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About Nunavut: Mining, Mineral Exploration and Geoscience Overview 2019
This publication is a combined effort of four partners: Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Government of Nunavut (GN), Nunavut Tunngavik Incorporated (NTI), and Canada-Nunavut Geoscience Office (CNGO). The intent is to capture information on exploration and mining activities in 2019 and to make this information available to the public and industry stakeholders.

We thank the many contributors who submitted data and photos for this edition. Prospectors and mining companies are welcome to submit information on their programs and photos for inclusion in next year’s publication. Feedback and comments are always appreciated.

Note to readers
This document has been prepared based on information available at the time of writing. All resource and reserve figures quoted in this publication are derived from company news releases, websites, and technical reports filed with SEDAR (www.sedar.com). Readers are directed to individual company websites for details on the reporting standards used. The authors make no guarantee of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.

All exploration information was gathered prior to December 2019. Exploration work was completed and reported during 2018 or 2019 for all projects with active status in this publication. Projects with inactive status had exploration work last completed on them in 2016 or 2017, have active mineral tenure, and may have valid land use permits and/or water licences as issued by CIRNAC and the Nunavut Water Board.

The term National Instrument 43-101 (NI 43-101) refers to a standard for the disclosure of scientific and technical information about mineral projects. This standard is supervised by the Canadian Securities Administrators (CSA), the regulatory body which oversees stock market and investment practices, and is intended to ensure that misleading, erroneous, or fraudulent information relating to mineral properties is not published and promoted to investors on the stock exchanges overseen by the CSA. Resource estimates reported by mineral exploration companies that are listed on Canadian stock exchanges must be NI 43-101 compliant.

Acknowledgements
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Cover photo:
This year’s cover is comprised of the past 20 years of Overview covers. We thank all our partners for their contributions over the last two decades.

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Twenty years of mineral exploration and mining in Nunavut

When Nunavut officially became a territory on April 1, 1999, the Nanisivik and Polaris zinc-lead-silver mines were both nearing the end of production, and the Lupin gold mine was on care and maintenance. Diamond exploration was underway, and kimberlites being discovered, in the Slave Province, on Victoria Island, and on northern Baffin Island. Tahera Diamond Corporation filed the project description for the Jericho diamond project to start the permitting process. Exploration for gold was in full swing at the George Lake, Hope Bay, Meadowbank, and Meliadine projects, and nickel-copper-platinum group elements (PGE) were sought from the Muskox Intrusion in the Bear Province and at Ferguson Lake in the Hearne Domain. Nunavut was ranked 6th in Canada for exploration and deposit appraisal with $37.4 million in expenditures.

Since 1999, Nunavut’s mineral production has fluctuated over the years. The Lupin gold mine re-opened in 2000, but was again placed into care and maintenance from August 2003 until March 2004, and finally ceased production in 2005. Both Polaris and Nanisivik closed in 2002, and have since been reclaimed. Following Lupin’s closure, there was no operating mine in the territory until the Jericho diamond mine opened in 2006, only to have the mine close down in 2008 due to financial losses. The Meadowbank gold mine began commercial production in March 2010, and is expected to cease in late 2019, having produced more than three million ounces of gold. The Mary River iron mine shipped its first ore to market in August 2015, and has continued operations under its “early revenue phase”. The Doris gold mine of the Hope Bay greenstone belt began commercial production in 2017. In 2019, the Meliadine and Amaruq gold mines each reached that milestone in May and September, respectively, briefly giving Nunavut five active mines with the start-up of operations at Amaruq and the cessation of production at Meadowbank.

Gold has long been a focus of exploration in Nunavut, generally second only to diamonds in the early years of the territory and making up more than three-quarters of exploration expenditures since 2014. Several projects that were in the early exploration phase in 1999 are active mines now: Meadowbank, Meliadine, and Hope Bay, with Back River nearing that goal. In addition to numerous grassroots projects, activity has been focused on the Hope Bay, Back River, and Committee Bay greenstone belts in the Kitikmeot; the rocks of the Woodburn Lake Group near Meadowbank and the Rankin-Ennadai greenstone belt in the Kivalliq; and the Piling Group of central Baffin Island. Attempts to bring the Lupin gold mine back into operation
largely ceased after 2013, and that property is in the process of being remediated, although there has been recent interest in reactivating the advanced Ulu project north of Lupin in the High Lake greenstone belt.

The diamond rush that started in the Northwest Territories in the 1990s continued after territorial division, leading to a large expansion in mineral tenure held in Nunavut. The pace of new tenure acquisition peaked in 2004 when 1,522 prospecting permits covering 25.9 million hectares were issued. Including existing permits and mineral claims, 43.1 million hectares of Crown land were held that year. The maximum area of Crown mineral tenure held was about 48 million hectares in 2005, consisting of approximately 2,250 prospecting permits, 9,650 mineral claims, and 332 mining leases. Since then, there has been a steady decline in mineral tenure held to the current total of approximately 5.5 million hectares as of November 2019.

Although much of the tenure acquired during the diamond staking rush of the early 2000s was later relinquished, diamond exploration continues to date in all three regions of Nunavut. Grassroots diamond exploration has decreased over the last decade, but several projects at which kimberlites were discovered in the early 2000s have continued to be explored to the present. Work has continued in the area between Rankin Inlet and Chesterfield Inlet, where close to 90 kimberlites are known, of which two have inferred resources; outside the community of Naujaat at the Q1-4 kimberlite, and northeast of Iqaluit on the Hall Peninsula at Chidliak.

A smaller uranium rush began in 2005, focused on the Hornby Bay Basin in the Kitikmeot and Thelon Basin in the Kivalliq. This renewed interest expanded into other areas of Nunavut from 2006 to 2008, including the Baker, Borden, Fury-Hecla, and Elu basins. Following the 2008 financial crisis, uranium exploration dwindled, continuing mainly around the Thelon and Baker basins. Uranium exploration in Nunavut largely ceased starting in 2016, following the federal ministerial decision that upheld the Nunavut Impact Review Board’s recommendation that the Kiggavik project, operated by AREVA (now called Orano Canada Inc.), not proceed to the licensing and permitting stage of the environmental assessment process.

In addition to the high-grade Mary River iron project on northern Baffin Island, which is currently in production, there have been several areas of Nunavut evaluated for their iron potential. From 2006 to 2012, portions of the Melville Peninsula were explored, and inferred resources established for the Roche Bay and Tuktu projects. Programs were also run in 2011 and 2012 to assess the Kiplu Formation on the Belcher Islands for iron, and one season was conducted at the Maguse project within the Rankin-Ennadai greenstone belt near Arviat in 2011.

Following the closures of Nanisivik and Polaris, base metal exploration in the territory has focused primarily within greenstone belts in the Slave Province and in the Coppermine River area of the Bear Province, with some work on the Melville Peninsula, on Somerset Island, and in the central Kivalliq. Work slowed in these areas following the 2008 financial crisis, and the two most advanced projects, the Izok Corridor and Hackett River zinc-lead-copper projects, entered care and maintenance in 2014 and 2013, respectively, based both on metal prices and their location which necessitated building expensive infrastructure to get resources to markets. A brief resurgence of interest in the Coppermine River area in 2014 and 2015 was curbed by the 2016 draft of the Nunavut Land Use Plan, which proposed to place prohibitions on mineral exploration in that area. In recent years, base metal exploration has been confined to Aston Bay Holdings’ Storm Zinc and Seal Silver targets on Somerset Island.

Nickel-copper-PGE exploration has been focused on the Muskox Intrusion in the Kitikmeot, and the Ferguson Lake area in the central Kivalliq, with limited efforts elsewhere, including Melville Peninsula, islands in the High Arctic, Southampton Island, and the Hall Peninsula on Baffin Island. Exploration for these commodities largely ceased after 2013.

There have been several attempts over the past twenty years to improve infrastructure to support the mining industry in Nunavut. Kitikmeot Corp. and a consortium of mining companies backed the Bathurst Inlet Port and Road project from the early 2000s until the project was shelved in 2008. The project was revisited by Xstrata Zinc Canada (now Glencore) and Sabina Gold & Silver Corp. in 2012 and 2013 before again being shelved. Sabina finally achieved a scaled-down version of the project in 2018, consisting of a marine laydown area and landing at Bathurst Inlet, connected to its Back River gold project by a winter road. MMG Resources Inc. initiated...
a feasibility study for the Izok Corridor Project in 2012, which proposed to connect the Izok and High Lake deposits to a port on the Coronation Gulf via a 325-km all-weather road. However, by 2014 MMG had determined the project was not economically feasible without additional partners to share the infrastructure costs. Since 2016, the Kitikmeot Inuit Association has supported and backed a revised version of this project, the Grays Bay Port and Road, which would involve a 227 km road linking the northern point of the Tibbett-Contwoyto winter road to a proposed port on Grays Bay. In the Kivalliq, Agnico Eagle Mines Ltd. has two all-weather roads that connect its projects to nearby communities: a 25 km road from Rankin Inlet to Meliadine, and a 110 km road connecting Baker Lake to Meadowbank, with a further 64 km extension completed in 2017 to link Meadowbank to Amaruq. Agnico is also supporting studies into the establishment of a hydro line running from Manitoba into the Kivalliq. In addition to the tote road between the Mary River Mine and Milne Inlet Port, Baffinland has proposed establishment of a rail line paralleling the road and, eventually, a rail line south to a proposed port at Steensby Inlet.

Several other commodities have been explored for in Nunavut. A small naturally-blue sapphire deposit near Kimmirut was found by prospectors in 2001 and optioned to True North Gems that explored the property through 2009. Although the mineral tenure has since lapsed, a single claim was staked over this deposit in 2019. Limited coal exploration took place on Axel Heiberg and Ellesmere islands from 2007 through 2012. A lithium-rich pegmatite occurrence west of Bathurst Inlet was briefly explored in 2009, and several rare earth element occurrences associated with uranium were investigated in various parts of the Kivalliq in 2011.

Nunavut in 2019 has matured from the primarily grassroots exploration of twenty years ago to having several producing mines, with more on the horizon including Sabina Gold & Silver Corp.’s Back River gold project, additional mines within TMAC Resources Inc.’s Hope Bay project, and the potential of a diamond mine at Chidliak. Nunavut is 6th in Canada for mineral production. Although exploration has been reduced the last several years, several initiatives are underway to increase Nunavut’s attractiveness, including the implementation of online mineral claim selection in 2021, and a territory-wide Nunavut Land Use Plan to provide certainty to industry on what ground exploration may occur.

February 2000
Lupin gold mine resumes production

April 2001
Vault deposit discovered at Meadowbank gold project

April 2001
DIAND’s Mineral Resources division opens in Iqaluit
Land Tenure in Nunavut

Spanning two million square kilometres (km²), the territory has 25 communities and a population of 37,996. Inuit represent 85 per cent of the residents, creating the foundation of the territory’s culture and values. With the exception of Baker Lake, communities are located on coasts, where hunting and fishing traditionally sustained Inuit. There is no road access to Nunavut, nor are there roads connecting communities within the territory. Access is mainly by air with ships delivering supplies during the open water season.

As a modern day treaty, the Nunavut Agreement provides certainty and clarity of rights to ownership and use of lands and resources within Nunavut. It gave Inuit fee simple title to 356,000 km² of land, making the Nunavut Agreement the largest Indigenous land settlement in Canadian history. There are 944 parcels of Inuit Owned Land (IOL) where Inuit hold surface title only. The Crown retains the mineral rights to these lands. Inuit also hold fee simple title including mineral rights to 150 parcels of IOL, which totals 38,000 km² and represent approximately two per cent of the territory. Surface title to all IOL is held in each of the three regions (Kitikmeot, Kivalliq and Qikiqtani) by the respective Regional Inuit Association (RIA) while title to subsurface IOL is held and administered by Nunavut Tunngavik Incorporated (NTI). Exploration agreements and mineral production leases are negotiated by NTI on land where it owns the subsurface rights, while access permission and land use licences are granted by RIAs on all IOL.

