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DIALOGUE NATIONAL SUR LES EAUX SOUTERRAINES

-

NATIONAL DIALOGUE ON GROUNDWATER

June 3, 2020 (1 – 2pm (ET))

Canada

SECOND CALL - OVERVIEW

1. Greetings and welcome intro by Réjean Couture – New manager for the Groundwater Geoscience Program (GGP) – 3 minutes
2. Quick Round-Table Presentation from all participants – 8 minutes
3. Presentations – Pacific North West (BC, YK, NWT) – 24 minutes
   - 6 minutes: Collaboration on the shared waters of the Mackenzie River Basin (Isabelle de-Grandpré)
   - 6 minutes: NWT's groundwater program (Isabelle de-Grandpré)
   - 6 minutes: BC's groundwater program (Amy Sloma)
   - 6 minutes: YT's groundwater program (Brendan Mulligan)
4. Open discussion from all based on the comments received from participants – 25 minutes
   - Impacts of COVID-19 on all jurisdiction activities (e.g. Fieldwork)
   - Canada Water Agency - What is the place for groundwater?
   - New version of the National Hydro Network (NHN)
   - Data base contacts in provinces and territories – please follow up with Étienne Girard
   - Terms of Reference for the NDGW
5. Next meeting
   - September 2 - Presentations by Martin Stapinsky from the *Ministère de l'environnement et de la lutte aux changements climatiques de la province de Québec* and Daniel Paradis from the Geological Survey of Canada in Quebec City.

Collaboration on the shared waters of the Mackenzie River Basin

Mackenzie River Basin

- 20% of Canada's land surface (1.8 million square kilometers)
- 1% of Canada's population (400,000 people)
- Crossing 5 jurisdictions (3 Provinces, 2 Territories)
- Water flowing South to North into the Arctic Ocean

Mackenzie River Basin Transboundary Waters Master Agreement

MACKENZIE RIVER BASIN TRANSBOUNDARY WATERS MASTER AGREEMENT

BETWEEN:

THE GOVERNMENT OF CANADA as represented by the Minister of the Environment and the Minister of Indian Affairs and Northern Development (hereinafter referred to as "Canada")

AND

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA as represented by the Minister of Environment, Lands and Parks (hereinafter referred to as "British Columbia")

AND

THE GOVERNMENT OF THE PROVINCE OF ALBERTA as represented by the Minister of Environmental Protection (hereinafter referred to as "Alberta")

AND

THE GOVERNMENT OF THE PROVINCE OF SASKATCHEWAN as represented by the Minister responsible for the Saskatchewan Water Corporation (hereinafter referred to as "Saskatchewan")

AND

THE GOVERNMENT OF THE NORTHWEST TERRITORIES as represented by the Minister of Renewable Resources and the Commissioner of the Northwest Territories (hereinafter referred to as the "Northwest Territories")

AND

THE GOVERNMENT OF THE YUKON as represented by the Minister of Renewable Resources (hereinafter referred to as the "Yukon")

Hereinafter referred to collectively as "the Parties"

WHEREAS the waters of the Mackenzie River Basin arise in or flow through British Columbia, Alberta, Saskatchewan, the Northwest Territories and the Yukon and are a precious resource;

AND WHEREAS the waters of the Mackenzie River Basin should be managed to preserve the Ecological Integrity of the Aquatic Ecosystem, and to facilitate reasonable, equitable and sustainable use of this resource for present and future generations;

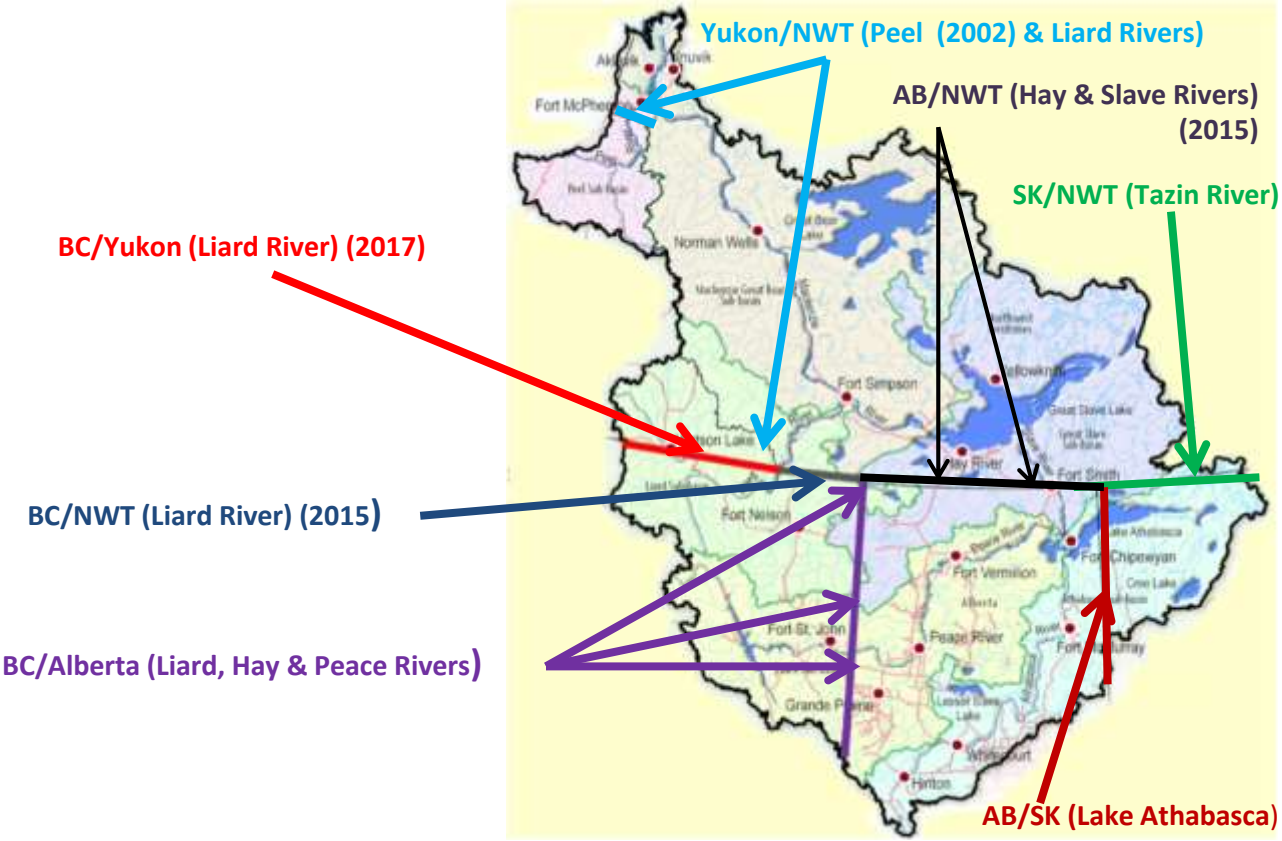
AND WHEREAS cooperative management of the waters of the Mackenzie River Basin requires the application of consistent guiding principles;

