



Global Water Futures at Five

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UNIVERSITY OF SASKATCHEWAN

Global Water Futures

GWF.USASK.CA



GWF Operations Team Meeting, 9 December 2021

Global Water Futures: Solutions to Water Threats in an Era of Global Change



**CANADA
FIRST**
RESEARCH
EXCELLENCE
FUND

**APOGÉE
CANADA**
FONDS
D'EXCELLENCE
EN RECHERCHE



**UNIVERSITY OF
SASKATCHEWAN**



**UNIVERSITY OF
WATERLOO**



University of Guelph

University of British Columbia

University of Northern British Columbia

University of Calgary

Université Laval

McGill University

Université du Québec à Montréal

University of Alberta

University de Montreal

University of Manitoba

University of Victoria

Brock University

Canadian Rivers Institute (University of New Brunswick & University of Prince Edward Island)

Yukon University



Global Water Futures Mission



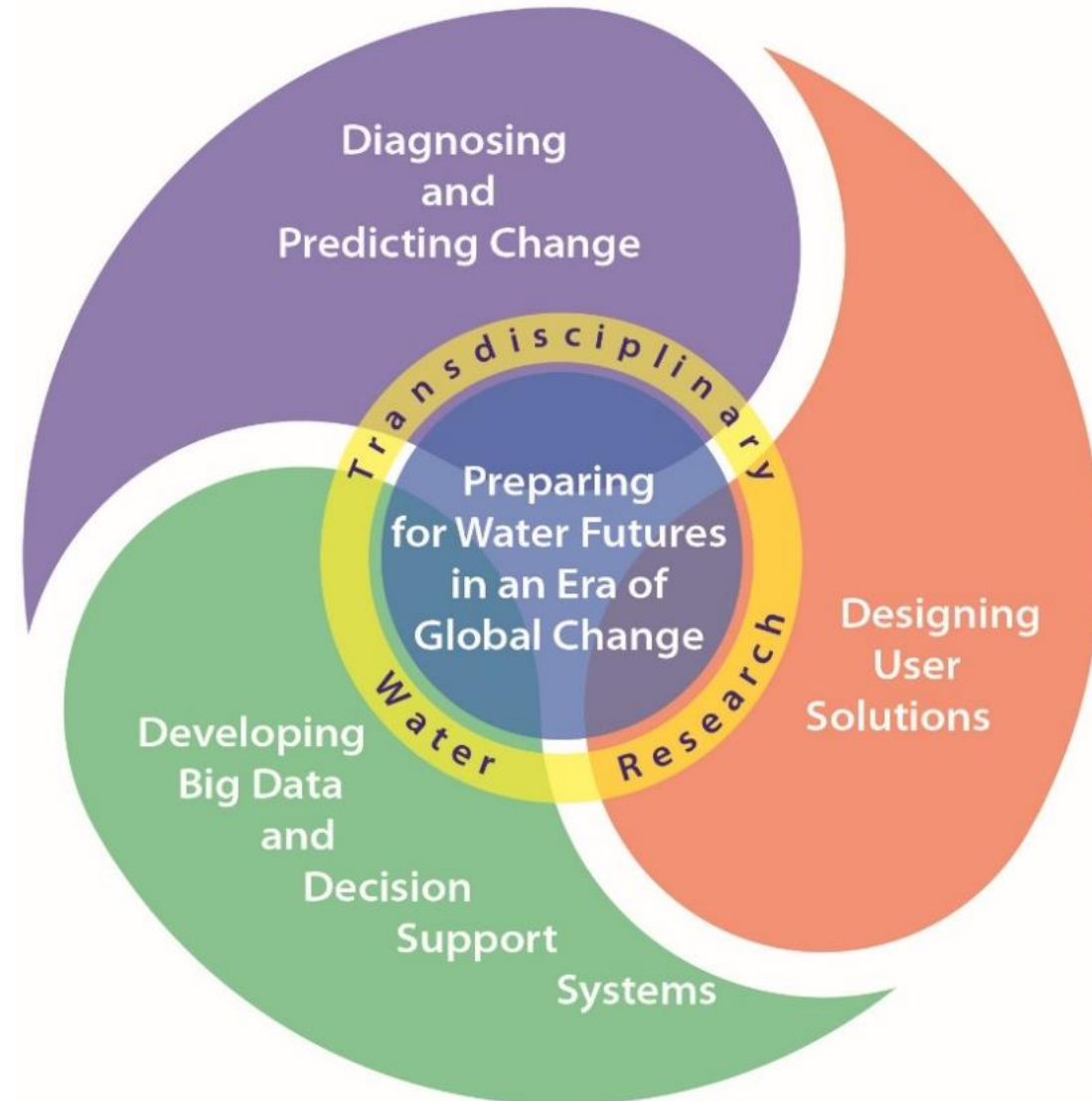
- Improve disaster warning
- Predict water futures
- Inform
 - a) adaptation to change
 - b) risk management.