The Government of Canada administers sub-surface rights for the remaining 98 per cent of Nunavut. Prospecting permits, mineral claims, and mineral leases are issued pursuant to the Nunavut Mining Regulations by Crown-Indigenous Relations and Northern Affairs Canada’s (CIRNAC) Nunavut Regional Office. Surface rights for Crown land are administered according to the Territorial Lands Act and its regulations. Carving stone and building materials are administered pursuant to the Territorial Quarrying Regulations and are also issued by CIRNAC’s Nunavut Regional Office.

For more information on the location of IOL and Crown land in the territory, refer to the Nunavut Mineral Exploration, Mining and Geoscience Projects 2019 Map. For details on mineral tenure, visit the Nunavut Map Viewer at https://services.aadnc-aandc.gc.ca/nms-scn/gv/index.html. The table on page four displays the number of prospecting permits, mineral claims and mineral leases held in good standing as of November 2019 and the accompanying figure illustrates the location and extent of this mineral tenure.

Concentrate shed at Polaris lead-zinc mine, 2002 - courtesy of CIRNAC

Nanisivik lead-zinc mine closes

September 2002

July 2002

Polaris lead-zinc mine closes

March 2003

Miramar files Doris North project description
Mineral Tenure in Good Standing in Nunavut

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<td>487</td>
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Source: CIRNAC

Exploration and Deposit Appraisal Expenditures in Nunavut

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<td>168.9</td>
<td>116.0</td>
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<td>TOTAL</td>
<td>256.7</td>
<td>535.6</td>
<td>422.5</td>
<td>257.6</td>
<td>158.0</td>
<td>215.0</td>
<td>204.5</td>
<td>177.0</td>
<td>155.6</td>
<td>166.5</td>
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Source: Natural Resources Canada | *Revised spending intentions released September 2019
Crown-Indigenous Relations and Northern Affairs Canada

Representing one-fifth of Canada’s land mass, Nunavut has tremendous resource potential and is a place of significant opportunity for Inuit, Northerners, and all Canadians. Statistics released by Natural Resources Canada indicate there was a modest recovery in exploration and deposit appraisal expenditures in Nunavut for 2019, increasing to $166.5 million and fifth in Canada up from $155.6 million and sixth in 2018. Most of this amount was incurred by senior companies, representing 73.3 per cent, reflecting the still-challenging investment climate for junior companies and uncertainties regarding land access. With two new mines entering production in 2019, mine complex development spending increased and spending on capital assets remained high. Expansions are planned for at least two existing mines in 2020, suggesting that these expenditures will remain high.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)’s mandate related to mineral resource development in Nunavut includes the implementation of the Nunavut Agreement, the administration of surface and subsurface rights on Crown land, and the stewardship of land and water resources.

IMPLEMENTATION OF THE NUNAVUT AGREEMENT

Signed in 1993, the Nunavut Agreement guarantees the right of Inuit to participate in decision-making concerning the use, management, and conservation of land, water, and resources. To support this, the Nunavut Agreement created five institutions of public government:

- Nunavut Planning Commission (NPC) prepares and assesses compliance with land use plans;
- Nunavut Impact Review Board (NIRB) conducts environmental assessments;
- Nunavut Water Board (NWB) manages fresh water resources;
- Nunavut Surface Rights Tribunal manages disputes related to surface rights; and
- Nunavut Wildlife Management Board manages wildlife.

ADMINISTRATION OF SURFACE AND SUBSURFACE RIGHTS

Nunavut is the last jurisdiction in Canada where the Government of Canada, rather than the province or territory, administers Crown land. On August 15, 2019, the Minister of Crown-Indigenous Relations and Northern Affairs Canada, the Premier of Nunavut, and the President of Nunavut Tunngavik Incorporated signed an Agreement-in-Principle for the devolution of land, rights in respect of waters and natural resource management in Nunavut. Devolution in Nunavut is an essential step in the political and economic development of the territory. The signing of the Agreement-in-Principle is a significant milestone towards placing decision-making power over lands and resources into the hands of Nunavut residents, while ensuring that economic and other benefits of resource development in the region are shared with the people of Nunavut. The next step is the negotiation of a Final Devolution Agreement, which is expected within five years.

Map Selection and the Nunavut Mining Regulations

The proposed amendments to the Nunavut Mining Regulations, allowing for the replacement of ground staking on Crown lands in Nunavut with the selection of mineral claims on an online map, were published in the Canada Gazette Part I.

September 2003

- Q1-4 kimberlite discovered at Qilalugaq (Naujaat) project

Baffinland revives Mary River iron project

January 2004

- Jericho project certificate issued to Tahera

July 2004

**Crown-Indigenous Relations and Northern Affairs Canada’s Nunavut Regional Office**

The Mining Recorder’s Office administers subsurface rights on Crown land in the territory. As of November 2019, there are 137 active prospecting permits, 2,588 mineral claims, and 519 mineral leases.

The area held as mineral claims, prospecting permits, and mining leases, including those on Crown land and grandfathered leases on Inuit Owned Land, totals 5.53 million hectares as of November 2019.

The Mineral Resources Division reviews annual work reports that, under the Nunavut Mining Regulations, mineral rights-holders must file to show that they have met minimum annual work requirements. The reports are confidential for a period of three years, after which they are released to the public on www.nunavutgeoscience.ca. In 2019, 17 reports documenting $7.06 million worth of work were released to the public.

Several divisions of Crown-Indigenous Relations and Northern Affairs Canada’s Nunavut Regional Office are involved in the stewardship of land and water resources. This includes participating in the regulatory process, enforcing authorizations and licences issued by Institutions of Public Government (IPGs) or CIRNAC, enabling water quality and quantity monitoring that informs decision-making, and co-development of water management strategies.

The Impact Assessment Division and a Socio-economic Analyst participate in the Nunavut Impact Review Board (NIRB)-led environmental assessments. In 2019, the Impact Assessment Division and the Socio-economic Analyst provided environmental and socio-economic expertise and technical review comments to the NIRB related to environmental assessments of two major project proposals and forty eight smaller proposals. The Division also reviewed five annual monitoring reports, submitted by proponents of major projects, to ensure they complied with terms and conditions of existing project certificates.

The Water Resources Division participates as an intervenor in water licensing processes of the Nunavut Water Board. So far in 2019, the Water Resources division has provided technical advice and comments on about 161 Nunavut Water Board processes including water licence amendments, renewals, cancellations, and management plans. The Water Resources Division also reviewed annual reports for major projects and municipal water licences.

The Water Resources Division works in partnership with Environment and Climate Change Canada (ECCC) to monitor water quantity. Currently, there are 25 hydrometric stations across Nunavut. The Water Resources Division is also involved in monitoring water quantity and quality across Nunavut.

Water quality is monitored through the review of water quality monitoring reports and participation in water quality monitoring initiatives. One of these initiatives is part of a Memorandum of Agreement with the Kivalliq Inuit Association that involves the monitoring of water quality around mining and exploration activities in the Kivalliq Region. Another water quality monitoring initiative involves water sampling and analysis in and around the City of Iqaluit, and is conducted solely by the Water Resources Division.

The Water Resources Division is also supporting the co-development of a Nunavut Water Management Strategy through collaboration with the Nunavut Water Board, Nunavut Tunngavik Incorporated, Government of Nunavut, Nunavut Planning Commission and people of Nunavut.

The Field Operations Division ensures compliance with the Nunavut Waters and Nunavut Surface Rights Tribunal Act, the Territorial Lands Act, the Nunavut Planning and Project Assessment Act, the Arctic Waters Pollution Prevention Act and related regulations. They also conduct inspections of sites that hold land-use permits, leases, and water licences to ensure compliance with the terms and conditions contained in these authorizations.

The Land Administration division, in addition to the responsibilities explained above, supports the licensing and environmental assessment processes by incorporating terms and conditions of project certificates into the authorizations they issue.
In addition to the monitoring noted above, CIRNAC hosts the Nunavut General Monitoring Plan (NGMP) Secretariat. NGMP is mandated under Article 12.7.6 of the Nunavut Agreement and the Nunavut Project Planning Assessment Act to monitor socio-economic and ecosystemic conditions within the Nunavut Settlement Area and to periodically report on findings. NGMP, through targeted investments, funds research initiatives that complement or build on existing knowledge and priorities. The purpose of this monitoring is to increase public access to important ecosystemic and socio-economic information and to inform decision-making. The NGMP is a partnership overseen by a steering committee comprised of CIRNAC, on behalf of the Government of Canada, the Nunavut Planning Commission, the Government of Nunavut, and Nunavut Tunngavik Incorporated.

Between 2019 and 2022, NGMP will fund 10 projects with a total budget request of $2.1 million.

Work toward the implementation of the science program for the Inuu’tuti cumulative effects water monitoring project continues. Inuu’tuti is a watershed-based monitoring program for the Baker Lake Basin and is a collaborative initiative managed via a steering committee made up of the NGMP, CIRNAC’s Water Resources Division, the Kivalliq Inuit Association, and the Nunavut Water Board. In addition, NGMP continues to fund and work with community partners and researchers in Baker Lake and Chesterfield Inlet to implement a community-based water monitoring program that monitors impacts and effects of importance to the residents of those communities. The community-focused data the monitoring program is collecting will complement the work being done by Inuu’tuti at the watershed level.
The Government of Nunavut (GN) is committed to supporting a strong and diversified minerals industry based on best practices of sustainable development and partnerships between Nunavummiut and industry. Economic growth through responsible development in all sectors is an on-going priority. Nunavut’s abundance of natural resources is an important contributor to long-term prosperity and success.

The opening of the Meliadine gold mine and the start of mining operations at Amaruq marks a major turning point in sustaining the resource development sector in Nunavut. Ore from the Whale Tail pit at Amaruq will allow processing facilities at Meadowbank to continue operating long after the mining operations at Meadowbank have been terminated. These two deposits join the Mary River iron mine on northern Baffin Island and gold mining operations at Doris North, near Hope Bay. Mines in all three regions enable Nunavummiut from across the territory to derive employment benefits. As other exploration projects proceed through advanced development stages and project approval processes, the GN is committed to support further participation of Nunavummiut in the many resource related opportunities on the horizon.

The GN Department of Economic Development and Transportation (EDT) provides guidance and economic support to prospectors, exploration and mining industry. EDT’s Minerals and Petroleum Resources Division prioritises geoscience information, resource management, prospector skills development, carving stone supplies, community education and awareness, as well as investor confidence, and socio-economic monitoring. The Division has its headquarters in Iqaluit, with resident geologists based in Arviat and Cambridge Bay. EDT has regional offices in Kugluktuk, Rankin Inlet, Pond Inlet, and Pangnirtung.

MINING STRATEGY AND MINERAL EXPLORATION

Parnautit: A foundation for the future (2007) and Ingirrasiliqta: Let’s Get Moving (2009), are EDT’s two key strategies outlining GN's priorities for natural resource development (www.gov.nu.ca/edt/information/strategies). Parnautit, Nunavut’s mineral exploration and mining strategy describes the vision for mineral exploration and mining in the territory and aims to create an attractive environment for the minerals industry sector that ultimately contributes to an improved quality of life for Nunavummiut. Many of the priorities for development in the past two decades since the creation of Nunavut have been achieved however a great many remain unfulfilled. More work needs to continue to ensure the next two decades and beyond are even more prosperous for Nunavummiut.

Ingirrasiliqta, Nunavut’s Transportation Strategy, guides projects that focus on new marine infrastructure across the north such as small craft harbours, improvements to sea-lift landing areas, and a commitment to developing a deep sea port in Iqaluit planned for completion by 2020. The Iqaluit International Airport, a public-private partnership opened in August 2017 helped establish better services and stronger links to northern communities.

