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NATIONAL DIALOGUE ON GROUNDWATER (NDGW)

DIALOGUE NATIONAL SUR LES EAUX SOUTERRAINES (DNES)

November 4, 2020




Canada

OVERVIEW

- Greetings and welcome intro by Éric Boisvert – New manager at the GSC-QC responsible for the Groundwater Geoscience Program (GGP) -5 minutes
- Presentations -30 minutes
  - Elizabeth Priebe on behalf of Steve Beneteau (Director at the Ontario Geological Survey (OGS)) – 15 minutes
  - Patrick Cherneski (Executive Director for the Transboundary Waters Unit, West and North at ECCC) – 15 minutes
- Questions to our speakers – 10 minutes
- Updates – 10 minutes
  - ToR
  - Linked data
  - PT database contacts
  - Questions
- Next meeting: January 13, 2021 - 5 minutes
  - Presentations to be determined (any volunteers?)

The Ontario Geological Survey's Groundwater Initiative

NDGW Meeting: November 4, 2020

Elizabeth Priebe, Ph.D., P.Geo.
Hydrogeologist, Ontario Geological Survey

Presentation Outline

- Brief Overview – Ontario Geological Survey (OGS)
- OGS Groundwater Initiative:
- Success Stories and Highlights
- Future direction

Ontario Geological Survey (OGS) Established 1891

Mandate:

- ***Provide citizens*** and institutions of Ontario with ***accurate*** and ***objective Earth Science knowledge*** – *to sustain and support quality of life, economic prosperity, environmental quality, and public health/safety*.

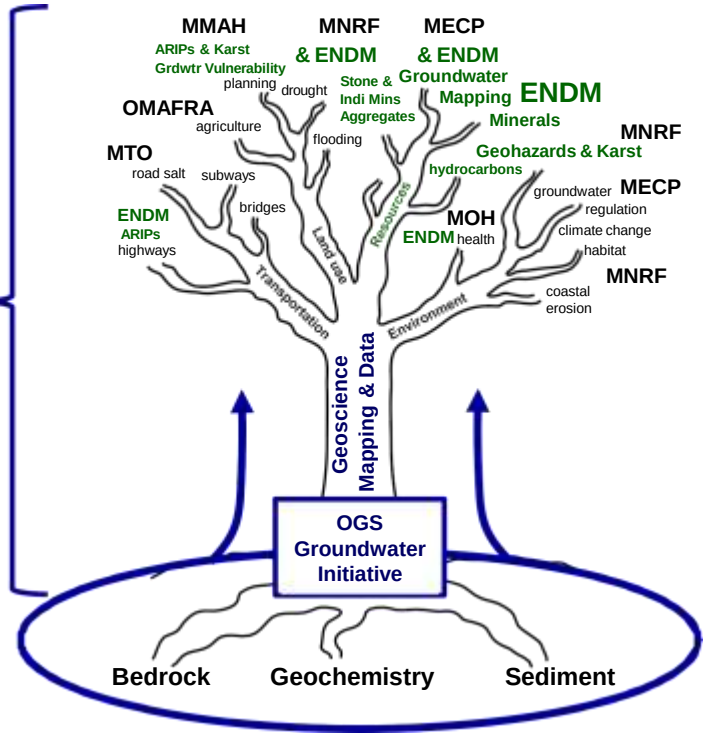
Four OGS Core Functions:

1. ***Geoscience Mapping***;
2. Geoservices (geochemical analyses; publication; library; warehouse services; and mineral sector analysis);
3. Front-line, local client Geoscience Expertise and Service;
4. Marketing Ontario's mineral investment opportunities & geoscience applications.

OGS Groundwater Initiative: Responsibilities

Performance Indicators

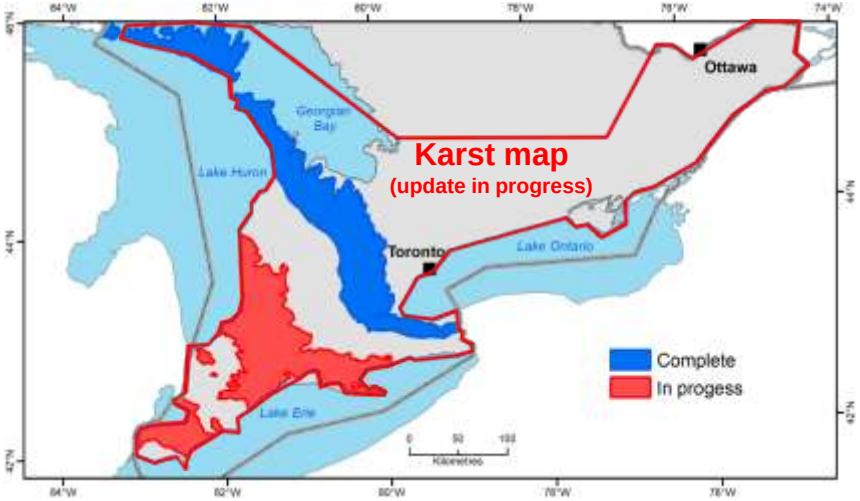
- Economic development
- Policy development
- Environmental decisions
- Public Health
- Saving client's $
- Saving client's time



