



NATURAL RESOURCES CANADA - INVENTIVE BY NATURE  
RESSOURCES NATURELLES CANADA - DE NATURE INVENTIVE

# Geological Survey of Canada 2015 Update

Presentation to  
Committee of Chairs of Canadian Earth Science Departments

October 16, 2015



Natural Resources  
Canada

Ressources naturelles  
Canada

Canada

# Overview

## Context

- Geological Survey of Canada Strategic Plan 2013-2018

## On going

- GSC collaboration with academia

## 2015 Updates

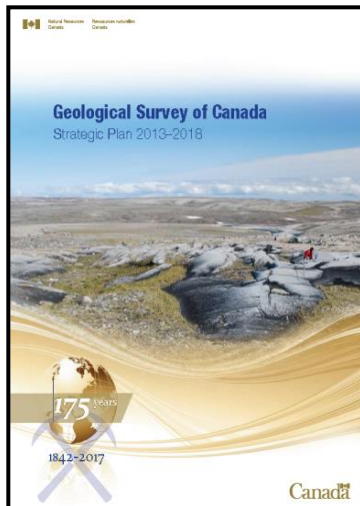
- Targeted Geoscience Initiative
- Geo-mapping for Energy and Minerals
- NRCan Postdoctoral Fellowship Pilot

# GSC's Mission and Vision



## **Mission** – *Why the GSC Exists*

***The Geological Survey of Canada provides geoscience knowledge to inform decision-making for internationally competitive mineral and energy sectors, for effective environmental stewardship and wise land use, and for the safety and security of Canadians.***



## **Vision** – *The difference GSC intends to make*

***Our vision is to sustain and extend Canadian prosperity and well-being through internationally authoritative and accessible public geoscience, anchored in a continuously improved understanding of earth dynamics and natural resources.***

# GSC Priorities (2013-2018)

## What the GSC will do.....

**Priority 1.** Unlock Canada's resource potential through geoscience

**Priority 2.** Environmental geoscience for responsible resource development

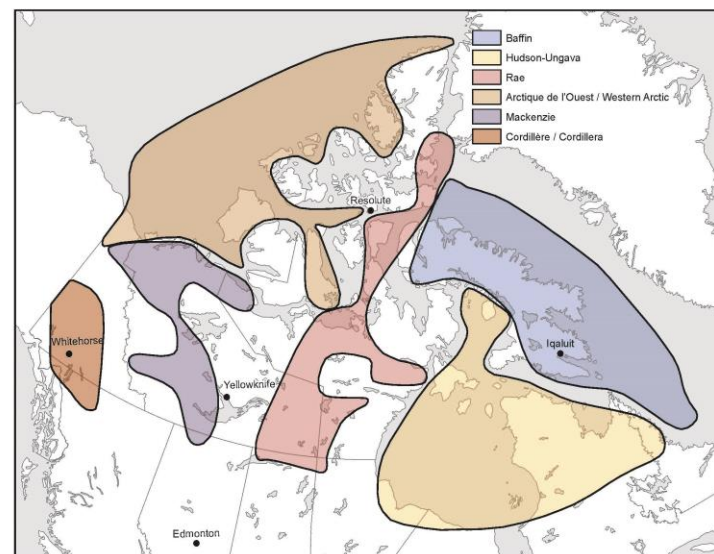
**Priority 3.** Geoscience for public safety and risk reduction

