



NGSC Progress Report 2022

Harnessing the power of Canadian geoscience
collaboration for a stronger future



Prepared by the National Geological Surveys Committee Secretariat
for the 2022 Energy and Mines Ministers Conference



National Geological Surveys Committee of Canada. 2022. NGSC Progress Report 2022: Harnessing the power of Canadian Geoscience collaboration for a stronger future. Geological Survey of Canada (Ed), 22 pages.

ISBN: 978-0-660-43880-1

Catalogue Number: M34-78/2022E-PDF

Aussi disponible en français sous le titre:

Rapport d'étape du CNCG 2022 : Exploiter le pouvoir de la collaboration géoscientifique canadienne pour un avenir plus fort.

Cover photo credit: Northwest Territories Geological Survey



Executive Summary

Public geoscience can help locate geological resources, monitor and predict geological hazards, and determine environmental baselines for contaminants. Such research is more important than ever as the world searches for the minerals and energy sources necessary to reach net-zero carbon emissions, works to adapt to the impacts of climate change, and seeks a higher standard of environmental protection. It is also possible to produce more accurate, precise and varied geoscience than ever before thanks to new technologies and new analytical techniques such as machine learning.

The National Geological Surveys Committee, composed of senior executives from all 13 federal, provincial, and territorial geological survey organizations across Canada, is advancing geoscience collaboration and coordination across jurisdictions, supporting economic development and serving the public good.

Between the last Energy and Mines Ministers Conference in September 2021 and the end of April 2022, the NGSC achieved outcomes on shared objectives:

- Negotiating and recommending to Canadian Mines Ministers the terms of the renewal of the Intergovernmental Geoscience Accord (IGA; March 2022)
- Launching the Pan-Canadian Geoscience Strategy (PGS) with Ministerial support from across Canada (February 2022)
- Taking initial action on IGA and PGS priority areas (ongoing)
- Applying shared principles when planning and implementing actions (ongoing)

Next steps include further advancing priority areas and principles, including communicating and engaging with stakeholders and Indigenous Peoples.



Table of Contents

Executive Summary.....	2
Introduction	5
The need for public geoscience	5
Public geoscience governance in Canada	7
The evolving roles of GSOs and the NGSC	8
Translating shared priorities into action: NGSC progress in 2021-22.....	10
Renewing the Intergovernmental Geoscience Accord (IGA)	10
Launching the Pan-Canadian Geoscience Strategy (PGS)	11
Taking action on priority areas identified in the IGA and PGS.....	12
Applying pre-defined principles to PGS implementation	17
The Way Forward.....	21
Annex: Acronyms	22

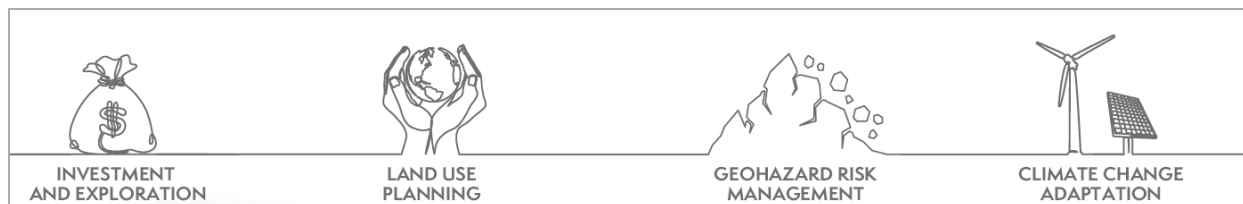


Introduction

The need for public geoscience

Geoscience refers to geological, geophysical, geochemical and other data, maps, and knowledge on a variety of topics such as minerals, energy, groundwater, permafrost, and the seafloor. Public geoscience is available openly to the public through geological survey organizations (GSOs) or other public sector players.

Geoscience has many economic, environmental, and societal benefits. Mineral and energy geoscience helps industry find new resources, and informs community and government land use and conservation decisions. Environmental geoscience helps identify environmental baselines of contaminants so that it is easier to monitor pollution and plan restoration efforts. Geoscience related to climate change and natural hazards, which considers issues such as thawing permafrost and landslides, provides an evidence base for governments' building codes and public safety decisions.



These benefits are enhanced when geoscience is openly available to the public, so that everyone who needs the information—whether data users from governments, communities, industry, non-profit organizations, or individuals—has access. Access increases the application of the science, and enables swifter economic, societal, and environmental advancements.

Today, public geoscience is more important than ever as the world searches for the minerals and energy sources necessary to reach net-zero carbon emissions, works to adapt to climate change, and seeks a higher level of environmental protection. It is also possible to produce more accurate, precise and varied geoscience than ever before thanks to new technologies and new analytical techniques such as machine learning.

