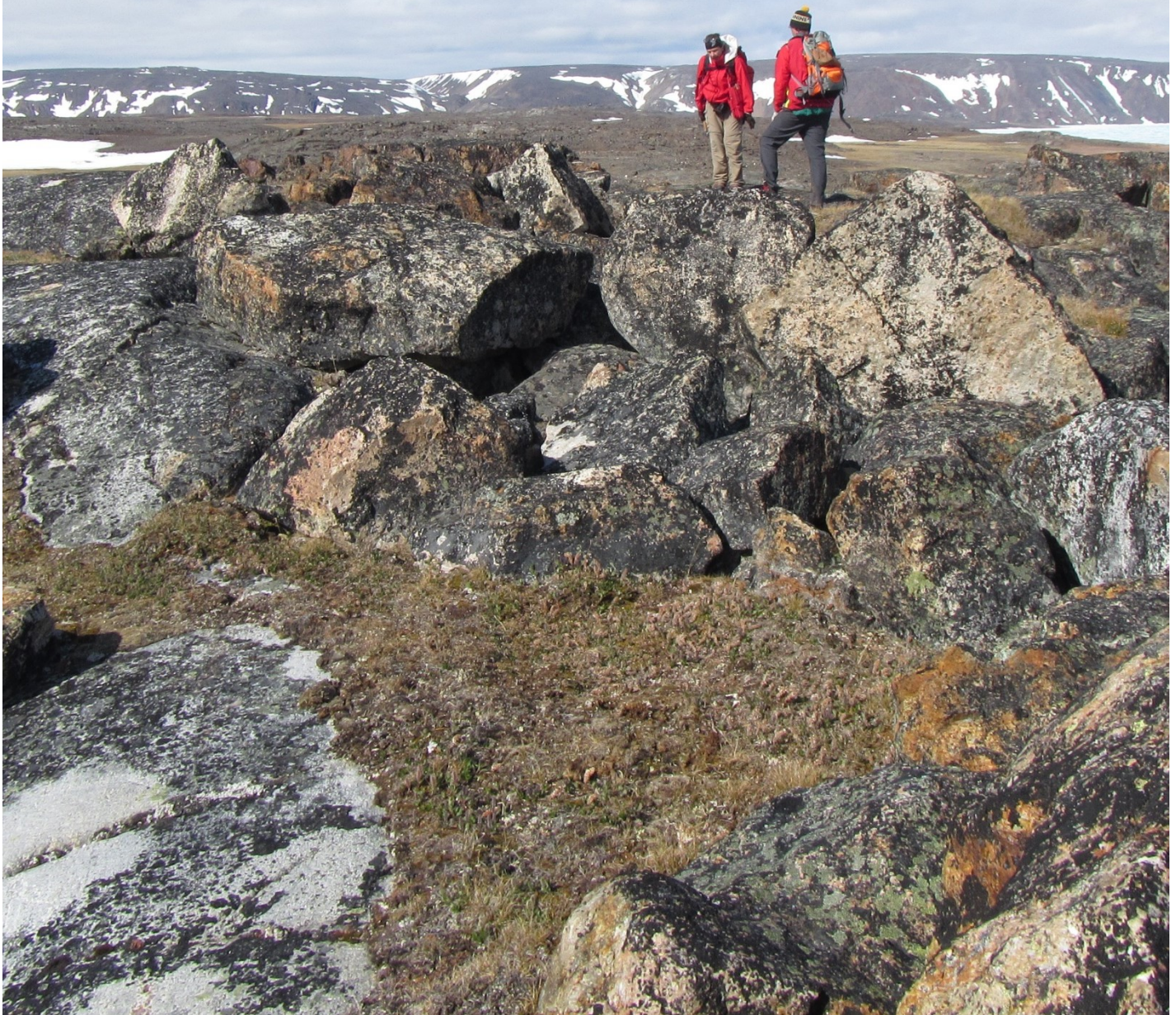




# NGSC Progress Report 2023

**Harnessing the power of Canadian geoscience  
collaboration for a stronger future**



Prepared by the National Geological Surveys Committee Secretariat for  
the 2023 Energy and Mines Ministers Conference

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**Cover photo credit:** Natural Resources Canada



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## 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.