## How the GSC will do it....

**Priority 4.** Open geoscience

**Priority 5.** Excellence in our people and science

See annex for more information on GSC priorities

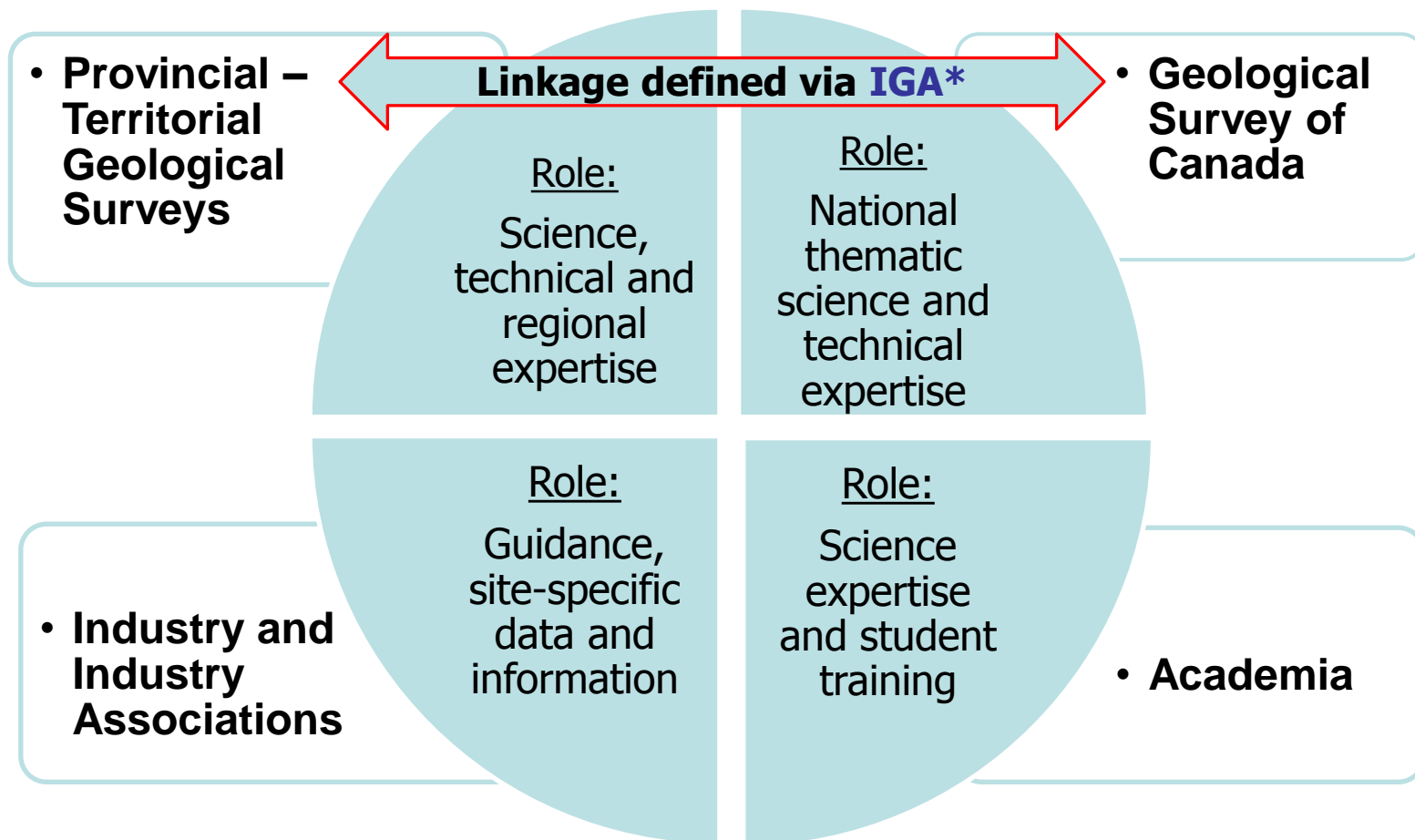


# Collaboration

The GSC is committed to the broadest possible collaborations in order to provide public good geoscience with a focus on geoscience surveys, sustainable development of Canada's resources, environmental protection, technology innovation and safety and security of Canadians.



# The Need to Collaborate in Delivery of Public Geoscience in Canada



*\* The Intergovernmental Geoscience Accord (IGA) defines the complementary roles of Canada's geological surveys, as well as mechanisms for cooperation and collaboration*

# Collaboration with Academia

GSC Collaborates with Academia via:

Direct Collaborations (e.g. Task-Shared Agreements)

Grant Programs (e.g. GEM-2, TGI 2015-2020)

- Specific application, proposal assessment and timeline requirements, tied to GSC Program outcomes

Student Bursary Programs (RAP)

- Set amount (\$17,500/a for MSc, \$21,000/a for PhD) for students working on multi-year research project co-supervised by GSC staff

Adjunct Professorships

- Research scientist can contribute to academic activities that are related to their duties at NRCan

Other Avenues

- Student hiring programs (FSWEP and CO-OP), visiting fellowship program, co-organization of events, contracts for services, Vote net revenue agreements, public servant-in-residence program etc.