Geoscience users from industry, governments, academia and Indigenous groups recognize the value of public geoscience and have expressed support for its advancement. The Prospectors and Developers Association of Canada (PDAC) states that “[government geoscience is crucial to the success of mineral exploration in Canada](#)” and consistently advocates for governments to fund public geoscience. The Mining Association of Canada has spoken to the importance of public geoscience in [levelling the playing field](#) for development in remote regions. The 2019 [Canadian Minerals and Metals Plan](#), which was developed in consultation with stakeholders and Indigenous Peoples in over 2000 engagement activities,



speaks to the importance of public geoscience beyond mineral exploration, noting that public geoscience supports “civil engineering projects, land-use planning, clean water supply, environmental impact assessment, public health and safety, economic development, and national sovereignty.” It also advises that “the federal, provincial and territorial governments and industry should explore options for increased funding for geoscience and examine ways to increase international collaboration on geoscience innovation.”



Geoscience and Canada’s investment attractiveness: a look at Fraser Institute Rankings

As surges in mineral commodity prices drive higher levels of exploration, there is much competition between countries to attract mining investment.

The [Fraser Institute 2021 Mining Survey](#) suggests that Canada’s success in this regard is partly due to its public geoscience.

When the institute ranked mining investment attractiveness of jurisdictions around the world, three Canadian provinces and territories were in the top 10 and another two were in the top 20.

These scores reflect a composite of factors, including political stability and regulatory environment, but the quality of the geological database (includes quality and scale of maps, ease of access to information, etc.) is also a contributing factor.

When considering quality of the geological database independently of other factors, six Canadian jurisdictions scored in the top 20. When companies had concerns about jurisdictions, these were rarely linked to geoscience and were more often about uncertainty around protected areas, disputed land claims, and environmental regulations.



We are not alone: Investments abroad result in competition and opportunities for partnerships

As countries globally compete for private mineral exploration investments, several other major geoscience investments have recently been announced. For example:

- Following a \$2 billion AUD investment in a [Critical Minerals Facility](#) in 2021, in March 2022 Australia announced \$50 million AUD over 3 years to establish a [virtual National Critical Minerals Research and Development Centre](#). This centre brings together expertise from Geoscience Australia and other federal scientific organizations.
- In February 2022, the American government voted \$320 million USD over 5 years for a new [Earth Mapping Resource Initiative](#), to be led by the United States Geological Survey.

International geoscience partnerships are also on the rise. For instance, over the last two years, Canada, Australia, and the USA have launched and begun implementing a joint [Critical Minerals Mapping Initiative](#), including producing an [interactive mapping tool](#) to help find critical mineral deposits.

The Pan-Canadian Geoscience Strategy and federal, provincial and territorial critical minerals strategies will help position Canada as both a strong competitor (with benefits to the economy), and a strong collaborator, helping to secure our global position.



Public geoscience governance in Canada

Geological survey organizations (GSOs) across Canada provide public geoscience on topics such as:

- Minerals
- Energy (oil, gas, renewables, geothermal)
- Natural hazards and climate change
- Environmental baselines
- Seafloor and continental shelf structure
- Groundwater

Although academia and industry also study some of these topics, GSOs are unique in making so much of their work available as public geoscience. GSOs also offer a complementary scientific perspective to academia and industry, by conducting research over larger areas, over longer times, or in regions that are harder to access.

Canada has 13 GSOs: one under each provincial/territorial government except Prince Edward Island, and one under the federal government (Geological Survey of Canada). In general, provincial and territorial GSOs are responsible for detailed geological knowledge in their provinces or territories, while the Geological Survey of Canada focuses on fundamental geoscience knowledge, conceptual models, and analytical tools that can be applied across multiple jurisdictions or offshore.

Indigenous Peoples and geoscience in Canada



Indigenous Peoples have inherent and important relationships with the lands and waters in Canada, and thus are in a strong position to both contribute to and benefit from geoscience.

Due to the colonial nature of Western science and Canadian history, Indigenous Peoples have historically been under-recognized or excluded from the geoscience ecosystem in Canada. However, this is starting to change. For instance:

- Indigenous governments and organizations are helping to set priorities for the federal geoscience program, [GEM-GeoNorth](#).
- Researchers and Indigenous communities are co-developing projects that combine traditional, local, and geoscientific knowledge in the [geo-hazard research](#) programs at the Geological Survey of Canada.
- Indigenous communities and groups are leading or co-leading projects to increase local geoscience capacity and to address communities' specific geoscience questions (e.g. pilot project on Tool Stones with Sts'ailes First Nation, British Columbia).
- The Geological Survey of Canada has developed an Indigenous Relations Network as an internal community of practice to support meaningful and consistent engagement with Indigenous communities.
- Renewal of the IGA includes a commitment that GSOs will keep each other informed of plans to consult or engage Indigenous Peoples, in order to coordinate efforts where possible (see page 10).

Reconciliation with Indigenous Peoples is an ongoing endeavour, and it is important for all producers of geoscience to continually seek better ways to engage, consult, involve, and acknowledge Indigenous Peoples.