Supporting the responsible development of mineral and energy resources and serving the public good requires governmental geological survey organizations (GSOs) to minimize redundancy, enhance synergies, and optimize the use of human and fiscal resources. The National Geological Surveys Committee (NGSC), composed of senior executives from all 13 federal, provincial, and territorial GSOs across Canada, plays a central role in promoting this geoscience collaboration and coordination, as outlined in the [Intergovernmental Geoscience Accord](#) (IGA).

Between the completion of the [previous report to Mines Ministers](#) at the end of April 2022, and the end of June 2023, the NGSC has advanced intergovernmental coordination and collaboration as follows:

- At the Energy and Mines Ministers Conference (EMMC) in July 2022, the updated IGA developed by the NGSC was approved by Mines Ministers. The Accord outlines roles, responsibilities, and collaboration mechanisms for GSOs in Canada, and the updated Accord further commits the NGSC to work together on the priority areas that are outlined in the [Pan-Canadian Geoscience Strategy](#) (PGS), and, where possible, to coordinate where possible Indigenous engagement.
- Over the course of 2022-2023, the NGSC further advanced the priority areas outlined in the PGS and IGA. In particular, the NGSC:
  - Held six regional geoscience workshops among the NGSC community to collaboratively identify regional and Canada-wide **framework geoscience** gaps and priorities for future regional and national work.

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- Launched a pilot project aimed at **connecting data** across GSOs, making the data available online to various applications (e.g., GIS) and web portals. The pilot project focuses on mineral occurrence data across a subset of GSOs.
  - Developed and circulated among Canadian GSOs a survey related to **best practices for hiring and training staff**. Preliminary findings indicate that GSOs should focus on increasing awareness, communication, and competitive compensation/benefits for geoscience opportunities. This could be achieved through collaborations with professional associations or other organizations.
  - In June 2023, the [Critical Minerals Geoscience and Data](#) (CMGD) initiative, led by the Geological Survey of Canada, launched a call for project proposals that will be supported through contribution funding for the provincial and territorial GSOs. Total available federal contribution funding is \$10 million over four years, intended to be leveraged with in-kind or cash funding from participating Canadian GSOs. It is intended to support critical minerals science, and develop capacity-building opportunities, data sharing, and digital evolution of critical minerals geoscience research in Canada, in alignment with the IGA and PGS.

In February 2022, the NGSC released its first newsletter to a mailing list of stakeholders, including the private sector and academia. More newsletters will be shared as additional progress is made.

#### Note

The Introduction to this report, which provides context for the NGSC's work, is very similar to the Introduction from the 2022 report. This is because the context in which the NGSC operates has not changed materially over the past year.

There are, however, some updates worth noting. In particular:

- More governments in Canada have released critical minerals strategies, which further highlight the need for public geoscience in Canada.
- Canada is still ranked among the top most attractive regions in the world for mining investment according to the Fraser Institute 2022 Mining Survey, which is based on policy environment and mineral potential. Rankings for Canadian regions have improved relative to the 2021 survey.
- Geological survey organizations continue to further build relationships with Indigenous Peoples.

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Credit: Natural Resources Canada

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## 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 & 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

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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 2022 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, **four Canadian provinces and territories** were in the top 10 and **another four** were in the top 20 – an increase from last year’s rankings.

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 key contributing factor.

When considering quality of the geological database independently of other factors, nine 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.

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## 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.

### 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.

Positive change is underway to continue improving how Indigenous Peoples and their knowledge are recognized and included in the Canadian geoscience ecosystem. Increasingly, Indigenous governments and organizations shape governmental program priorities (e.g., GEM-GeoNorth), co-develop projects with government scientists (e.g., annual permafrost monitoring workshops by the Northwest Territories Geological Survey and Inuvialuit Land Administration), and take leadership of geoscience research.

#### Examples of progress made in the last year include:

- The Geological Survey of Canada has formalized plans to expand its Indigenous Relations Network (an internal community of practice) into an Indigenous Relations Office. This Office will have increased resources and capacity, with one aim being to keep other GSOs better informed of engagements to coordinate efforts where possible.
- The Geological Survey of Newfoundland and Labrador is working with the province's Office of Indigenous Affairs and Reconciliation to consult with the Innu Nation and Nunatukavut Community Council regarding new engagement protocols.



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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.

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 interest. 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 region.

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.