# Engagement and Communication with Academia

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GSC is engaging with key academic stakeholders on approach to enhance collaborations. For example, to better account for today's information overload environment.

As a result, GSC is working to:

- ☐ Be more proactive in its communication and engagement
  - ☐ Better target those strategies to specific stakeholders
  - ☐ Work with stakeholders to develop better dissemination and distribution channels
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# What we have been doing:

## Grants

- Engagement with Chair of CCCESD for redistribution to chairs who redistribute to department
- Engagement with Provincial-Territorial Geological Survey Directors
- Announcements and flyers at science conferences, on the web
- Scientist-to-scientist communication

## Other opportunities

- Contracts: Post on government contracting website
- Contracts: Small dollar value (<\$25k) Request For Proposals
- Informal collaboration, co-organization of events: Scientist-to-scientist communication
- MOU's: Discussion and negotiation between Faculty/department and NRCan/GSC
- Research outputs (e.g. joint papers, reports): Scientist to scientist engagement

## Student Hiring Programs

- Announcements and flyers at science conferences, on the web
- General student awareness

## Student Bursary Programs

- Scientist-to-scientist communication
- Announcements and flyers at science conferences, on the web
- General student awareness



# Targeted Geoscience Initiative 2015-2020

Targeted Geoscience Initiative generates geoscience knowledge to enhance effectiveness of deep exploration for Canada's key economic minerals

TGI is designed to be a driver of innovation in the mineral exploration industry that ultimately improves our global competitiveness and supports Canadian mining-dependent communities

TGI phase 5 supports program goals with long-term outcomes:

- **New knowledge, methodologies and models** enhance the exploration industry's ability to detect buried ore deposits.
- Integrated, multi-scale **scientific knowledge of source-to-ore formation** that is both authoritative and accessible results in industry innovating exploration approaches.
- A **replenished pool of highly qualified personnel** equipped with state-of-the-art knowledge, is available for employment in the mineral exploration industry.