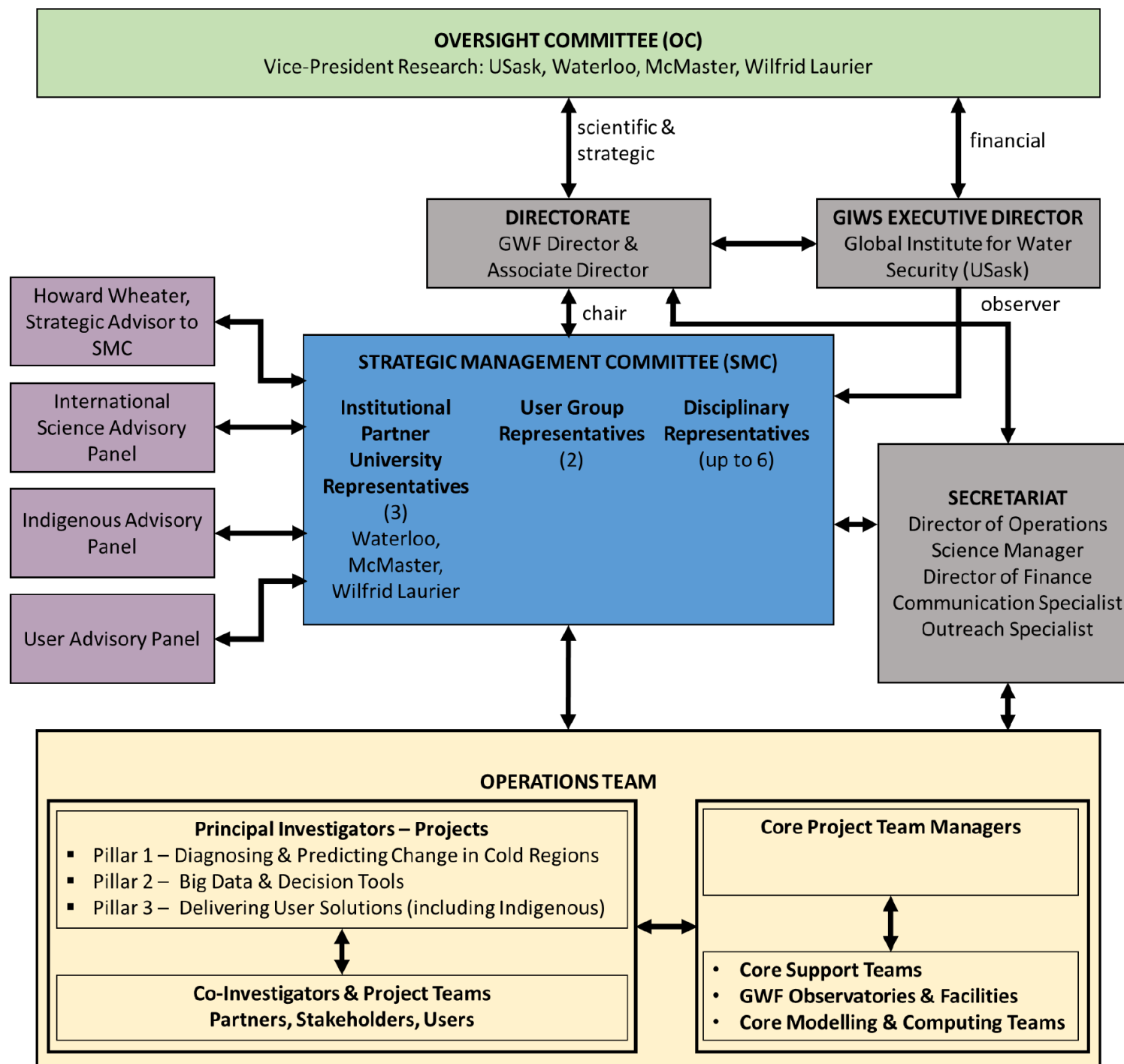


Transdisciplinary Science Pillars



- **Pillar 1** - Diagnosing and Predicting Change in Cold Regions
- **Pillar 2** - Developing Big Data and Decision Support Systems
- **Pillar 3** - Designing User Solutions





North American Geographic Domain



Awarded
\$ 77.84 M

over 7 years
2016 - 2023



supports

4 Global Programs

futureearth
research for global sustainability

WCRP
World Climate Research Programme



64 Projects & Core Teams



18 Canadian universities