Credit: Natural Resources Canada

First in-person NGSC meeting post-pandemic in March 2023. From left to right, starting with back row, which includes the screen: Geneviève Marquis (Geological Survey of Canada – GSC), Diane Webber (Nova Scotia), Linda Ham (Nunavut), Jean-Yves Labbé (Quebec), Dorothea Hanchar (Newfoundland and Labrador), Tafa Kennedy (Manitoba), Daniel Lebel (GSC), Andrew Beaton (Alberta), Réjean Couture (GSC), [front row] John Hechler (Ontario), Ryan Morelli (Saskatchewan), Carolyn Relf (Yukon), John Ketchum (Northwest Territories). Not shown: Christian Bohm (Manitoba), Kay Thorne (New Brunswick) and Adrian Hickin (British Columbia).

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## The evolving priorities and 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 governments in Canada ([Canada](#), [Quebec](#), [Ontario](#), [Alberta](#), [Saskatchewan](#)) have published critical minerals strategies over the course of the past two years, and others will be releasing them soon ([Northwest Territories](#), Newfoundland and Labrador). Aligned with this priority, GSOs are taking leadership by reorienting or expanding their mineral geoscience research to focus more on 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 are modelling geothermal potential, in different regions.

The organizational culture of GSOs is 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. From 2019 to 2022, 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

### Critical minerals geoscience by the numbers

Governments across Canada recognize the importance of geoscience to advance the competitiveness of critical minerals supply chains. For example:

- Under the Canadian Critical Minerals Strategy, the Geological Survey of Canada has been allocated **almost \$80 million** to advance the Critical Minerals Geoscience and Data (CMGD) initiative. The initiative will enhance the quality and availability of data and digital technologies to support geoscience and mapping that will accelerate the efficient and effective development of Canadian critical minerals value chains.
- Newfoundland and Labrador, recognizing the importance of a domestic supply of critical minerals to support the advancement of renewable green energy, is providing **\$7.2 million** for a Labrador-specific geoscience program to acquire, process, and make publicly available geoscience information, including fundamental bedrock mapping, mineral potential mapping, and prospectivity reports.
- This year, Quebec invested **\$3.3 million** in critical and strategic minerals. This funding facilitated geological, geophysical, and geochemical surveys, building on previous work and investments.

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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. Early efforts on this were reported in the [2022 NGSC Progress Report](#); this report provides further updates.



Credit: Northwest Territories Geological Survey

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## Translating shared priorities into action: NGSC progress in 2022-2023

Between the beginning of May 2022 and the end of June 2023, the NGSC continued to advance both the IGA and the PGS. Work included:

- Launching the renewed IGA
- Continuing to implement IGA and PGS priority areas (ongoing)
- Continuing to incorporate shared principles when planning and implementing actions (ongoing)

### **Reminder: NGSC progress in 2021-2022**

As described in the previous progress report, between September 2021 and the end of April 2022, the NGSC advanced several 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)
- Actively incorporating shared principles when planning and implementing actions (ongoing)



Credit: Natural Resources Canada

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## Launching the renewed 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.

Based on work by the NGSC in 2021-22, an updated version of the IGA was signed by Ministers and released at 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.