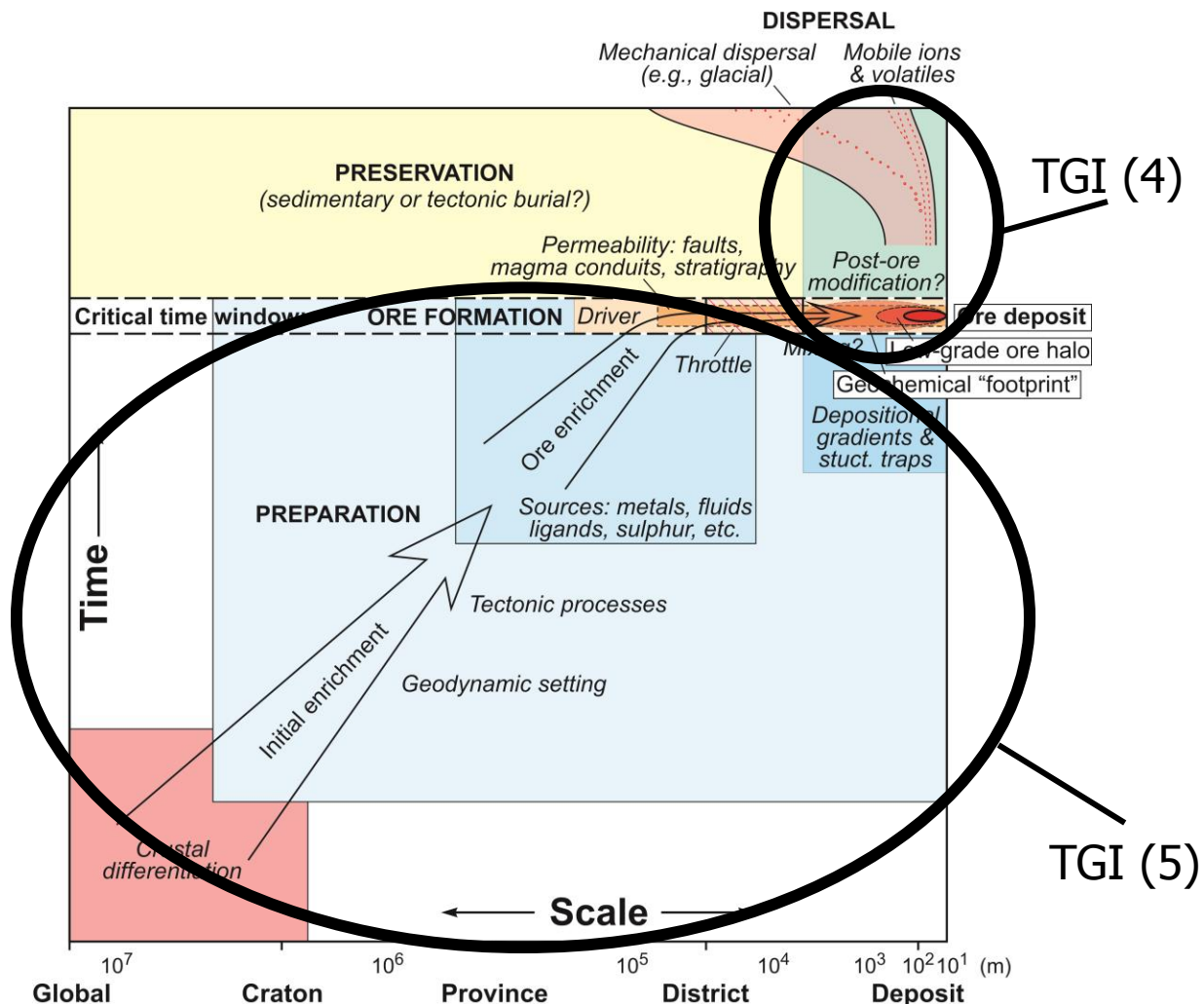
# TGI Renewal based on Engagement with Internal and External Stakeholders

- In 2014, TGI collected advice and input on future exploration from Provincial Territorial Geological Surveys, from mineral exploration industry, their professional associations and academia
- TGI phase 4 audit and evaluation recommendations including greater emphasis on engagement and reporting.
- The internal TGI Science Advisory Group recommended that future research evolving from TGI phase 4 incorporate the following principles:
  - **Remain national and thematic in scope**
  - **Strengthen the ore systems approach**
  - **Crosscut ore deposit types**
  - **Focus on source to ore deposition part of the ore forming system**



# TGI Science Focus: Source-to-Ore (phase 5) complements Ore-to-Surface (phase 4)

- TGI (4) was mostly focused on **deposit-scale and its surface expression**
- TGI (5) will integrate new knowledge about **source of metals and the pathways depositional environment**
- This will lead to innovation-based exploration approaches that can be **applied at all scales.**



# TGI 2015 -2020 Framework

As in TGI phase 4, projects will be managed around ore systems of high economic importance to Canada:

- Gold
- Nickel-Platinum Group Elements-Chrome
- Base Metals
- Other Metals (Uranium, Specialty Metals)



# Collaboration with Academia – GSC Grants

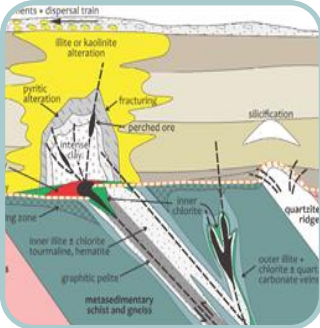
## Example: **Targeted Geoscience Initiative (TGI) Grant Agreements**

Development of strategic collaborations with the Canadian academic community (professors and students) will:

- help complement existing TGI scientific and/or technical expertise to address TGI research objectives to generate improved mineral system models and new methods and technologies
- Contribute to long-term Canadian research capacity
- Provide opportunity for innovation in the development of ideas and methods that are applicable to industry needs.
- multi-year agreements involving academic institutions, federal contributions will be limited to 95% of total project costs.

