CHAPTER 3

Geoscience work program in Québec in 2014

Patrice Roy and Abdelali Moukhsil

The province of Québec is vast, and its geological knowledge remains, to a large extent, fairly rudimentary. There are indications the province contains profitable resources for many different commodities, such as precious and base metals, as well as rare metals for which new applications are currently being developed. Therefore, it is essential to improve our geological understanding so that the province’s mineral potential can be taken into account during land use planning.

In this perspective, the work carried out by the Bureau de la connaissance géoscientifique Québec (BCGQ) is a key component of mining development in Québec and helps to better define its mineral potential. The information gathered will also contribute to decision-making in public land use planning, particularly where it concerns the conservation of mineral and water resources. The findings will be made public through Québec’s geomining database system (SIGEOM) via the MERN website. The interactive map function allows the user to consult regularly updated geoscience data.

The realization of geoscientific knowledge acquisition projects has been made possible through the mining heritage component of the Natural Resources Fund, which is financed by mining royalties. In 2014, the MERN’s budget for geoscience work was $12 million, to which another $250,000 was added for mapping Quaternary deposits in areas targeted by the Groundwater Knowledge Acquisition Program of the Ministère du Développement Durable, de l’Environnement et de la Lutte contre les Changements Climatiques (MDDELCC).

In 2014, the MERN had 22 projects involving geoscience data acquisition and mineral potential assessment, comprising eight geological surveys, four geophysical surveys, seven Quaternary surveys, an inventory of industrial minerals and dimension stone, and two mineral potential studies (Figure 3.1). By the end of the year, the fieldwork was complete for 19 projects, and in the preparation stage for the remaining three (geophysical projects for Baie-Comeau, Gouin and Matapédia), scheduled to be carried out in early 2015.

Over the course of 2014, 53 new exploration targets were identified based on the MERN’s geoscience work.

3.1 Geological surveys

Of the eight geological surveys in 2014, five represent the continuation of projects undertaken in previous years, and three are new projects. All the projects are designed to increase geoscience knowledge, particularly in lesser-known regions, and to stimulate exploration in Northern Québec and mining regions.

The Churchill-Lac Brisson project (No. 1) represents the fourth year of a five-year mapping project at a scale of 1:250,000 in the Churchill Province. In 2014, the project covered the northern part of NTS sheet 24A, the southern part of 24H and the northeastern part of 24B.

In the James Bay region, a geological survey was carried out in the Lac Dalmas area (No. 2), as the continuation of the Lac des Vœux and Lac Pelletan projects. The Lac Dalmas project completes the east-west cross-section of the contact between the La Grande Subprovince to the north, and the Opinaca Subprovince to the south.
The Grenville-Gouin-Parent project (No. 3) is a new mapping project at a scale of 1:50,000 in the Haute-Mauricie region. The program will run for at least five years. Current knowledge suggests good potential for rare metals, as well as Fe-Ti-P and Ni-Cu mineralization.

The Lac Holmes project (No. 4), a new project, focuses on the Attic Complex, in the southeast Abitibi. A recent aeromagnetic survey carried out in this area (DP 2010-04) yielded geophysical signatures indicating geological and structural complexity, including the presence of greenstone rocks that are not shown on existing maps.

A geological survey (Chibougamau project, No. 5) at 1:20,000 scale was carried out at the contact between the Abitibi and Opatica subprovinces, north of Chibougamau, as the continuation of the 2013 project. This area has potential for orogenic gold and volcanogenic massive sulphides.

The Val-d’Or project (No. 6) follows a cartographic revision at a scale of 1:20,000 in the Malartic area, and covers the southwestern quarter of map sheet 32C05, and the western half of 32C04. The project will link the mapping work in the western part of the Malartic Group to the work conducted on the Val-d’Or Formation to the east.

The Rimouski project (No. 7) completed the geological compilation of the Appalachian Province in an area where new roads were recently built.

The Lac Saint-Jean project (No. 8) was launched in 2013 and continued in 2014, with a focus on the mineral potential of granites for rare metals and dimension stone.

### 3.2 Geophysical surveys

The “B” component of the Gouin project (No. 9) covers the area southeast of the reservoir bearing the same name, all the way to La Tuque. The objective of this survey was to prepare for future mapping programs.

The Baie-Comeau project (No. 10) completes a north-south cross-section through the central part of the Grenville. It covers an area supposedly underlain by supracrustal rocks, which will be tested by a petrologic study and an upcoming mapping survey.

