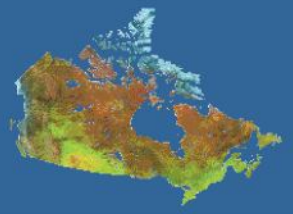

The Geological Survey of Canada: Overview

November 5, 2010

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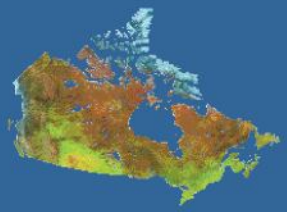
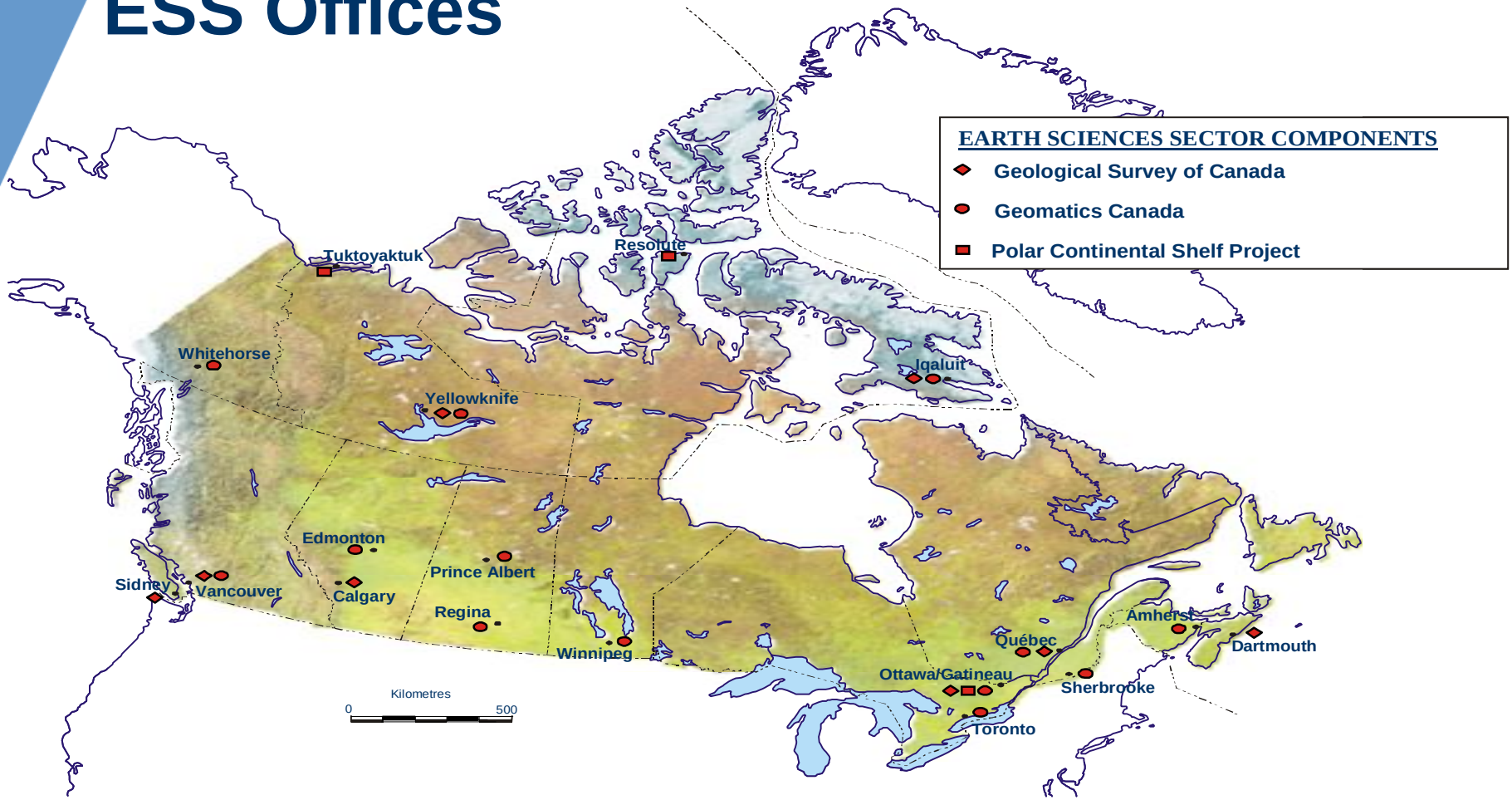