In this context, it is important to ensure federal and provincial/territorial GSOs are doing complementary work, and maximizing knowledge transfer and cooperation in areas of shared interests. For example, all GSOs in Canada conduct some form of mineral geoscience, whether it is investigating the processes underlying economically important ore deposit formations across the country, or the geological structures in a specific region. In such situations, it is useful to lean on each other's expertise and plan collaborative projects that serve the needs of more than one jurisdiction.

Established in 1979, the [National Geological Surveys Committee \(NGSC\)](#) exists to facilitate such complementarity and collaboration. The NGSC is a group of senior executives from all 13 GSOs, who coordinate and integrate public geoscience activities across Canada. NGSC members work together to:

- identify emerging geoscience issues
- consult on best practices
- seek out opportunities to cooperate and collaborate
- promote the value of public geoscience among Canadians
- implement intergovernmental agreements related to geoscience
- prepare reports and recommendations to federal, provincial and territorial Mines Ministers

The evolving roles of GSOs and the NGSC

GSO priorities continually evolve alongside governmental priorities. One increasingly important priority of federal, provincial and territorial governments across Canada is securing domestic supply chains for critical minerals. These minerals are required for renewable energy and clean technology products (e.g. batteries, solar panels), modern electronics, and more. Several provinces ([Quebec](#), [Ontario](#), [Alberta](#)) have released critical minerals strategies over the past year, and others are planning to do so soon ([Canada](#), [Northwest Territories](#), Saskatchewan). The federal government also recently [announced major funding](#) specifically for critical minerals supply chains. Aligned with this priority, GSOs are taking leadership by reorienting or expanding their mineral geoscience research to focus more on critical minerals. For instance, the most recent iterations of the flagship federal mineral geoscience programs, [GEM-GeoNorth](#) and [TGI](#), included specific commitments to research critical minerals. Likewise, many governments in Canada have committed to advancing other aspects of a low-carbon economy, such as carbon capture and underground storage, and development of geothermal energy. GSOs from these governments are researching the best locations and methods for underground storage of carbon, and modelling geothermal potential in different regions.

The organizational culture of GSOs are also evolving. Governments across Canada are increasingly committed to breaking down silos, and stimulating innovation through multi-disciplinary and multi-organizational cooperation. For GSOs, this means developing programs and planning science directions in a more collaborative way.

The need for new geoscience to meet today's challenges, together with the evolving roles, culture and leadership of GSOs, have in turn influenced work by the NGSC. The role of the NGSC is to facilitate



communication, coordination, and collaboration between GSOs. From 2019 to 2021, aligned with directions from Ministers, the NGSC took on additional responsibilities and leadership, in particular by working together with geoscience users to identify the most important gaps in the geoscience ecosystem in Canada, and developing a [Pan-Canadian Geoscience Strategy](#) (PGS) to help GSOs coordinate efforts on these priority areas. The NGSC is now working to translate these shared priorities as well as pre-defined principles into action.



NGSC preliminary meeting on development of a Pan-Canadian Geoscience Strategy. October 2019.



Translating shared priorities into action: NGSC progress in 2021-22

Between the last Energy and Mines Ministers Conference in September 2021 and the end of April 2022, the NGSC advanced several shared objectives, described in more detail in later sections:

- Negotiating and recommending to Canadian Mines Ministers the terms of the renewal of the Intergovernmental Geoscience Accord (IGA; March 2022)
- Launching the Pan-Canadian Geoscience Strategy (PGS) with Ministerial support from across Canada (February 2022)
- Taking initial action on IGA and PGS priority areas (ongoing)
- Actively incorporating shared principles when planning and implementing actions (ongoing)

Renewing the Intergovernmental Geoscience Accord (IGA)

The IGA is a ministerial agreement outlining roles, responsibilities, and collaboration mechanisms for GSOs in Canada. The IGA was established in 1996, and the NGSC leads its renewal every five years.

Between September 2021 and the end of April 2022, the NGSC achieved the following:

- **Consensus between GSOs** on an updated IGA
- **Recommendation to Ministers of renewal** of the IGA

Renewal of the IGA will be confirmed by Mines Ministers at the Energy and Mines Ministers Conference in July 2022.

The updated IGA includes some small but important additions that will enhance cooperation between GSOs:

- A commitment that GSOs will **co-plan** geoscience when appropriate (in addition to the 2017 commitment to co-conduct geoscience when appropriate). The intention here is to create more meaningful intergovernmental partnerships, and increase efficiency.
- A list of **priority areas for collaboration** between GSOs. These priority areas represent the culmination of lengthy discussions within the NGSC, and also respond to stakeholder input received by the NGSC over the past two years while developing the PGS.
- A commitment that GSOs will keep each other informed of plans to consult or engage Indigenous Peoples, in order to coordinate efforts where possible.

The next scheduled renewal of the IGA will be in 2027.



