

Evaluating Microbial Risks Associated with Stormwater Management and Reuse in Alberta

Alberta faces water quality and scarcity issues driven by population growth, aging infrastructure and climate change. Stormwater and rainwater harvesting as an alternative water source is plagued by a lack of pathogen-related data for safe use and a lack of scientific data on pathogen/contaminant concentrations to estimate health risks. These risks are compounded by aging pipe infrastructure, environmental design flaws and challenges, and a conflicting regulatory policy framework. These challenges have impeded the adoption of a province-wide stormwater/rainwater regulatory framework.



RECIPIENT:

University of Alberta, Dr. Norman Neumann



PARTNERS:

City of Calgary, City of Airdrie, Government of Canada



TOTAL BUDGET:

\$1,447,632



AI FUNDING:

\$750,000



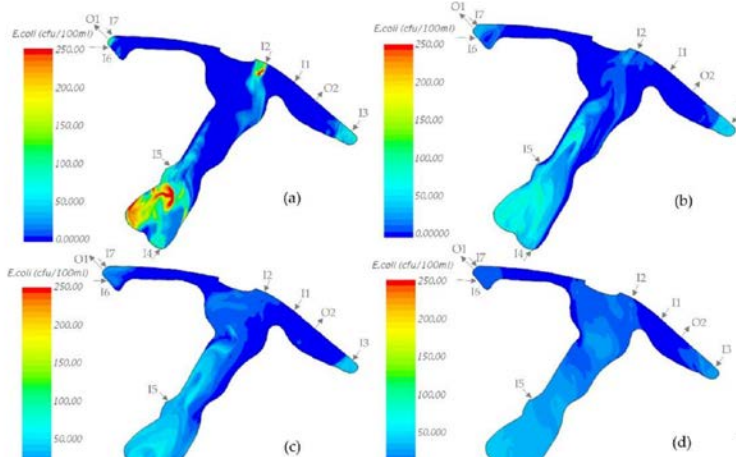
PROJECT DATES:

MAY 2016 - FEB 2020



PROJECT TRL:

Not Applicable



Contours of *E. coli* concentration (cfu/100 mL) on the surface of the Inverness Stormwater pond (Calgary) for 18 hours following a storm event on Aug 26, 2007.

APPLICATION

The goal of this study is to support sustainable use of Alberta's precious water sources by working with the City of Calgary, City of Airdrie and provincial/national regulators to fill knowledge gaps regarding microbial contamination sources and risks associated with stormwater/rainwater use. This research has supported the development of evidence-based regulatory frameworks centered around microbial risk assessment for 'water-fit-for-purpose' uses of stormwater and/or rainwater, to be incorporated into a water safety plans suitable for risk management.



PROJECT GOALS

- Evaluate microbial water quality, pathogen occurrence and treatment efficacy in urban stormwater/rainwater systems in urban municipalities in Alberta
- Use quantitative microbial risk assessment approaches to strategically identify water-fit-for purpose reuse options for stormwater and rainwater
- Develop process-based and probabilistic models of microbial contamination in urban stormwater ponds
- Develop a Stormwater Use Management Plan (SUMP) Framework to support rainwater and stormwater use in Alberta
- Microbial urban stormwater quality monitoring locations included three City of Calgary stormponds (McCall Lake, Country Hills, and Inverness) as well as Elbow River (Calgary) and Nose Creek (Airdrie) receiving waters

BENEFITS TO ALBERTA

- The risk-based regulatory framework being developed through this research will:
 - Enable safe, fit-for-purpose use of stormwater and rainwater as an alternative source of water to support sustainable water supply for growing urban populations and economic activity
 - Address water quality and water supply threats to Alberta’s economy and society (public health)
 - Support environmental management and stewardship of our water resources
 - Provide a framework to foster innovation in water reuse design and technology, with potential to provide a competitive edge to Alberta-based innovators in national and international markets
 - Elevate the reputation of Alberta academic institutions, municipalities, government regulators and industry as leaders use and re-use of alternative sources of water



14 Publications



5 Students Trained



3 Project Jobs



Indirectly Enable Future Jobs



Indirectly Enable New Products/Services



Indirect or Enabling kT/yr Future GHGs

CURRENT STATUS

MAR 2020 - Complete.

Final report to Alberta Innovates is confidential for one year (March 2021). In the meantime, results are being disseminated through academic publications, theses, Alberta provincial regulatory guidance documents (pending), conferences and workshops, etc. Contributing researchers include Drs. Norman Neumann, Nick Ashbolt and Graham Banting; Candis Scott and Qiaozhi Li; and students Megan Beaudry (MSc), Marie Sereneo (MPH), Farzam Alfachi (PhD).