Other partnerships currently in development aim to enhance community access roads and to construct and operate new all-season or winter transportation corridors, including improvements to access and increased capacity for information transmission. These strategic visions are shared between several partners, including various Canadian industry associations, Nunavut Tunngavik Incorporated (NTI) and the Government of Canada (GoC).

Uranium Policy Statement

In 2012, the GN released a uranium policy statement (www.uran.nu.gov.nu.ca) to highlight the importance of safe and responsible development of uranium mineral resources. Uranium mined in Nunavut shall be used only for peaceful and environmentally responsible purposes and be subject to international agreements and national law; however, any proposed mine must also have the support of Nunavummiut, especially in communities close to development projects. The GN supports the mandate and responsibilities of the Canadian
Nuclear Safety Commission and recognizes the jurisdiction and important roles of the Nunavut Impact Review Board and the Nunavut Water Board as established by the Nunavut Land Claims Agreement in the regulation of uranium exploration and mining.

**Nunavut Geoscience**

The GN remains strongly committed to improving public geoscience as a means of encouraging new exploration investment. EDT provides core funding and additional program support for territorial mapping and geological research to the Canada-Nunavut Geoscience Office (CNGO).

**Impact Assessment and Monitoring**

EDT is the GN’s lead department on the assessment and management of socio-economic impacts and benefits associated with mineral development. EDT participates in environmental assessment processes in Nunavut through the GN’s Environmental Assessment Review Team (EART). Focused on both environmental and socio-economic impacts and comprising two committees and a lead coordinator, the EART ensures resource development projects are carried out responsibly. Together with the Environmental and Human Health Assessment Committee, led by the Department of Environment, EART reviews environmental impact statements submitted to the Nunavut Impact Review Board (NIRB) and actively participates in technical meetings, hearings, and regulatory workshops. Since the inception of the EART in 2012, the GN has participated in all NIRB processes for the review of major mining projects. In 2019, the GN participated in two NIRB reviews: (1), Agnico Eagle Mines’ Whale Tail Pit Expansion Project, which was recommended for approval by the responsible federal ministers in October 2019, and (2), Baffinland’s Mary River Phase 2 Expansion Project, which underwent a public hearing in Iqaluit and Pond Inlet in November 2019.

In addition to responsibilities for impact assessment, EDT continues to take a leading role in ongoing socio-economic monitoring of approved projects. The department leads three regional socio-economic monitoring committees in Nunavut (nunavutsemc.com). The committees’ primary purpose is to monitor the socio-economic impacts and benefits associated with major resource developments and determine if they are occurring as predicted in a given project environmental impact statement. The reviews provide a venue for a variety of stakeholders to take part in meaningful discussions surrounding resource development.

In 2018 the department took the first step towards a comprehensive territory-wide mineral monitoring framework and published the first Nunavut Socio-Economic Monitoring Report -- “Tunngavia: Foundations for Development”. The report tracks a comprehensive list of Valued Socio-Economic Components and associated indicator data to provide a fulsome overview of the impacts of mining and mineral development on Nunavummiut. The report will be produced annually using data from projects’ socio-economic monitoring programs, the Nunavut Bureau of Statistics, and Statistics Canada to be the definitive guide to the relationship between Nunavut and the mining industry.

**Petroleum Resources**

Petroleum exploration in Nunavut began in 1962 and occurred throughout the territory until 1986. Nunavut is estimated to hold approximately a quarter of Canada’s petroleum resource endowment. Current resources discovered in Nunavut are held in 20 licensed fields, mostly in the Sverdrup Basin in the High Arctic. These resources total almost two billion barrels of crude oil and 27 trillion cubic feet of natural gas. For 10 years (1986-1996), oil production occurred in Nunavut at the Bent Horn field on Cameron Island. In total, approximately three million barrels were produced and it is estimated that another three million barrels remain at Bent Horn.

Naturally occurring oil seeps exist in some marine regions of Nunavut. The Scott Inlet seep, located north of Clyde River in Baffin Bay, has been well-known to locals for years. Approximately 50,000 barrels of crude oil seep from several locations in the area’s sea floor each year. During the summers of 2018 and 2019 EDT sent research crews to investigate the phenomenon. Samples of the slicks were collected and wildlife observations were recorded. A summary report will be shared in 2020. The study is conducted in partnership with NRCan, NAC, the Hamlet of Clyde River, NTI, and the Marine Institute.
On December 20th, 2016, the Government of Canada announced a moratorium on oil and gas activity in Canadian Arctic waters. This decision will be revisited through a science-based review ending in 2021. In February 2017, the Minister of Indigenous and Northern Affairs Canada (INAC) appointed the Nunavut Impact and Review Board (NIRB) to conduct a Strategic Environmental Assessment (SEA) for Baffin Bay and Davis Strait. The NIRB submitted their final report during the summer of 2019. The study will be used to inform the Minister of INAC’s decision in 2021.

The NIRB and the SEA working group toured 10 Baffin communities (Qikiqtarjuaq, Pangnirtung, Clyde River, Arctic Bay, Pond Inlet, Grise Fiord, Resolute, Cape Dorset, Kimmirut and Iqaluit) to share the NIRB’s report and recommendations including next steps for the five year review. The GN will continue to actively participate in the SEA process and the five year review of the moratorium.

Carving Stone Deposit Evaluation Program

The Nunavut Carving Stone Deposit Evaluation Program led by EDT in collaboration with the CNGO, universities and local Inuit organizations was conceived to locate and evaluate known and new carving stone deposits, assess their artisanal suitability, and quantify the potential of these sources to supply nearby communities. Sample material was collected for archival, analytical and exhibition purposes.

Over 119 carving stone resource sites were evaluated, many of which are located near communities. Results indicated that 17 out of 25 communities have an adequate supply of local carving stone resources to meet long term demands. In addition to 12 quarries, there are 20 undeveloped deposits with sufficient supply to provide stone for several decades to the nearest communities. Some communities where resources are limited by supply or are becoming depleted include Arviat, Chesterfield Inlet, Grise Fiord, Repulse Bay and Whale Cove.

In Nunavut, most carving stone is gathered seasonally at two large quarries which have been in operation since the 1970s. Korok Inlet quarry is the premier producer of carving stone for south Baffin, supplying the communities of Cape Dorset, Kimmirut and Iqaluit with an estimated 450 tonnes per year of excellent quality artisan serpentinite. The main quarry in the Belcher Islands supplies Sanikiluaq carvers with approximately 50 tonnes per year of excellent quality artisan marble.

Prospector Development

Since 1999, EDT geologists have offered an annual Introduction to Prospecting Course (IPC) over a one-week period to interested residents. The program over the past two decades has been popular with over 1,200 participants completing the one-week course given during the summer months. To date, IPC has been delivered 122 times and in every community throughout the territory. This year 48 people in Arviat, Baker Lake, Cape Dorset, Chesterfield Inlet, Hall Beach, Rankin Inlet, Kugluktuk and Rankin Inlet successfully completed the training. IPC outlines basic principles of geology and practical skills to encourage an interest in prospecting and to apply Nunavummiut knowledge of the land to mineral exploration.

Nunavut Prospectors Program

Operated by EDT, the Nunavut Prospectors Program (NPP) encourages mineral prospecting in Nunavut. Many participants who have successfully completed IPC have subsequently applied to the NPP to start their own projects. Successful applicants qualify for a financial contribution of up to $8,000 (per recipient, per year) towards expenses to carry out their own work. To qualify for funding, a prospector must be a resident of Nunavut, hold a valid Prospector’s License, and have demonstrated prospecting experience or have completed the IPC. Contributions are awarded on the basis of the project proposal and past performance of the applicant in the program. In 2019, four projects were awarded funding from the NPP.

Community Engagement Support Program

In 2019, EDT began the formal roll-out of the Community Engagement Support Program (CESP). Designed to replace the Fuel Tax Rebate and Development Partnership Agreement Policy, the CESP is designed to support exploration and junior mining companies complete community engagement and consultation work in the early phases of project development.
when community support and buy-in are critical. Effective stakeholder engagement can lead to increased valuations for junior mining and exploration companies, making the territory a more economically viable and attractive jurisdiction in which to operate.

Under the program, companies are eligible to apply for up to $100,000 in funding annually to support engagement work in Nunavut communities near their project sites. Eligible expenses under the program include costs associated with direct engagement activities, including travel, document preparation, translation services, and facility rentals, as well as salaries to hire a project liaison employee or employees from within the potentially impacted community.

To qualify for funding, the applicant must provide a draft Community Engagement Plan that considers the communities closest to the project location, identifies potential concerns and benefits, and endeavours to meaningfully engage communities in project planning, monitoring, and reporting. Additionally, the applicant must have a signed authorization from a community organization in a potentially impacted community indicating that the organization has reviewed and approved of the plan. For application materials and further information, please visit the program website: https://gov.nu.ca/economic-development-and-transportation/programs-services/community-engagement-support-program.

Community Education and Training
EDT collaborates with various stakeholders to plan and coordinate mining-related education and training programs in Nunavut. EDT along with the Department of Education, Department of Family Services, Nunavut Arctic College, Nunavut Tunngavik Incorporated, the regional Inuit associations and industry partners, plan and undertake a number of initiatives to facilitate the participation of Nunavummiut in the opportunities the minerals industry bring to Nunavut.
The Nunavut Mine Training Fund provides our training partners with leverage funding to develop, coordinate, and deliver mine training programs for Nunavut Inuit that will give them specific training as required by mining companies which could lead to direct employment. EDT contributes $200,000 annually to the fund, while the Nunavut Mine Training Roundtable is responsible for reviewing applications and allocating training funds to approved training programs in Nunavut. Over the last five years, the Nunavut Mine Training Fund budgeted a total of one million dollars which has resulted in over 1,400 trained participants as well as resource materials and publications being produced.

The Science Education Enabling Program (SEEP) is intended to encourage Nunavut students gain interest in the field of Science, Technology, Engineering and Mathematics. The two components of SEEP are the Math and Science Awards Fund and the Independent Science Programs for Youth.

The Math and Science Awards Fund is a cash-award program for student recipients who demonstrate strong comprehension, good work habits, and interest in mathematics and sciences. Each school in Nunavut selects award winners from Grades 8 ($175), 10 ($275) and 12 ($350). The award is accompanied by a certificate from EDT and students’ achievements are recognized at their schools’ end of year. Over a 5-year period, 221 students throughout Nunavut were awarded over $51,000 for their excellence in the subjects of math and science.

The Independent Science Programs for Youth has funded a number of extra-curricular activities offered by local and national organizations, which have consistently delivered their programs for Nunavut students over the past decade and continue to show their commitment to Nunavut in the years to come.

In the past 5 years, EDT contributed over $370,000 to the educational organizations and charities that have engaged over 25,000 students in Nunavut. EDT provides a portion of funding required by the organizations to carry out their programming, other funders range from private to national funding agencies.

For more information, please contact the Minerals and Petroleum Resources Division of EDT.

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December 2009

Complex consolidates control of Meliadine gold project
Nunavut Tunngavik Incorporated (NTI) is the Inuit organization responsible for overseeing the implementation of the Nunavut Agreement. NTI’s mandate includes safeguarding, administering and advancing the rights and benefits of the Inuit of Nunavut, as set out in the Nunavut Agreement, to promote their economic, social and cultural well-being through succeeding generations.

The Nunavut Agreement is an agreement between the Inuit of the Nunavut Settlement Area, as represented by NTI (formerly Tunngavik Federation of Nunavut from 1982 to 1993) and her Majesty the Queen in Right of Canada. It was signed on May 25, 1993 in Iqaluit, Northwest Territories by Brian Mulroney, Prime Minister of Canada, and by Paul Quassa, the President of Nunavut Tunngavik Incorporated. The Parliament of Canada passed the Nunavut Land Claims Agreement Act on June 10, 1993 and the Nunavut Agreement came into force on July 9, 1993.

