# RESULTS BOOK

## Working together for groundwater protection and sustainable management

Victoria, British Columbia

Workshop organized by:

the Quebec Groundwater Network (RQES)

March 2018

Réseau québécois sur les eaux souterraines

Ressources naturelles Canada | Natural Resources Canada

This workshop was made possible through funding from the Geological Survey of Canada (GSC). It is the result of a collaborative effort between the Quebec Groundwater Network (Réseau québécois sur les eaux souterraines; RQES), the GSC, the BC Ministry of Environment (ME), the BC Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO), and the Université du Québec à Trois-Rivières (UQTR) Landscape Ecology and Planning Chair.

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The RQES is pleased to present the results of the workshop Working together for groundwater protection and sustainable management, which took place on February 26th, 2018 in the auditorium of the BC Ministry of Environment and Climate Change Strategy in Victoria. This book presents the results of the activities carried out during the workshop. Participants will find their contributions and will also be able to analyze these results in order to draw conclusions.

We would like to thank all of the participants who, through their interest and involvement, have made this workshop conducive to exchange and collaboration between the various stakeholders.

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# Reminder of the agenda of the day

**9:00 - 9:20am**
Opening
(formal presentations)

**9:20 - 10:30am**
**Activity 1** - Characterizing Canada's key regional aquifers : details, scope and limitations of the GSC approach for the provinces
(formal presentation and group discussion)

**Coffee Break**

**10:45 - 11:55am**
**Activity 2** - Sharing our expertise and our needs
(formal presentation and brainstorming activity)

**LUNCH**

**1:00pm - 2:00pm**
**Activity 3** - Understanding the different working environments
(formal presentation and discussion)

**2:00pm - 3:00pm**
**Activity 4** - Realistic ideas on how to collaborate going forward
(group activities and discussion)

**3:00 - 3:30pm**
**Closing discussion**
(group discussion and closing remarks)

# Participants

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# Facilitators

| | | | |
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Province of BC expertise
More than 20 staff specialize in & have education & experience in hydrogeology
Specialized knowledge in:
SOUTH

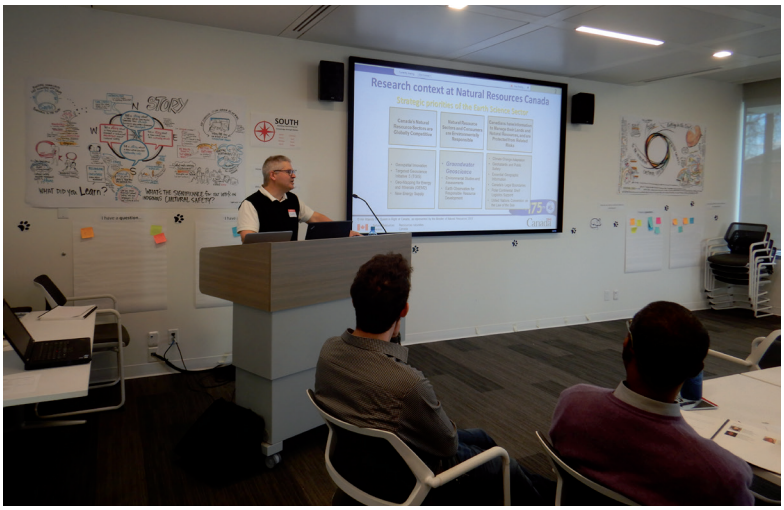
# 1

# Characterizing Canada's key regional aquifers: details, scope and limitations of the GSC approach for the provinces

## Mission of the GSC and its approach to characterizing Canada's key regional aquifers: the Nanaimo case study

**Yves Michaud**
Geological Survey of Canada

**Click here for the presentation**




## The province of BC's main groundwater objectives

**Amy Sloma** and **Christine Bieber**
Ministry of Environment and Climate Change Strategy

**Click here for the presentation**

# Scope and limitations of the GSC approach for the province

Participants were asked to think about and discuss the following questions:

- What has worked well?
- What is the scope of the GSC approach?
- What are the limitations of the GSC approach?
- What could work better?