201 faculty investigators



478 partners



915 publications



2302 presentations

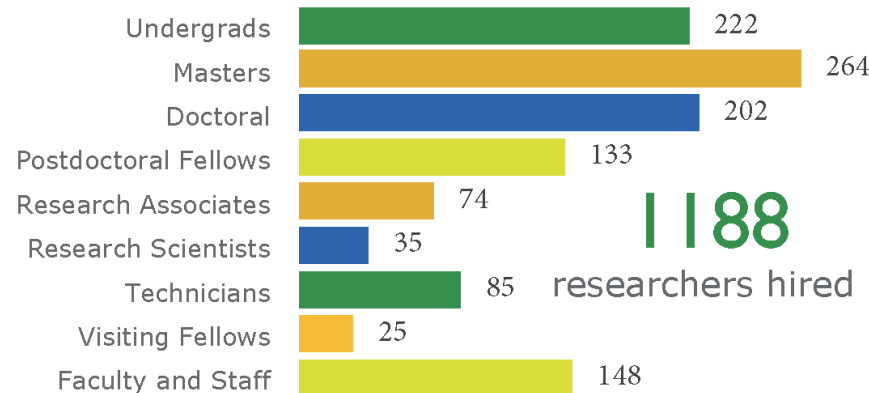


3989 media stories



60

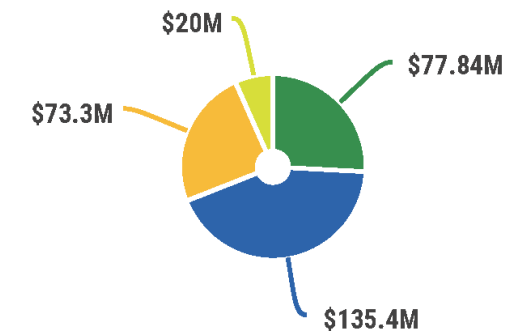
observatories



1188

researchers hired

\$306.5M in GWF project & core team funding



CFREF
cash and formal in-kind contributions
historical data sets (in-kind)
Tri Agency, CFI, and other federal funding

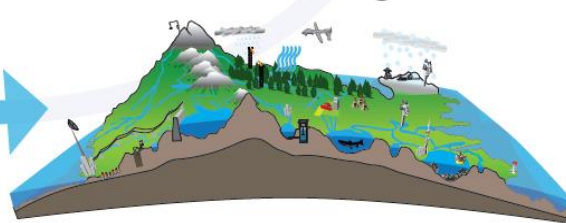
GWF core water observation, data, prediction, and knowledge mobilization strategy