Nunavut Day is celebrated annually on July 9 to commemorate the passing of the Nunavut Land Claims Agreement Act (1993) as well as the Nunavut Act (1993), which enabled the 1999 establishment of the Nunavut Territory.

Since Nunavut has been established, NTI has developed mining, uranium and reclamation policies that have helped industry better understand the unique exploration opportunities Nunavut has to offer and the ecosystemic integrity Inuit want to protect and promote. For over twenty years Nunavut has seen successful mineral exploration and development, from grassroots exploration to three operating mines bringing in royalties for Nunavut Inuit. Mineral, oil and gas exploration and development have also led to good jobs, specialized training and new infrastructure, and have been catalysts for regional economic development across the Kitikmeot, Kivalliq and Qikiqtani regions of Nunavut. While several socio-economic, cultural, environmental and industry considerations remain, NTI is committed to working with Nunavut’s three Regional Inuit Associations to better the lives of all Nunavummiut through the implementation of the Nunavut Agreement.

NTI uses a map selection system for the acquisition of mineral rights. Interested parties submit to NTI an expression of interest, which includes a detailed map of the proposed exploration area. Expressions of interest and subsequent correspondence and negotiation are kept confidential by NTI and by the applicable Regional Inuit Association until required to be made public—typically upon signing of a Mineral Exploration Agreement (MEA) between NTI and the applicant.

Although the process described above normally applies, NTI—as a private organization—has complete discretion as to whether it will issue an MEA (or other agreement), as to what the process will be to obtain an agreement, and as to what the terms of the agreement will be. The terms may include, for example, NTI holding a direct interest option in a project or additional benefits such as shares or milestone payments.

Under the standard terms, successful applicants—upon executing the MEA and submitting the first year’s annual fees—will be granted the exclusive right to explore for minerals throughout the exploration area. In order to gain access to the land, however, the applicant must first obtain a surface right such as a land use license issued by the respective Regional Inuit Association.

Agnico Eagle pours first gold bar
at Meadowbank mine

Sabina discovers Llama and Umwelt
gold deposits at Back River

Start of commercial production
at Meadowbank mine

March 2010

February 2010
Holders of MEAs are required to submit exploration work reports to NTI annually, reports that remain confidential for a period of up to three years.

**URANIUM, MINING AND RECLAMATION POLICIES**

Nunavut Tunngavik Incorporated has developed a series of policies applicable to exploration and mining, specifically a Mining Policy, a Uranium Policy, and a Reclamation Policy for Inuit Owned Lands.

The policies were created by NTI to support and promote mining and mineral development in Nunavut, while protecting the ecosystemic integrity of the Nunavut Settlement Area. Some of the key objectives of these policies are to ensure that:

- there are minimal negative environmental and socio-economic impacts;
- Inuit cultural and social needs are respected;
- investment in Nunavut is encouraged;
- land-use conflicts are resolved equitably; and
- Inuit economic opportunities are maximized.

The policies are available on NTI’s website at https://ntilands.tunngavik.com.

**PROJECTS ON INUIT OWNED LANDS**

Many of the advanced exploration projects in Nunavut fall on Inuit Owned Lands parcels for which NTI is the mineral title owner. The adjacent table summarizes the current active MEAs and their locations.

Grandfathered leases are mineral leases which were established on Crown land that then became Inuit Owned Lands after the Nunavut Agreement was signed in 1993. The grandfathered leases continue to be managed by the Crown, although the leases’ rental fees and royalty are transferred to Nunavut Tunngavik Incorporated.

<table>
<thead>
<tr>
<th>August 2010</th>
<th>January 2011</th>
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<tbody>
<tr>
<td>Shear Diamonds acquires Jericho mine</td>
<td>Arcelor-Mittal and Nunavut Iron Ore purchase Baffinland Iron Mines Corp.</td>
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Agnico Eagle acquires Comaplex Minerals and its Meliadine project

Haul truck with a full load of iron ore from Deposit 1, Mary River mine - courtesy of CIRNAC
1. The project involves Crown land and land held under NTI MEAs and grandfathered leases.
2. The Boston deposit is located on surface IOL, while the Doris, Madrid, South Patch, Naatok and Suluk deposits are on subsurface IOL, distributed among grandfathered leases and NTI MEAs. Potential extension of the Boston deposit down-dip or along strike to the north will also be on subsurface IOL.
3. The project involves land held under NTI MEAs, grandfathered leases, and the Vault Mineral Production Lease issued by NTI.
4. The project involves land held under NTI MEAs as well as grandfathered claims and leases.
5. The Mary River mine is located on a grandfathered lease. Additional showings and deposits in the area are located on a mixture of subsurface IOL and Crown land.
Canada-Nunavut Geoscience Office Overview

The Canada-Nunavut Geoscience Office (CNGO) was established in 1999 through the signing of a Memorandum of Agreement (MoA) on Government Geoscience Program Coordination in Nunavut between the Government of Canada (Natural Resources Canada [NRCan], the Department of Indian Affairs and Northern Development [DIAND], now Crown-Indigenous Relations and Northern Affairs Canada [CIRNAC]) and the Government of Nunavut (GN).

The MoA followed a 1998 Treasury Board submission led by DIAND that set out incremental costs to the two federal departments. NRCan’s submission included requirements for the costs to NRCan’s Geological Survey of Canada (GSC) and DIAND for establishing a co-ordinated geoscience delivery within Nunavut.

The long-term goal was to devolve the CNGO to the Government of Nunavut in order to establish a geological survey for the territory. The original intention of the 1999 MoA was that the CNGO would devolve to the GN when the MoA expired in March 2004. However, until very recently, the Government of Nunavut has not been in a position to take over the office.

On August 15, 2019, the federal government announced the signing of an Agreement-in-Principle (AIP) between the federal government, the Government of Nunavut and NTI. This AIP is a significant step toward Nunavut assuming control over its Crown lands and natural resources, with one chapter devoted to how this agreement affects the CNGO. The CNGO is seen as a success story and one of the first key pieces in devolution for the territory.

Five separate five-year cost-sharing agreements have been signed between the three partners for the operational running of the CNGO. These agreements have defined CNGO office operations, its management structure, and funding envelopes. With the AIP signed, the most recent agreement (2018-2023) will remain in effect until devolution.

The Chief Geologist of the CNGO reports to a Management Board that consists of representatives from our partners and ex-officio member Nunavut Tunngavik Incorporated (NTI). NRCan manages the office on behalf of its partners and is the employer of CNGO staff.

ABOUT THE OFFICE

Development of Nunavut’s mineral and energy resources, and the infrastructure required to develop such resources and support Nunavut’s communities, forms an important foundation for the territory’s economy. The CNGO’s mandate is to conduct geoscience research that supports responsible resource and infrastructure development and land use planning, build geoscience capacity, disseminate geoscience data and results, and conduct geoscience outreach. CNGO delivers a diverse program that includes regional geoscience mapping, mineral district and deposit studies, industrial minerals and aggregates, climate change adaptation, data dissemination, and carving stone evaluation.

CNGO is based in Iqaluit and functions with an annual operational budget of $1.4 million from the three partners and annual project funding ($1.2 million, on average, since 2005) from the Government of Nunavut, Economic Development and Transportation (GN-EDT) through CanNor (the Canadian Northern Economic Development Agency) under the SINED (Strategic Investments in Northern Economic Development) funding and programming.

October 2011

Sabina sells Hackett River to Xstrata Zinc (Glencore)

Newmont puts Hope Bay project into care and maintenance

January 2012

Shear Diamonds begins recovering diamonds from concentrate stockpiles at Jericho

April 2012
CNGO STAFFING

In December 1999, Chief Geologist Dr. David Scott hired the CNGO’s first employee, Celine Gilbert, as the GIS/Multimedia Specialist; Celine celebrates her 20th year with the CNGO in 2019. Dr. Scott, in 2000, subsequently hired four research scientists: Dr. Hamish Sandeman, Dr. Ted Little, Dr. Elizabeth Turner and Dr. Ross Sherlock. In 2005, there was a significant turnover of employees, with all scientists leaving and Dr. Donald James hired as the second Chief Geologist.

David Mate and Paul Budkewitsch successively acted in the Chief Geologist role when Dr. James departed in 2010, and David Mate became the third Chief Geologist from 2011 to 2014. Linda Ham became the fourth Chief Geologist in 2015, on an Interchange Canada agreement and ‘secondment’ from the GN-EDT. Mid-June of 2019, Linda officially became an NRCan employee.

Currently, the CNGO is fully staffed with six positions. These employees are: Linda Ham (Chief Geologist), Dr. Shunxin Zhang (Paleozoic Geologist; started in 2006), Tommy Tremblay (Surficial Geologist; started in 2009), Lorraine Lebeau (Bedrock Geologist; started in 2019), Celine Gilbert (GIS Specialist; started in 1999) and Serge Basso (Geotechnology Analyst; started in 2010).


Additionally, the CNGO hires summer students to assist with the summer field programs. Some of these students are northerners attending Nunavut Arctic College programs such as the Environmental Technology Program, and others are geology graduate students, from southern universities, who conduct field mapping and research for their graduate degrees. Since 2012, CNGO has hired several Inuit Learning and Development Program (ILDP) participants for four-month work rotations. The ILDP participants who have worked with the CNGO include Scott Monteith (2013; currently employed with CanNor), Joanna Panipak (2014; currently employed with the federal department of Fisheries and Oceans); Patricia Peyton (2014, currently employed with CanNor), Candice Sudlovenik (2014; currently employed with an NGO); and Joanne Idlout (2017; currently employed with the GN). This ILDP initiative is currently in its third tranche of participants with Shauna Seeteenak (2019 and 2020) and Layla Autut (2020).

Government of Nunavut releases its Uranium Policy Statement

May 2012

NTI receives first royalty payment for mining on IOL, from Agnico Eagle Mines

June 2012

Shear Diamonds shuts down Jericho mine, citing low diamond prices

September 2012
CNGO ACTIVITIES

From 1999-2005, the CNGO conducted its research mainly in collaboration with the Geological Survey in Canada. In 2005, the Government of Canada introduced the Strategic Investments in Northern Economic Development (SINED) programming and funds through the then-federal Department of Indian Affairs and Northern Development. In 2010, the Government of Canada created the Canadian Northern Economic Development Agency (CanNor); professionals with DIAND/INAC who had been administering the SINED funds moved to this new agency. Since 2010, CanNor has provided the majority of research funds for the CNGO under SINED programming. Even with SINED funding, however, the majority of the CNGO projects are undertaken with other partners and collaborators.

In 2008, the first Geo-Mapping for Energy and Minerals (GEM 1) funding was announced as a five-year (2008-2013), $100-million geological mapping program administered by NRCan’s Geological Survey of Canada. At that time, Canada had an insufficient geological understanding of vast tracts of its three Northern territories – a landmass roughly equivalent to the landmass of Quebec, Ontario and Manitoba.

In August 2013 the Government of Canada renewed support of $100 million over seven years (2013-2020) for a Geo-mapping for Energy and Minerals (GEM 2) program. GEM 2 was renewed to advance geological knowledge in the North to support increased exploration of natural resources and informed decisions on land use that balance conservation and responsible resource development.

For both GEM 1 and GEM 2 programming, the CNGO was collaboratively involved in some of the Nunavut GEM projects.

The mapping and research programs that the CNGO has conducted since the office opened generally fall into six categories, with those being: A. Geoscience for Responsible Natural Resource Development, B. Mineral Exploration and Deposit Studies, C. Geoscience for Infrastructure Development, D. Granular Aggregate and Industrial Minerals, E. Education and Outreach, and F. Data Dissemination.