OGS Groundwater Initiative

Mapping Activities:

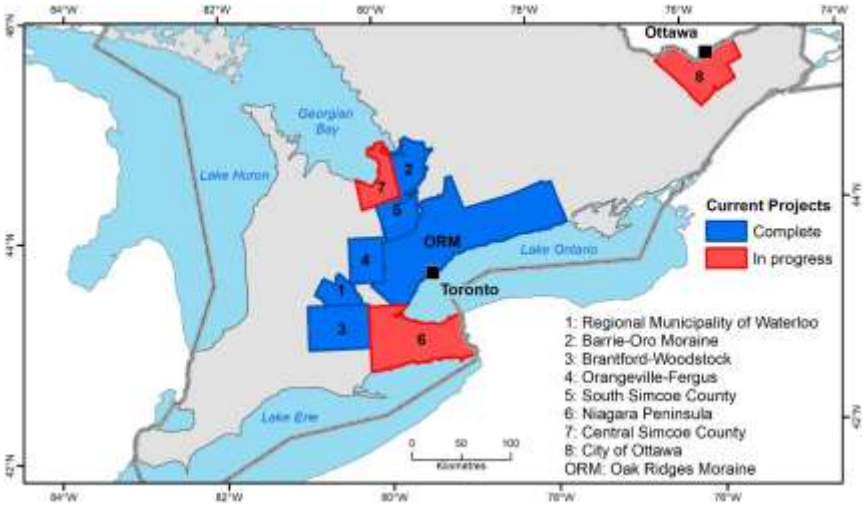
1. 3D Paleozoic bedrock, Groundwater flow zone & Karst mapping



OGS Groundwater Initiative

Mapping Activities:

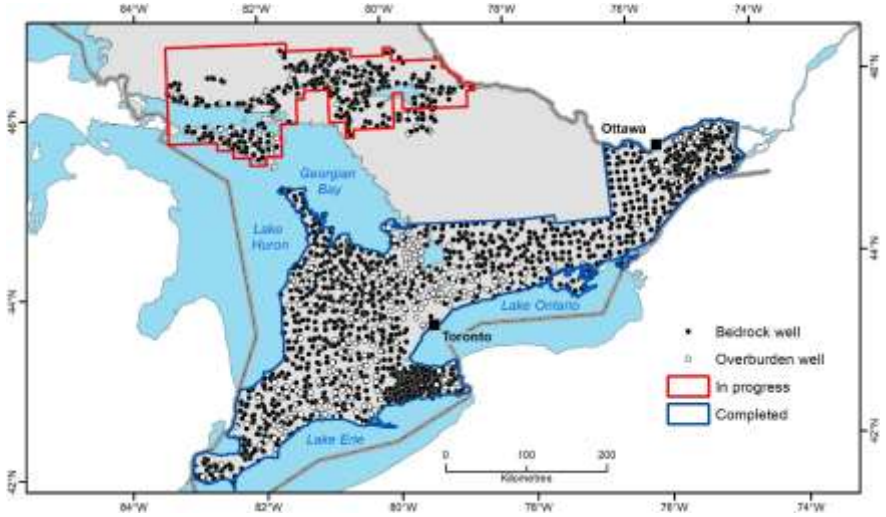
2. 3D Sediment mapping



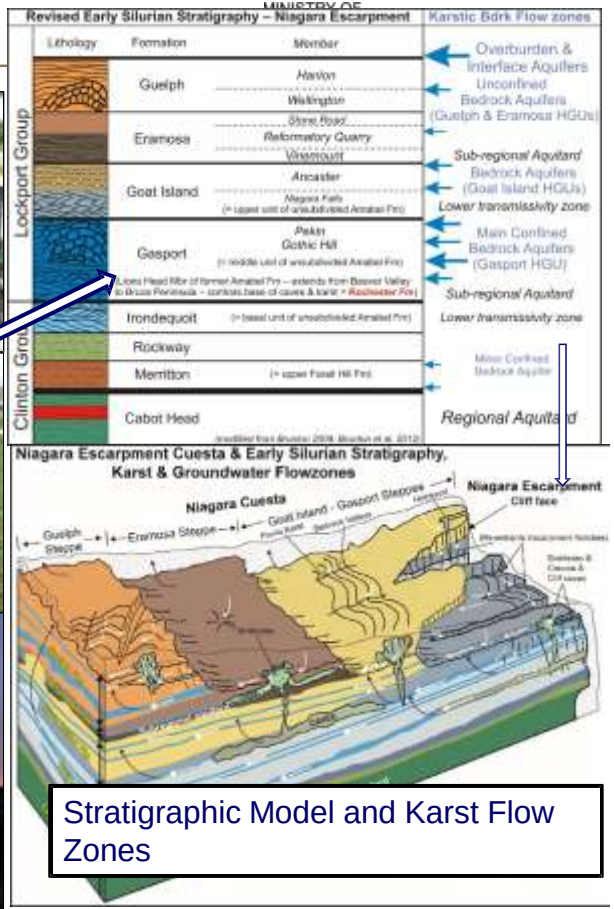
OGS Groundwater Initiative

Mapping Activities:

3. Ambient Groundwater Geochemistry mapping



3-D Paleozoic Bedrock & Karst mapping



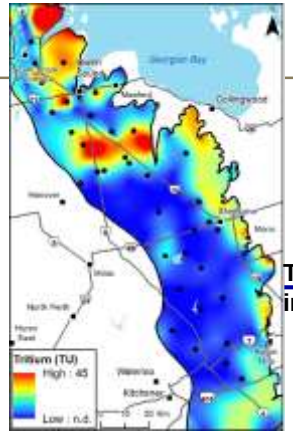
Stratigraphic Model and Karst Flow Zones

Ontario

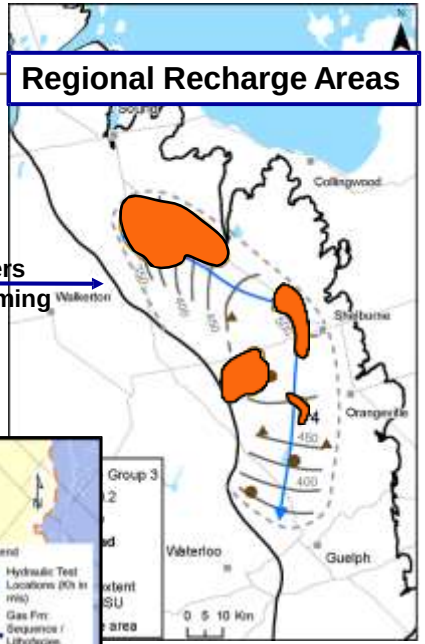
Hydrogeological Characterization & Mapping

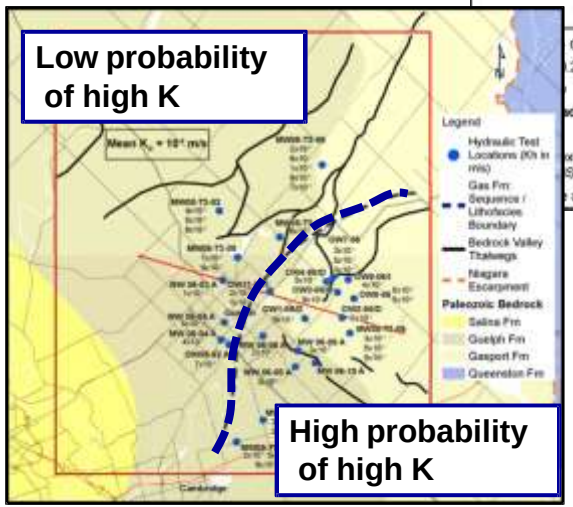
Interpret aquifer property and hydrochemistry within the geological framework to map regional-scale:

- Hydraulic conductivity (K) distribution and probability
- Groundwater flow, recharge areas and hydrochemical evolution.