Natural Resources Canada's Earth Sciences Sector

- **Expertise at the service of Canadians to access, understand, and use Earth science information to deal with economic, environmental, and social changes.**
  - **Geological Survey of Canada…** ***Canada's National Geoscience Agency since 1842***
  - **Geomatics Canada ….*provides maps of, and geographic information on, Canada's landmass and offshore***
  - **Polar Continental Shelf Project …*support arctic research***

ESS Offices


EARTH SCIENCES SECTOR COMPONENTS
Geological Survey of Canada
Geomatics Canada
Polar Continental Shelf Project
Tuktoyaktuk
Resolute
Whitehorse
Iqaluit
Yellowknife
Edmonton
Prince Albert
Sidney
Vancouver
Calgary
Regina
Winnipeg
Amherst
Québec
Dartmouth
Ottawa/Gatineau
Sherbrooke
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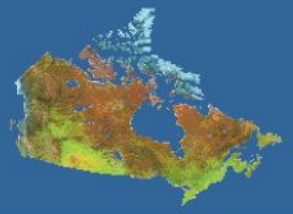
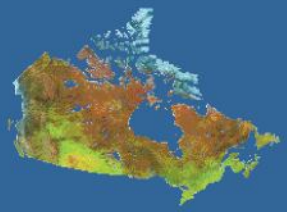


ESS contributes to all three of NRCan's Strategic Outcomes

- Economic Development
  - Geoscience is used to help stimulate the exploration and development of new energy and mineral resources
- Environment Responsibility
  - Geoscience is used to understand environmental issues and reduce risks to the environment
- Safety Security and Governance
  - ESS science and knowledge are used to help Canada adapt to a changing climate, the risks of natural and man-made hazards are reduced, and basic infrastructure is provided to support the governing of Canada.