A. Geoscience for Responsible Natural Resource Development

Projects under this category involve mapping projects including regional bedrock mapping, surficial mapping, targeted Paleozoic research stratigraphic research, and regional airborne geophysical surveys.

- **Committee Bay Project** (2000-2003), in collaboration with GSC and CNGO.
- **Central Baffin Project** (2000-2003), in collaboration with GSC, with bedrock and surficial geology components and all focussed on gold.
- **The North Baffin Quaternary project** (2003-2006) involved Quaternary (surficial) geology research, with emphasis on rocks and till over the Mary River Group of rocks with high potential for gold, nickel, zinc and platinum group elements (PGE). Kimberlite potential was also considered. This project was a collaboration with GSC and university collaborators (University of Alberta, Dalhousie University)
- **The Boothia Mainland Project** (2005-2007) was a joint GSC-CNGO project that incorporated an aeromagnetic survey and bedrock and surficial mapping. Mineral exploration companies were concurrently exploring for diamonds in this area.
- **Southwest Baffin Integrated Geoscience Project** (2005, 2006) involved both surficial and bedrock mapping components and was collaborative with GSC. The study areas included the Foxe Peninsula area of southwest Baffin Island. A detailed aeromagnetic survey over the eastern part of Foxe Peninsula preceded the mapping.
- **Southampton Island Integrated Geoscience Project** (2007-2009) involved CNGO geologists Dr. Joyia Chankungal and Dr. Shunxin Zhang. This project was in collaboration with the GSC and the University of Waterloo, centred on Southampton Island, and involved bedrock, surficial and Paleozoic mapping. Prior to the mapping components, an aeromagnetic survey was...
flown over central and eastern Southampton Island, completing a gap in geophysical information for this area. As part of this project, Dr. Zhang corrected a historically incorrect geological assumption by determining that there were three oil shales in the Red Head Rapids Formation, rather than just the one previously recognized to be between the Bad Cache Rapids and Churchill River formation.

- **Cumberland Peninsula Geoscience Project** (2008-2011) involved an aeromagnetic survey (2008) flown over the Cumberland Peninsula of southeast Baffin Island and funded by the GN-EDT under SINED programming. In 2009, under GSC GEM 1 programming, bedrock mapping followed the geophysical survey. The results of these works provide new geoscience knowledge for eastern Baffin Island.

- The **Melville Peninsula project** (2009-2012), led by the GSC under GEM 1 programming, was a bedrock and surficial mapping project, and involved Tommy Tremblay of the CNGO and researchers from six universities. Aeromagnetic and radiometric surveys were flown in 2009 over central Melville Peninsula and a ground magnetotelluric survey conducted. Geoscience results highlight the economic potential of the peninsula and the Prince Albert greenstone belt.

- The multi-faceted and multi-year **Hall Peninsula Integrated Geoscience Project** (2009-2014) was a CNGO and SINED-funded project in collaboration with six universities, industry, and federal and territorial governments. In 2008, Peregrine Diamonds found diamond-bearing kimberlites in the Chidliak area of Hall Peninsula 115 km north and northeast of Iqaluit. At that time, this peninsula was poorly mapped and mostly under-explored.
  - In 2009, the Hall Peninsula Project started with an aeromagnetic survey, in collaboration with the GSC, in advance of ground-based bedrock and surficial work.
  - In 2011-2013, the CNGO and its collaborators conducted reconnaissance fieldwork. Highlights of the program included identifying a new kimberlite dike, and mapping previously undocumented layered-mafic igneous intrusions.
  - In 2013, Dr. Zhang and Dr. Pell (Peregrine Diamonds) discovered an Ordovician organic-rich black shale xenolith in kimberlite pipes underlying the Chidliak property. This finding provided new data for the petroleum potential in the Paleozoic sequence in Baffin Bay and Davis Strait area; subsequent microfossil (conodont) work allowed reconstruction of the lost Paleozoic stratigraphy on the Precambrian terrane, and to estimate the kimberlite emplacement temperatures.

- The **GN-EDT in 2010 started its multi-year Carving Stone Deposit Evaluation Program** to determine, territory-wide, the supply of raw carving stone on behalf of Inuit artisans. In 2012 and 2013, CNGO, GN-EDT and local carvers Jayko Ishulutak from Pangnirtung and Manasie Qillaq from Clyde River worked on the **Hall Peninsula project**. Highlights of this program included identifying new carving stone occurrences.
  - In 2014, CNGO conducted further work on carving stone occurrences at Cumberland Sound, Mary River, and on Melville Peninsula.
  - In 2015, the CNGO and GN-EDT further collaborated on assessing new carving stone resources and large-scale deposits of carving stone on Baffin Island.
• In 2016 and 2017, the Qikiqtani Inuit Association (QIA) conducted a project that involved geologists from CNGO and GN-EDT evaluating three well-known carving stone quarries.

• In 2010, the Chesterfield Gold Project under GSC GEM 1 programming involved a high-resolution aeromagnetic survey over the gold-rich central Kivalliq region.

• The Tri-Territorial Bedrock and Surficial Compilation, under GSC GEM 1 programming, started in 2009 and continued in 2010, focused on Nunavut, NWT and Yukon.

• The Meta-Incognita Peninsula bedrock mapping project (2015), to the south of the Hall Peninsula project, completed mapping of southern Baffin Island under GSC GEM 2 programming.

• The Tehery Lake-Wager Bay bedrock mapping project (2015-2018), under GSC GEM 2 programming, complemented two on-going graduate student theses to provide answers to the geological history of this area.

• A regional geochemical survey (till, stream and lake sediments, and water samples) was undertaken in 2015 north of Iqaluit by the CNGO, in collaboration with the GSC under GEM 2 programming, the Nunavut Research Institute, and Carleton University. These samples and observations will help determine various aspects of the glacial history of the area.

• The Fury-Hecla Geoscience Project (2017-2020), a multi-year and multi-faceted project with CNGO and three universities (professors and graduate students) under an NSERC Strategic Grant, was centred over the northwest portion of Baffin Island, north of the Fury and Hecla Strait and Admiralty Inlet. This area is the last remaining area of Baffin Island without modern geoscience information. An airborne magnetic survey, with partial radiometric coverage, started in 2017, and completion of the geophysical survey, and bedrock, Paleozoic, and surficial mapping fieldwork followed in 2018 and 2019.

Baffinland applies for Phase 2 amendment to Mary River project certificate

NIRB issues recommendation that AREVA’s Kiggavik uranium project not proceed

April 2015

May 2015

November 2014

MMG Ltd. withdraws Izok Corridor project from NIRB environmental review process
- **Proterozoic Sedimentary Basins**, and the Kilohigok paleosol of the western Kitikmeot region, were mapped in 2015 and 2016, in collaboration with Laurentian University and GSC GEM 2 programming.

- The **Nunavut Paleostratigraphy Projects** involve Dr. Shunxin Zhang, hired in early 2006 for her expertise in stratigraphy and biostratigraphy. Her projects include:
  - Determining the Ordovician and Silurian biostratigraphy and thermal maturity in Hudson Bay offshore and Lowland areas by studying the Ordovician and Silurian rocks and conodonts collected from Hudson Bay offshore and Lowland areas, in order to make stratigraphic classifications and correlations and to determine thermal maturity. This project started in 2006.
  - Studying Paleozoic strata of Southampton Island, deposited on the northern margin of the Hudson Bay Basin – one of the largest Paleozoic sedimentary basins in Canada – to determine the number and stratigraphic position of the oil shale intervals in the basin.
  - Studying sedimentary xenoliths (2014-2020), in collaboration with Peregrine Diamonds (now De Beers Canada), to reconstruct the lost Paleozoic strata on Hall Peninsula and thermal history of kimberlite emplacement.
  - Boothia Peninsula Paleostratigraphy (2017-2018), in collaboration with GSC GEM 2 programming, to fill a gap in Paleostratigraphy in the region.
  - Fury-Hecla Paleostratigraphy (2018), under the CNGO Fury-Hecla mapping project, to refine stratigraphy and biostratigraphy on northern Baffin Island.
  - Devon and southern Ellesmere biostratigraphy (2015-2016), in collaboration with the University of Victoria, to establish Upper Ordovician-upper Silurian bio-zonation, and regional thermal maturation.
  - Cornwallis Island biostratigraphy (2016-2017), in collaboration with the University of Victoria, to refine uppermost Ordovician-middle Silurian biostratigraphy on the island.
  - Nunavut Energy Projects: In 2007, Dr. Zhang started projects, in collaboration with the GSC GEM programming.

- **The Hudson Bay-Foxe Basin Energy project**, started in 2007, merged in 2009 into the GSC GEM **Hudson Bay-Foxe Basin project** (2009-2020). This project resulted in:
  - The discovery of three oil shales in the Upper Ordovician Red Head Rapids Formation on Southampton Island; these discoveries significantly increased the petroleum potential in Hudson Bay.
  - A field trip on Southampton Island for international petroleum geologists led by Dr. Zhang in 2010.
  - Providing new data about the organic-rich interval in Upper Ordovician Amadjuak Formation on southern Baffin Island, Foxe Basin.

- **Hudson Bay, Foxe Basin and Ungava Bay projects** (2016-2020) provide new data about the Ordovician petroleum potential in Hudson Strait area.

- **Baffin Bay and Davis Strait project** (2014-2017) that, for the first time, provided data about the petroleum potential in offshore area.

- The **Boothia Peninsula and Somerset Island Geoscience Project** (2015-2017), a joint GSC-CNGO project, involving an aeromagnetic survey, bedrock mapping and surficial geology sampling.

B. Mineral Exploration and Deposit Studies

Following the 1999 set-up of the CNGO, early work included many projects in collaboration with the GSC, mainly thematic
research of significant occurrences and deposits throughout Nunavut. These works included:

- Studies at the lead-zinc Nanisivik former mine (2000-2003)
- A 2002 study of the Hope Bay greenstone belt of rocks that included the Wolverine-Doris-Boston gold occurrence corridor
- A 2002 study of the now-Meadowbank mine (Vault deposit)
- A study conducted in 2002-2003 at the Ferguson Lake nickel-copper-PGE deposit (Kivalliq region)
- Arctic Zinc Project (2000-2003) – with emphasis on the Polaris and Nanisivik former base metal mines and the western part of Little Cornwallis Island. Under the Arctic Zinc project, a new thematic study was initiated in 2002 on the Borden Peninsula.
- The Borden Basin Project started in 2004, in collaboration with researchers at Laurentian University and CNGO, was supported by GSC GEM 1 programming and NRCan’s Polar Continental Shelf Project (PCSP). This multi-year project has looked at the base-metal mineralization of Northern Baffin Island.
  - Starting in 2009, the Borden Basin Multiple Metals Project (2009-2012) focussed on the very large deep-water carbonate mounds of the Ikpiarjuk Formation, to determine the depositional environment and the timing of the mineralization of the mounds. This project overall provided insight into the temperature and composition of the mineralizing fluids at Nanisivik.
  - In 2009, the Mesoproterozoic Basins of Nunavut project updated and refined the understanding of the evolution and metallogeny of the Bylot Basins (Borden Basin, Fury and Hecla Basin, and Aston and Hunting basins of Somerset Island).
- The NE Thelon Basin Uranium project (2009-2012), led by Dr. Charlie Jefferson of the GSC and under GEM 1 funding, was part of the larger Northern Uranium for Canada Project. This project tested the hypothesis that the significant uranium deposit knowledge from the Athabasca Basin of Saskatchewan can be adapted to Nunavut. Collaboration with GSC, INAC, CNGO, NTI, 12 companies, and 10 universities produced comprehensive datasets and databases.
- In 2009, a multi-year collaborative project (2009-2011) between GSC (GEM 1) and UNB studied the mineral district of the Elu Greenstone belt in the western Kitikmeot region. The Elu belt and the Hope Bay greenstone rocks, host to numerous gold deposits and occurrences, are two stratigraphically and structurally connected greenstone belts of the northeast Slave Craton. The Boston deposit mapping of the Hope Bay belt, in 2011, was a collaborative effort with industry (Newmont Mining Corporation) and the CNGO.
- In 2009, the Booth River intrusion, hosting nickel-copper-iron sulphide mineralization in the western Kitikmeot, was studied under GSC GEM 1 programming and in collaboration with Laurentian University for a graduate student thesis.
- In 2009, remote sensing (hyperspectral) surveys over the Hackett River greenstone belt hosting silver-zinc-gold-copper-lead mineralization at Hackett River and the Hope Bay greenstone belt hosting numerous gold deposits (including the Doris mine and Madrid and Boston deposits) tested the usefulness of hyperspectral imaging as an exploration tool. This was a cooperative project involving NRCan’s GSC, NRCan’s Canada Centre for Remote Sensing (CCRS) and CNGO, with logistical support from mineral exploration companies Sabina Gold & Silver Corp. and MMG Resources Inc.
  - In 2010, the Izok Lake zinc-copper-lead-silver deposit and the High Lake copper-zinc-silver-gold deposit were studied by NRCan using similar hyperspectral surveys.
- In 2010, the Central Baffin gold project, in collaboration with Laurentian University, CNGO, and several mineral exploration companies, was the subject of a doctoral thesis.