Participants worked in two subgroups and filled the template below. Results include comments of both subgroups.

**DETAILS, SCOPE, AND LIMITATIONS OF THE GSC APPROACH FOR THE PROVINCE OF BC**

| What has worked well ? | Scope | Limitations | What could work better? |
|---|---|---|---|
| • Increased knowledge<br>• More in-depth comprehensive<br>• GSC promote the «Big picture»<br>• Professional development<br>• Expansion of PEWON<br>• Yves Michaud and Pat Lapcevic experience<br>• Friendly relationship with Mike Wei<br>• Having accessibility to data and being transparent when collaborating thru MOU<br>• BC second time with an official MOU<br>• Willingness of the province to work collaboratively (people, research, $) | • Longer data collection time frame (GSC can manage a longer time frame)<br>• Development of archetypes<br>• High quality products<br>• Technically defensible<br>• Approach as research project<br>• Interconnectedness<br>• Very good broad approach with MOU<br>• GSC approach from regional to more specific | • Operationalization<br>• Scale challenges<br>• Approach tends to be regional<br>• Tends to be a snapshot<br>• Linking to province aquifer<br>• GSC approach is not 100% compatible with BC approach<br>• Disconnect with existing mapping<br>• Accessibility to data<br>• Different mandates (GSC has research goals and not necessarily working for decision makers)<br>• GSC cannot accommodate all requests from the province<br>• Before the WSA the province did not have the resources to follow the pace of GSC, now it does<br>• Understanding how the GSC system works in terms of data integration and collection | • Find a better balance between the needs of the province and GSC interests<br>• How do we work together to integrate data? |

# 2

# Sharing our expertise and our needs

## Specific projects and core competencies of the GSC

**Yves Michaud**
Geological Survey of Canada

**Click here for the presentation**

## Needs of the province

**Julie-Ann Ishikawa**
Ministry of Environment and Climate Change Strategy

**Click here for the presentation**

# List the expertise of the GSC and the needs of the province

Participants worked in subgroups and were asked to list the GSC competencies and provincial needs regarding aquifer knowledge and management.

**GSC COMPETENCIES AND PROVINCIAL NEEDS REGARDING AQUIFER KNOWLEDGE AND MANAGEMENT**

| GSC Competencies | Province of BC needs |
|---|---|
| • Research level science<br>• Modelling<br>• Remote sensing<br>• Field data collection (sonic, seismic, geophysics, electromagnetic)<br>• Being at the forefront in terms of data integration, multidisciplinary and interconnection between data<br>• GIN and everything around it (links with different databases, data infrastructure, translation of well logs, standardization of terminology)<br>• Federal standardization (static and ongoing)<br>• Data tools (scripts, linking)<br>• Translating terms into words that mean something to geologists or geoscientists (e.g. well logs description)<br>• Structure data in order to make sense of it<br>• Basic quality information about water quality but everything more serious goes to Environment Canada<br>• Specialized skills | • Integrate data into GIN (connection to other databases)<br>• Data information and interpretation (report, allocations)<br>• Translate data such as logs, into standardized description<br>• Regional studies<br>• Policy development and implementation (licensing, water reserves, curtailment)<br>• Data integration into BC data systems (authorization and decisions, protections, build on with local studies once GSC moves)<br>• Protection<br>• Need everyone to be at the table for decision-making<br>• Integrate groundwater knowledge with surface water knowledge<br>• Impacts of agriculture (quality and quantity)<br>• Groundwater management<br>• Climate change (adaptation)<br>• Understand recharge<br>• Understand sustainable yield<br>• Understand salt water intrusion |

# 3

# Understanding the different working environments

# The GSC working environment

**Yves Michaud**
Geological Survey of Canada

**Click here for the presentation**

# The province of BC working environment

**Julie Pisani**
Regional District of Nanaimo

**Click here for the presentation**

# Barriers and challenges related to our working environments and potential ways to address them

Discussion of what the barriers and challenges are, and potential ways to address them.