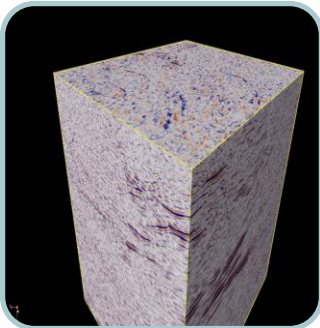


# TGI Outcomes achieved via Grant Programs



## Increased geoscience knowledge

- Improve understanding of ore systems from source-to-ore to increase the effectiveness of exploration at all scales, from regional to sub-kilometre.



## Provide better returns on private sector investments:

- Address significant public geoscience gaps by expanding the industry toolkit for exploration, with further innovative geoscience tools, exploration models and new techniques to more efficiently and effectively detect the presence of buried mineral deposits.

# TGI 2015-2020 Draft Grant Mechanism

- Funding is available for 2016-2017 (600K\$), 2017-2018 (600K\$), 2018-2019 (600K\$) and 2019-2020 (400K\$)
- Upcoming call for agreements;
- All calls are posted on Geoscan and trigger an RSS feed
- Email notification distributed to Canadian Earth Sciences department heads and known Canada Research Chairs and research groups
- Priority areas will focused on gaps related to metal sources, magmatic metals, metal pathways, metal traps, metals through time and metals through space





# Geo-Mapping for Energy and Minerals

## 2015-2016 Status Update

- 17 on-going field and desktop studies
- 14 fieldcamps this summer
- 183 engagement letters sent to ~60 identified communities, 11 communities visits took place
- 38 students (RAP, FSWEF, casual) hired by GEM activities
- 29 task-shared agreements (completed/in-progress for 2015-16)
- 63 publications released through GEOSCAN
- 10 multiyear geoscience grants awarded to academic collaborators (\$1.1M)



# Geo-Mapping for Energy and Minerals Grants Update

## Geoscience Grants:

- Open call Jan 2015 resulted in 33 proposals, 18 eligible and 10 selected, project titles and proponent information
- \$1.1M in grant funds were awarded to fund 10 projects at 9 Canadian universities in 8 provinces
- Short descriptions of each of the funded projects will be posted on the GEM website in late October

## Multidisciplinary Grants:

- The GEM Multidisciplinary Grant Program will be released this fall, funding innovative tools and approaches to facilitate uptake of GEM knowledge by Northerners
  - First call will be for projects of less than \$50K to be completed by March 31<sup>st</sup> 2016
  - Later calls will include larger, full year projects



# Other Updates: NRCan Postdoctoral Fellowship Pilot

- The visiting fellowships in Canadian government laboratory program (administered by NSERC) to be replaced by a government-wide staffing program to clarify employer-employee relationship.
- Until the final program is established, Natural Resources Canada has joined with other departments (Agriculture, Defence Research) to initiate a new pilot Postdoctoral Research Pilot program (apply to program at [jobs.gc.ca](https://jobs.gc.ca)).
- GSC will use to pilot to launch the Alice Wilson Fellowship program that will focus on providing postdoctoral opportunities to women in geoscience in priority areas (more information to follow)



# Annex



# Priority 1: Unlock Canada's resource potential through geoscience

## The Issue

## GSC Commitment

## Program Area

- Existing geoscience knowledge for much of Canada's vast North – necessary for mineral and energy exploration and development – is sparse and not to modern standards
- Proven mineral & metal reserves are decreasing, and important regional mining-based economies are at risk
- Proven energy reserves are increasing, but there is much uncertainty about the scale of shale oil & gas reserves, and northern reserves
- The area of Canada's offshore landmass over which sovereignty can be exercised is uncertain

Complete onshore geological framework mapping in areas of the North with the highest resource potential.