Amended project certificate for Doris North is issued to TMAC

December 2016

Baffinland announces plan to build railway from Mary River to Milne Inlet

September 2016

TMAC pours first gold at Doris North mine

February 2017
In 2015, the Elu Basin, already studied by numerous scientists over the years, was investigated by way of bedrock mapping and radiometric surveys funded under GSC GEM 2.

From 2012-2017, CNGO and the GN have accessed new, high-resolution remote sensing satellite data sets for identifying exploration targets.

C. Geoscience for Infrastructure Development

In 2010, a GEM 1 program included an Earthquake Studies project that installed a new earthquake monitoring station in Clyde River.

Also in 2010, a Landscape Hazard Mapping project, in collaboration with Université Laval and GSC, evaluated landscape hazards in permafrost in Pangnirtung and Iqaluit.

In 2010, a joint CNGO, Université Laval, and NRCan (GSC and CCRS) multi-year project (2010-2013) studied the permafrost and terrain conditions in Iqaluit, and particularly at the Iqaluit airport. The runway, taxiways, and apron at the airport experienced instability and subsidence, likely related to permafrost degradation and drainage conditions. Results from this integrated work helped government, industry, and community stakeholders in the building of the new Iqaluit airport.

A one-year project (2011-2012), in collaboration with the NWT Geoscience Office, developed kimberlite indicator information for Nunavut. Two databases, the Kimberlite Indicator Database (KIDD) and the Kimberlite Indicator Chemistry Database (KIMC), were made available in 2012.

In 2012 and 2013, an update of coastal climate-change issues across Nunavut emphasized coastal mapping work in southern Coronation Gulf and sea-level change in Hudson Bay.

The Western Hudson Bay Project (2016-2020) involves permafrost-infrastructure analyses and susceptibility of permafrost to the effects of climate change and warming conditions. A collaborative GSC-CNGO project has monitored permafrost conditions in the Rankin Inlet area of the Kivalliq region.

CNGO and GSC began a geoscience surficial map compilation project in 2014 for an area (‘corridor’) approximately 50 km wide along the western Hudson Bay coast extending from the Manitoba border to Rankin Inlet. The objective was to compile all existing aggregate, mineral potential, surficial and permafrost data for this area.

Multi-beam mapping for combined bathymetric and ecological seabed mapping of the seabed of Frobisher Bay supports infrastructure development. Infrastructure requirements for Iqaluit, for the GN, and for the proposed port of Iqaluit place additional possible stressors on Frobisher Bay. Data collection was ongoing for several years (2014-2018) through ArcticNet consortium in partnership with Memorial University, GN Department of Environment (GN-DoE), University of New Brunswick, and CNGO.

Geological mapping and characterization of the seabed of Frobisher Bay to support infrastructure development, exploration, and natural hazard assessment. In 2014 and 2015, CNGO (with GN-EDT and GN-DoE) and NRCan (GSC-Atlantic) contributed to the larger seabed mapping project conducted aboard the Government of Nunavut’s RV Nul’ajuk and the CCGS Amundsen.

The Northeastern Baffin Island Surficial Geology project (2019-2022) is a collaboration between CNGO and the Arctic ULINNIQ project (Underwater Listening Network for Novel Investigations of Quakes) proposed by researchers at Dalhousie University. This project targets western Baffin Bay, a tsunami-prone region, and will study the geomorphology and geophysics of this seismic region. The goals of this project are to obtain scientific knowledge required to inform decision-makers about policies for coastal building, land use, and emergency responses for the communities of northeastern Baffin Island.

August 2017
Grays Bay Port and Road project begins NIRB environmental screening

August 2017
Agnico Eagle completes 64 km Amaruq-Meadowbank all-weather road

August 2017
Project certificate for Back River gold project issued to Sabina Gold & Silver

December 2017

Grays Bay Port and Road project begins NIRB environmental screening

Agnico Eagle completes 64 km Amaruq-Meadowbank all-weather road

Project certificate for Back River gold project issued to Sabina Gold & Silver
D. Granular Aggregate and Industrial Minerals

- In 2005, a Granular Aggregate Resource Assessment Project was conducted around the City of Iqaluit.

- Initiated in 2009, aggregate and industrial minerals (limestone) were investigated (2009 and 2013) on Southampton Island as a collaborative project between Dr. Zhang and Dr. Eric Prosh (GN-EDT) to explore for high-calcium limestone. Follow-up research in 2015 by Dr. Zhang identified mineable intervals of limestone with high to very high calcium oxide contents.

- A further study in 2010 of aggregate and resource mapping for potential infrastructure development in Repulse Bay and Gjoa Haven was a collaborative project between industry, the GN, and CNGO. This project continued in 2011 with the development of an aggregate resource database.

E. Education and Outreach:

- Northern Geoscience Training Program: CNGO and Dalhousie University (Halifax) established this training program in 2013 to 2016. This program aimed to provide intensive hands-on training for northerners, particularly students enrolled in Arctic College’s Environmental Technology Program (ETP), to help lead them to careers in the public or private sectors.

  - The program was comprised of two components: 1) a spring geological field school with Dalhousie University and 2) summer work experience with the CNGO. Logistical realities posed challenges to the continuation of this program, but a similar program may be re-instated in the future.

- Outreach and Communication: CNGO professionals engage in outreach and communication efforts on a regular basis. During the summer field seasons, there are fieldwork related workshops and presentations at territorial parks. During the regular year, there are presentations and talks at schools (primary through high school) to present science work, and presenting modules to the ETP post-secondary school students.
F. Data Dissemination:

- CNGO publications include: the Summary of Activities (SoA) annual science volume (established 2013), the Open File Map (OFM) series (established 2013), and the Geoscience Data Series (GDS) of digital data (established 2014). All CNGO, pre-2013, internal publications were released as Geological Survey of Canada publications.

  - **Summary of Activities (SoA):** Starting in 2012, this annual science volume contains an average of 16 papers written by CNGO researchers, partners, and collaborators who are reporting on project activities and results. Non-CNGO project-related papers were introduced in the past couple of years.

  - **Open File Map Series (OFM):** In 2013, CNGO began publishing this preliminary level map series. To date, subjects covered by this series include bedrock geology, surficial geology, geophysical maps, and Inuktut place names. Many of these map publications include GIS data.

  - **Geoscience Data Series (GDS):** In 2014, CNGO began releasing digital data. This data is usually in tabular (Microsoft Excel) form and commonly, but not always, accompanies specific Summary of Activities papers. Data typically released in this series include geochronology, geochemistry, assay, and small GIS projects.
- **Traditional place names:** The CNGO began an informal collaboration with Inuit Heritage Trust (IHT) in 2000-2001 to aid IHT in the production of traditional Inuktitut place names maps. CNGO-IHT produced these place name maps, and others like them – with these being instrumental in the process of Inuktitut place names gaining official recognition by the Geographical Names Board of Canada. Since 1999, over 2000 Inuktitut place names have been officially recognized, with thousands more coming in the future. Many of these names replace the current European ones.

- **NunavutGeoscience.ca:** In 2006, CNGO, with partners INAC, GN, and NTI, and assistance from the NWT Geoscience Office and GSC, implemented a data delivery project called NunavutGeoscience.ca. NunavutGeoscience.ca went on-line in September 2006, and was updated in 2008. Work on both NunavutGeoscience.ca and the CNGO’s own website continues.

- **A surficial sediments geochemical database compilation project,** started in 2016, aims at assembling the geochemical analyses resulting from CNGO and GSC geoscience initiatives.

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### Nunavut drill-hole database compilation (contributed by the NWT & NU Chamber of Mines)

The NWT & Nunavut Chamber of Mines has created, and is expanding, an interactive database, the Nunavut Assessment Drill Database (NADD), of drilling information, compiled from mineral assessment reports filed from mineral exploration companies as representative work with Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) in Iqaluit. There have been two versions completed to date. The latest complete version (Version 2.1) of this NADD is available for downloading from the Chamber of Mines website (www.miningnorth.com) in the Resources section under ‘Geoscience.’

This work is funded in full by the Geo-mapping for Energy and Minerals (GEM 2) program of Natural Resources Canada. The NWT & Nunavut Chamber of Mines is grateful for the financial support from the GEM program.

The Chamber of Mines hired a consultant geologist to do this compilation work. Database compilation was also assisted by in-kind contributions of staff time and advice from CIRNAC’S Mineral Resources Division, Nunavut Regional Office; the CNGO; and the GN-EDT, Mineral and Petroleum Resources Division.

NADD presents public-domain geoscience data from across Nunavut in an interactive, easy to use format. Version 2.1 captures information on more than 2,700 drill holes reported in some 800 mineral assessment reports filed in Nunavut from 1999 to 2015. The core product is a geo-referenced dataset that is viewed easily in Google Earth™ (or a similar earth-browser), or loaded to a GIS program. The data includes drill hole identification, drill type (core or chip), hole size, assessment report catalog number, year drilled/reported, project operator or tenure holder, map coordinates, other types of information available from the relevant assessment report (geology log, geotechnical log, records of samples and analyses, geophysical and physical property tests) and commodities sought. This compiled information on drill holes and assessment reports is readily searchable and displayed on-screen.

This project is ongoing with a third phase of the NADD to be completed by the end of December 2019. To date, the database now contains over 3,000 drill holes and associated information. The simple, yet effective, database is expected to be a valuable resource for mineral exploration, public awareness, community engagement, and for land use planning.

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**Start of commercial production at Meliadine gold mine**

**Start of commercial production at Amaruq gold mine**

**Devolution Agreement in Principle signed between the Governments of Canada and Nunavut and NTI**

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**August 2019**

**September 2019**

**May 2019**
Covering over 440,000 square kilometres (km²), the Kitikmeot is the smallest of the three Nunavut regions. This region encompasses most of the Canadian western Arctic, including the western and northern portions of the Nunavut mainland, and the King William and Stefansson islands, the Boothia Peninsula, and portions of Victoria, Prince of Wales, and Somerset islands. The region is one of the least densely populated in the world with density of less than 0.02 people/ km² and total population of 6,902 people (2018 estimate) living in five permanent communities. Cambridge Bay, located on the southern shore of Victoria Island, is the largest community in the Kitikmeot, with a population of 1,858 people. With no road connections between Kitikmeot communities, Yellowknife, the capital of the Northwest Territories, is the main logistical and supply centre for the region.