Launching the Pan-Canadian Geoscience Strategy (PGS)

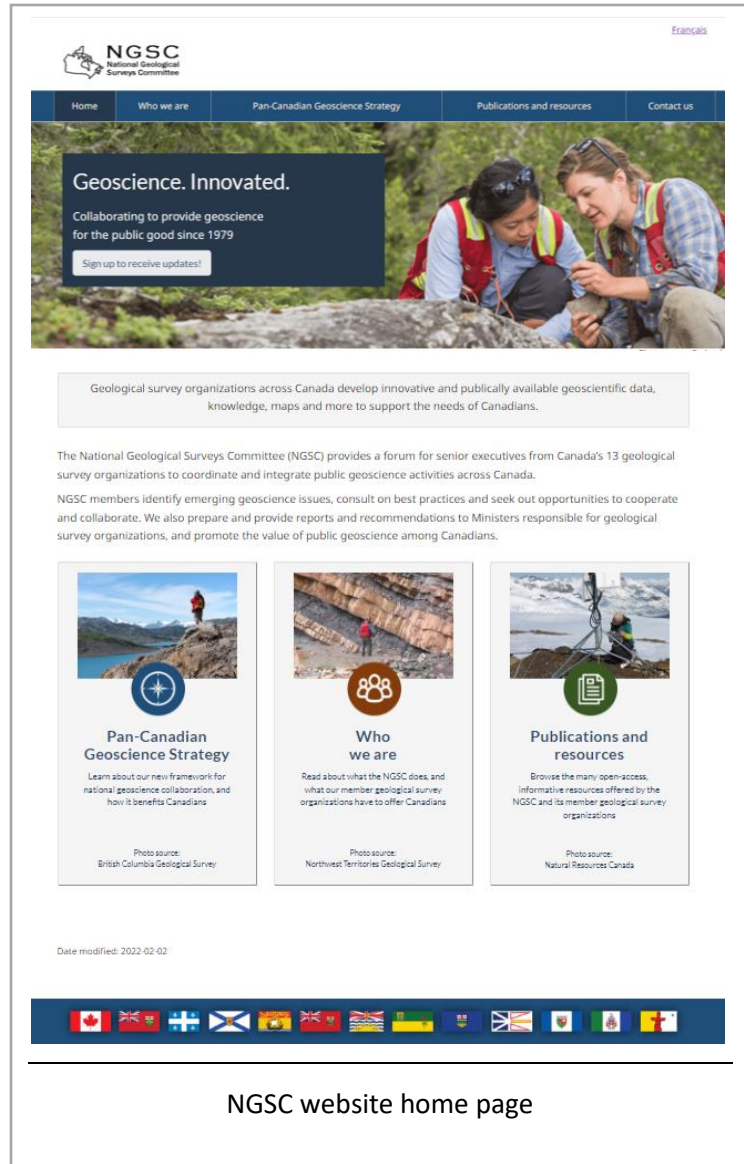
The PGS is a framework to focus collaborations between GSOs on areas of mutual interest. Such focused efforts will enhance the ability of GSOs to provide geoscience information that underpins the responsible development of Canada’s geological resources and serves the public good. In comparison to the IGA, the PGS concentrates less on the governance of GSOs and mechanisms for collaboration, and more on the topics where coordination is needed. It also describes plans for early actions related to the different priority areas.

Between September 2021 and the end of April 2022, the NGSC achieved the following to launch the PGS:

- **Ministerial endorsement** of the PGS¹ (December 2022–February 2022)
- **Public release** of the PGS (February 2022)
- **Engagement with geoscience users** related to the PGS, including at conferences and open houses and on social media

As a result of discussions when planning the PGS launch, the NGSC also developed a **new NGSC website and mailing list**. These tools will help increase public awareness of the NGSC, its member GSOs, and its publications—including the PGS and the IGA.

As a framework for collaboration, the PGS is now complete. Implementation of the PGS is now underway and will be ongoing. Implementation progress is detailed in the following section.