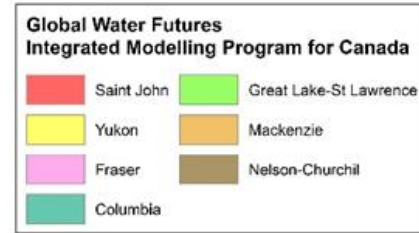
User Engagement & Information Sharing



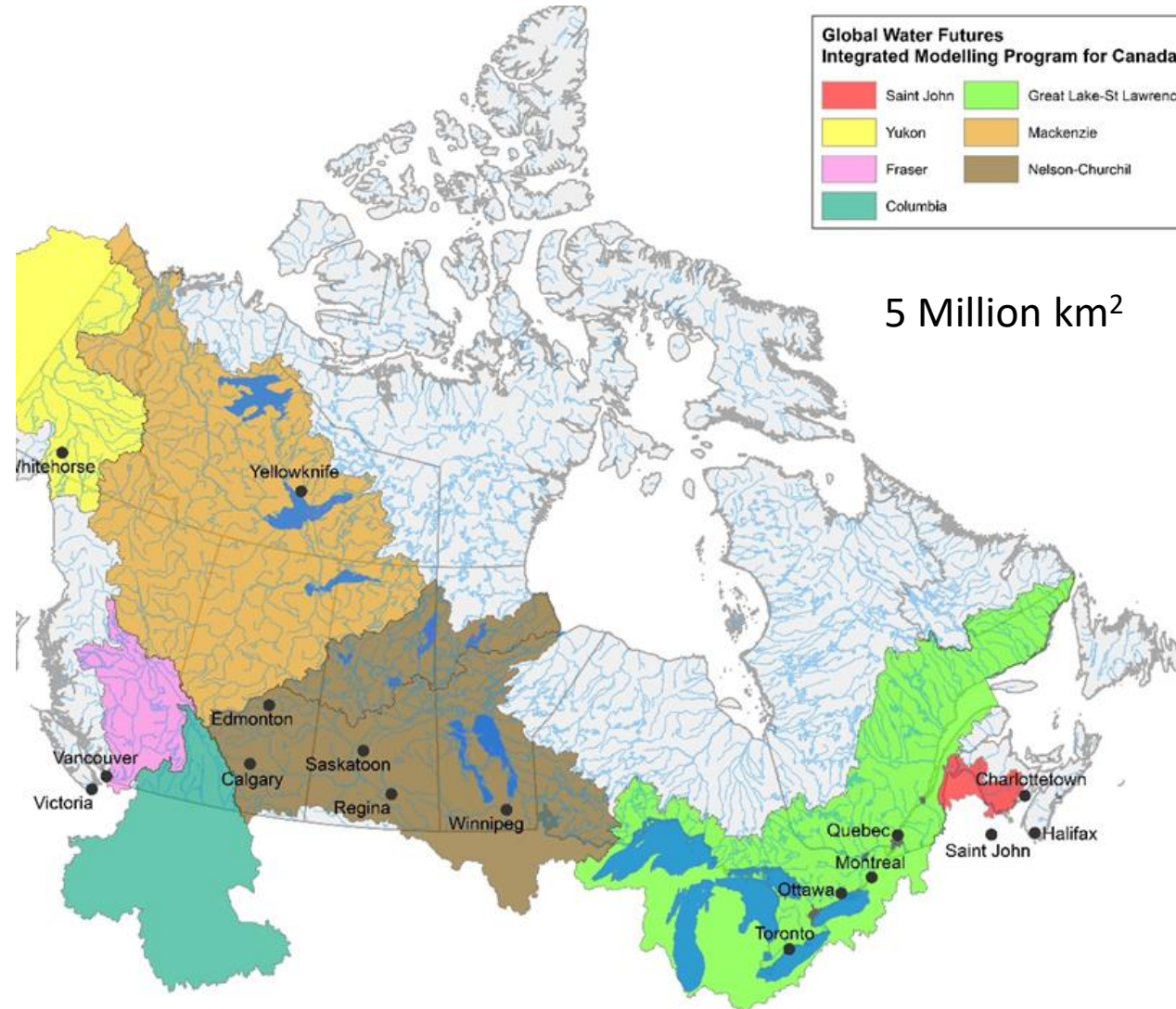
Data Sensing



Cloud Computing
Data Modelling



5 Million km²



GWF Planetary Water Prediction Initiative



National
Boundaries



Major
River
Basins



International Network for Alpine
Research Catchment Hydrology
(INARCH) Research Basins

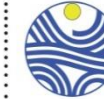


GEWEX

GEWEX
INARCH

ANDEX

UNESCO
United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Hydrological
Programme