The geology of the Kitikmeot region is dominated by Archean and Proterozoic aged rocks of the Bear, Slave, and Churchill provinces, and by the Paleozoic Arctic Platform in the north. This region has been explored historically for gold, base metals, uranium, platinum group elements, and diamonds. As of November 2019, about 2.65 million hectares (ha) of land were held in 774 mineral claims, 77 prospecting permits, and 285 leases. Of these land holdings, prospecting permits totaled over 1.58 million ha and mineral claims over 829,000 ha. Four past-producing mines are located in the Kitikmeot region: the Roberts Bay and Ida Bay silver mines are located in the Hope Bay area, south of the Coronation Gulf and Victoria Island, and the Lupin gold mine and Jericho diamond mine are located near the border with the Northwest Territories. The Kitikmeot’s presently operating mine, Doris North gold mine, is located at the northern end of the Hope Bay greenstone belt, approximately 125 km southwest of Cambridge Bay.

In October, TMAC Resources Inc., owners of the Doris North mine, commenced construction of the Madrid North underground portal intended to provide access to the first production stopes at Naartok West by late 2020. TMAC also conducted a $25 million exploration program that included 60,000 m of diamond drilling divided amongst expansion and infill drilling at Doris’ BTD zone, regional exploration drilling, and drilling at the Madrid North trend. The program also included till and lake-bottom sediment sampling, mapping, and prospecting. Gold mineralization and anomalous gold values have been intersected in regional exploration drilling at Doris Valley to the north of the main Doris deposit, and at the Pogey, Kamik, and Quaqtuq prospects, with results from two other targets pending.

Sabina Gold & Silver Corp. constructed a 170 km winter ice road starting in February 2019, which was used to transport equipment and supplies stored at the marine landing area at Bathurst Inlet to the Goose property, part of the Back River gold project. The company secured $5.2 million financing in April, and completed a modest, 6,400 metre, nine drill hole spring exploration program testing targets at Llama Extension, Umwelt, and the Nuvuyak target discovered in 2018 and located 700 m down-plunge to the west of the main Goose deposit.

Auryn Resources Inc. completed a 2,700 metre diamond drill program at its Committee Bay gold project testing three exploration targets selected using “machine learning” as well as several geologist-generated targets at the Shamrock and Aiviq prospects. Although the computer-generated targets proved to be altered but non-mineralized ultramafic rocks, gold mineralization was found in the remaining drill holes at both prospects. An induced polarization survey over selected targets was planned for 2019.

Blue Star Gold Corp. conducted a brief exploration program consisting of surface sampling, mapping, and 2,000 metres of diamond drilling at its Hood River gold project, the first program conducted there since 2014.

Rio Algom Exploration Inc. carried out an aeromagnetic survey over the northern and southern blocks of prospecting permits which comprise its Wolverine copper project, as well as a limited sampling and prospecting program. The project is located on Victoria Island.
The Kivalliq region covers 445,109 km² and occupies the central portion of Nunavut. Located along the west coast of Hudson Bay, the region is bounded to the south by Manitoba and to the west by the Northwest Territories. The regional hub is Rankin Inlet; it and Baker Lake, the territory’s only inland community, are key gateways for exploration and mining in this region. The region also includes the communities of Arviat, Whale Cove, Chesterfield Inlet, Coral Harbour, and Naujaat.

As of November 2019, mineral tenure in the region showed modest increases in each tenure category over the previous year, and consisted of 1,184 claims covering 1,061,405 ha, 32 prospecting permits covering 420,126 ha, and 199 mineral leases covering 150,363 ha.

The bedrock geology of the Kivalliq region is characterized by Archean and Proterozoic plutonic rocks, extensive Paleoproterozoic sedimentary basins, and numerous metasedimentary and greenstone belts of the Rae and Hearne domains of the Western Churchill Province. Paleozoic-age strata of the Hudson Bay Lowlands are found in the east, on Southampton and Coats islands. The region's economic geology is diverse and consists of a number of significant mineral occurrences and deposits, including historical and current resources in gold, uranium, diamonds, nickel, and platinum-group and rare earth elements. The Kivalliq has a long history of mining, and hosted two of Canada’s first mines north of 60°: the North Rankin Nickel Mine, which operated from 1957 to 1962, and the Cullaton-Shear Lake gold mine, west of Arviat, which operated in the early 1980s. The Kivalliq region has two gold mines that have recently begun operations, and one gold mine in the process of winding down operations. Continuing the trend of the last several years, gold was once again the main target for exploration.

Located approximately 80 km north of Baker Lake, Agnico Eagle Mines Limited’s Meadowbank gold mine, which has produced over 3 million ounces of gold since 2010, will reach the end of its production lifespan by Q4 2019, but the mill facilities will continue to operate to process ore from the satellite Amaruq mine. Operations at Meadowbank were extended to Q4 of 2019, with 96,548 ounces of gold produced as of the end of Q3, mainly from the Portage pit.

Agnico Eagle announced that commercial production began at its Amaruq mine in September 2019. Pre-commercial production from the mine totaled 35,281 ounces of gold. Exploration and conversion drilling at the Amaruq site continued through 2019 and results indicate that the deposit has potential for underground mining as well as the planned open pit. A total of $14.9 million was allocated for the 2019 drill program.

The Meliadine mine, also operated by Agnico Eagle, is located 25 km north of Rankin Inlet. Commercial production at this mine began in May 2019. Annual gold production is anticipated to reach 400,000 ounces by its second year of operation, and the Meliadine mine is expected to produce 5.3 million ounces of gold over its 14-year lifespan. The mine is currently producing 3,750 tonnes of ore per day during its first phase of operations; the second phase of production, which will reach 6,000 tonnes per day, has been accelerated by two years to begin in 2021.

Northquest Ltd., a subsidiary of Nord Gold SE, continued exploration at the Pistol Bay project near the community of Whale Cove. This summer’s work expanded the known mineralized zone at the Vickers deposit through a 10-hole diamond drill program.

Solstice Gold Ltd. ran a summer exploration program on its Kahuna gold project near Rankin Inlet. The program, including reconnaissance drilling, mapping, and prospecting, was to follow-up high-grade results from 2018.

Aura Resources Inc. announced a spring drill program on the company’s Greyhound project, which is optioned to, and operated by, Agnico Eagle. The program commenced in May 2019, to follow up on results from an induced polarization geophysical survey performed in 2018.

Margaret Lake Diamonds Inc. operated a short reconnaissance program at its Kiyuk Lake property in the southwest Kivalliq region. The program was intended to complete legal surveys of mineral claims to allow conversion to mineral leases, and to review historic drill core at the property.
At 1,040,418 km², the Qikiqtani region is the largest of Nunavut’s three administrative districts and is primarily comprised of the islands, notably Baffin, Bathurst, Devon, Cornwallis, and Ellesmere, of the Canadian Arctic Archipelago. The region also includes the Belcher Islands in southeastern Hudson Bay and the northern portion of the Melville Peninsula.

Approximately 20,000 people inhabit the Qikiqtani region, making it the most populous of the three regions. Iqaluit, the territorial capital located on southern Baffin Island, is the centre for supplies and support services for the region. The region includes the communities of Arctic Bay, Cape Dorset, Clyde River, Kimmirut, Pangnirtung, Pond Inlet, and Qikiqtarjuaq on Baffin Island; Sanikiluaq on Flaherty Island, one of the Belcher Islands in Hudson Bay; Igloolik and Hall Beach on the Melville Peninsula; and Resolute and Grise Fiord in the High Arctic. Several of these communities, notably Pond Inlet, provide services, supplies, and workers to exploration and mining projects.

Archean and Proterozoic rocks of the Churchill Province and Paleozoic rocks of the Arctic Platform and Inuitian Belt underlie the region. Mineral deposits and occurrences found in the Qikiqtani include iron, diamonds, gold, base metals, platinum group elements, carving stone, and sapphires. Two past-producing mines in the region were the Nanisivik zinc-lead-silver mine near Arctic Bay on northern Baffin Island, and Polaris, a zinc-lead mine on Little Cornwallis Island. Both ceased production in 2002.

In 2019, companies were exploring the Qikiqtani for iron and diamonds. Mineral claims, prospecting permits, and mining leases covering a total of 1.25 million ha were held in the region as of November 2019, down from 1.74 million ha held in November 2018.

Baffinland Iron Mines Corporation’s Mary River mine is located near Pond Inlet on northern Baffin Island and has been in production since 2014. In 2019, the company produced and shipped close to the maximum of 6 million tonnes of ore from the Milne Inlet port allowed under a variance to its project certificate. This variance is a temporary measure while the Phase 2 project certificate amendment is under consideration by the Nunavut Impact Review Board (NIRB). The amendment proposes to increase the quantity of ore shipped through Milne Inlet port to 12 Mt, via the construction of a railway running parallel to the existing tote road. To accommodate the proposed increased shipping from the Milne Inlet port, infrastructure at the mine would be re-arranged and upgraded.

Technical review meetings concerning the Phase 2 amendment were held in Iqaluit in March 2019, involving both the NIRB and Nunavut Water Board. Public hearings were arranged by NIRB in Iqaluit and Pond Inlet in November 2019. Concerns raised during the Iqaluit hearing led to the Pond Inlet hearing being cancelled and further hearings to be postponed until 2020.

De Beers Group’s Chidliak Project is located on the Hall Peninsula of Baffin Island northeast of Iqaluit. De Beers vastly decreased its mineral tenure holdings on the property in 2019, retaining only about 33,000 ha of claims and leases of the more than 315,000 ha held in 2018. The 2019 field activities consisted of 14 core holes at the CH-6 kimberlite, 31 mining lease surveys, and environmental baseline studies.

De Beers purchased the project’s previous operator, Peregrine Diamonds, in 2018. De Beers is considering different plans for Chidliak than was envisioned in the Peregrine 2018 preliminary economic assessment reporting. This earlier reporting called for open pit mining of the CH-6 and CH-7 kimberlites to extract 16.7 million carats of diamonds over a 13-year mine life, and construction of an all-weather road to Iqaluit to allow transportation of supplies to site. De Beers is proposing using modular, mobile infrastructure and increased automation (i.e., FutureSmart Mining technology) to mine the multiple kimberlites at Chidliak, resulting in a reduced footprint when compared to conventional mining technologies.
Base Metals

The 100 per cent owned Aston Bay project, located on the northwestern portion of Somerset Island, includes the Storm Copper prospect and Seal Zinc deposit, and comprises 12 prospecting permits and 133 mineral claims covering an area of 414,537 hectares. Copper mineralization, consisting of copper oxides (malachite, azurite, and chalcocite), bornite, and chalcopyrite, at Storm is strata-bound and hosted in brecciated zones within dolomitic sediments of the Allen Bay formation. Zinc mineralization at Seal occurs as massive sphalerite and pyrite, found in permeable quartz-arenites interbedded with dolostone. Other prospects on the property are Blizzard, Tornado, Typhoon, Hurricane, and Squall.

Historical work by previous operators at the Storm Copper prospect includes over 9,000 metres (m) of diamond drilling, geological mapping, prospecting, and magnetic and electromagnetic geophysical surveys. Aston Bay acquired and re-evaluated this data in 2015, identifying several high-priority targets for geophysical work and drill testing.

The 2016 field season consisted of 12 drill holes, followed by a 2017 program including prospecting and preparations for the 2018 drill program. A property-wide, 18,000 line-kilometre airborne gravity geophysical survey was flown in the fall of 2017. Results indicated strong gravity responses at Storm, Seal, and Typhoon, and possible horst-graben structures in the southern part of the property that could indicate favourable settings for base metal mineralization.

In December 2017, Aston Bay released an initial NI 43-101 inferred resource for the Seal property of 1.01 million tonnes of ore at an average grade of 10.24% Zn and 46.5 grams per tonne of silver (g/t Ag), with a cut-off of 4.0% Zn. The resource is based on evaluation of historical core from previous operators. The Seal prospect is interpreted as a zinc-silver Mississippi Valley-type deposit.