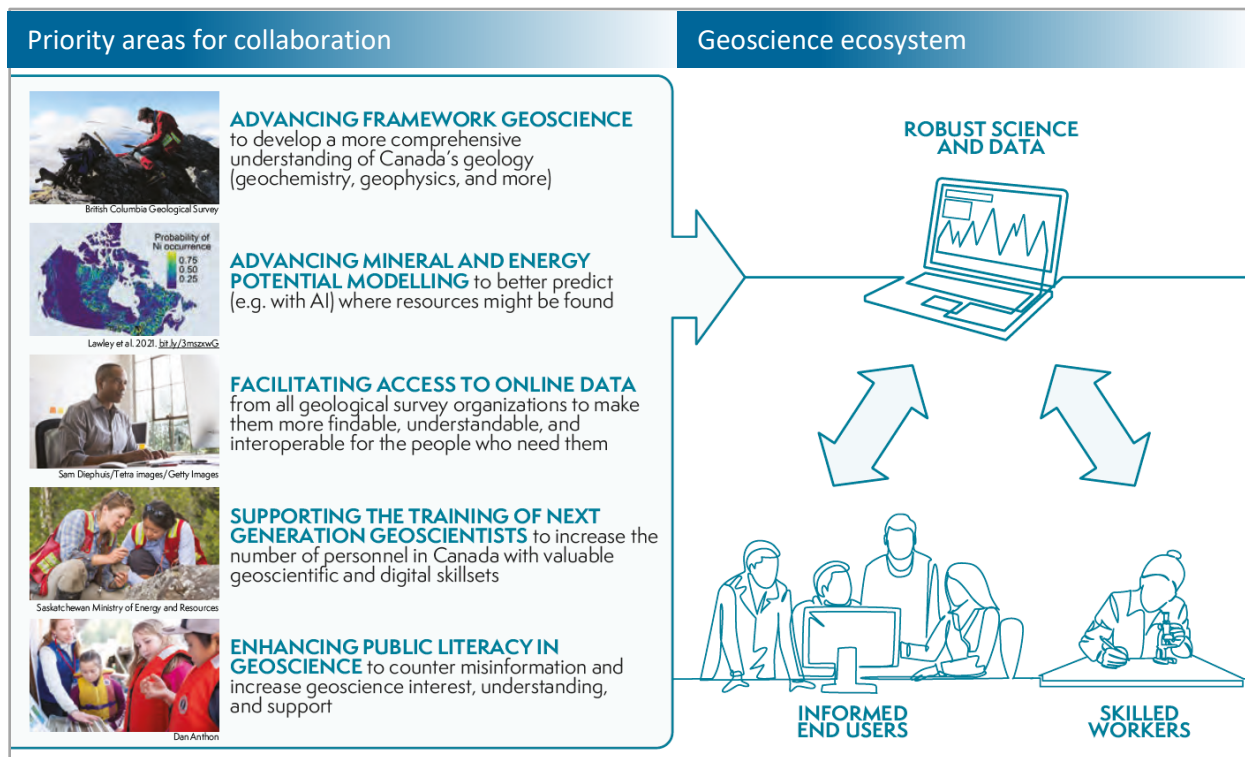
NGSC website home page

¹ Note: The PGS has currently been endorsed by Mines Ministers from all the jurisdictions in Canada that earlier endorsed the Canadian Minerals and Metals Plan.



Taking action on priority areas identified in the IGA and PGS

Priority areas for collaboration between GSOs are described in the PGS and listed in the updated IGA. Collectively, these will help build on Canada’s existing expertise in geoscience and strengthen the nation’s geoscience ecosystem.



As these are still early days of PGS implementation, and the new IGA only takes effect in July 2022, progress this year—detailed in Table 1 below—reflects work towards short-term goals under these priority areas. The NGSC is still considering options for medium and longer-term initiatives; such initiatives will be planned and developed in consultation with industry, academia, Indigenous organizations and professional associations.



Table 1. Progress on priority areas

Priority Area	Short-term goal	Actions in 2021-22 and next steps
<p>1. Advancing framework geoscience</p>	<p><u>Goal 1.a.</u> Determine where the most pressing gaps in the geoscience framework are, for each major geological region of Canada.</p>	<p><i>Actions in 2021-22:</i></p> <p><u>Action 1.a.i: Gather a group who can lead this effort - COMPLETE</u> A Director-level committee was established, with representation from the federal, British Columbia, and Manitoba GSOs.</p> <p><u>Action 1.a.ii Develop a model to identify regional and national framework geoscience gaps - COMPLETE</u> The Director-level committee developed a high-level plan to hold a series of facilitated regional workshops where managers and scientists from local GSOs can meet and discuss the needs expressed by their stakeholders.</p> <p>Each group of regional managers and scientists will establish regionally specific, ranked priorities for framework geoscience (e.g. high-resolution mapping, collection of geophysical data). The intended outcome is that within a geological region, jurisdictions can use the priorities to co-develop, co-deliver, and co-fund joint projects.</p> <p>Regions for the workshops will be based on geology (e.g. Cordillera, Western Canada Sedimentary Basin), and thus will include at least two provinces or territories. Representatives from all provinces or territories in that region will be included in the workshops.</p> <hr/> <p><i>Next steps:</i></p> <p><u>Action 1.a.iii: Implement the model to identify regional and national framework geoscience gaps - PENDING</u> The committee will hold one national and six regional workshops across Canada.</p> <p><u>Action 1.a.iv: Report on findings – PENDING</u> The committee will develop a set of reports that identify key priorities within each geological region in the context of critical minerals or substantial economic development, consistent with the PGS mission statements. Each report will represent a chapter and be compiled into a short volume that will be delivered to NGSC.</p> <p>The committee will also develop a national synthesis of regional needs, to identify additional opportunities for collaborative work.</p>



