CHAPTER 3

Geoscience work program in Québec in 2015

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 a multitude of commodities, such as precious and base metals, and rare metals for which new applications are being developed. Therefore, it is essential to improve our geological understanding so the province’s mineral potential can be taken into consideration during land-use planning.

In this respect, the work carried out by the Direction générale de Géologie Québec (DGGQ) is a key component of mining development in Québec by better defining the province’s mineral potential. The information gathered will also contribute to decision-making processes in public land-use planning and management, particularly where it concerns the conservation of mineral and water resources. The findings will be made public through Québec’s geomining database system (SIGÉOM) on the MERN website. The interactive map function allows users to quickly consult regularly updated geoscience data.

Geoscientific knowledge acquisition projects have been made possible through the mining heritage component of the Natural Resources Fund, which is financed by mining royalties. In its 2016 Budget Speech, the Government of Québec stated it would increase its investment in the MERN’s bedrock characterization work in the Plan Nord territory by $3 million per year for three years. This geoscientific work is the first step in the mining development process and it helps focus exploration investments in areas with the best discovery potential for mineral deposits.

In 2015, the MERN conducted 24 geoscientific knowledge acquisition projects: nine geological surveys, five geophysical surveys, six Quaternary surveys, three sampling surveys and one geological study (Figure 3.1). The field work for 18 of these projects was completed by the end of 2015, and two geophysical surveys will commence in the winter of 2016 (the Rivière Romaine and Rivière Delay projects). A detailed overview of these projects is provided in the document Abstracts of Oral Presentations and Posters, Québec Mines 2015 (DV 2015-06)10.

During the Québec Mines 2015 convention, the MERN published 126 new exploration targets identified by the MERN’s 2015 geoscientific work (PRO 2015-06)11.

3.1 Geological surveys

Of the nine geological surveys in 2015, seven represent the continuation of projects undertaken in previous years, and two 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 project (No. 1) represents the fifth year of a five-year mapping project at a scale of 1:250,000 in the Churchill Province. In 2015, the project mainly concentrated on NTS map sheet 24B in the Core Zone. Farther north, near Baie aux Feuilles, the aim of the Kuujjuaq project (No. 5) is to refine the geological map of the area, which covers the Labrador Trough and the lithotectonic Rachel-Laporte Zone.

In the Baie-James region, three geological surveys were conducted at a scale of 1:50,000. The Baie-James survey (No. 2), centred on the Lac Joubert area, straddles the Opinaca and Opatica subprovinces, whereas the Baie-James-West survey (No. 3), centred on Lac Villaret, mainly covers units belonging to the Opinaca Subprovince. The Assinica project (No. 9), centred on Lac Rodayer, covers units of both the Opatica and Opinaca subprovinces.

10 - sigeom.mines.gouv.qc.ca
11 - sigeom.mines.gouv.qc.ca
The Clova project (No. 4) is a 1:50,000 mapping program in the Haute-Mauricie region. It is the second year of the program, which will run at least five years in this part of the Grenville Province. The Escoumins project (No. 8) is a 1:250,000 mapping program that will highlight the area’s metal potential, particularly for copper and gold.

A geological survey at a scale of 1:20,000 (Chapais-South project, No. 6) was carried out in the Abitibi Subprovince to the south of Chibougamau, in an area known for its strong gold potential.

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

3.2 Geophysical surveys

The Rivière Delay aeromagnetic survey project (No. 10), situated northwest of Schefferville, covers an area containing belts of volcanic rocks hosting Ni-Cu showings.

The Radisson aeromagnetic survey project (No. 11), situated north of Radisson, covers an area in the Bienville Subprovince that will be subject to a 1:250,000 geological mapping program over the coming years.

The Rivière Romaine aeromagnetic survey project (No. 12), situated northeast of Havre-Saint-Pierre, covers an area in the Grenville Province that will eventually be subject to a 1:50,000 geological mapping program.

East of the Baie-James-East geological survey, the Ashuanipi aeromagnetic survey project (No. 13) covers an area in the Grenville Province that will eventually be subject to a 1:50,000 geological mapping program over the coming years.

The Rivière Vachon radiometric and aeromagnetic survey project (No. 14), situated in the Superior and Churchill provinces to the west of Ungava Bay, covers the units in the far northern end of the Labrador Trough and in the adjacent Archean bedrock. This area has potential for Ni-Cu and gold mineralization.