Improve understanding of major mineral deposit types through targeted & thematic studies for deep/remote exploration

Improve quantitative assessment methods for shale-based hydrocarbon  
Conduct energy resource assessments of key offshore basins in northern Canada

Complete and defend Canada's UNCLOS submission

**Geo-mapping for Energy and Minerals**

**Targeted Geoscience Initiative**  
**(announced in Budget 2015)**

**New Energy Supply**

**UNCLOS**



# Priority 2: Environmental geoscience for responsible resource development

## The Issue

## GSC Commitment

## Program Area

<ul style="list-style-type: none"> <li>Resource exploration &amp; development should not compromise the integrity or vitality of our ecosystems; related regulatory processes should <i>both</i> reduce ecosystem risk <i>and</i> investment risk by being evidence-based, effective, and efficient</li> </ul>	<ul style="list-style-type: none"> <li>Understand baselines, and the cycling and transport of contaminants from oil sands and mineral development to the environment</li> <li>Understand induced seismic hazards &amp; risks to groundwater from hydraulic fracking</li> <li>Timely &amp; authoritative execution of Environmental Assessment reviews, and resource assessments for federal protected areas</li> </ul>	<b>Environmental Studies &amp; Assessments</b>
<ul style="list-style-type: none"> <li>Permafrost is unlikely to remain stable over the 50- to 100-year design life of existing &amp; planned northern infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Model the responses of permafrost to a changing climate in priority areas for northern infrastructure to inform development, maintenance, and operation</li> </ul>	<b>Climate Change Geoscience</b>
<ul style="list-style-type: none"> <li>Managing growing demands on water requires consistent and credible data on the extent and dynamics of the resource</li> </ul>	<ul style="list-style-type: none"> <li>Assess the extent &amp; dynamics of archetypical Canadian aquifers, and develop standard assessment methods that others can use</li> </ul>	<b>Groundwater Geoscience</b>



# Priority 3: Geoscience for public safety and risk reduction

## The Issue

- The magnitude and recurrence of most geohazards is relatively constant, but the risks they pose are increasing due to the growing concentration of people & wealth in hazard-prone regions, and an increased dependence on technological systems and infrastructure
- Emergency services, international partners, and the public require near-real time authoritative reports of seismic events, as well as forecasts of geomagnetic storms in order to mobilize effective responses that minimize costs and casualties

## GSC Commitment

- Implement & validate tools for assessing earthquake risk at regional and national scales
- Improve understanding of submarine geohazard processes and develop robust methods to establish their probability of occurrence
- Advance national and regional-scale seismic monitoring and Global Navigation Satellite Systems (GNSS) to improve real-time earthquake and tsunami alerting
- Timely and authoritative execution of mandated responsibilities for emergency management (earthquakes, space weather, Comprehensive Test Ban Treaty)

## NRCan Program

**Public Safety  
Geoscience**

**Canadian Hazard  
Information Service**



# Priority 4: Open Geoscience

## The Issue

- A coordinated and enhanced effort is required to meet current and future needs of the Government of Canada and stakeholders for Open Government, including sound stewardship of our knowledge and collections.

## GSC Commitment

- Within the scope of the federal Open Government initiative – and in collaboration with key partners, stakeholders and staff – develop and implement an Open Geoscience information management and technology (IMT) plan.
- Acquire, manage and disseminate all geoscience data by using internationally accepted, Web-enabled methods and standards for quality, authority, timeliness and accessibility
- Modernize and Web-enable all key ESS geoscience datasets and publications, including metadata of rock collections and archive material.
- Implement a dashboard that records performance measures for the quality, authority, timeliness and accessibility of our geoscience data, information and knowledge.



# Priority 5 : Excellence in our People and Science

## The Issue

- To fulfil its vision, the GSC needs to be world class and equipped to serve Canada and Canadians now and in the future
- On-going efforts to eliminate the federal deficit and modernize how the government delivers programs and services to Canadians have resulted in a leaner public service

## GSC Commitment

- **People:** Define, cultivate and reward excellence, innovation and focus, and ensure recognition of work contributing to our goals
- **Partnership:** Seek out, maintain and enhance internal and external collaborations for mutually beneficial access to the best resources
- **Programming:** Ensure the continuing alignment of our geoscience with current government priorities and responsiveness to emerging needs.
- **Organization:** Through efficient internal partnerships, ensure that staff has free and timely access to the data, information and knowledge that are necessary to deliver our objectives and that is necessary for professional development.