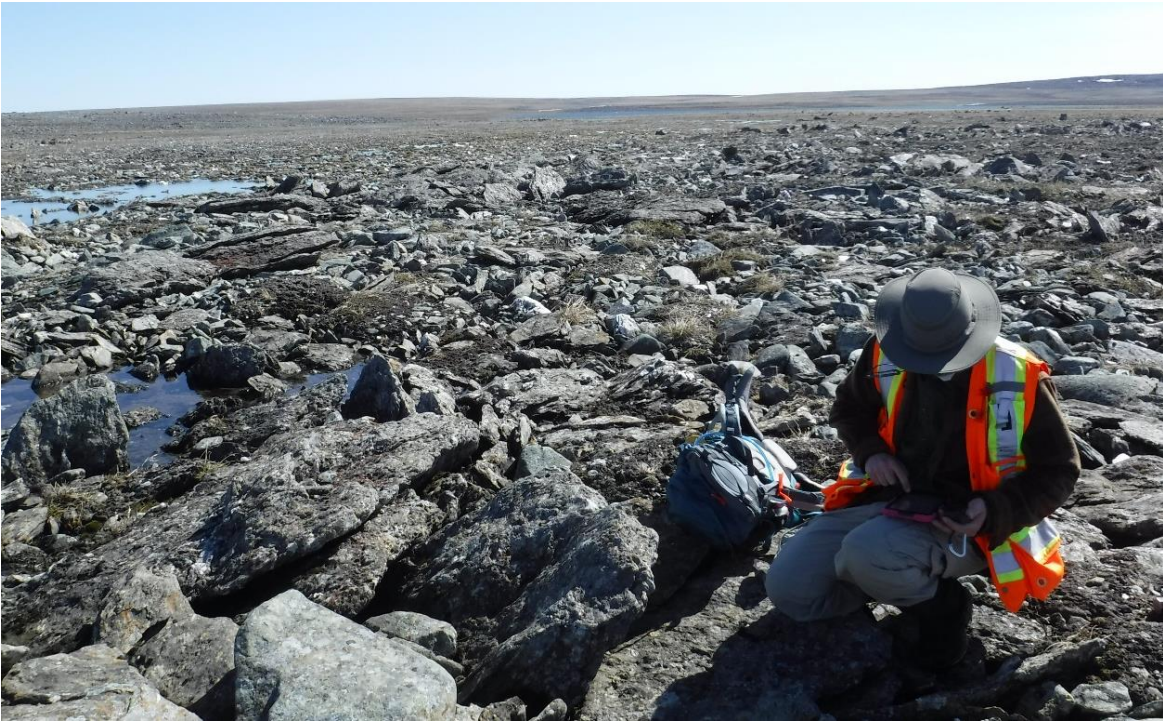
Priority Area	Short-term goal	Actions in 2021-22 and next steps
2. Advancing mineral and energy potential modelling	Goal 2.a. Develop a compilation of modelling best practices by examining domestic and international work.	<p><i>Actions in 2021-22:</i></p> <p><u>Action 2.a.i. Gather experts to conduct this work - COMPLETE</u> An expert working group was established to advance this priority area, with representation from the federal, Newfoundland, and Yukon GSOs. The group includes expertise in both mineral and energy potential modelling.</p>
		<p><i>Next steps:</i></p> <p><u>Action 2.a.ii. Compile best practices – PENDING</u> The group will first complete an environmental scan of mineral and energy potential modelling practices in Canada, and will then examine international practices. The group plans to evaluate which of these practices are “best practices” in Canadian contexts and develop a summary report.</p> <p>This work will set the stage for identifying other tangible outputs, such as a manual on mineral and energy potential modelling for geoscientists.</p>
3. Facilitating access to online data	Goal 3.a. Coordinate the development of common data standards for GSOs.	<p><i>Actions in 2021-22:</i></p> <p><u>Action 3.a.i. Plan how to approach this work - COMPLETE</u> The NGSC’s Information and Data Management (IDM) Working Group (established in 2019, with representation from all Canadian GSOs) has agreed to take this on. They will begin with an environmental scan (see 3.a.ii).</p>
		<p><i>Next steps:</i></p> <p><u>Action 3.a.ii. Conduct an environmental scan - PENDING</u> The IDM Working Group plans to conduct an environmental scan of international data standards relevant to geoscience, and work with the NGSC to determine how these can best be used in the Canadian context.</p>
	Goal 3.b. Build data-source transformations between jurisdiction-managed data assets.	<p><i>Actions in 2021-22:</i></p> <p><u>Action 3.b.i. Plan an appropriate pilot project - COMPLETE</u> Building on an analysis conducted in 2020-21 that examined to what extent data from different jurisdictions are ready for integration, the IDM Working Group plans to begin a pilot project on data integration. The pilot project will focus on mineral occurrence data from 6-8 Canadian provinces and territories.</p>
		<p><i>Next steps:</i></p> <p><u>Action 3.b.ii. Conduct the pilot project – PENDING</u> The pilot project is targeted to begin in September 2022.</p>