**WORKING ENVIRONMENTS**

| Barriers and challenges | How to address them |
|---|---|
| • Scale of interest<br>• Process vs. assessment<br>• Different framework for different applications (stratigraphic - watershed - classification)<br>• Funding and resources for data storage/ diffusion<br>• Upcoming problems: First Nation, reasonable withdrawals, sustainability.<br>• Software differences between actors (compatibilities, 3D model, import/export)<br>• People changing projects or leaving halfway<br>• Boundaries go from administration, political (agencies, levels of government), to natural (geology, watershed, etc.)<br>• Communication to stakeholders<br>• Changing political environments<br>• Define project that aligns with BC goals and must meet the GCS mandate (e.g. authorization)<br>• Seismic, hydraulic testing and drilling requires GSC on the ground<br>• Have professional staff involved<br>• Reporting out / communication (everybody need to be kept up-to-date)<br>• Extrapolate to other parts of the province from Nanaimo to NE BC<br>• True collaboration for the whole province (observation wells, modelling, aquifer stress, knowledge integration | • Upgrading approaches and methodologies for compatibility (standardization, open data)<br>• Alignment/communication between stakeholders<br>• Cooperation/collaboration to leverage funding<br>• Shared acknowledgement for communities<br>• Efficiency (implementing science in decision making)<br>• Implementation of an agreement (MOU) for each study<br>• Open source software<br>• Education components, joint publications between GSC and funding agencies, lessons learnt from the methodology, outreach.<br>• Obtain funding from RDN<br>• Skills and knowledge transfer would be easier if professionals were involved<br>• Phone call every two months<br>• Learn from one case study and apply it to other aquifers<br>• General framework can be utilized but methods are site-specific |

# 4

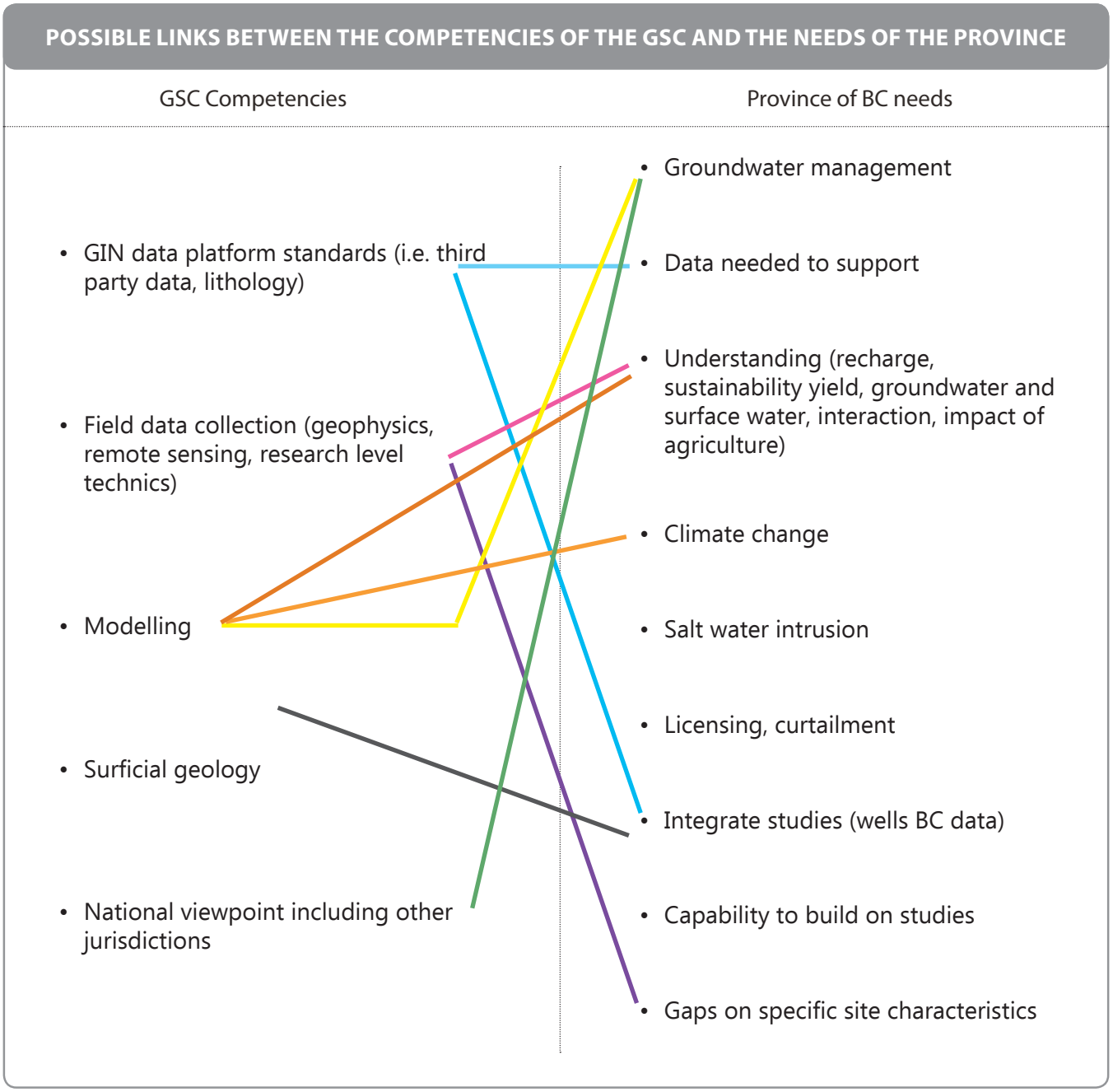
# Realistic ideas of how to collaborate going forward