WORLD
METEOROLOGICAL
ORGANIZATION



WATER
ACTION DECADE
2018-2028



waterfuture
Sustainable Water Future Programme



UNIVERSIDAD
DE CHILE

GW⁴
Water
Security
Alliance



ARCTIC COUNCIL

OTPE
THIRD POLE ENVIRONMENT



中国科学院 青藏高原研究所
Institute of Tibetan Plateau Research
Chinese Academy of Sciences



भारतीय विज्ञान संस्थान



Gorgan University of Agricultural
Sciences & Natural Resources



CAMP4ASB
Climate Adaptation & Mitigation
Program for Aral Sea Basin
CENTRAL ASIA

See <https://gwf.usask.ca/projects-facilities/global-programs.php>


11 renewed Transdisciplinary, User Question Led Projects



6 continuing Transdisciplinary, Indigenous Community Co-led Projects



- 6 Indigenous Community water research projects, co-developed and co-led with Indigenous communities



Is our Water Good to Drink?
Water-related practices,
perceptions, and TK indicators
for human health



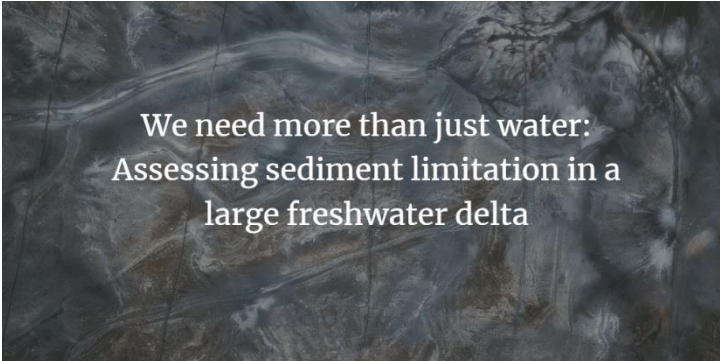
FIShNET (Fish & Indigenous
NorthErn healTh): Healthy
Water, Healthy Fish, Healthy
People



Ohneganos – Indigenous Ecological
Knowledge, Training and
co-creation of mixed method tools



Water Knowledge Camps: Building
Capacity for Cross-Cultural Water
Knowledge, Research,
and Environmental Monitoring



We need more than just water:
Assessing sediment limitation in a
large freshwater delta



Matawa Water Futures: Developing
an Indigenous-informed framework
for Watershed Monitoring and
Stewardship


12 new Transformative Science Projects




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Global Water Futures
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New projects include research into climate projections, water-borne diseases, groundwater quality and quantity, lake ice, hydro-economics, metal release in thawing permafrost environments, inequitable impacts of water insecurity, and more.




Geogenic Contamination of
Groundwater Resources in
Subarctic Regions




Hydrology-Ecology
Feedbacks in the Arctic:

Narrowing the Gap Between Theory and Models



SaJESS

Saint John river Experiment on
cold Season Storms



What is Water Worth?

Valuing Canada's Water Resources
and Aquatic Ecosystem Services



Modelling Hydrological
Processes for Wildfire and
Carbon Management



Paradigm Shift in Downscaling
Climate Model Projections

Building Models and Tools to Advance Climate
Change Research in Cold Regions



New Tools for Northern
Groundwater Vulnerability
Assessment



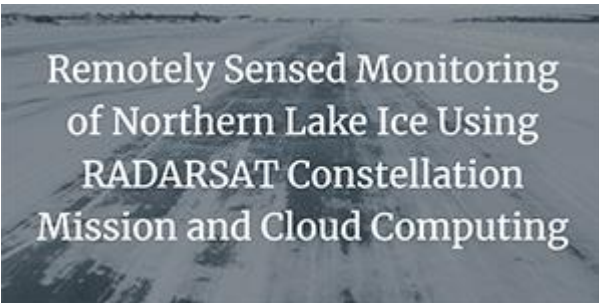
Towards Saskatchewan
Well Water Security

Knowledge and Tools for People
and Livestock Health



Managing Urban
Eutrophication Risks under
Climate Change

An Integrated Modelling and Decision
Support Framework



Remotely Sensed Monitoring
of Northern Lake Ice Using
RADARSAT Constellation
Mission and Cloud Computing



Groundwater, Climate
Change and Water Security
in the Canadian Prairies



Artificial Intelligence for Rapid
and Reliable Detection of
Cryptosporidium oocysts and
Giardia cysts

Pivoting research during the pandemic



COVID-19 Early Indicators

Wastewater Surveillance for SARS-COV-2 Virus Particles



USask
toxicologist
Markus
Brinkmann.