AND WHEREAS the Parties have been exchanging information on water-related issues, developments and research, and have been undertaking cooperative studies and programs of

The Mackenzie River Basin Transboundary Waters Master Agreement was signed in 1997 by :

- Canada,
- British Columbia
- Alberta
- Saskatchewan
- Northwest Territories
- Yukon

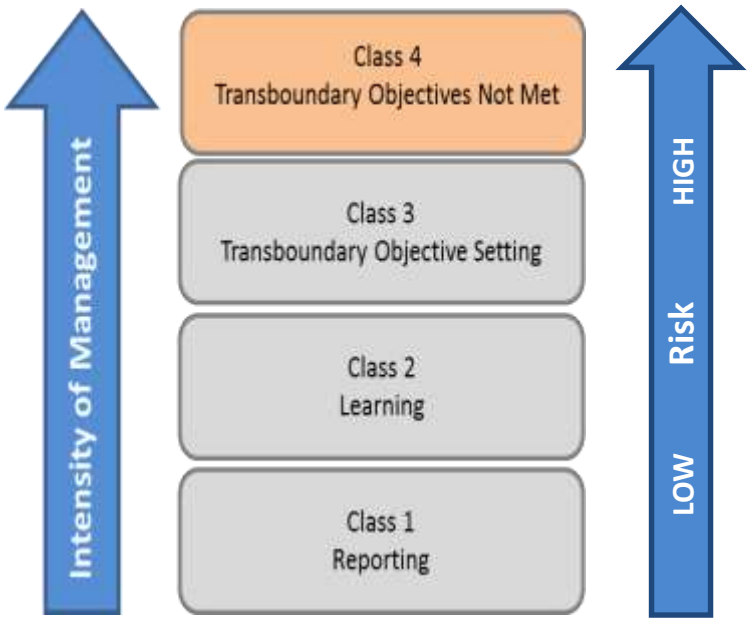
Bilateral Water Management Agreements (BWMA)



Principles of BWMAs

- BWMAs commit pairs of jurisdictions to work together to:
  - Address specific water issues for transboundary basins/aquifers
  - Provide a framework for cooperative decision making and maintaining aquatic ecosystem health through surface water and groundwater quality, quantity and biology
  - Develop collaborative work plans
  - Improve knowledge of water resources and aquatic ecosystems
  - Establish a mechanism for information sharing, notification and consultation
  - Use a Risk Informed Management Approach (RIM)

Risk Informed Management (RIM)



- Transboundary water bodies and aquifers are categorized based on risk.

- Management actions increase in intensity with increased risk.

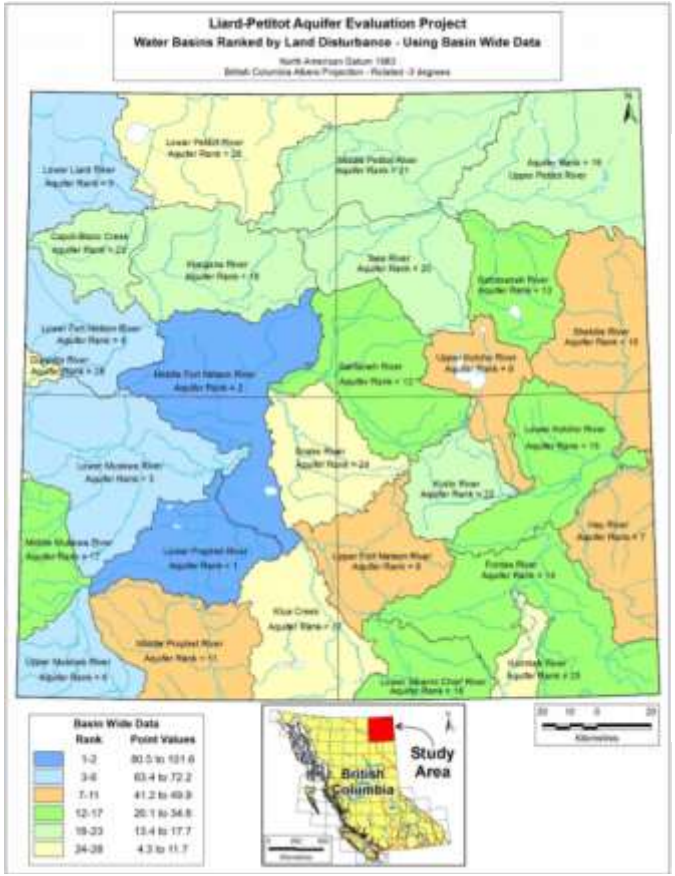
  Class 1 – No action required

  Class 2 – Learn, monitor and study

  Class 3 – Continue to monitor and study, set objectives.

  Class 4 – Actions required to return to meeting objectives ASAP so aquatic ecosystem health is maintained