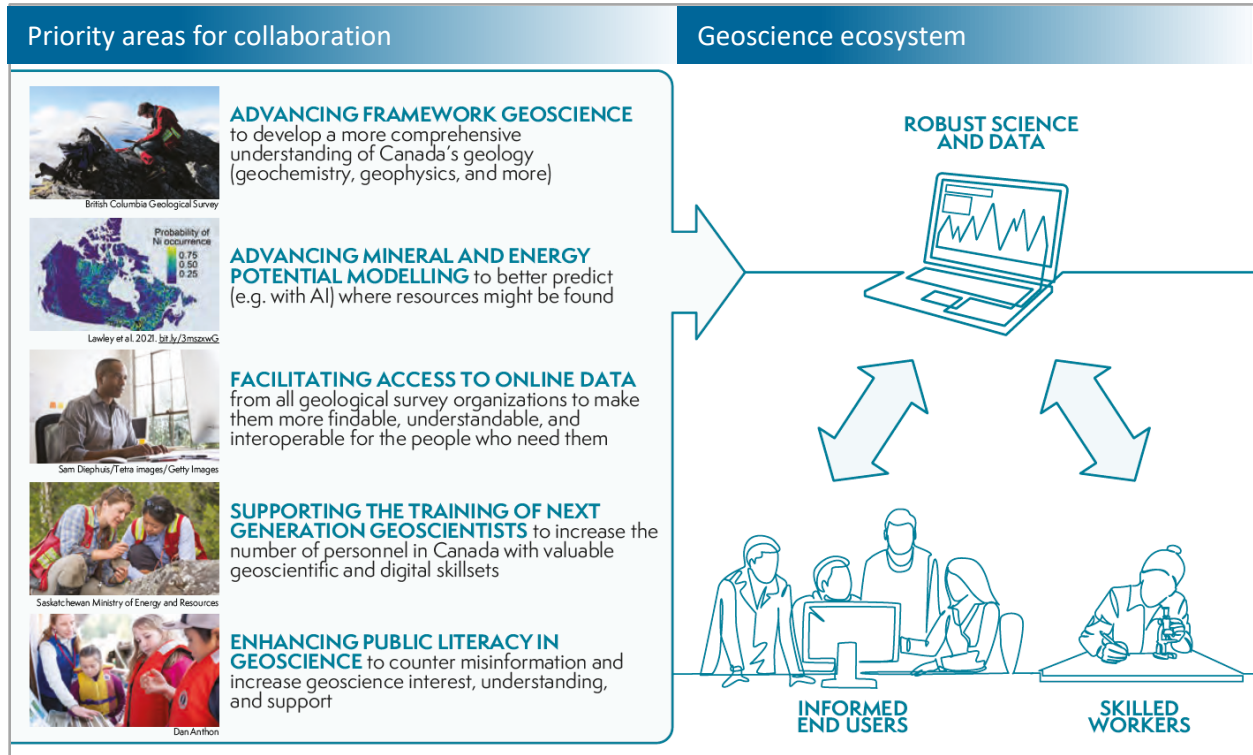
The next scheduled renewal of the IGA will be in 2027.



Credit: Northwest Territories Geological Survey

## Continuing to implement IGA and PGS priority areas

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.



The NGSC is in the process of determining medium and long initiatives under these priority areas. Short-term goals, actions, and immediate next steps are described in Table 1 below.

Table 1. Progress on priority areas

Priority Area	Short-term goal	Actions so far and next steps
<b>I. Advancing framework geoscience</b>	Goal 1.a. Determine where the most pressing gaps in the geoscience framework are, for each major geological region of Canada	<p><i>Actions in 2021-2022:</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 could meet and discuss the needs expressed by their staff and stakeholders.</p> <p><i>Actions in 2022-2023:</i></p> <p><u>Action 1.a.iii: Implement the model to identify regional and national framework geoscience gaps — COMPLETE</u> The committee held six regional workshops across Canada, from January to April of 2023. Regions for the workshops were based on geology (e.g. Cordillera, Western Canada Sedimentary Basin), and thus included at least two provinces or territories. Participants in each regional workshop included at least one manager and one scientist from each province or territory in the geological region.</p> <p>Each group of regional managers and scientists established regionally specific, ranked priorities for framework geoscience (e.g. high-resolution mapping, collection of geophysical data).</p> <p><u>Action 1.a.iv: Report on findings — COMPLETE</u> The committee developed a series of reports that identify key priorities within each geological region in the context of critical minerals or substantial economic development, as well as a national synthesis report. Each report represents a chapter that will be compiled into a short volume and delivered to NGSC.</p> <p>The intended outcome is that within a geological region, GSOs can use the priorities to co-develop, co-deliver, and co-fund joint projects.</p>
	Goal 1.b. Address identified gaps in geoscience framework	<p><i>Next steps:</i></p> <p><u>Action 1.b.i.: Consider implementation of recommendations made in report on findings — PENDING</u> Determine strategies to address regional and national framework geoscience gaps identified in the report on findings, including examining and evaluating available resourcing options.</p>