Tracers informing





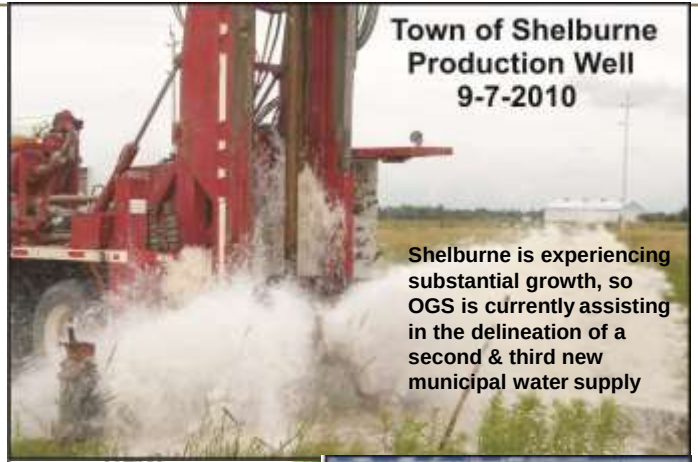
Success story

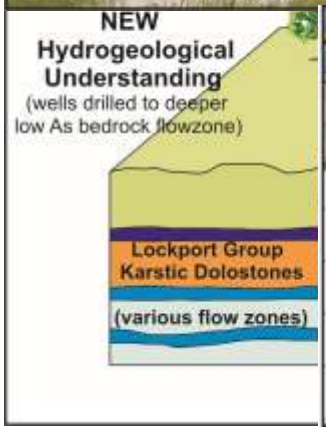
Problem:
Historic elevated levels of Arsenic in Municipal groundwater supply.
Treatment cost estimate: $6 million.

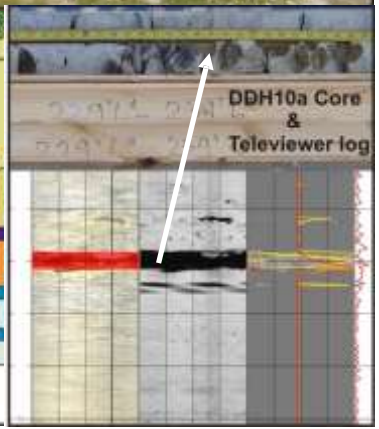
Approach:

- OGS developed regional bedrock model
- Identified groundwater flow zones, provided rock/water geochemistry; found flow zone with good quantity and low Arsenic
- Collaboration with Town of Shelburne & consultants during Federal and Provincial EA studies

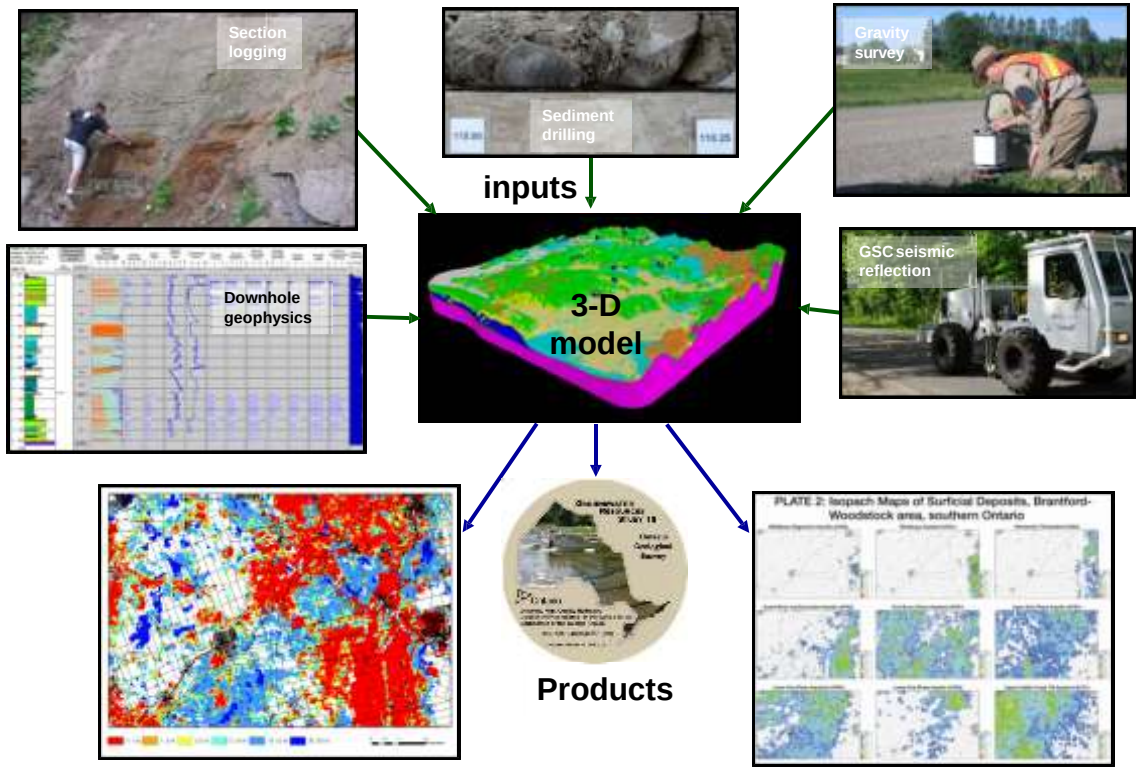
Solution: New water supply is online! OGS model is currently assisting in delineating additional supplies.