Collaborative Work in the Liard Basin



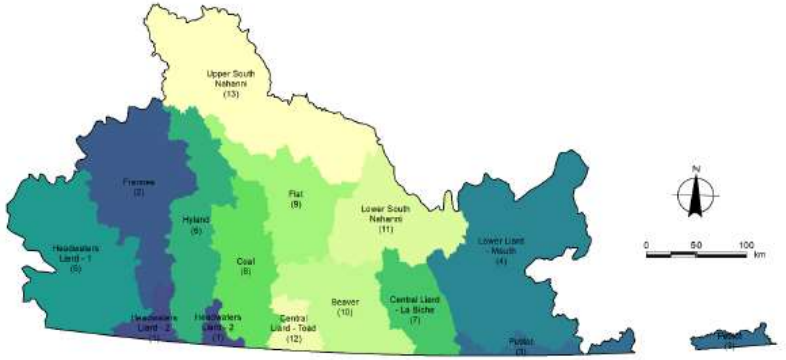
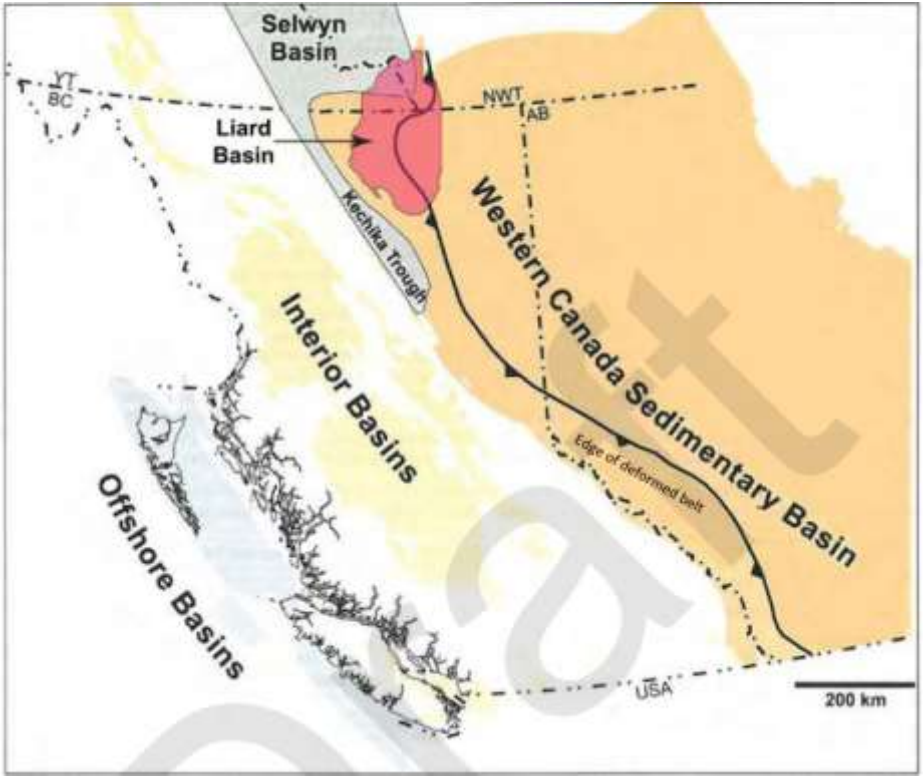


Figure 3-15. Sub-basins ranked by Index of Groundwater Disturbance Potential (Sub-basin). Rank out of 13 sub-basins provided in parentheses and symbolized by colour gradient, from lightest (tan, lowest rank) to darkest (navy blue, highest rank).

Collaborative Work in the Liard Basin



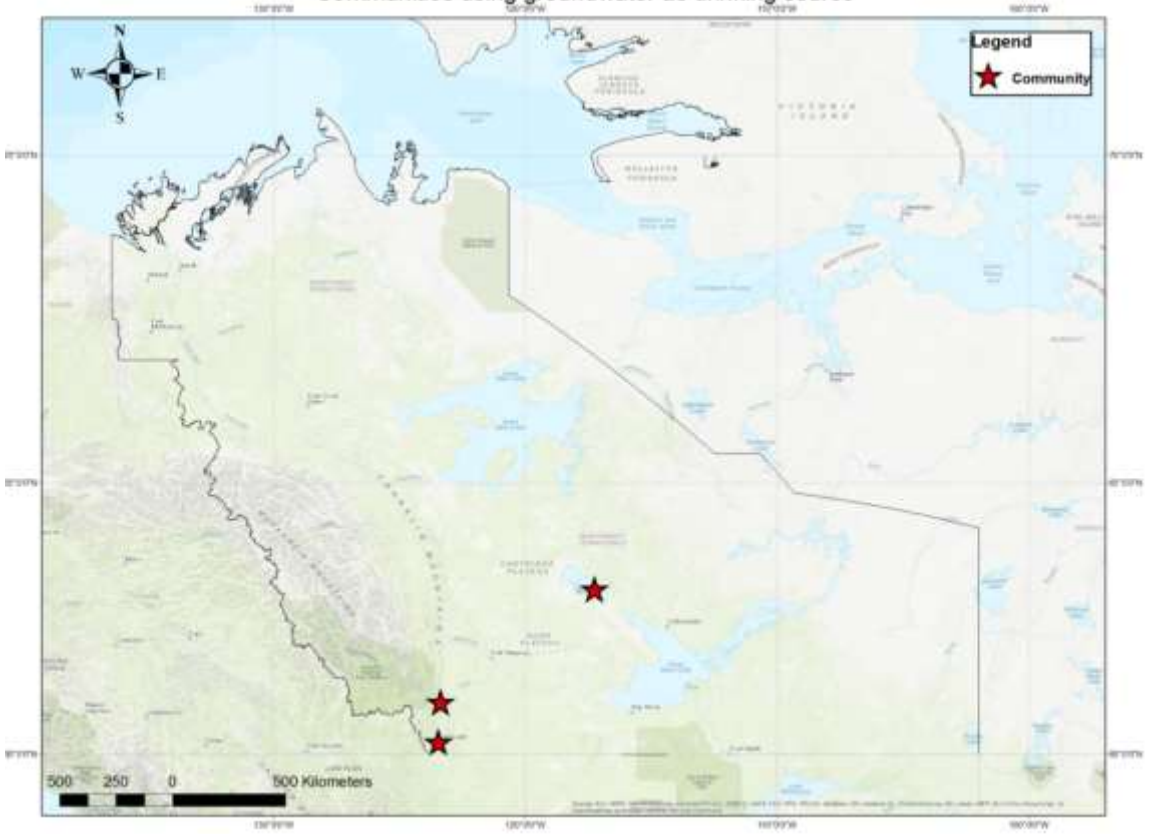
Groundwater Program, Northwest Territories