3.3 Quaternary surveys

The Churchill project (No. 15), a Quaternary mapping project, continues to advance alongside the bedrock mapping program (No. 1) and will provide a better understanding of glacial dynamics in northeastern Québec. In addition, chemical and heavy mineral analyses of sampled glacial sediments will assist research on mineralization.

The Chibougamau Project (No. 16) expanded our knowledge on the Quaternary deposits at the contact between the Grenville Province and the Abitibi and Opatica subprovinces. The project also assessed the relevance of conducting geological mapping projects along the Grenville Front in the north-central part of this geological province.

The Gouin project (No. 17) south of the Gouin Reservoir, conducted at the same time as the bedrock mapping program (Clova project, No. 4), improved our understanding of the Quaternary deposits in this part of the Grenville Province. Chemical and heavy mineral analyses of sampled glacial sediments will shed light on the mineral potential of this region.

North of Matagami, the Assinica project (No. 18), conducted in tandem with a bedrock mapping project (Assinica project, No. 9), has led to a better understanding of the Quaternary deposits in this part of the Superior Province. The geochemical data on collected till samples will help assess the mineral potential of the area and supply key information for land-use reconciliation purposes.

The communities of Akulivik and Puvirnituq were the subject of aggregate resource inventories (sand and gravel, project No. 19). The project was in response to a request by the Ministère des Affaires municipales et de l’Occupation du territoire (MAMOT) to help find ways to address the issues of melting permafrost and the construction of new infrastructure in Nunavik communities. Another aggregate resource inventory project (sand and gravel, project No. 20) was also carried out in the La Malbaie area in the Charlevoix region.

3.4 Geological studies

The Labrador Trough hosts many Ni-Cu showings, distributed throughout the region. A study focusing on the Ni-Cu potential (project No. 21) was carried out to identify the geoscientific elements that are essential for the presence of this type of mineralization and to delineate new areas with exploration potential.
3.5 Sampling surveys

The following work was conducted in 2015 for mineral potential assessment purposes and to provide new and indispensable geoscientific knowledge that can be used in decision-making processes for public land-use planning:

- The continued analysis of indicator minerals from till samples collected north of Chibougamau (project No. 22);
- A till survey in an area between Lac Assinica and the town of Chibougamau, in the Superior Province (project No. 23); and
- A till survey in an area centred on Lac Brisson, east of Rivière George, in the Core Zone of the Churchill Province (project No. 24).

3.6 Publications

In 2015, thanks to the work by MERN geologists and the statutory work carried out by mineral exploration and mining companies, the SIGÉOM-Examine database grew by 540 documents collected from a wide range of sources. The bulk comprised the following documents that were added to the Mineral Exploration Dossier:

- 437 statutory work reports (GM);
- 3 internal documents (GM);
- 3 reports classified as donations from companies.

The other filings over the course of the year included the following 103 documents added to the QERPU collection:

- 17 geoscientific compilation maps (Compilations géologiques: CG);
- 8 documents in the public document series (Documents publics: DP);
- 6 documents in the miscellaneous series (Divers: DV);
- 2 documents in the SIGÉOM series (EP);
- 2 documents in the public outreach series (Géologie pour tous: GT);
- 55 documents in the manuscript series (Manuscrits bruts: MB);
- 1 document in the thesis series (Mémoires: MM);
- 6 documents in the promotional document series (Documents promotionnels: PRO);
- 3 documents in the geological report series (Rapports géologiques: RG);
- 3 documents in the preliminary report series (Rapports préliminaires: RP).

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 2015.
Figure 3.2 - New geoscientific publications in 2015.

Legend:
- **Geological Reports**
  - A - Géologie de la région du lac Henrietta (SNRC 24H) (RG 2015-01)
  - B - Géologie de la région du lac Carmoy, Baie-James (SNRC 33H06, 33H11, 33H14) (RG 2015-02)
  - C - Géologie de la région de Parent, Haut-Saint-Maurice (partie ouest du Grenville) (RG 2014-03)
  - D - Révision de la géologie de la région de la rivière Wawagosis (RP 2014-04)
  - E - Géologie des dépôts de surface de la région du lac Saffray (24G) (RP 2014-06)

- **Preliminary Geological Reports**
  - Datations U-Pb dans les provinces du Supérieur, de Churchill et de Grenville effectuées au JSGL en 2012-2013 (RP 2014-07)

- **Geophysical Surveys**
  - Area covered by new geophysical data

- **Geochemical Surveys**
  - Area covered by new geochemical data

- **Statutory Work**
  - NTS sheets including new statutory work reports
  - Area covered by the Plan Nord