3D sediment mapping: methods and products



Success story

Problem

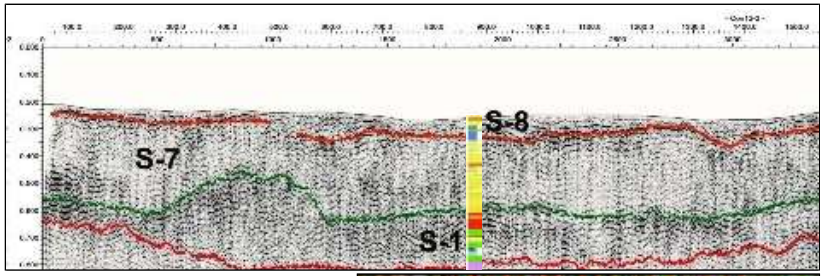
Township of Clearview water demand will exceed supply capacity by 2030

Approach

- Regional geophysical surveys
- Client consultation
- Sediment drilling

Solution

Township of Clearview purchased land adjacent to borehole site, drilled test wells, completing EA



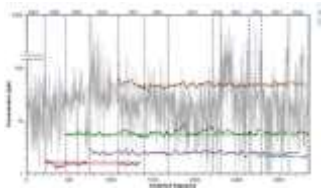
*"**Through excellent communication, emails, and site visits, the OGS … has potentially saved the Township of Clearview upwards of 15 million dollars in drinking water source costs.**"*