Isabelle de Grandpré, Government of Northwest Territories

Government of
Northwest Territories

Government of
Northwest Territories

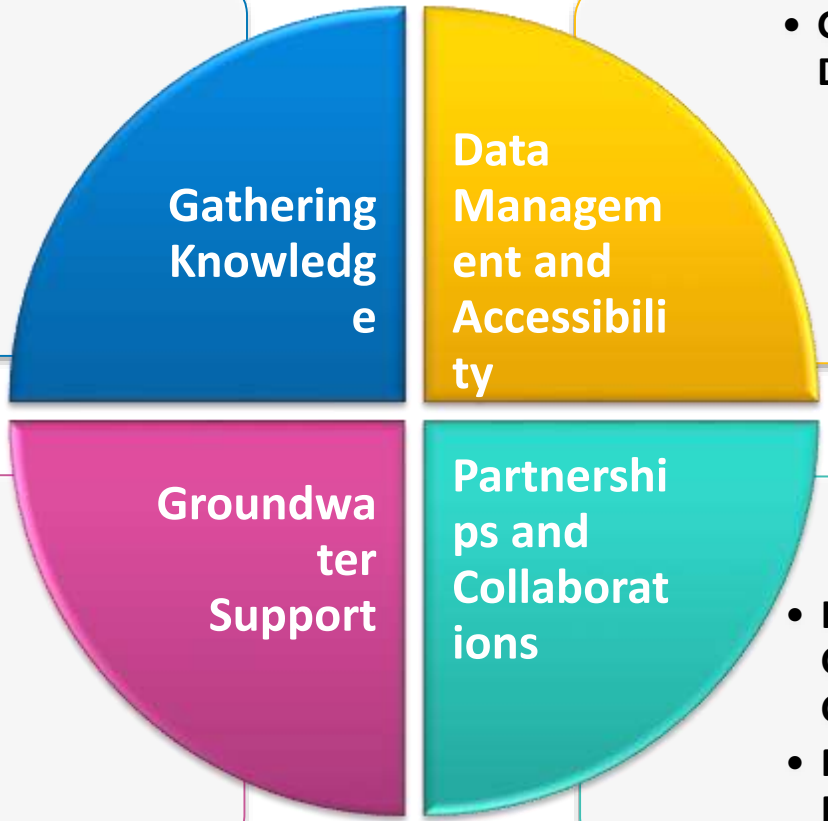
Communities using groundwater as drinking source



NWT's Groundwater Program

Government of Northwest Territories

- Western Science
- Traditional and Local Knowledge



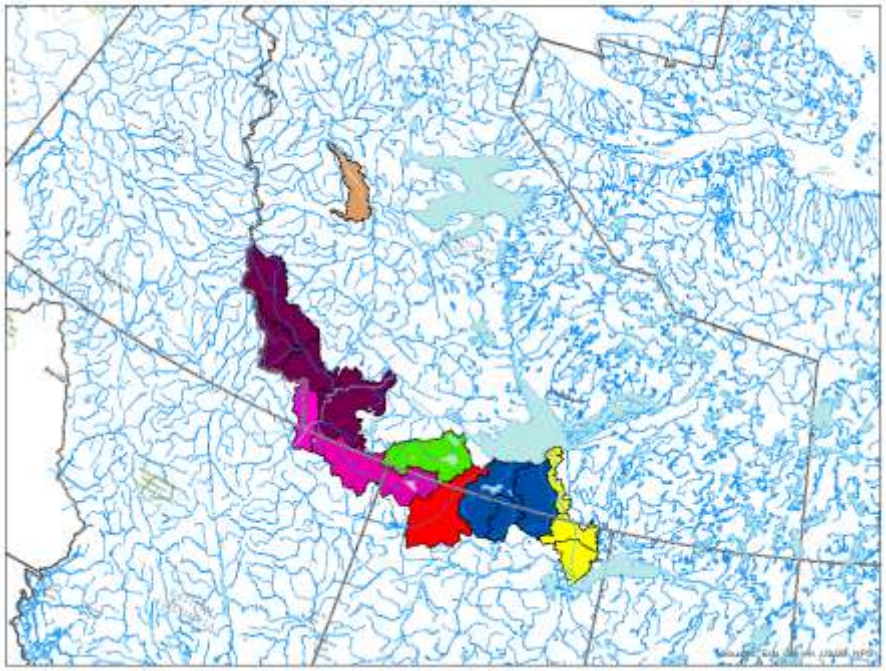
- Groundwater Database

- Landfill and sewage Lagoon Monitoring
- Regulation

- Interdepartmental Groundwater Group
- Mackenzie River Basin Bilateral Agreements

Gathering knowledge

Government of
Northwest Territories



Focus:

- Transboundary regions
- Areas where human activities could potentially impact groundwater
- Areas with great permafrost degradation potential

Gathering knowledge

Government of
Northwest Territories

Aquifers assessments projects

- Liard River Basin (Transboundary with BC and Yukon)
- Hay and Slave Rivers Basins (Transboundary with Alberta)

Baseline assessment projects

- Characterization and baseline assessment in advance of shale oil and gas development in the Sahtu
- Liard Basin Baseline Groundwater Study