Priority Area	Short-term goal	Actions so far and next steps
<b>2. Advancing mineral and energy potential modelling</b>	Goal 2.a. Develop a compilation of modelling best practices by examining domestic and international work	<i>Actions in 2021-2022:</i>
		<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 included expertise in both mineral and energy potential modelling.
		<i>Actions in 2022-2023:</i>
		<u>Action 2.a.i. (Restarted) Gather experts to conduct this work — COMPLETE</u> The working group experienced significant staff turnover and underwent a restructuring process in 2023. A new expert working group has now been established to advance this priority area, with representation from Newfoundland and Labrador, British Columbia and Yukon’s GSOs.
		<i>Next steps:</i>
		<u>Action 2.a.ii. Compile best practices — PENDING</u> The newly re-established working group is preparing to conduct an environmental scan of mineral and energy potential modelling practices in Canada. A set of “best practices” in Canadian contexts will be determined and made available to NGSC members via a web portal that can be easily updated. A similar scan of international practices will be conducted at a later time.  This work will set the stage for identifying other tangible outputs, such as a manual on mineral and energy potential modelling for geoscientists to maximize practical applications of these technologies.  <u>Action 2.a.iii: Explore options to leverage funding from critical minerals geoscience programs — IN PROGRESS</u> A recent call for proposals by the CMGD initiative offers the working group an opportunity to apply for contributions funding. The working group will investigate this and other resourcing options.
<b>3. Facilitating access to online data</b>	Goal 3.a. Coordinate the development of common data standards for GSOs	<i>Actions in 2021-2022:</i>
		<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 lead this work and planned an approach, including an environmental scan of existing international data standards.
		<i>Actions in 2022-2023:</i>
		<u>Action 3.a.ii. Conduct an environmental scan — ON HOLD</u> Due to capacity limitations, the working group decided to selectively prioritize its goals this year, with Goal 3.b. (below) taking precedence. Goal 3.a. is on hold until further notice.



Priority Area	Short-term goal	Actions so far and next steps
		<p><i>Next steps:</i></p> <p><u>ON HOLD</u> As noted above, work related to Goal 3.a. is presently on hold. No next steps have yet been planned for this goal.</p>
	<p>Goal 3.b. Plan and develop pilot project to integrate jurisdiction-managed data assets into a unified data network</p> <p>(Titled in previous year's progress report as "Build data-source transformations between jurisdiction-managed data assets")</p>	<p><i>Actions in 2021-2022:</i></p> <p><u>Action 3.b.i. Plan an appropriate pilot project — COMPLETE</u> Building on an analysis conducted in 2020-2021 that examined to what extent data from different jurisdictions are ready for online integration by international standards, the IDM Working Group planned a pilot project. The pilot project was to focus on mineral occurrence data from a subset of Canadian provinces, territories and Natural Resources Canada.</p> <p><i>Actions in 2022-2023:</i></p> <p><u>Action 3.b.ii. Develop a technical strategy for the pilot project — IN PROGRESS</u> A technical expert was contracted to advance the pilot project, in consultation with GSO experts. The contractor started work in March 2023 and as of June 2023, has produced a draft report and demonstration prototype for connecting distributed datasets into a unified data network using international standards adapted to Canadian needs.</p> <p><i>Next steps:</i></p> <p><u>Action 3.b.iii. Implement the technical strategy for the pilot project — IN PROGRESS</u> A subset of the Canadian provinces, territories, and Natural Resources Canada will adapt the findings of the contractor to their mineral occurrence data sources, making them available online in standard ways to enable their integration. The result will be a prototype data network satisfying three critical usage scenarios. This result will be evaluated for possible expansion to remaining stakeholders and progress towards an operational longer-term Canadian geoscience data network.</p>
	<p>Goal 3.c. Across jurisdictions, increase consistency of digital data requirements for companies submitting mineral exploration assessment work to government</p>	<p><i>Actions in 2021-2022:</i></p> <p><u>Action 3.c.i. Plan how to approach this work — IN PROGRESS</u> The IDM working group leads this work. Planning began in 2021-2022, and has continued into 2022-2023 (see below).</p>

Priority Area	Short-term goal	Actions so far and next steps
		<p><i>Actions in 2022-2023:</i></p> <p><u>Action 3.c.i. (continued) Plan how to approach this work — IN PROGRESS</u>            Planning for this work is ongoing, as the IDM working group has prioritized efforts related to Goal 3.b. (above) this year. Thus far, it has been decided that the process will include engagement with stakeholders, as well as with the authorities responsible for submissions of mineral exploration assessment work in each jurisdiction. The group will also perform a cross-jurisdictional review of mineral exploration assessment guidelines.</p> <p><u>Action 3.c.ii. Engage appropriate stakeholders. — IN PROGRESS</u>            Representatives from the IDM working group met with the Prospectors &amp; Developers Association of Canada (PDAC) to understand previous analyses by PDAC of data submission standards, and to set the stage for future collaboration.</p> <p><u>Action 3.c.iii. Develop a sub-working group to advance this specific goal — COMPLETE</u>            An expert working group was established to advance this goal, including representatives from British Columbia, New Brunswick, Newfoundland and Labrador, Northwest Territories, Ontario, Saskatchewan.</p> <p><i>Next steps:</i></p> <p><u>Action 3.c.iv: Complete review of existing digital submission standards for mineral exploration assessment work — PENDING</u>            Over the past year, the IDM working group has prioritized efforts related to Goal 3.b. (above), but progress on Goal 3.c. has continued steadily in the background. This pattern will continue over the next year as the sub-group reviews current data submission standards.</p>
<p><b>4. Supporting the training of next generation geoscientists</b></p>	<p>Goal 4.a. Identify geoscience hiring needs and training best practices in Canada</p>	<p><i>Actions in 2021-2022:</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 identified subject matter experts in GSOs with whom to correspond, and developed survey questions to ask them. The survey was circulated for input in 2022-2023 (see below).</p>

