



# Canada-Nunavut Geoscience Office: looking back and looking forward

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## Abstract

The Canada-Nunavut Geoscience Office (CNGO) was established in September 1999 following the creation of Nunavut. The CNGO is co-funded and co-managed by three partners—two federal departments (Natural Resources Canada and Indigenous and Northern Affairs Canada) and the Government of Nunavut's Department of Economic Development and Transportation. The CNGO is considered Nunavut's de facto geological survey. The office is governed and managed through a tripartite operating agreement that has been renewed every five years. This agreement outlines the operational and core funding context provided to the CNGO. Based in Iqaluit, Nunavut, the CNGO has six professional staff members and initiates and conducts a wide range of collaborative geoscience research with partners from other government departments, universities, industry and communities.

## Résumé

Le Bureau géoscientifique Canada-Nunavut a été mis sur pied en septembre 1999, peu après la fondation du Nunavut. Le Bureau est financé et dirigé conjointement par trois partenaires, soit deux ministères fédéraux (Ressources naturelles Canada et Affaires autochtones et du Nord Canada) et le ministère du Développement économique et des Transports relevant du Gouvernement du Nunavut. Le Bureau géoscientifique Canada-Nunavut est considéré l'organisme de fait chargé des levés géologiques du Nunavut. Le Bureau est régi et géré en fonction d'un accord d'exploitation tripartite qui a été renouvelé tous les cinq ans. Cet accord décrit les conditions associées à l'exploitation et au financement de base dont jouit le Bureau. Le Bureau géoscientifique Canada-Nunavut est situé à Iqaluit, au Nunavut, et son complément de personnel professionnel compte six personnes grâce auxquelles il est en mesure d'entreprendre et de mener une vaste gamme de travaux de recherche géoscientifique de nature collaborative avec des partenaires provenant d'autres ministères gouvernementaux, d'universités et de diverses collectivités.

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## Introduction

Natural resource development, particularly through the mineral sector, is and will be the main driver for economic development in Nunavut. When Nunavut became a territory in 1999, the belief was that 70% of its landmass had not been adequately mapped and, therefore, responsible mineral exploration and land-use decision making was hindered with significant impacts on Nunavut's economic future.

The Canada-Nunavut Geoscience Office (CNGO) was conceived to help address these issues. The CNGO is Nunavut's de facto geological survey and will become an official entity when a devolution agreement is reached between the territory and Canada. Currently, the CNGO is co-funded and co-managed by Natural Resources Canada–

Lands and Minerals Sector (NRCan-LMS); the Government of Nunavut's Department of Economic Development and Transportation (GN-EDT) and Indigenous and Northern Affairs Canada (INAC). Most of the research conducted by the office is undertaken in collaboration with a wide range of partners.

## Background of the CNGO

Loosely modelled at the time on the Yukon Geoscience Centre (now the Yukon Geological Survey), the CNGO was opened in September 1999 (McCluskey, 1999; Nunatsiaq News, 1999) by the Minister of Natural Resources, R. Goodale, who said, "Nunavut has remarkable natural resources potential. A key to unlocking that potential and to bringing exploration and investment north is expanding

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geoscience knowledge in the region.” (The Northern Miner, 1999).

The CNGO was established following the signing of a Treasury Board submission between INAC, NRCan and the Government of Nunavut. Through this submission, NRCan, represented by the Geological Survey of Canada (GSC), would provide scientific and logistical responsibilities to the CNGO and would take the lead on providing administrative support to the office.

The responsibility of managing natural-resource development on Crown lands through regulating land tenure would remain with INAC. The GN, being the territorial government with their mandate to stimulate sustainable and responsible economic development in Nunavut, would assist the CNGO by collaborating in research efforts and sharing the administration of project funding and logistics.

## The CNGO is born

Natural Resources Canada, GN, INAC and Nunavut Tunngavik Inc. (NTI), the Inuit birthright organization for oversight of the Nunavut Land Claims Agreement, met several times to determine the most effective way to establish and deliver a geoscience presence in Nunavut. The parties committed to establish the CNGO as a co-operative venture and created the Canada-Nunavut Geoscience Agreement as an office operating agreement. This agreement, outlining the co-management and co-funding relationship for the office, has been renewed three times, with the current agreement (2013–2018) set to expire March 31, 2018. The three government organizations provide core funding to the CNGO; this funding covers salary, basic operations and maintenance expenses, and some research programs. The office also seeks additional project funding from other sources. Each of the three partners sit on the CNGO management board, along with an ex-officio representative from NTI, which provides scientific and operational oversight for the office.