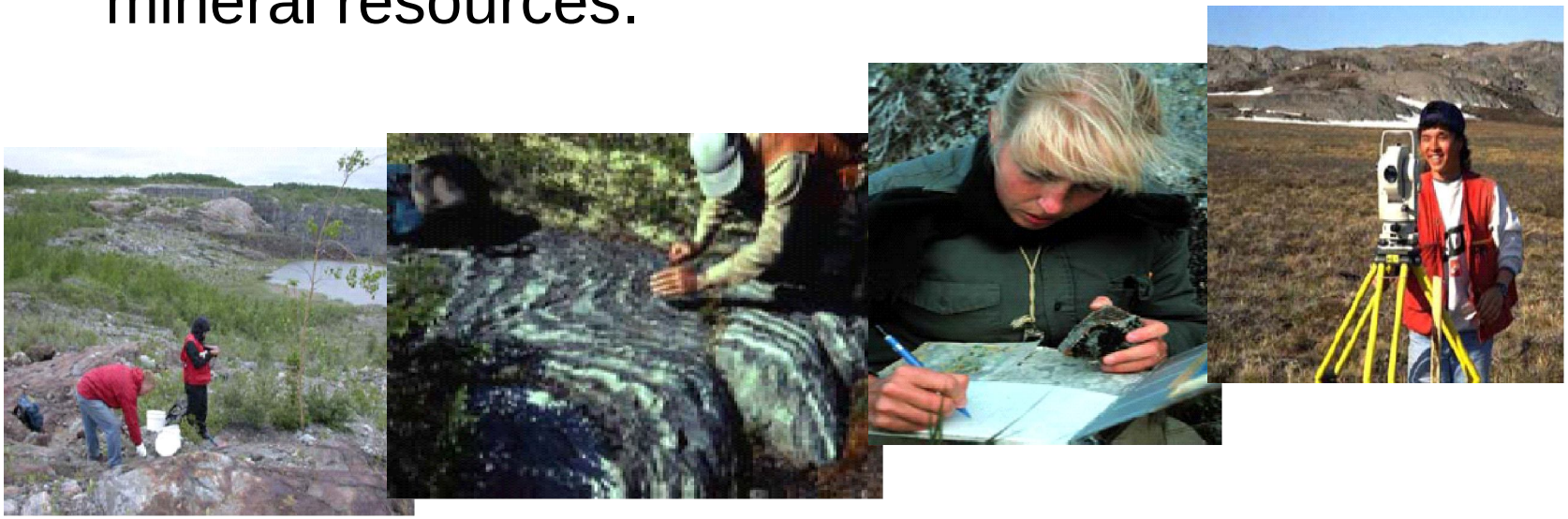


ESS has a key role to play in NRCan's Priorities

PROGRAMS AND ACTIVITIES	DEPARTMENT PRIORITIES
▪ Legislated Environmental and Resource Assessments (LERA) ▪ Environmental Geoscience program	Regulatory System
▪ Green Mining Initiative ▪ Targeted Geoscience Initiative (TGI) ▪ Offshore Geoscience Program ▪ Gas Hydrates Program ▪ Groundwater Geoscience Program	Competitive Resource Sectors
▪ Polar Continental Shelf Program (PCSP) ▪ Geo-mapping for Energy and Minerals (GEM) ▪ UN Convention on Law of the Sea (UNCLOS)	Development in the North

Economic Development

Geoscience is used to help stimulate the exploration and development of new energy and mineral resources.



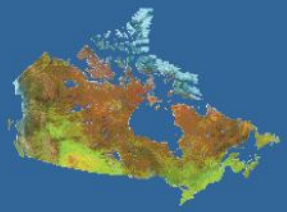
Economic Development

Geoscience Exploration

- Targeted Geoscience Initiative
- Offshore Geoscience
- Gas Hydrates

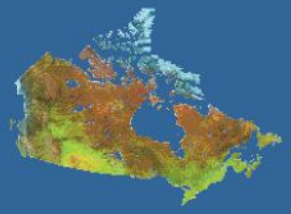
Northern Development

- Geo-mapping for Energy and Minerals
- Polar Continental Shelf Project
- Canada-Nunavut Geoscience Office



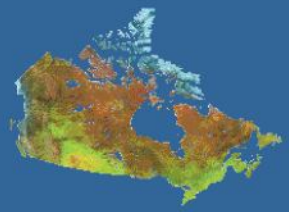
Targeted Geoscience Initiative 4: Objectives

- Improved exploration models where gaps exist in our understanding of Canada's major mineral systems
- Improved methods for detecting buried mineral deposits



TGI4 – An Ore Systems Approach

- Allows the consideration of all scales of processes that control the development of a mineral district
- More than one mining camp can be included within a single ore system study in order to use optimum examples from across Canada
- Develop multi-disciplinary expert teams from across Canada to focus on specific ore systems

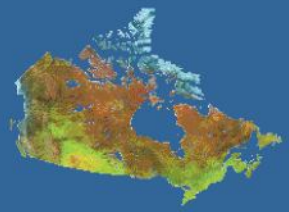


TGI4 Framework

- Create knowledge and techniques to better understand, model and detect Canada's major mineral systems
- Focus on areas of highest mineral potential as defined by established and emerging mineral districts
- Include all non-ferrous commodities, i.e. base, precious and rare metals
- Program focus influenced and defined by the research needs of national and international exploration and mining companies (e.g. CMIC).
- High priority on partnering: provinces/territories and academia; training of students

Offshore Geoscience

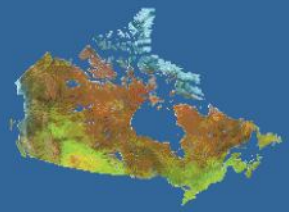
- **Facilitate offshore development activities through provision of geological information about the seafloor**
  - **Seafloor environment**
  - **Seafloor hazards to built infrastructure**
  - **Seafloor marine benthic habitat**
  - **Collaborations with Ocean Networks Canada on NEPTUNE and VENUS**



Gas Hydrates

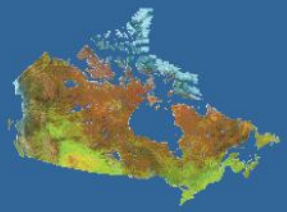
- Evaluate the feasibility of producing land-based gas hydrates resources by depressurization
- Test well at Mallik, NWT
- Future steps: possible long-term production tests.