Mike Rawn, GM Environmental Services, Township of Clearview

Ambient Groundwater Geochemistry Mapping: Methods and Products

Data acquisition

Quality Assurance Program

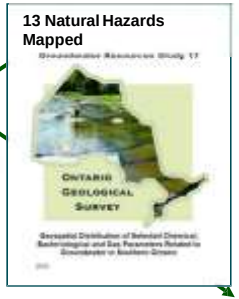


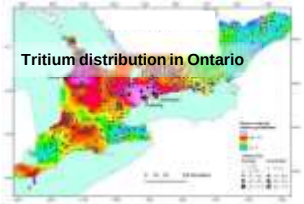
Products

AGGP Database

Value added studies & societal benefits

13 Natural Hazards Mapped

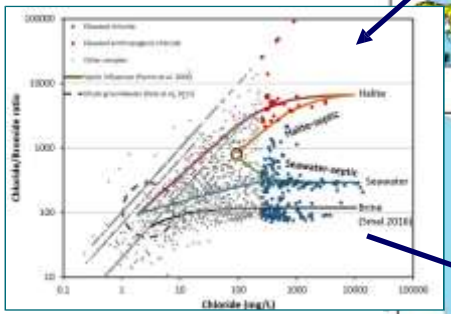


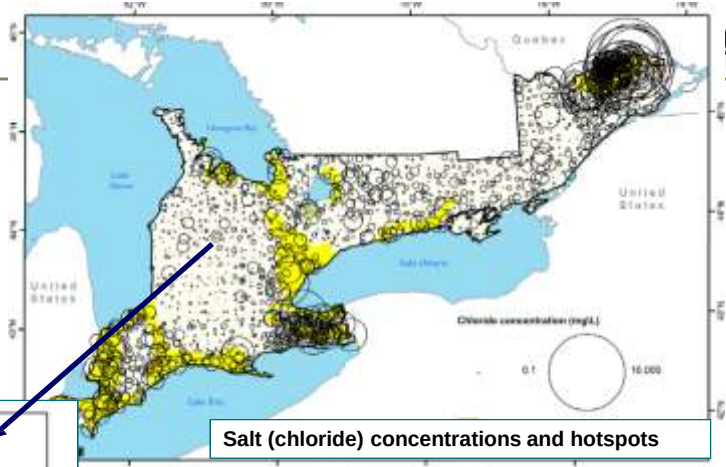


Success story

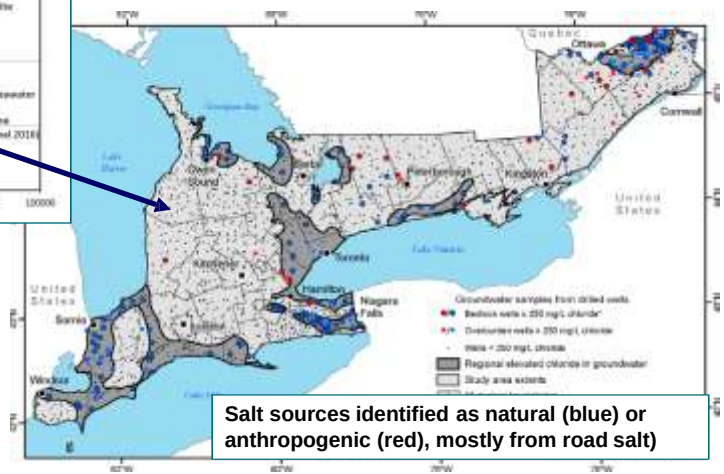
Problem: Areas of high salt in groundwater but source is unknown.

Approach: Ambient Groundwater Geochemistry Mapping and analysis to determine source of salt.





Salt (chloride) concentrations and hotspots



Salt sources identified as natural (blue) or anthropogenic (red), mostly from road salt)

Solution:

OGS maps areas of high salt in groundwater and identifies which are natural from bedrock and sediments, or are anthropogenic, from road salting. Justifies changes to salting.

Future Directions:

- **Focus on public & industry needs.**
- **Cover more ground; continue to innovative groundwater–focused mapping across Ontario.**
- **Communication of Geoscience to non-technical audiences to inform economic and policy development, and land-use planning.**
- **Improve marketing & communication.**

OGS Groundwater Team

- **Paleozoic Geology**
  - Frank Brunton (frank.brunton@ontario.ca)
- **Quaternary sediments**
  - Abigail Burt (abigail.burt@ontario.ca)
  - Riley Mulligan (riley.mulligan@ontario.ca)
- **Geochemistry**
  - Stew Hamilton (stew.hamilton@ontario.ca)
  - Kayla Dell (kayla.dell@ontario.ca)
- **Hydrogeology**
  - Elizabeth Priebe (elizabeth.priebe@ontario.ca)
- **Manager**
  - Richard Dyer (richard.dyer@ontario.ca)

http://www.geologyontario.mndm.gov.on.ca/index.html

Thank you

An Overview of the Prairie Provinces Water Board and Groundwater

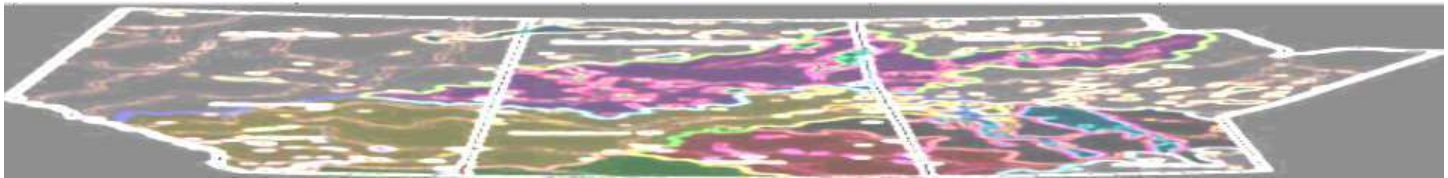
A presentation to the
NRCan National Dialogue on Groundwater

Virtual presentation, Nov 4 2020
by Patrick Cherneski, Executive Director
www.ppwb.ca

What We Will Cover Today…

- Brief background and highlights of the Master Agreement on Apportionment (MAA), the Board that oversees it, and the groundwater technical committee

- a new Schedule on groundwater that is proposed for addition to the Master Agreement
  - Schedule F - what it is and why it was proposed
  - Highlights of what is proposed
  - Current status
  - Potential benefits and opportunities



The Master Agreement on Apportionment came into effect in 1969

- Is between Federal-Provincial Jurisdictions
- Outlines “obligations” and “entitlements” vis-à-vis surface and groundwater quantity and quality
- Creates the ‘environment’ for continuous dialogue regarding cooperative water management
- Re-constituted the PPWB which was originally created in 1948

The Master Agreement on Apportionment is a successful framework for cooperation

- No termination clause
- Alteration/cancellation of Agreement in writing by all 4 jurisdictions
- Surface water quantity, quality and groundwater
- Principle of cooperation-coordination
- Disagreements to Federal Court of Canada

In the 50 year history of the MAA, there has not yet been a dispute that the Board could not resolve

The Master Agreement on Apportionment has 5 Schedules

- A: Apportionment - AB to SK
- B: Apportionment - SK to MB
- C: PPWB Agreement: Operations
- D: Pre-1969 Orders-in-Council regarding water allocation
- E: Water Quality Agreement (1992)
- F: Transboundary Aquifers (proposed for addition in 2020)