Permafrost assessment projects

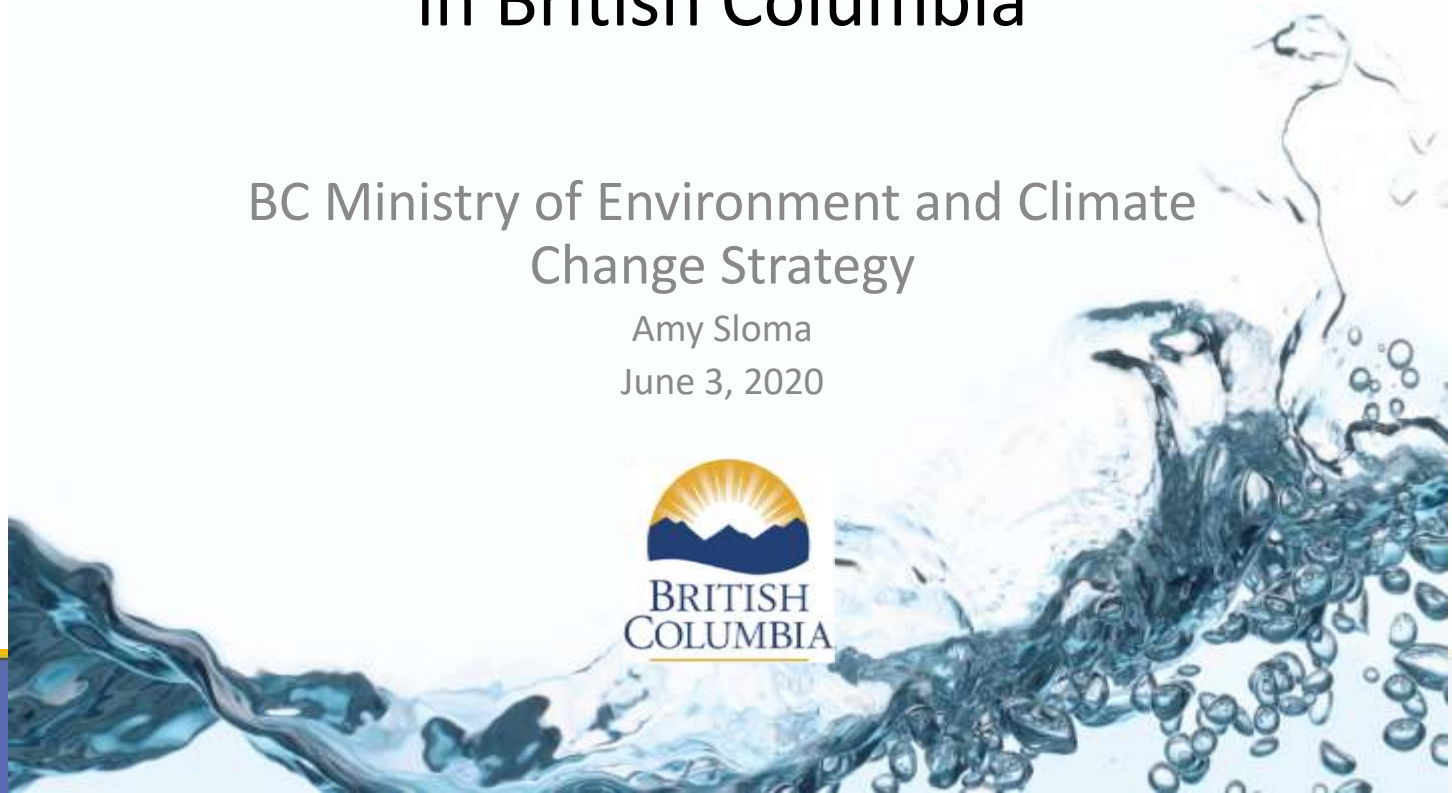
- Permafrost characterization of the Hay and Slave Rivers Basins
- Northwest Territory Thermokarst Collective Mapping Project – Aufeis mapping

Government of
Northwest Territories

Thank you!

Isabelle_de-grandpre@gov.nt.ca

Groundwater Initiatives and Research in British Columbia



BC Ministry of Environment and Climate Change Strategy

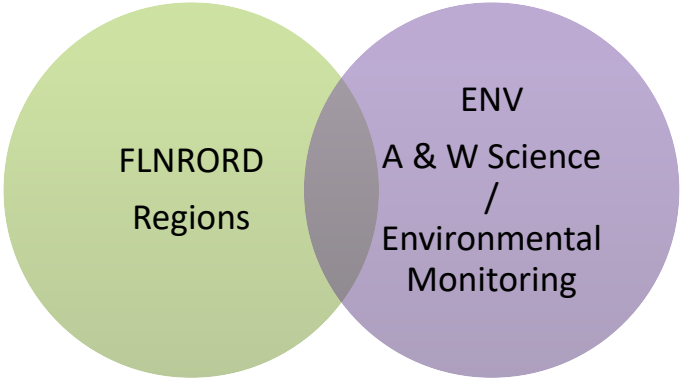
Amy Sloma

June 3, 2020

BRITISH COLUMBIA

BRITISH COLUMBIA

Province of BC Groundwater Science

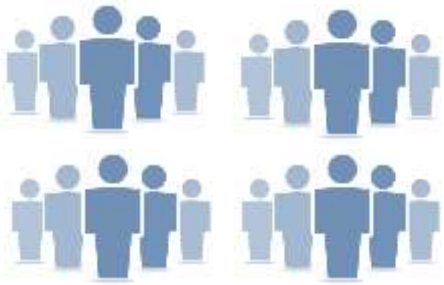


Collaborate on :

- Science & Research
- Groundwater Characterization Studies
- Monitoring
- Policy Development

Province of BC Expertise

More than 20 staff specialize in & have education & experience in hydrogeology.



Specialized knowledge in:

Management & Planning	Legislation & Policy	Standards and Data Systems
Stakeholder Relationships	Protection	Monitoring Networks
Conducting Regional Studies	Groundwater Characterization	Groundwater Modelling