Priority Area	Short-term goal	Actions so far and next steps
		<p><i>Actions in 2022-2023:</i></p> <p><u>Action 4.a.ii. (continued): Work with GSOs across Canada to identify hiring needs and current training practices — IN PROGRESS</u> Continuing the work that they started in 2021-2022, the working group surveyed approximately half of all GSO representatives to identify expertise gaps in different jurisdictions, as well as best practices for hiring and training. The survey yielded detailed and nuanced responses, and revealed common themes among GSOs, such as the importance of providing fieldwork opportunities for students, and of balancing efforts between employee attraction and employee retention. Regarding attraction of new employees, particularly students, preliminary findings indicate that GSOs should focus on increasing awareness, communication, and competitive compensation/benefits for geoscience positions. This could be achieved through collaborations with professional associations or other organizations.</p> <p><i>Next steps:</i></p> <p><u>Action 4.a.ii. (continued): Work with GSOs across Canada to identify hiring needs and current training practices — IN PROGRESS</u> Using the survey from 2022-2023 as a starting point, develop a second iteration of the survey that will collect additional information (particularly related to supporting inclusion, diversity, equity, and accessibility), and seek responses from all Canadian GSOs. The survey may also be circulated to other geoscience organizations (e.g., university departments, private companies) — to be determined.</p> <p><u>Action 4.a.iii. 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>
	Goal 4.b. Make it easier for potential applicants to find opportunities with GSOs	<p><i>Next steps:</i></p> <p><u>Action 4.b.i. Develop an online national repository of geoscience training opportunities — PENDING</u> The working group will explore options and requirements to create an online tool to connect next-generation geoscientists with potential work or training opportunities in GSOs across Canada.</p>
<b>5. Enhancing public literacy in geoscience</b>	Goal 5.a. Determine specifically what geoscience outreach activities are taking place across Canada	<p><i>Actions in 2021-2022:</i></p> <p><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.</p> <p><u>Action 5.a.ii: Conduct an environmental scan — (COMPLETE as of 2023; see below)</u> The group began to compile a list of all geoscience outreach activities taking place across GSOs in Canada.</p>

Priority Area	Short-term goal	Actions so far and next steps
		<p><i>Actions in 2022-2023:</i></p> <p><u>Action 5.a.ii (continued): Conduct an environmental scan — COMPLETE</u> The environmental scan for all jurisdictions was completed in fall 2022, with outreach activities classified by type (e.g., publications, in-person activities) and target audience. This list is evergreen and thus may be added to in the future.</p> <p><i>Next steps:</i></p> <p><u>Action 5.a.iv: Report on findings — PENDING</u> Using the items in the environmental scan as a starting point, a shortlist of priority activities with potential for deployment across Canada will be developed and shared with the NGSC.</p>
	Goal 5.b. Promote International Geodiversity Day	<p><i>Actions in 2022-2023:</i></p> <p><u>Action 5.b.i. Develop promotional communications plan for annual International Geodiversity Day celebrations — IN PROGRESS</u> Proclaimed by UNESCO at the 41<sup>st</sup> General Conference in 2021, <a href="#">International Geodiversity Day</a> marks a worldwide celebration to promote the many aspects of geodiversity. The working group has begun to develop materials in preparation for the next celebration in October 2023 (see below).</p> <p><i>Next steps:</i></p> <p><u>Action 5.b.ii: Develop promotional communications plan for annual International Geodiversity Day celebrations — IN PROGRESS</u> Over the coming year, the outreach working group plans to capitalize on this event to bring more attention to geoscience in Canada. Leading up to October 6, 2023, the group will develop a pan-Canadian communications plan to ensure a coordinated message, visuals and strategy for celebration activities across the country. The material will align with this year's theme, "Geodiversity for Everyone," and will include stakeholders and Indigenous peoples.</p>