## Mandate and mission statement

The mandate and mission statement of the CNGO is to

- develop capacity (human and otherwise) in geoscience,
- build and maintain an accessible geoscience knowledge base,
- promote sustainable development of mineral and energy resources for Nunavut and
- increase awareness of the importance of earth science for Nunavummiut.

Inuit societal values also guide the CNGO; these include the principles of respecting others; valuing relationships and caring for people; being open, welcoming and inclusive; serving and providing for family and/or community; using consensus decision making with discussions; acquir-

ing skills and knowledge through observation and mentoring; being innovative and resourceful; working together for a common cause; developing collaborative relationships; and practising environmental stewardship.

## Why invest in geoscience?

There are many reasons why governments globally invest in geoscience, including determining the presence and abundance of natural resources found within a jurisdiction, and providing new information to support evidence-based decision making. Nunavut’s geology is diverse, which provides the territory with significant potential to develop gold, diamond, base-metal (e.g., lead, zinc, copper), uranium, gemstone and hydrocarbon resources. Public geoscience provides exploration companies with information and innovative ideas that will reduce the risks of exploration and improve chances for successful natural-resource discoveries. Public geoscience also provides other stakeholders with information with which to make informed decisions for infrastructure development and support land-use planning.

Public investments in geoscience are needed to support grassroots exploration activities that are key to supporting private-sector investment. Globally, exploration is and was built on the outputs of public geoscience. The Lands and Minerals (LMS) sector of NRCan collects and publishes statistics on mineral exploration, development and production. From these statistics, experts have estimated that more than \$3.9 billion has been spent on exploration in Nunavut since 1999.

The mineral exploration industry has stated, “The reach of public geoscience is broad: It is virtually impossible to identify all of the actual and potential users. While it is safe to assume that any companies holding exploration licences or claims in a given area have used available government maps or reports, there is no way of knowing how many other firms have reviewed this same information... Moreover, the same public geoscience information is used in a range of other applications” (Prospectors & Developers Association of Canada [PDAC], 2010). Within Canada, there is a widely quoted assertion that every \$1 million of government investment to enhance the geoscience knowledge base will likely stimulate \$5 million in private-sector exploration expenditures (PDAC, 2010). This assertion demonstrates that for every \$1 invested by governments in public geoscience, exploration companies—using government geological information and publicly accessible data—have subsequently invested \$5 in ‘preliminary’ or grassroots exploration activities to identify exploration targets and advance their mineral properties. There is further suggestion that if a discovery is, in fact, made, the value of the resource—once mined—will be a minimum of \$125 (125 times greater) over the initial \$1 in public investment.

## Work 2000–present

Most of the CNGO's projects are funded primarily with project-specific funds. One of the key funders of the office has been the Strategic Investments in Northern Economic Development (SINED) program that has been supporting northern economic development since 2004. The SINED funding is currently administered by the Canadian Northern Economic Development Agency (CanNor). There have been four SINED agreements to date—two 5 year agreements (2004–2009, 2009–2014) and two 2 year agreements (2014–2016, 2016–2018).

Project-specific research focuses on several areas. Geoscience mapping work includes bedrock mapping, surficial mapping, geochemical surveys and aeromagnetic surveys. Detailed mineral-deposit work studies selected targets (e.g., the Meadowbank gold mine in central Nunavut, the Borden Basin of northern Baffin Island basins of the Kitikmeot Region). Thematic geoscience studies include energy-related research (uranium, petroleum) and geoscience research to protect investments in infrastructure (permafrost studies, aggregate studies). Capacity building and data dissemination includes communication and outreach efforts, peer-reviewed publications and online dissemination. Results from selected projects since 2012 have been published annually in the CNGO's *Summary of Activities* volume; these and other publications can be downloaded at [www.cngo.ca](http://www.cngo.ca).

### Increasing awareness of the importance of earth science for Nunavummiut

Another key component of the CNGO's work and mandate is to communicate the importance of geoscience and its results to communities across the territory. Communication and community engagement activities fulfill this mandate, as well as informing the public of the geoscience work conducted by the CNGO and its many collaborators.

#### *Communication and community engagement*

Communication and community engagement efforts are best done at three stages. The first stage involves discussions before the work starts, to gauge interest and support for the projects, and to inform communities and their citizens. Secondly, it is important to update people midway through the project, when there are results to share. It is equally important to return to communities after the project is complete, to discuss the results and leave finished products (i.e., maps) with the communities.