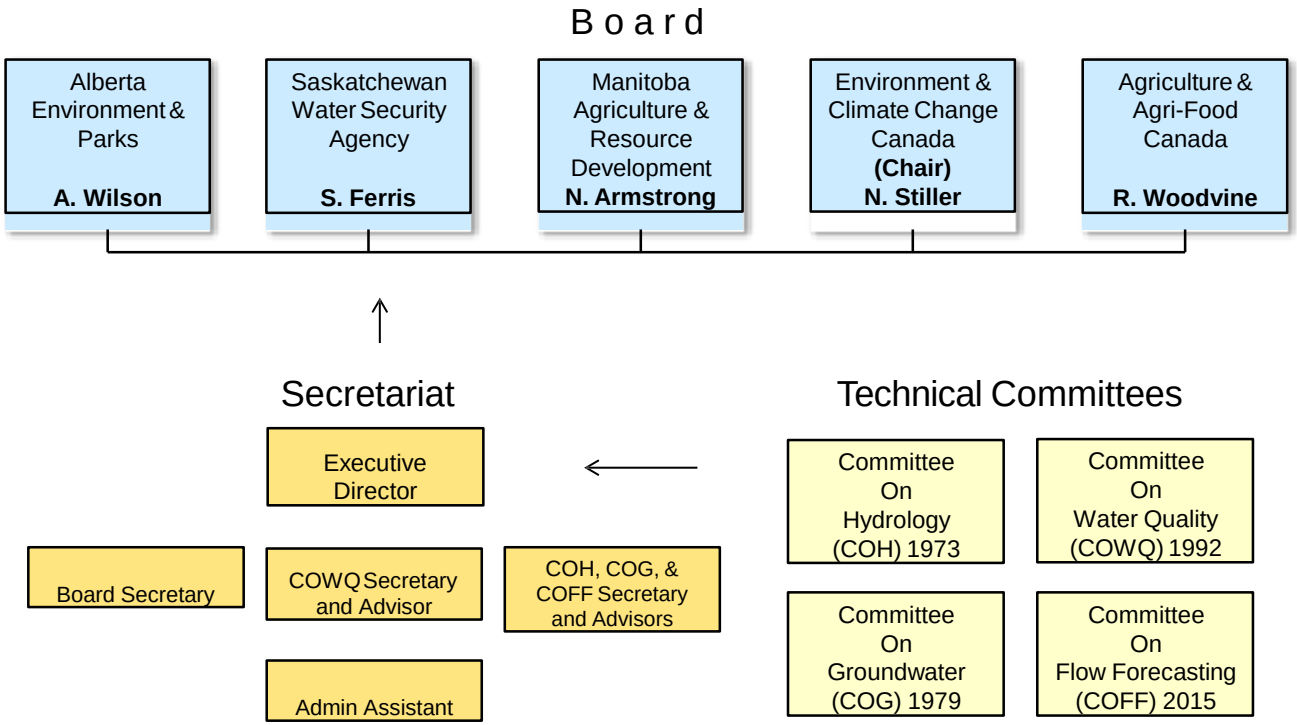
The Prairie Provinces Water Board Oversees the Agreement

- Reports annually to Ministers
- Main duties:
  - Compute and report on apportionment
  - Review and report on water quality
  - Promote integrated water resource development
  - Coordinate studies and monitoring
  - Make recommendations on water matters
  - Report on disputes
  - Review and recommend water quality objectives
  - Review and update the Risk Informed Management (proposed)
  - Assess and classify transboundary aquifers (proposed)

The PPWB has 8 Strategic Goals

- Agreed transboundary apportionment of water is achieved.
- Transboundary groundwater aquifers are protected and used in a sustainable manner.
- Agreed transboundary MAA water quality objectives are achieved.
- Governments are informed about emergency and unusual water conditions.
- Transboundary water issues are addressed cooperatively to avoid disputes.
- Ministers, senior managers and appropriate staff of governments are informed about PPWB activities.
- Information knowledge and research are shared among governments.
- PPWB business is conducted effectively.

The PPWB has 3 Main Components



The Committee on Groundwater Was Established in 1979

- PPWB recognized the growing importance of groundwater issues and the potential risks and implications of transboundary aquifer contamination.
- Responsibilities
  - Exchange information
  - Compile and interpret data
  - Recommend groundwater information/monitoring needs
  - Determine effect of proposed projects on groundwater at provincial boundaries
  - Other interjurisdictional groundwater issues
- Section on Groundwater in the MAA was added in 1992

  6.1 The parties mutually agree to consider groundwater matters that have implications affecting transboundary surface and groundwater, to refer such matters to the Board, and to consider recommendations of the Board thereon.