- Researchers at the University of Saskatchewan and the University of Waterloo pivoted part of their efforts to address the pandemic.
- Specifically, research was pivoted to enable wastewater surveillance of SARS-CoV-2 in several municipalities to support Public Health Units

<https://water.usask.ca/covid-19/index.php>

Saskatoon - Current Numbers

SARS-CoV-2



Wastewater Virus Load
(normalized)

73,360 /100 ml

▼ 8%*



Delta Variant

50,597 /100 ml

▼ 42%*

⌚ Average of 3 individual measurements from the period October 14-20, 2021

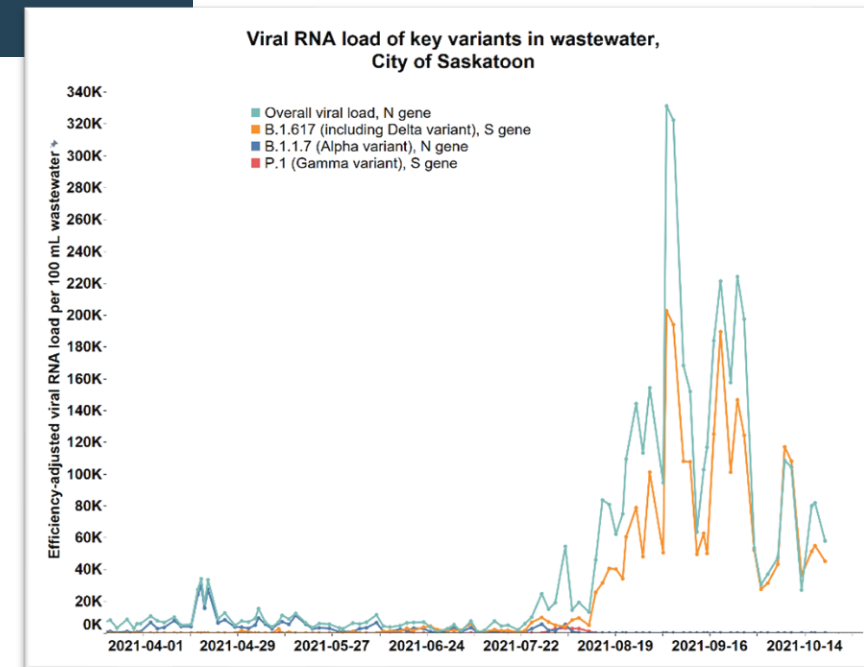
* Percentages are relative to average of individual measurements from previous week

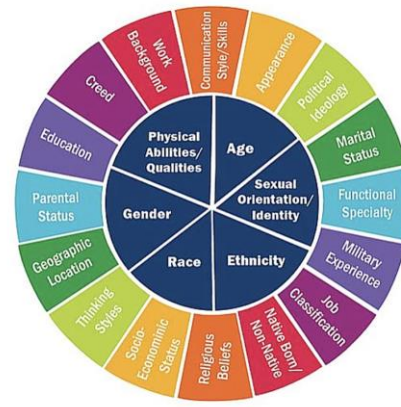


USask
environmental
toxicologist John
Giesy.



U. Waterloo Ecotoxicologist,
Mark Servos





Mentoring and Career Development

- GWF [Women+Water Lecture Series](#)
- GIWS/GWF yearly [Distinguished Lecture Series](#)
- [GWF Young Professionals](#) (GWF-YP)
- [CREATE for Water Security Program](#) (McMaster, Waterloo, Manitoba, Calgary, Saskatchewan).