Priority Area	Short-term goal	Actions in 2021-22 and next steps
	Goal 3.c. Across jurisdictions, increase consistency of digital data requirements for companies submitting mineral exploration assessment work to government.	<p><i>Actions in 2021-22:</i></p> <p><u>Action 3.c.i. Plan how to approach this work – IN PROGRESS</u> The IDM working group has agreed to lead this work. Planning is in the early stages, but it will include engagement with stakeholders, as well as with the authorities responsible for submissions of mineral exploration assessment work in each jurisdiction. These authorities are sometimes, but not always, GSOs.</p> <p><i>Next steps:</i></p> <p><u>Action 3.c.ii. Begin engaging stakeholders. - PENDING</u> As the first step in their engagement campaign, representatives from the IDM working group will meet with the Prospectors and Developers Association of Canada (PDAC) to develop a forward strategy.</p>
4. Supporting the training of next generation geoscientists	Goal 4.a. Identify geoscience hiring needs and training best practices in Canada.	<p><i>Actions in 2021-22:</i></p> <p><u>Action 4.a.i: Gather a group who can lead this effort - COMPLETE</u> A working group was established to advance this priority area, with representation from the federal, Northwest Territories, and New Brunswick GSOs.</p> <p><u>Action 4.a.ii. Work with GSOs across Canada to identify hiring needs and current training practices. – IN PROGRESS</u> The group is currently identifying subject matter experts in GSOs with whom to correspond, and has developed survey questions to ask them.</p> <p><i>Next steps:</i></p> <p><u>Action 4.b.i. Survey GSOs about the efficacy of their current hiring and training practices – PENDING</u> The working group will survey GSO representatives to identify expertise gaps in different jurisdictions, as well as best practices for hiring and training. This survey may later be expanded to include other geoscience organizations (e.g., university departments, exploration and mining companies, consulting firms).</p> <p><u>Action 4.b.ii. Report on findings - PENDING</u> The working group will compile survey results and develop a best practices document that will be reviewed by the GSO representatives and then distributed to the NGSC.</p>



Priority Area	Short-term goal	Actions in 2021-22 and next steps
5. Enhancing public literacy in geoscience	Goal 5.a. Determine specifically what geoscience outreach activities are taking place across Canada, and	<i>Actions in 2021-22:</i>
		<u>Action 5.a.i: Gather a group who can lead this effort - COMPLETE</u> A working group was established to advance this priority area, with representation from the federal, Quebec, Nunavut, and Yukon GSOs.
		<u>Action 5.a.ii: Conduct an environmental scan – IN PROGRESS</u> The group has begun to compile a list of all geoscience outreach activities taking place across GSOs in Canada.
		<i>Next steps:</i>
		<u>Action 5.a.iii: Complete the environmental scan – PENDING</u> The environmental scan for all jurisdictions should be completed by Fall 2022.
		<u>Action 5.a.iv: Report on findings - PENDING</u> Outreach activities from the environmental scan will be classified by type (e.g. publications, in-person activities) and target audience. A list of activities with potential for deployment across Canada will be developed and shared with the NGSC.



Credit: Gouvernement du Québec, Ministère de l'Énergie et des Ressources naturelles



Applying pre-defined principles to PGS implementation

In the PGS, the NGSC committed to several guiding principles for implementation of the strategy:

- Responsiveness to stakeholders and Indigenous Peoples
- Respect for jurisdictional roles and responsibilities
- Balance between aspirational goals and practical considerations
- Inclusivity
- Intersectional opportunities

The NGSC has consciously applied these principles to its work so far and will continue to do so in the future. NGSC is also working to mitigate associated risks. Details are in Table 2.

Table 2. Applying pre-defined principles to PGS implementation

Principle	Application during PGS activities to date	Risks	Mitigation
Responsiveness to stakeholders and Indigenous Peoples	PGS priority areas were developed in consultation with stakeholders and Indigenous Peoples.	Real or perceived insufficient involvement: Some stakeholders and Indigenous Peoples may feel insufficiently involved during PGS development, and may be upset that they are not being invited to participate in priority area working groups/project planning.	Communication: Most priority area working groups are still at the stage of conducting environmental scans within governments, rather than actively planning future projects. The NGSC is making sure that stakeholders know this through communication with interested parties: specifically, through a mailing list (sign-up is on the NGSC website), and through presentations at major conferences such as AME Roundup (used for PGS launch in 2022), PDAC Convention, and GACMAC. Involvement where possible: The IDM working group (Priority Area 3) plans to consult with stakeholders regarding digital data submission standards. This will particularly involve PDAC, as one of the groups who had expressed interest. As implementation of the other priority areas progresses, the NGSC will explore opportunities to involve stakeholders and Indigenous Peoples there as well.