- Canadian recoverable natural gas (excluding gas hydrate): **~733 TCF** (*Canadian Society for Unconventional Gas, May 2010, low case*).
- Natural gas contained in Canadian gas hydrate deposits: **~1755 to 25,836 TCF*** (Majorowicz and Osadetz, 2002; Osdetz and Chen, 2005)



Geo-Mapping for Energy and Minerals (GEM)

- Increase the economic prosperity of Northern Canada through stable, long-term investment in natural resources development
- Mapping 60% of the North to modern standards over 10 years- with approval received for first five years
- Multi-metals, diamonds, conventional petroleum
- Major, multi-year field work, massive data acquisition
- Training for the next generation of highly-qualified geoscientists
- Catalyst for developing and adopting new approaches to managing information throughout its life cycle



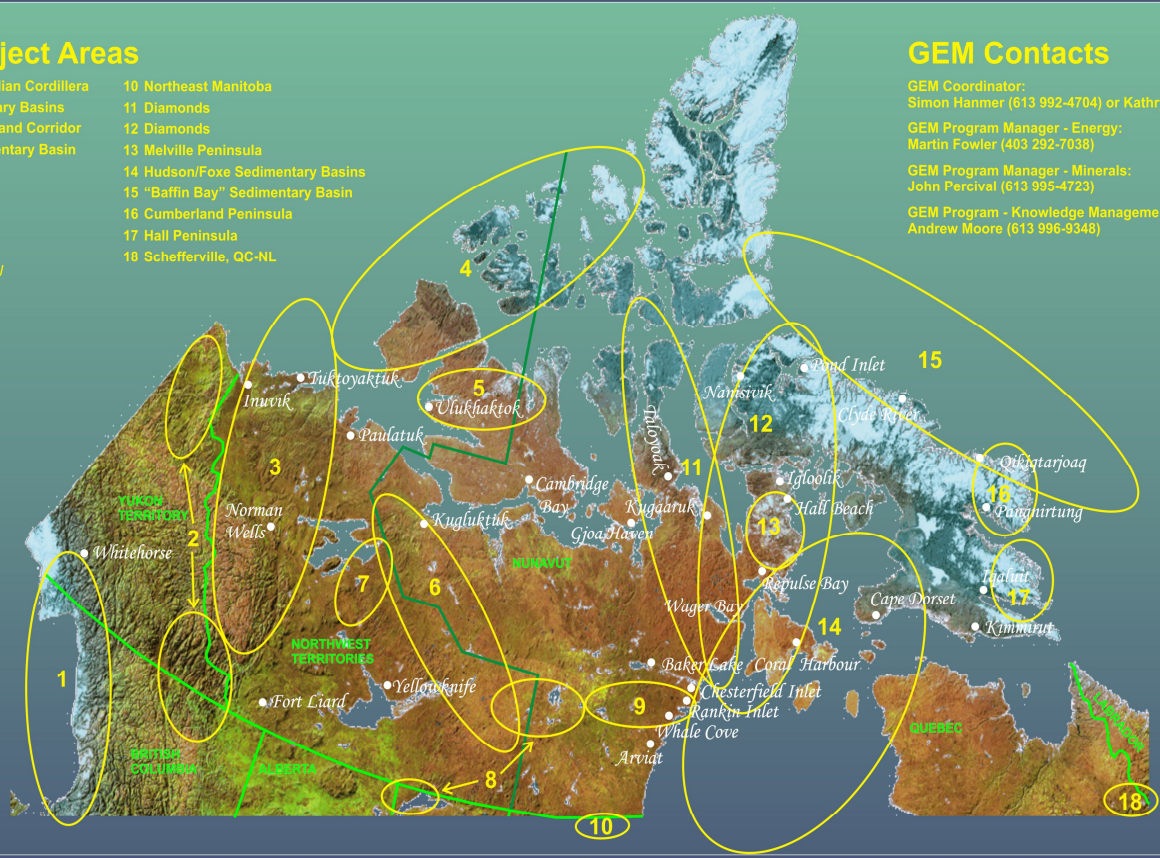
Natural Resources Canada | Ressources naturelles Canada