Communication

- [GWF EDI](#) and [Indigenization and Co-Creation In Water Research](#) webpages (2020)
- GWF Science Features and E-News also feature a regular **#GWFEDI** section

2022
WOMEN + WATER
lecture series

SAVE THE DATES

12:30 CST / 1:30 EDT

To register, visit: gwf.usask.ca

January 13
Transborder Collaboration: Women and High Mountain Water
Izabella Koziell, ICIMOD & **Dr. Valentina Radic**, UBC

January 27
Innovations in Watershed Management: Towards Better Engagement Between Upstream and Downstream Voices
Dr. Deborah McGregor, YorkU & **Michela Carriere**, Aski Holistic Adventures

February 10
Women, Water and Food Security
Dr. Alirah Emmanuel Weyori, UHannover, **Dr. Margaret Akuriba**, UDS & **Dr. Thierno Malick Diallo**, GBU

March 10
Women and Rural Water Security Around the World
Euphrasie Hortense Kouassi Yao, UNESCO

March 24
Making the Invisible Visible Chemical Exposure and Ground Water
Dr. Karletta Chief, UArizona & **Dr. Sarah Dickson-Anderson**, McMaster

Photo credit: Lindsey Langis

#GWFEDI: Changing Practice

#GWFEDI: A Strategy for Change

<https://gwf.usask.ca/edi/index.php>

Institutional: Working Together

Research: Global Impact

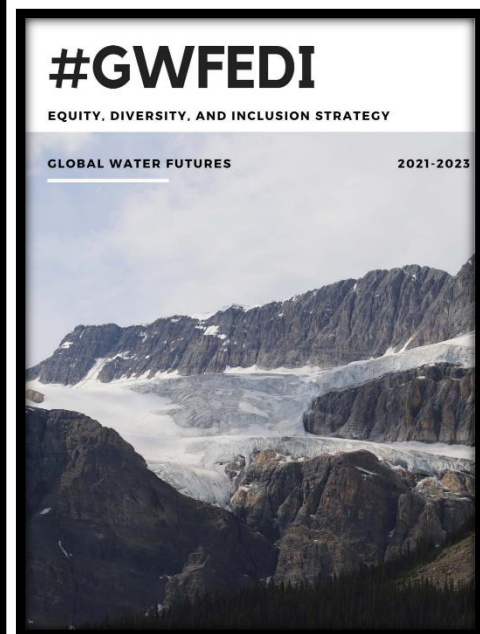
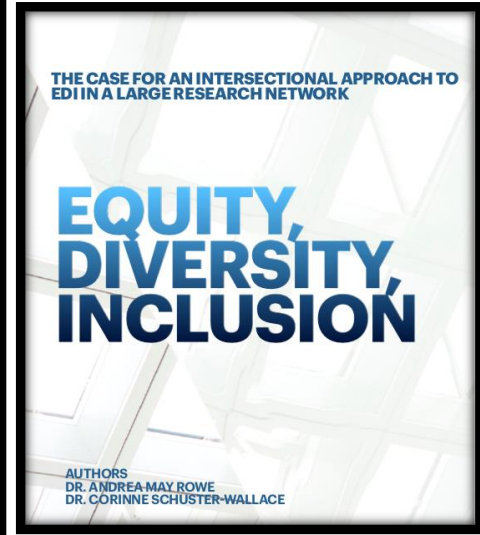
Knowledge Mobilization: Partnerships

People

Education & Training

Operations

Practice



Artist in Residence & Virtual Water Gallery

TRANSITIONS

AN INTER-DISCIPLINARY COLLABORATION



VIRTUAL WATER GALLERY



A space for artists, water experts, knowledge keepers, and the public to co-explore water challenges.

29 April 2021, 10:30-11:30 CST

Register at:
globalwaterfutures.ca

Next Steps

- Increase in field and community research activity as pandemic restrictions ease
- Increased engagement with partners, stakeholders, users, communities as gatherings are again permitted
 - Regional and sectoral science discussions
 - Deeper user/partner engagement through custom knowledge translation and applications
- Extensions to many projects to permit catchup from Covid-impacts
- Synthesis activities – workshops, sectoral meetings, model applications, synthesis papers, special issues, books, others
- GWF Annual Science Meeting (online) – May 16-18, 2022
- Virtual Water Gallery – Canmore with CWRA May-June 2022
- GWF – no-cost extension to 2024 .
- 2023 Synthesis Meeting