# Connecting the expertise of the GSC with the needs of the province

Based on the competencies and needs previously identified, and considering the working environments, participants were asked to work in subgroups to identify possible links between the competencies of the GSC and the needs of the province.

Contents of the template above have been simplified to facilitate reading and understanding (see all the competencies and needs identified on page 11).

**POSSIBLE LINKS BETWEEN THE COMPETENCIES OF THE GSC AND THE NEEDS OF THE PROVINCE**

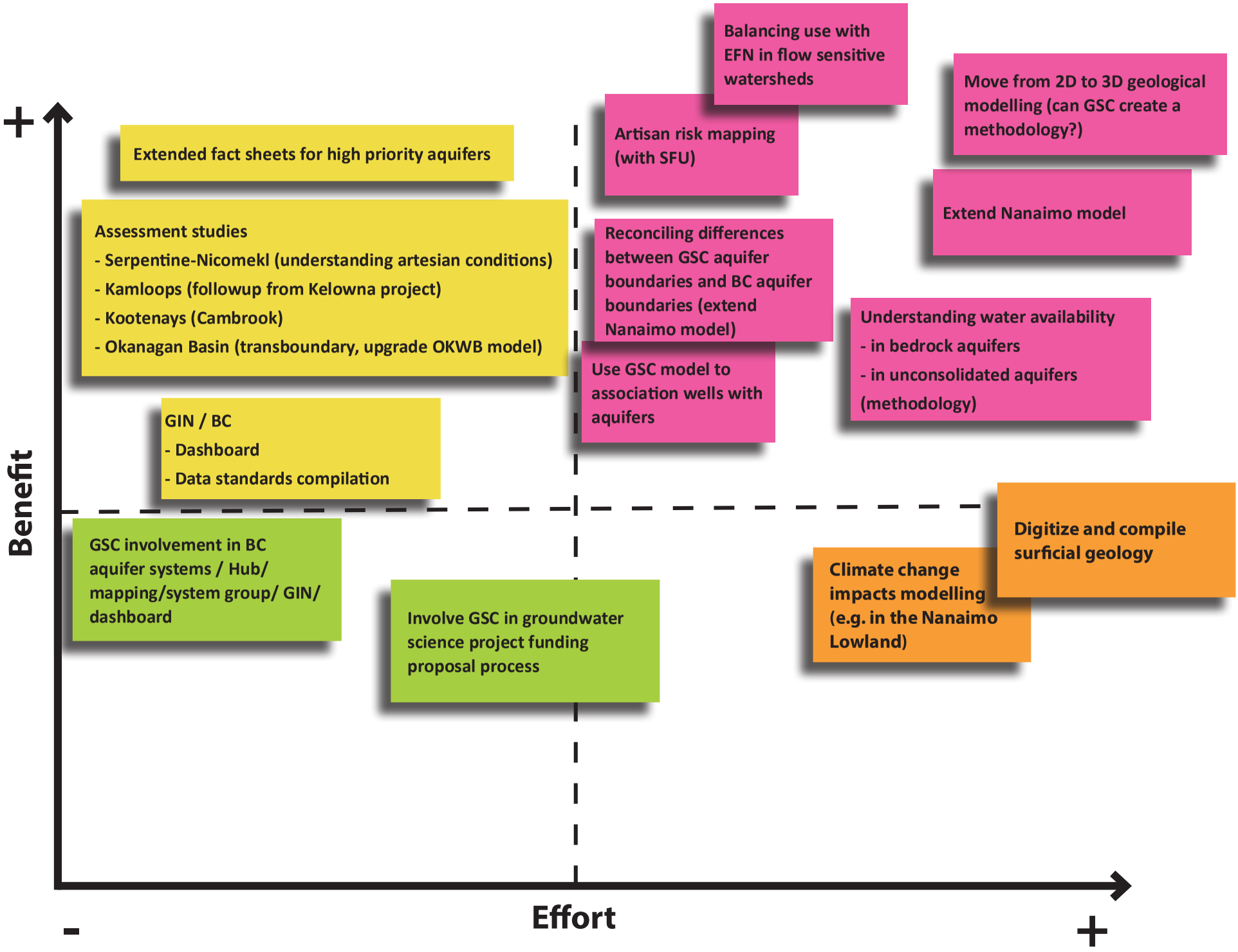


# Identifying and evaluating the effort and benefits of ideas or projects where we can work together

For the identified links between competencies and needs, participants identified ideas or projects where we can work together. Working in subgroups, participants were asked to write one idea per post-it.

Then, participants evaluated the effort and benefits of each idea or project. The post-its were placed on the effort-benefit matrix:

- BENEFIT: If we put this idea in place tomorrow, what would the benefit be for the province?
- EFFORT: What would the effort required (combined GSC+BC) be to carry out the project?


Balancing use with EFN in flow sensitive watersheds
Move from 2D to 3D geological modelling (can GSC create a methodology?)
Artisan risk mapping (with SFU)
Extended fact sheets for high priority aquifers
Extend Nanaimo model
Assessment studies
- Serpentine-Nicomekl (understanding artesian conditions)
- Kamloops (followup from Kelowna project)
- Kootenays (Cambrook)
- Okanagan Basin (transboundary, upgrade OKWB model)
Reconciling differences between GSC aquifer boundaries and BC aquifer boundaries (extend Nanaimo model)
Understanding water availability
- in bedrock aquifers
- in unconsolidated aquifers
(methodology)
Use GSC model to association wells with aquifers
GIN / BC
- Dashboard
- Data standards compilation
Digitize and compile surficial geology
GSC involvement in BC aquifer systems / Hub/ mapping/system group/ GIN/ dashboard
Climate change impacts modelling (e.g. in the Nanaimo Lowland)
Involve GSC in groundwater science project funding proposal process
+
Benefit
-
Effort
+

**Contributors to this knowledge exchange workshop :**