G E M - Geo-Mapping for Energy & Minerals

Canada

GEM Project Areas

1 Northwest Canadian Cordillera
2 Yukon Sedimentary Basins
3 Mackenzie Delta and Corridor
4 Sverdrup Sedimentary Basin
5 Victoria Island
6 Diamonds
7 Great Bear Lake
8 Uranium
9 Baker Lake/ Chesterfield Inlet/ Wager Bay
10 Northeast Manitoba
11 Diamonds
12 Diamonds
13 Melville Peninsula
14 Hudson/Foxe Sedimentary Basins
15 "Baffin Bay" Sedimentary Basin
16 Cumberland Peninsula
17 Hall Peninsula
18 Schefferville, QC-NL



GEM Contacts

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GEM Program Manager - Minerals:
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Canada

GEM Knowledge Management

Field Project Process
Information Mgmt

Geoscience

Knowledge
Information
Data
Collections

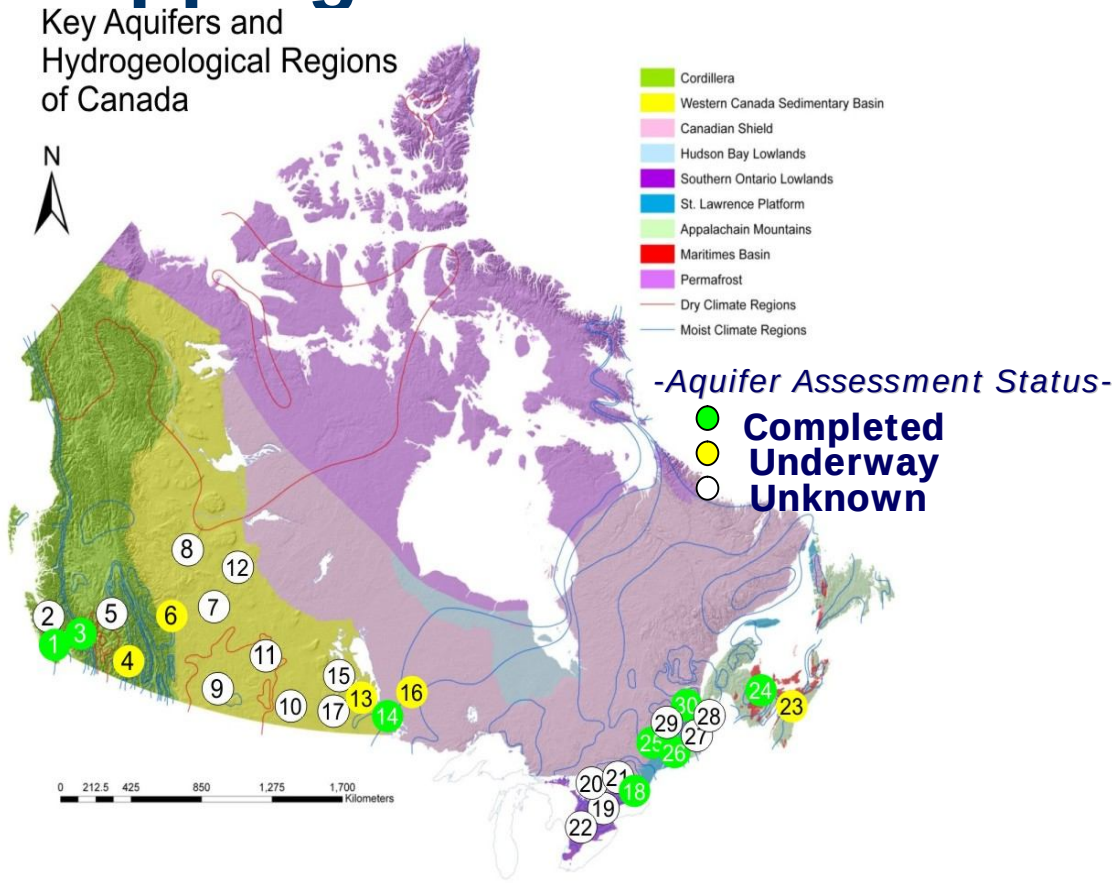
Discovery – Access
Application – Use
Understanding