### Fury and Hecla Geoscience Project

The CNGO has identified a new multi-year (2017–2020) collaborative project, the Fury and Hecla Geoscience Project, which covers an area of northern Baffin Island north of Fury and Hecla Strait (Figure 1). This project will result in

new geological maps (parts of NTS 47C, D, E, F, G and H) of the bedrock, glacial deposits and permafrost of the area between Igloolik and Arctic Bay (Figure 1). Results from this work will be publicly available and will increase the understanding of the resource potential in this area, along with its sensitivity to climate change.

In January and February 2017, CNGO and GN-EDT representatives visited both Igloolik and Arctic Bay (Figure 2) and held several meetings with community elders, the Hunters and Trappers Association, Hamlet Council and other community members. In both communities, the high school was visited and students were introduced to geology as a potential career. In Igloolik, the visiting CNGO and GN-EDT professionals spoke on a radio talk show and provided more information to people who called in.

These community information sessions are critical to the success of CNGO projects. Many community members want information about geoscience mapping projects, such as where the camp will be located, how any impacts related to fieldwork will be lessened to avoid conflicts with wildlife (particularly caribou, an important source of food), what outputs will be produced from the work and potential job opportunities for local community members. Furthermore, many community members have hunted and travelled in proposed project areas and, therefore, have local knowledge about the area—from ideal places to camp, traditional camp sites, areas to avoid, location of archeological or culturally significant sites, and places that could support a landing strip for re-supply planes during the fieldwork. Both the CNGO and the communities view these meetings as information exchanges.

Several important comments were heard during the information meetings—communities welcome being consulted and informed and want, and expect, researchers to return to the communities during the project and after it is completed, to tell community members the results of the research and what was found. In these ways, communities feel involved and included in the work, and feel that they are informed and will be involved in any future decisions about the use of the land around their communities. Additionally, many community members want to understand how geoscience products are used and who uses them—the responses provided to communities are consistent with the comments that PDAC (2010) made about the value of geoscience information.

The Fury and Hecla Geoscience Project covers a portion of northern Baffin Island that has not been mapped or studied in any detail. Airborne geophysical surveys are commonly used as initial steps in a mapping project and are especially useful in areas of limited outcrop. In August 2017, the CNGO initiated an airborne geophysical survey (aeromagnetic and radiometric) over the southern portion of the pro-



**Figure 1:** Regional Google Earth™ map (Google, 2017) showing location of the proposed Fury and Hecla Geoscience Project field mapping area, boundaries of the airborne geophysical survey in 2017 and 2018, and proposed mapping program area for 2018 and 2019.

ject area. The CNGO has funded similar aeromagnetic surveys as a successful first step in several flagship projects in the recent past over Hall Peninsula (Dumont and Dostaler, 2010) as part of the Hall Peninsula Integrated Geoscience Program (2010–2014; Machado et al., 2013; Steenkamp and St-Onge, 2014) and an aeromagnetic survey of the McKeand River area, southern Baffin Island (Miles et al., 2015).

Another aeromagnetic survey in 2018 will cover the northern portion of the study area, funding and approvals permitting. New field mapping will start in the summer 2018 in the southern portion of the study area (Figure 1). In summer 2019, geologists will map the northern portion of the study area.

### Capacity building and outreach

One of the CNGO’s mandates is to build capacity—human and otherwise—in geoscience. Since its inception, the CNGO has initiated much capacity building in many ways. The office has hired northerners, including participants from a government-led Inuit Learning Development Program, to work both in the office (e.g., GIS interns, adminis-

trators, data manipulators) and in the field (e.g., geological summer field assistants, cook assistants, bear monitors). Additionally, the CNGO has delivered numerous workshops and presentations to the public (e.g., Nunavut Arctic College students, teachers, primary school and high school students and community members).



**Figure 2:** Community information sessions with the Arctic Bay community members and committees. Photo taken by R. Suluk, Manager, Community Mining Engagement, with the Government of Nunavut, Economic Development and Transportation Arviat office, Nunavut.

## ***Northern Geoscience Training Program***

One such project, the Northern Geoscience Training Program, was established in 2013 between the CNGO and Dalhousie University (Halifax, Nova Scotia). This program provided intensive hands-on training for northerners and could lead to exciting geoscience careers in the public or private sector (Young et al., 2014). The program has two components: a two week geological field school held in the spring with Dalhousie University for third-year undergraduate geology students and summer work experience with the CNGO. This program has already provided opportunities for ten young Inuit Nunavut Arctic College students (two in 2013, five in 2014 and three in 2015) and has also included participation from northerners from Yukon. This program was not run in 2016 or 2017; discussions are being held to restart this program likely for fieldwork in 2019.