Our Approach:
Data Systems & Analysis

GWELLS

Mapping

Water Budgets

Modelling & Characterization Projects

WSA GWPR: Wells

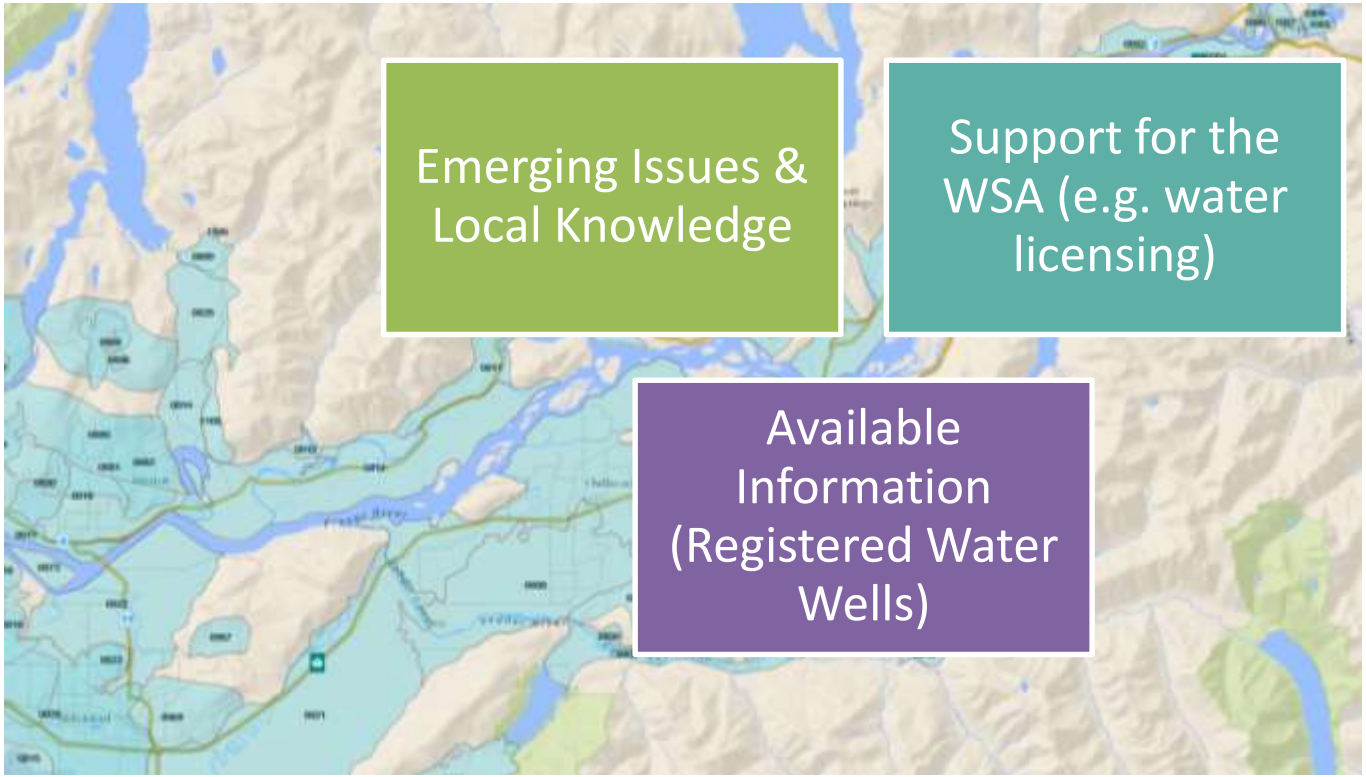
Groundwater Protection Regulation

- Addresses hazards at the **site scale**
- Does not address aquifer scale issues

Well log submission required in 2016

- GWELLS database online
- Data quality is variable
- Abandoned wells may be shown as active

BC Aquifer Mapping Prioritization

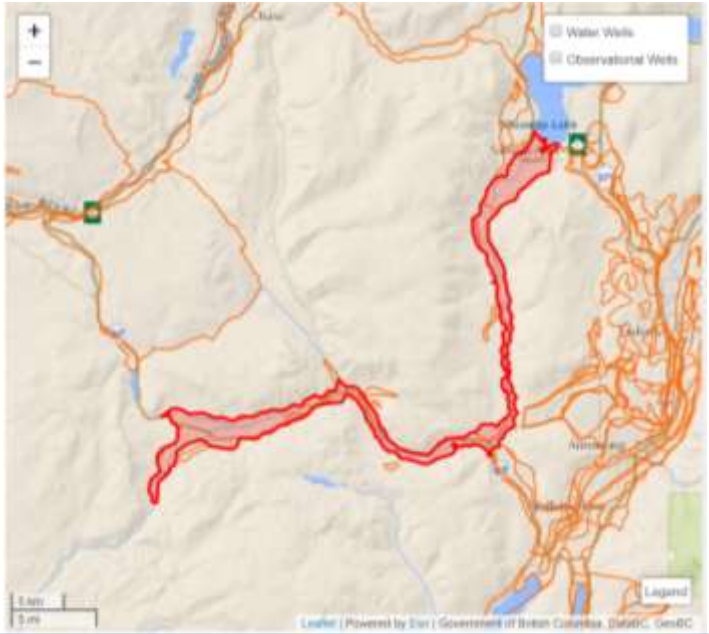


Accessing Aquifer Mapping

https://apps.nrs.gov.bc.ca/gwells/aquifers

Aquifer 98 Summary

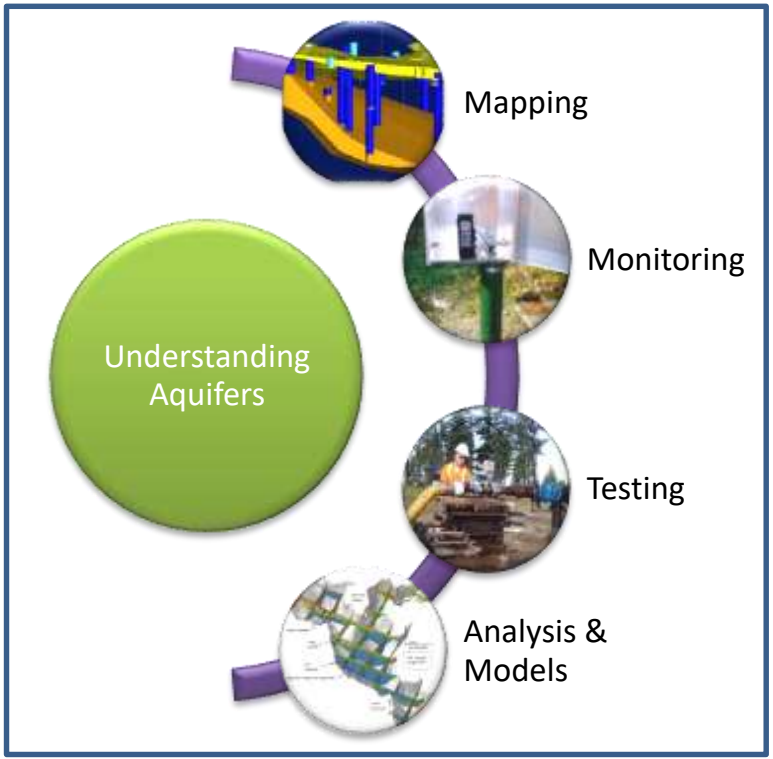
Aquifer number	98
Year of mapping	2017
Aquifer name	Salmon River - Lower Aquifer
Litho stratigraphic unit	
Descriptive location	Salmon River - Westwold to Salmon Arm
Vulnerability	Moderate
Material type	Sand and Gravel
Subtype	Confined sand and gravel - glacial
Quality concerns	
Productivity	Moderate
Size (km^2)	
Demand	Moderate



BC Aquifer Mapping Limitations

Mapping is just one piece of the puzzle

BC Water Science Series



Key Reports:

Liard and Petitot Sub Basins Transboundary Groundwater Resources Assessment (2018)

- Provides geological and hydrogeological data to aid in groundwater resources assessments in the Liard and Petitot sub-basins transboundary water management areas
- Compiles, synthesizes and analyzes groundwater information , including:
  - Surficial geology maps, water well records, geology, hydrology, current development and groundwater use

Our Approach:
Research Partnerships

Example:

Assessment of Aquifer-Stream Connectivity Related to Groundwater Abstraction in the Lower Fraser Valley

Phase 1 Field Investigation

Glenn Hall, Diana M. Allen, Mike Simpson, Habtamu Tolera, Bryan Jackson, Mary Ann Middleton, and Michele Lepitre

a

b

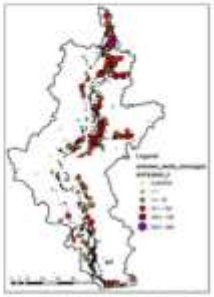
Our Approach: Compendium

WSS 2019-08: Compendium of Provincial Groundwater Science and Monitoring Projects: 2018-19

Mapping and Mitigating Risk of Flowing Artesian Wells: Okanagan Basin & Lower Fraser Valley

Project Description

The main goal of this project is to develop a more comprehensive understanding of the factors controlling where flowing artesian conditions occur and where there is elevated risk when drilling into such conditions. This project also examines how current policies and regulatory requirements regarding flowing artesian wells might be improved.