Polar Continental Shelf Project

- **Provide logistical coordination and a northern base to support Arctic research**

Groundwater Mapping

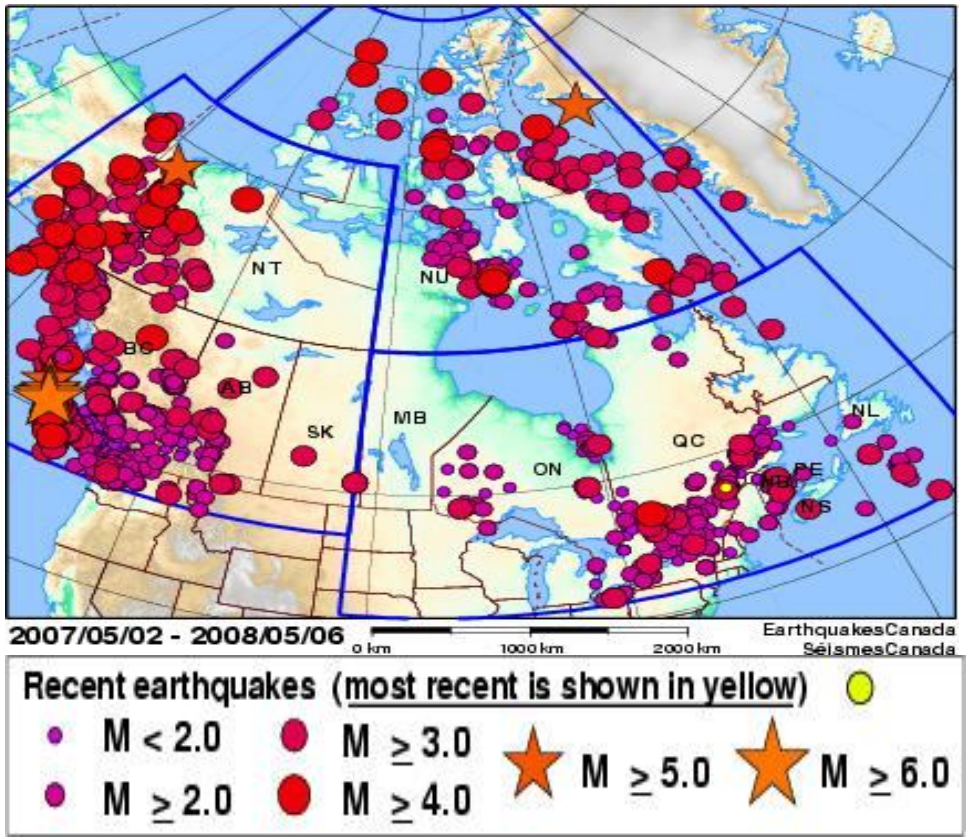
- **Complete assessment of 30 key regional aquifers**
  - **Aquifer assessments**
  - **Data and information integration and dissemination**
  - **Integration with the Provinces and Territories**
  - **Methodologies for aquifer assessment**

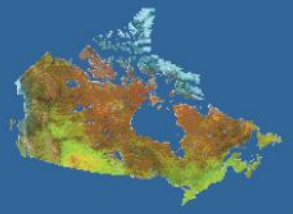


Public Safety Geoscience and Hazards

The risks of natural and man-made hazards are reduced

- **Public Safety Geoscience Program**
- **Canadian Hazard Information Service**





Opportunities for Collaboration

- Geological mapping: boots on the ground, knowledge management
- Methodologies for pre-competitive mineral exploration
- Environmental geology
- Gas hydrates
- Developing the next generation of highly-qualified Canadian Geologists (RAP, FSWEP, PDF)