Credit: Natural Resources Canada

## 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
<b>Responsiveness to stakeholders and Indigenous Peoples</b>	PGS priority areas were developed in consultation with stakeholders and Indigenous Peoples.	<b>Real or perceived insufficient involvement:</b> 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.	<b>Communication:</b> Some priority area working groups are still at the stage of conducting environmental scans within governments, whereas others are 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 <a href="#">NGSC website</a> ), and through presentations at major conferences such as the Association for Mineral Exploration (AME) Roundup (used for PGS launch in 2022) and PDAC Convention.  <b>Involvement where possible:</b> 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. The NGSC is exploring and identifying opportunities to involve stakeholders and share products with stakeholders and Indigenous Peoples.

Principle	Application during PGS activities to date	Risks	Mitigation
<b>Respect for jurisdictional roles and responsibilities</b>	<p>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.</p>	<p><b>Uneven capacity across jurisdictions:</b> Some GSOs have more capacity and resources than others. It can be harder for smaller GSOs to participate in PGS implementation.</p>	<p><b>Working-level support from jurisdictions with more capacity:</b> 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.</p>
<b>Balance between aspirational goals and practical considerations</b>	<p>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.</p>	<p><b>Real or perceived insufficient impact:</b> 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:</p> <ul style="list-style-type: none"> <li>• The PGS is unfunded</li> <li>• GSOs have competing priorities</li> <li>• GSOs are lacking capacity to dedicate full-time to PGS advancement</li> </ul> <p>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.</p>	<p><b>Setting achievable goals:</b> The NGSC is focusing efforts towards low-hanging fruit so that there will be visible progress.</p> <p><b>Managing expectations:</b> The NGSC is using careful wording in presentations and discussions.</p> <p><b>Leveraging existing resources:</b> The NGSC is advancing priority areas through a combination of the following:</p> <ul style="list-style-type: none"> <li>• Funding contractors through existing geoscience programs whose goals align with the priority areas of the PGS</li> <li>• In-kind contributions of partial staff time by GSOs</li> </ul> <p>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.</p>

Principle	Application during PGS activities to date	Risks	Mitigation
<p><b>Inclusivity</b></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><b>Missing certain viewpoints in activity planning or implementation:</b> 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"> <li>• Indigenous Peoples may have a unique perspective on what kind of geoscience (<b>priority area 1</b>) or prospectivity modelling is most needed in their traditional territories (<b>priority area 2</b>)</li> <li>• People who live in remote regions with low infrastructure, or people who have disabilities, may have unique difficulties in accessing online data (<b>priority area 3</b>), training opportunities (<b>priority area 4</b>), or learning opportunities (<b>priority area 5</b>)</li> <li>• 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 (<b>priority area 4</b>).</li> </ul>	<p><b>Applying an inclusivity lens to planning:</b> The NGSC is exploring options to enhance inclusivity in PGS implementation. Efforts include:</p> <ul style="list-style-type: none"> <li>• Expanding the second iteration of the survey to include information on hiring and training practices aimed at advancing inclusion, diversity, equity, and accessibility (<b>priority area 4</b>).</li> </ul>

Principle	Application during PGS activities to date	Risks	Mitigation
<b>Intersectional opportunities</b>	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.	<b>Siloed working groups:</b> 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.	<b>Formalizing information-sharing:</b> The NGSC continues to provide a forum for leaders to share updates with each other and bring important information back to the working groups that advance PGS and IGA priority areas.



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



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## The way forward

Through PGS and IGA implementation, the NGSC is working to enhance intergovernmental collaboration, coordination, and communication—thus strengthening Canada’s geoscience ecosystem and benefiting Canadians. Over 2023-2024, the NGSC will continue to advance existing projects such as developing best practices for hiring and training geoscientists, will initiate new projects such as promoting Canadian geoscience through International Geodiversity Day, and will strategically plan how best to advance ambitious projects that may have higher resource requirements.



Credit: Northwest Territories Geological Survey

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## Annex: Acronyms

**GSO:** Geological Survey Organization

**IDM:** Information and Data Management Working Group

**IGA:** Intergovernmental Geoscience Accord

**NGSC:** National Geological Surveys Committee

**PDAC:** Prospectors & Developers Association of Canada

**PGS:** Pan-Canadian Geoscience Strategy