Map showing flowing artesian wells in the Okanagan Basin.

Summary of Project Outcome

This multi-year project is being implemented in phases. Phase 1 (completed) involved carrying out a preliminary geostatistical analysis on the occurrence of flowing artesian wells in the Okanagan Basin and Lower Fraser Valley. Phase 2 (in progress) involves developing an understanding of why and where flowing artesian wells occur. This involves developing conceptual hydrogeological models based on hydrogeological information (e.g., geological cross-sections), groundwater flow modeling, and local knowledge (e.g. well drillers) on the occurrence of flowing artesian wells in mountainous (Okanagan) and low relief (Lower Fraser Valley) settings. Phase 3 will involve mapping the likelihood of encountering flowing artesian wells in each study area, and Phase 4 will focus on developing an information package.

Relevance

Flowing artesian wells are a known problem in many regions of B.C., particularly in the Lower Fraser Valley and the Okanagan. Allowed to flow uncontrolled, these wells can eventually reduce the long-term sustainability of the aquifer, leading to reduced water yield for surrounding wells and springs, and reduced natural groundwater discharge to streams which can impact aquatic habitat. Moreover, flowing artesian wells may significantly increase the risk of land subsidence or formation of sinkholes as evidenced by the recent flowing artesian well in the City of Vancouver. The results may be extensive property damage, loss of property value, and exorbitant costs to the property owner, as well as limiting the future use of the land. Controlling artesian flow is a requirement of the *Water Sustainability Act* (S. 52 and 53).

Learnings & Recommendations

This project will yield insight into the hydrogeological factors that control the occurrence of flowing artesian wells. The maps produced for the Okanagan Basin and Lower Fraser Valley will show areas of high and moderate risk for flowing artesian conditions. These maps can be used for identifying areas that should be more closely examined or monitored, as well as for issuing Flowing Artesian Conditions Advisories. The project is intended to support regulatory requirements for controlling artesian flow by providing better understanding of where such conditions occur, and how B.C. and other jurisdictions are managing the problem through policy and regulation.

Questions, suggestions, advice?

Thank you!

Amy Sloma
amy.sloma@gov.bc.ca

Yukon Government's Groundwater Program

June 3, 2020 · National Dialogue on Groundwater · Brendan Mulligan


482,443 km²
Cold, changing climate
40,854 people
97% dependent on groundwater
Young, evolving groundwater program…

Yukon Government's Groundwater Program

Collaboration & Accessibility

- Workshop on Hydrogeology in Yukon
- Yukon Water Well Registry
- Yukon Water Data Catalogue
- Multi-jurisdictional coordination

Understanding & Monitoring

- Yukon Observation Well Network
- Aquifer mapping
- Targeted projects

Management & Protection

- Guidance
- Regulation
- Technical reviews

Education & Awareness

- Classroom presentations and community outreach

Collaboration & Accessibility

- Workshop on Hydrogeology in Yukon
- Yukon Water Well Registry
- Yukon Water Data Catalogue
- Multi-jurisdictional coordination

Workshop on Hydrogeology in Yukon

Yukon

CNC - SNC

Collaboration & Accessibility

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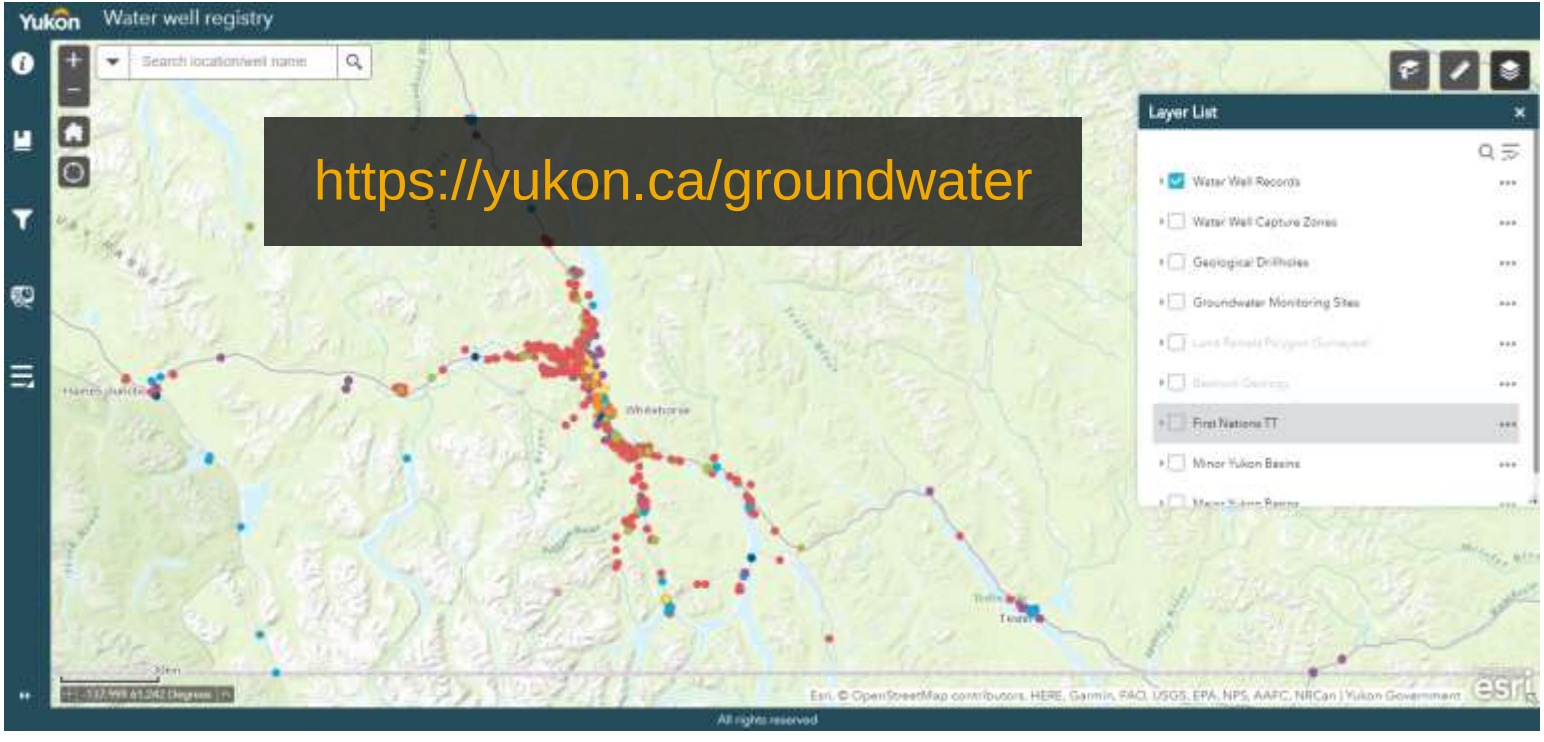