## **Economic considerations**

Geoscience research and projects in Nunavut—and the data collected from such research—increases the overall level of knowledge of Nunavut’s geology and mineral potential. This increased understanding of the land enables all stakeholders to make informed, evidence-based decisions about responsible natural-resource development and land-use planning. Such knowledgeable decision-making will promote sustainable and responsible economic development and strengthen the territory’s economy through responsible natural-resource development.

## **Conclusions**

The CNGO, established in 1999, has evolved into an office that produces high-quality, relevant and applied research and publishes results in a timely manner through its annual *Summary of Activities*. As one industry representative said, “the work that the little CNGO office has done during the past few years has been exceptional”. The type of work that the CNGO and its many collaborators have been able to achieve and sustain, both through core mandate work and additional ‘value-added’ research, has proven that the Canada-Nunavut Geoscience Office is a successful partnership.

## **Acknowledgments**

I am now the fourth Chief Geologist of the CNGO. The first was D. Scott (1999–2003), the second was D. James (2004–2010) and the third was D. Mate (2011–2014). I have written this paper, building on the excellent work of my predecessors and the outstanding work provided by the scientists and other professionals—both with this office

over the years and those who have worked with the CNGO as partners and collaborators. I acknowledge, with thanks, the hard work and dedication to Nunavut from all who have gone before me and have contributed to our collective knowledge of geoscience in Nunavut. A review of this manuscript was provided by D. Mate.

## **References**

- Dumont, R. and Dostaler, F. 2010: Geophysical Series, NTS 25-I/SE and part of 25-I/SW, Aeromagnetic Survey Hall Peninsula, Nunavut; Geological Survey of Canada, Open File 6413, scale 1:100 000.
- Google 2017: Google Earth™ satellite image of Qikiqtalluk Region, Nunavut; Google, image, URL <<http://www.google.com/earth/earth.google.com/>> [©2017 Google – Imagery, ©2017 IBCAO, Landsat, November 2017].
- Machado, G., Bilodeau, C., Takpanie, R., St-Onge, M.R., Rayner, N.M., Skipton, D.R., From, R.E., MacKay, C.B., Creason, C.G. and Braden, Z.M. 2013: Hall Peninsula regional bedrock mapping, Baffin Island, Nunavut: summary of fieldwork; *in* Summary of Activities 2012, Canada-Nunavut Geoscience Office, p. 13–22.
- McCluskey, K. 1999: Million-dollar resources: geologist sets up new office in Nunavut; Northern News Services, October 18, 1999, URL <[http://www.nns.com/frames/newspapers/1999-10/oct18\\_99mining.html](http://www.nns.com/frames/newspapers/1999-10/oct18_99mining.html)> [November 2017; dead link].
- Miles, W., Mate, D.J., St-Onge, M.R. and Steenkamp, H.M. 2015: Aeromagnetic survey of the McKeand River area, southern Baffin Island, Nunavut; *in* Summary of Activities 2014, Canada-Nunavut Geoscience Office, p. 97–104.
- Nunatsiaq News 1999: Nunavut and Ottawa open geological office in Iqaluit; Nunatsiaq Online, October 8, 1999, URL <[http://www.nunatsiaqonline.ca/stories/article/nunavut\\_and\\_ottawa\\_open\\_geological\\_office\\_in\\_iqaluit/](http://www.nunatsiaqonline.ca/stories/article/nunavut_and_ottawa_open_geological_office_in_iqaluit/)> [November 2017].
- PDAC 2017: Data fact sheet, Government geoscience in support of mineral exploration; Prospectors and Developers Association of Canada, URL <[http://www.pdac.ca/docs/default-source/priorities/public-affairs/fact-sheet-geomapping.pdf?sfvrsn=9e446b5e\\_6](http://www.pdac.ca/docs/default-source/priorities/public-affairs/fact-sheet-geomapping.pdf?sfvrsn=9e446b5e_6)> [November 2017].
- Steenkamp, H.M. and St-Onge, M.R. 2014: Overview of the 2013 regional bedrock mapping program on northern Hall Peninsula, Baffin Island, Nunavut; *in* Summary of Activities 2013, Canada-Nunavut Geoscience Office, p. 27–38.
- The Northern Miner 1999: Gov’ts open Nunavut geoscience base – office part of federal effort to support northern mining projects; The Northern Miner, October 11–17, 1999, v. 85, no. 33.
- Young, M.D., Mate, D.J., Peyton, P., Sudlovenick, C. and Steenkamp, H.M. 2014: Geoscience field training for Nunavut students: a collaboration between the Canada-Nunavut Geoscience Office and Dalhousie University; *in* Summary of Activities 2013, Canada-Nunavut Geoscience Office, p. 213–219.

