn, featuring the lovely Alberta Water. bit.ly/ABNaturevids



BLOG: Water Canada's publisher, Todd Latham shares the highlights from his water tour of Germany. bit.ly/TK