Collaboration & Accessibility

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Understanding & Monitoring

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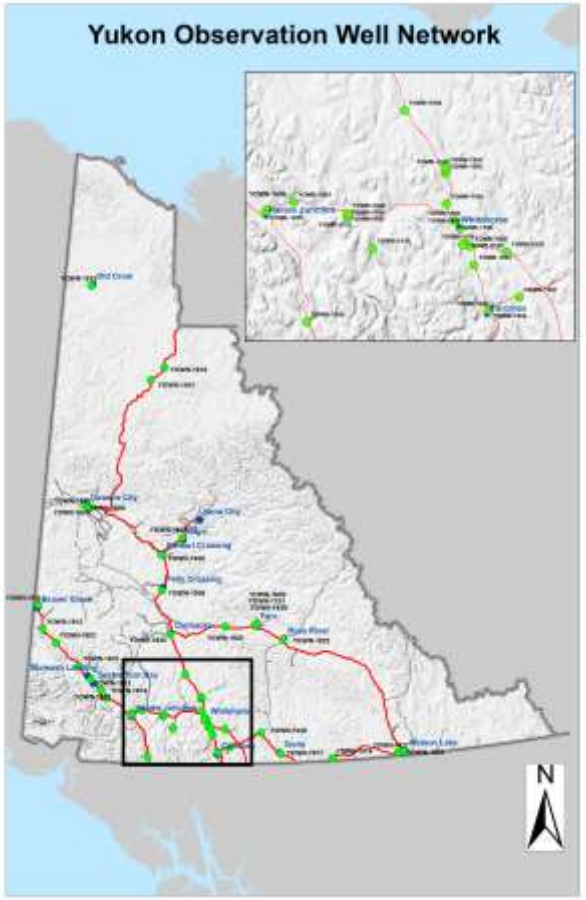
- Targeted projects

YOWN

- Water quality / level
- 8 wells in 2013, 52 wells currently
- Modest budget to add new wells annually
- Data interpretation (2020)

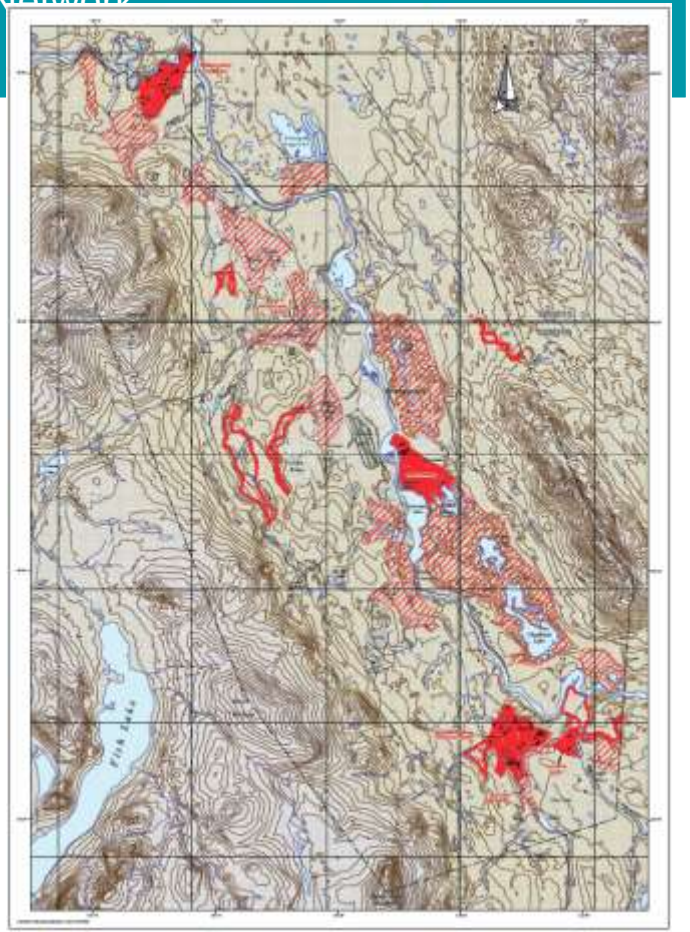


Understanding & Monitoring

- Yukon Observation Well Network
- Aquifer mapping
- Targeted projects

Aquifer Mapping

- Developed aquifers underlying communities across the territory
- 3-year initiative to map 3 communities with greatest number of available well records:
  - 2020-21: Carmacks
  - 2021-22: Watson Lake
  - 2022-23: Whitehorse



Map 7 – Overburden Aquifer Potential. From the Preliminary Groundwater Inventory of the City of Whitehorse, prepared by Community Development Branch by Gartner Lee Ltd., 2003.

Management & Protection

- Guidance
- Regulation
- Technical reviews

- Reviewing projects in various stages of assessment and licencing
  - Hard rock mines
  - Municipal wastewater treatment facilities
- Conducting site visits and studies

Questions?

Brendan Mulligan · Brendan.Mulligan@gov.yk.ca

Last points on the agenda

4. Open discussion from all based on the comments received from participants – 25 minutes
   - Impacts of COVID-19 on all jurisdiction activities (e.g. Fieldwork)
   - Canada Water Agency - What is the place for groundwater?
   - New version of the National Hydro Network (NHN)
   - Data base contacts in provinces and territories – please follow up with Étienne Girard
   - Terms of Reference for the NDGW
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THANK YOU
/
MERCI!