In Nunavik, the Rivière Buron-Rivière Brochant project (No. 11), divided into two blocks, covers the extension of the Labrador Trough, west of Ungava Bay, and several greenstone belts identified during the Far North mapping program in the late 1990s.

The Rivière Matapédia project (No. 12) was designed to support the cartographic revision of the Rimouski project. The study area has potential for mineral deposits and hydrocarbons.

### 3.3 Quaternary surveys

The Churchill program (No. 13), a Quaternary mapping project, is continuing alongside the bedrock mapping program (No. 1). This program will lead to a better understanding of glacial dynamics of northeastern Quebec. Moreover, the chemical analyses of heavy minerals in sampled sediments will assist research on mineralization.

In selected municipalized regions of Quebec, four Quaternary mapping projects (Nos. 14, 15, 16 and 17), launched in 2012 or 2013, were completed in 2014 at a scale of 1:50,000. The goal of these projects, which covered the Charlevoix, Nicolet-Saint-François, Chaudière and Vaudreuil-Soulanges areas, was to support the MDDEFP’s Groundwater Knowledge Acquisition Program.

The communities of Tasiujaq, Aupaluk and Kangirsuk were the focus of a sand and gravel (aggregate) resource inventory (project No. 18). The work was carried out in response to a request by the Ministère des Affaires Municipales et de l’Occupation du Territoire (MAMOT) to help Nunavik communities experiencing issues related to melting permafrost and the construction of new infrastructure.

The Chibougamau Project (No. 19) expanded the knowledge on Quaternary deposits along the contacts of the Abitibi and Opatica subprovinces and the Grenville Province, in the north-central part of the province.
3.4 Mineral potential studies

A synthesis of the geology and mineral potential of the Rivière Bell and Rivière Octave areas in the Abitibi region is
being carried out in 2014 based on five drilling campaigns that targeted the Quaternary deposits and bedrock of these
areas (project No. 20). The objective is to gain a better understanding of the distribution of Quaternary deposits, and to
identify potential pathfinders that could lead to new mineral occurrences.

The BCGQ has updated its gold potential study of the James Bay region using the results of a major mapping program
along the contact between the Opinaca and La Grande subprovinces, the reanalysis of lake sediments and rocks, and
the development of region-specific metallogenic models for gold (project No. 21).

3.5 Other projects

The recent opening of several operations for non-metallic commodities created a need for new information on deposit
characterizations (project No. 22). The resulting synopsis was used to update the fact sheets on industrial minerals,
architectural stone and gemstones.

3.6 Publications

In 2014, the SIGÉOM-Examine database was enriched with 968 documents from a wide variety of sources. Added
to the collection of mineral exploration records were 871 statutory work reports (GM), one internal document (GM)
and eight reports donated by mining companies. Among other documents filed over the course of the year were the
following: three geological reports and eight preliminary reports produced by the MERN (four of these were translated
into English), as well as their accompanying maps; two promotional documents; six public awareness documents in
the series “Géologie pour Tous”; and five miscellaneous documents. Also added to the database were 44 geological
compilation maps (CG), and 862 aeromagnetic and/or spectrometry maps at a scale of 1:50,000. Finally, 121 internal
documents (GM series from 2000 to 2013) were converted into manuscripts (MB) to increase their visibility and make
them free.

Areas covered by new maps or new data sets are shown in Figure 3.2. This includes geological maps with accompanying
reports, geological compilation maps and regional geophysical surveys (aeromagnetic, spectrometry, or both).
Figure 3.1 - Geoscientific projects in 2014.
Figure 3.2 - New geoscientific publications in 2014.

- **Geological Reports**
  - A - Cartographie des dépôts de surface des bassins versants contigus des rivières Richelieu, Yamaska et de la baie Missisquoi (RG 2014-01)
  - B - Géologie de la région du lac Saffray (SNRC 24F, 24G) (RG 2014-03)
  - C - Géologie de la région du lac Okaopéo, Côte-Nord (RG 2014-03)

- **Preliminary Geological Reports**
  - D - Gold fertility assessment of alkaline intrusions in the Abitibi and Pontiac subprovinces of Québec (RP 2014-01-A)
  - E - Geological revision of the Rivière Octave region (NTS 32D16 and 32E01) (RP 2014-02-A)

- **Geochemical Surveys**
  - F - Geochemistry of volcanic and intrusive rocks in the Lac Guyer and Lac Nochet region, Baie-James (RP 2014-03-A)
  - Datations U-Pb effectuées dans les provinces du Supérieur et de Churchill en 2011-2012 (RP 2014-05)

- **Statutory Work**
  - NTS sheets including new statutory work reports