Proposed Schedule F (MAA) Federal Process

Even though Canada is represented on the Prairie Provinces Water Board (PPWB) by two federal Departments, ECCC and AAFC, it is necessary to:

- **Engage all federal departments with roles and interests in Prairie groundwater governance or with responsibility for federal lands** in order to develop a Government of Canada position for involvement under the proposed Schedule F; and

- Fully explore the opportunities, considerations and any other implications of the chosen policy option.

Proposed Schedule F (MAA)
Federal Role in the MAA

- Authority is from the Canada Water Act (CWA)
- Fed/Prov Comprehensive Water Resource Management Programs
- Fed/Prov Agreements for Water Quality Management
- ECCC ARDG-West & North region is Chair of the PPWB; AAFC is the founding member of the PPWB and is currently a Board member
- Canada pays for all surface water quality/quantity monitoring
- Canada pays for half administrative costs of the MAA
- Executive Director and the Secretariat are housed in ECCC
- GoC members support the four technical committees with experts as needed

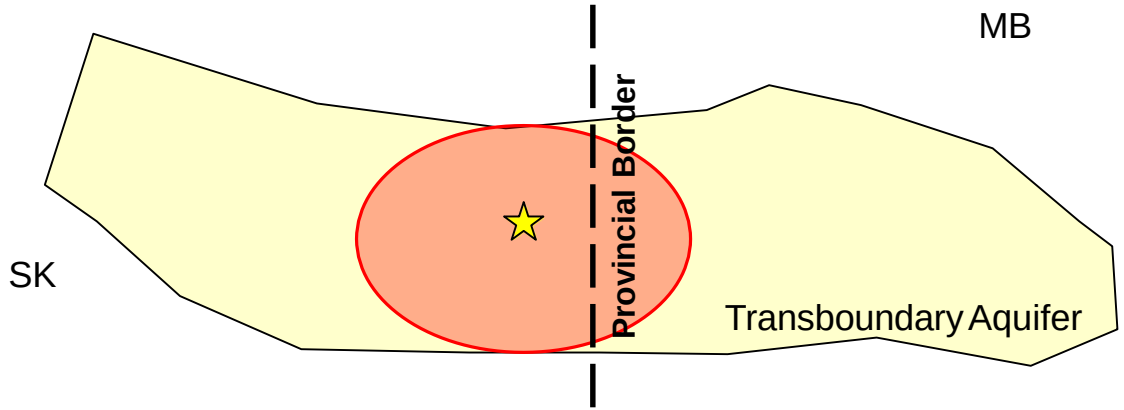
Proposed Schedule F
What It Is and Highlights

- Is a framework to collectively, effectively and efficiently manage, protect and share transboundary aquifers and associated aquatic environments between adjacent Prairie provinces
- Suggests criteria for determining sustainable use and equitable sharing of groundwater
- Commitments and Duties of the Jurisdictions:
  - Monitor development and activities affecting Transboundary Aquifers;
  - Identify potential impacts and work together to mitigate significant harm to Transboundary Aquifers;
  - Report annually to Ministers on Transboundary Aquifers; and
  - Implement a Risk Informed Management (RIM) approach which involves objectives, triggers, aquifer monitoring / assessments / reporting, and learning plans.

Schedule F
Why it was Proposed

Desire from the Provinces to have a framework to deal with interjurisdictional groundwater issues *before* they arise.

Provincial regulations cannot extend past provincial borders, but impacts of a project can



Proposed Schedule F
Current Status

- The draft Schedule for cooperation on groundwater was drafted over three years; adding a schedule to the MAA is a protracted process
- The Schedule F package is currently with Provinces for review and approval
- At present the plan is to have the Provinces as signatory to the Schedule, and Canada with all three Provinces signatory to the amending agreement
- Schedule F will be a formal schedule and will require an Order in Council to annex it to the MAA

Benefits and Opportunities

- Advances the Freshwater Mandate
  - Opportunity for proactive engagement, demonstration of protection and stewardship of groundwater
  - Practical opportunities such as between NRCan and Provinces in mapping groundwater resources in the Prairie region
- Advances the Climate Change Mandate
  - Help proactively address climate change impacts on groundwater resources. Enable adaptation / mitigation.
- Fills a gap in the framework for addressing groundwater on federal lands
- Advances opportunities for Indigenous engagement
  - Opportunity to engage in co-operation and partnership on protection and stewardship of transboundary groundwater


Questions?
www.ppwb.ca
PPWB: Alberta - Saskatchewan - Manitoba - Canada