Principle	Application during PGS activities to date	Risks	Mitigation
Respect for jurisdictional roles and responsibilities	Jurisdictions may choose to participate, in PGS-related activities or not. Provincial and territorial GSOs (rather than the federal government) are encouraged to take leadership roles wherever possible, and each Priority Area working group has a good regional balance of members.	Uneven capacity across jurisdictions: Some GSOs have more capacity and resources than others. It can be harder for smaller GSOs to participate in PGS implementation.	Working-level support from jurisdictions with more capacity: The Geological Survey of Canada staffs a Secretariat to provide policy, communications, and administrative support to the NGSC. As needed, GSOs with more capacity also provide working-level support to PGS priority area working groups. Collectively, this allows jurisdictions to take on leadership roles in PGS implementation even if their own GSO does not have enough capacity to support the work.
Balance between aspirational goals and practical considerations	When writing the PGS and when advertising it to stakeholders, the NGSC described the long-term aspirational goals associated with each priority area, coupled with early actions that represent low-hanging fruit and realize some progress without new funding.	Real or perceived insufficient impact: Although collaboration under the PGS will doubtless have positive impacts, there is a risk that the PGS might not be as impactful as stakeholders or governments would like, because as of April 2022: <ul style="list-style-type: none"> • The PGS is unfunded • GSOs have competing priorities • GSOs are lacking capacity to dedicate full-time to PGS advancement This means that progress will sometimes be slow and that certain nation-wide projects desired by stakeholders (e.g. providing magnetotelluric data across the country) may not be possible.	Setting achievable goals: The NGSC is focusing efforts towards low-hanging fruit so that there will be visible progress. Managing expectations: The NGSC is using careful wording in presentations and discussions. Creatively seeking resources: The NGSC is advancing priority areas through a combination of the following: <ul style="list-style-type: none"> • Funding contractors through existing geoscience programs whose goals align with the priority areas of the PGS • In-kind contributions of partial staff time by GSOs The NGSC is also willing to consider, in the future, seeking new funding from departments if warranted by the early environmental scans and geoscience user input.



Principle	Application during PGS activities to date	Risks	Mitigation
<p>Inclusivity</p>	<p>The NGSC has a gender balance that is close to parity.</p> <p>The NGSC is aware that greater inclusivity will be important when conducting environmental scans and planning projects.</p>	<p>Missing certain viewpoints in activity planning or implementation: The majority of professionals in the natural resources sector—including the majority of GSO scientists—in Canada are white, cis-gendered, heterosexual, non-disabled men who live in regions with moderate to high amounts of infrastructure. If NGSC does not make a special effort to speak to people from other demographics, the group may miss important viewpoints and thus important information. For example:</p> <ul style="list-style-type: none"> • Indigenous Peoples may have a unique perspective on what kind of geoscience (priority area 1) or prospectivity modelling is most needed in their traditional territories (priority area 2) • People who live in remote regions with low infrastructure, or people who have disabilities, may have unique difficulties in accessing online data (priority area 3), training opportunities (priority area 4), or learning opportunities (priority area 5) • People who have been historically excluded from natural resource sciences, and/or who have worse socioeconomic conditions, may face additional barriers when applying for geoscience training (priority area 4). 	<p>Applying an inclusivity lens to planning: The NGSC is exploring options to enhance inclusivity in PGS implementation. Early efforts include:</p> <ul style="list-style-type: none"> • Identifying EDI criteria to include when establishing training best practices for next-generation geoscientists (priority area 4) • Including ‘awareness of priorities of Indigenous Peoples in the region’ as a criterion for nominees to participate in framework geoscience workshops (priority area 1)



Principle	Application during PGS activities to date	Risks	Mitigation
Intersectional opportunities	The NGSC recognizes that all of the priority areas are inter-related, and thus holds regular meetings with representatives from all five priority area working groups.	Siloed working groups: Members of each working group may not always know what the other groups are doing, which would make it difficult to identify opportunities that intersect more than one priority area.	Formalizing information-sharing: The NGSC established a PGS Steering Committee, which brings together the leaders for each priority area. The leaders share updates with each other, and bring important information back to their groups.



Credit: M.A. Rutka



The Way Forward

Through launching and implementing the PGS and renewing the IGA, the NGSC is working to enhance intergovernmental collaboration, coordination, and communication—thus strengthening Canada’s geoscience ecosystem and benefiting Canadians. This year, work primarily involved discussions between the 13 GSOs, with the NGSC keeping other geoscience users informed about progress through conference presentations, updates to the new NGSC website, and email updates to the new NGSC mailing list. In addition to the next steps outlined in the tables above, the NGSC aims to further engage geoscience users when moving beyond environmental scans and into planning and delivery of specific projects.



Credit: Serge Allard



Annex: Acronyms

EDI: Equity, diversity and inclusion

GSO: Geological Survey Organization

IDM: Information and Data Management Working Group

IGA: Intergovernmental Geoscience Accord

NGSC: National Geological Surveys Committee

PGS: Pan-Canadian Geoscience Strategy