The 2018 field program included a total of 3,135 m of drilling over seven holes at Storm Copper and two holes at Seal Zinc. Highlights included 1.5 m grading 4.39% Cu and 9.76 g/t Ag, and 2.0 m grading 2.54% Cu in hole AB18-09; this target was selected on electromagnetic data collected in 2017. Drilling at Seal Zinc led to the discovery of a new tidewater-adjacent zinc-mineralized zone, with intervals of 6.0 m grading 0.67% Zn and 2.0 m grading 1.11% Zn. The host rocks at Seal are considered analogous to those found at the past-producing Polaris mine, located on Little Cornwallis Island about 200 km to the north.

As part of the 2018 program, Aston Bay brought in supplies to facilitate a 2019 drilling program by sealift; no further work on the property has been announced.

Most of Victoria Island is underlain by Cambrian-Silurian carbonate and siliciclastic rocks from the Paleozoic Era, dated at around 490 to 435 million years. A stable platform developed from the Cambrian through the Silurian and thick carbonates with high oil and gas potential were deposited in this area. The Caledonian orogeny brought uplift and erosion from the Silurian through the early Devonian, generating potential red bed-related copper deposits in a thick clastic wedge. Rio Algom Exploration Inc., a subsidiary of BHP Billiton, is targeting these sedimentary copper deposits.

Rio Algom is exploring two blocks; consisting of two to three dozen prospecting permits each, on Victoria Island, with a total size of 1,234,959 hectares. The North Block is in the north of the island between the Northwest Territories border and Hadley Bay, underlain by sediments from the early Neoproterozoic era with intrusions of gabbro diorite. The South Block is in the south of the island, close to Coronation Gulf, where carbonate and siliciclastic formations from the late Cambrian and early Silurian are prevalent.

Work during the 2019 field season was supported by a field camp located within the South Block prospecting permits, and was limited to two days of mapping, prospecting, and collecting small samples for analysis, as well as a 2,100 line-km airborne electromagnetic survey.
Diamonds

The Chidliak project is located on the Hall Peninsula of Baffin Island and consists of 33,443 hectares (ha) of mineral claims and leases, reduced from the more than 315,000 ha held in 2018. The project was acquired by De Beers Canada Inc. in 2018 and includes 74 kimberlites discovered by the previous operator, Peregrine Diamonds Ltd., between 2008 and 2014. Eight kimberlites at Chidliak have sufficient tonnage and coarse diamond distribution to have economic potential.

The kimberlites at Chidliak are hosted in Archean orthogneisses and Archean to Paleoproterozoic supracrustal rocks of the Hall Peninsula block. Glacial till cover is found throughout the project area, typically up to 3 metres (m) thick, and up to 15 m in some places. The kimberlites occur as sheet-like dykes and pipe-like bodies, injected between 157 and 139 million years ago. The kimberlite pipes are divided into 1) those infilled with volcaniclastic material only and tend to be larger, and 2) those infilled by a combination of volcaniclastic, pyroclastic, coherent, and apparent coherent kimberlite. The second group of kimberlites are most likely to have economic potential. Out of the 51 kimberlites tested, 41 have potential for diamonds.

Inferred resource estimates have been established for two kimberlites, CH-6 and CH-7. The CH-6 kimberlite pipe is estimated to contain about 18 million carats in about 7.5 million tonnes of kimberlite, to a depth of 525 m below surface. The CH-7 pipe is estimated to contain about 4.2 million carats in about five million tonnes of kimberlite to a depth of 240 m.

Peregrine released an updated preliminary economic assessment in 2018. The plan at the time was to use open pit mining of CH-6 and CH-7 kimberlites to extract 9.5 million tonnes of processing plant feed over a 13-year mine life to produce close to 17 million carats of diamonds for an average grade of 1.8 carats/tonne. An all-weather road was contemplated to provide access and allow transportation of supplies to the site from Iqaluit.
Instead of using a road and conventional open pit mining, as proposed by Peregrine, De Beers envisions building a diamond mine on Baffin Island that is relatively small, moveable, and powered by clean energy. As part of this plan, the company may use FutureSmart Mining technology being developed by its parent company, Anglo American. The goal is to use innovative technologies and increased automation to result in a smaller mining and environmental footprint. Small, modular, movable infrastructure and a mobile processing plant that leaves a minimal impact could work for a site such as Chidliak, with its numerous smaller kimberlite pipes. The main power source for such a mine is intended to be renewable energy rather than diesel-generated electricity. To this end, baseline data is being collected to erect a 60 m wind tower to assess the potential for wind turbines. Plans to bring a fibre-optic internet connection to Iqaluit are also being considered with the potential Chidliak mine also taking advantage of this. The communication of data and the possibility of a remote control centre in Iqaluit where some workers could control equipment from afar are being considered.

De Beers planned to submit conceptual plans for this mine to the Nunavut Planning Commission in April 2019, but, by November, no plans had been submitted to the Planning Commission.

In 2019, a field program from the beginning of July to mid-September consisted of 14 core holes at the CH-6 kimberlite, 31 mining lease surveys, and environmental baseline studies. No results from this program have been released.

The Kahuna project area is located in the northern Hearne Domain of the Churchill Province, and is underlain by rocks of the Archean Rankin Inlet Group and Archean metaplutonic rocks of the Churchill Structural Province. The Rankin Inlet Group is overlain by Proterozoic metasediments of the Hurwitz Group.

At least 88 kimberlites have been identified on the property and occur as both pipes and dykes. In total, approximately 20 kilometres of kimberlite dykes have been defined at Kahuna through drilling and geophysics.

Early in 2018, Dunnedin announced the discovery of a new cluster of possibly diamondiferous kimberlite targets in the south-central portion of the property. Five targets were identified and tested using rotary air-blast drill holes totaling 801 m during the spring program. This drilling extended the strike length of two kimberlite dykes, 07KD-24 and PST. Both of these dykes remain open along strike and down dip, and are compelling targets for further drilling.

For the 2018 summer program, 17 targets were tested using a rotary air-blast drill; three of these targets proved to be kimberlite, one of which was a new kimberlite discovery, KH10-11. Till sampling results defined a discrete target area for potential diamond sources of 300 hectares at the head of JTA, a trend of abundant high-quality diamond indicator minerals for which no source is yet known. The focus of Dunnedin’s exploration plans are the discovery of kimberlite pipes within this newly defined area.

No work was reported in 2019.

North Arrow Minerals Inc.’s Mel project consists of 55,867 ha of Crown and surface Inuit Owned Land tenure. The project is subject to a one per cent gross royalty on production payable to Anglo Celtic Exploration Ltd. The property is located within 20 km of tide water.

The 2018 drilling program at Mel resulted in the discovery of a new kimberlite, ML-345. The kimberlite is located south of ML-8, where anomalously high kimberlite indicator mineral (KIM) values and a northwest-trending weak magnetic high had been identified. Three of the holes drilled at ML-8 intersected kimberlite; this kimberlite is over 170 m in strike length and the core recovered is similar to the mineralogy found in the ML-8
surface subcrop. This ML-8 kimberlite was later interpreted to be two kimberlites, termed ML-8 (Upper) and ML-8 (Lower). Microdiamond recoveries indicate ML8 (Lower) is significantly diamondiferous, with eight diamonds above the 0.106 mm sieve size from caustic fusion processing of 24 kg of drill core. ML8 (Upper) returned 13 diamonds (from the greater than 0.106 mm sieve size) from 79.5 kg of kimberlite.

A till sampling program over high-priority targets was undertaken in 2018, collecting 447 till samples. The results widened the North Mel KIM target by 750 m to 3,600 m width, and expanded the South Mel KIM target area. A fourth KIM train within the North Mel target area has been interpreted based on a sample collected 1,200 m north of ML-8.

Further work for the Mel Project include additional prospecting and till sampling to better define areas with unresolved indicator minerals, and further geophysics to define specific drill targets at the heads of the more well-defined KIM trains. No work was reported at Mel in 2019.

GGL Resources Corp. optioned the Stein project from Arctic Star Exploration Corp. in 2018. The company can earn a 60 per cent interest in Stein by discovering in-situ kimberlite. The property consists of four contiguous prospecting permits covering an area of 106,500 ha, 45 kilometres from tide water, on southern Boothia Peninsula.

The bedrock on the Boothia Peninsula ranges in age from Archean to Tertiary. The Boothia Plateau is underlain by complexly folded and faulted Archean gneissic and granitic terrains termed the Boothia Horst event. The overall structure of the Boothia Peninsula is dominated by the Boothia Uplift event, a basement-controlled region of uplift active from the Archean to the Devonian. The Stein property is underlain by rocks of the Boothia Horst that is assigned to the lowest structural-level event of the Boothia Uplift. The Boothia Horst is believed to be the northern extension of the Churchill Province; age determinations of 1.63 to 1.67 Ga suggest that the gneiss domains formed during the Hudsonian Orogeny. The horst has an overall north-trending structure and the main fold has a northerly strike parallel to that of the Boothia Uplift. Surface sediments were deposited during the late Wisconsin glaciation. Deglaciation began more than 9250 years ago and the Boothia Peninsula was largely ice-free by 8,800 years before present.

Multiple previous exploration programs with more than $1.5 million in expenditures have been carried out over the Stein project area. Historical heavy mineral sampling traced kimberlite indicator minerals up-ice to a potential source area. Detailed airborne magnetic surveys flown over this source area identified numerous high-priority targets with signatures similar to kimberlites found elsewhere in Canada’s North.

In 2019, GGL conducted ground-based magnetic surveys over priority airborne targets in preparation for future drill testing. A range of kimberlite-like signatures was defined during the surveys; this bolsters the possibility of a new kimberlite field being discovered at Stein. Three emplacement style signatures have been identified on the property, including 1) a large isolated magnetic high approximately 200 metres in diameter, 2) multiple strong, discrete dipolar signatures, and 3) an elongate dyke-like signature over 800 metres in length. No drill testing has been conducted on the project to date.

The high-priority geophysical targets are interpreted to be intrusive in nature, occurring at the surface and covered by a sequence of glacial till. Although magnetic signatures of known kimberlites are not always indicative of diamond content, the potential of the Stein cluster of high-interest targets is reinforced by heavy mineral samples collected down-ice that contain indicator mineral grains. These grains are indicative of diamond inclusion chemistry showing high chrome, low calcium G10D pyrope garnets.

The planned next step is target evaluation with drilling.
Gold

The Amaruq property, located 50 km northwest of Agnico Eagle’s Meadowbank gold mine, was acquired in 2013. The property covers 116,717 hectares (ha) of the Amaruq and Meadow River claim blocks, which includes Crown mineral tenure and a Mineral Exploration Agreement (MEA) on Inuit Owned Land (IOL). The property is connected to the Meadowbank gold mine site via a 64 km all-weather road. Commercial production began at the Amaruq mine in 2019. There are currently nine mineralized zones known at Amaruq – Whale Tail, Whale Tail North, I, V, R, Mammoth 1 and 2, Buffalo, and Tugak. Gold mineralization is found in quartz-pyrite-arsenopyrite veins in volcano-sedimentary rocks, similar to the mineralization style found at the Goose and Portage deposits at the Meadowbank gold mine. Mineralization occurs predominantly as two styles: 1) silica flooding with significant pyrrhotite and arsenopyrite in veinlets or as, 2) disseminated grains in chert bands and gold-bearing quartz-sulphide veins, up to one metre-thick, cutting the main foliation in all rock sequences. These quartz-sulphide veins are better developed in the mafic to ultramafic volcanic rocks and fold hinge zones. In both mineralization types, gold occurs as micron-size inclusions in pyrrhotite and/or arsenopyrite, or as free gold in quartz-rich gange. The mineralized zones strike east-northeast to northeast and dip to the southeast. Whale Tail, the largest deposit, has a strike length of 2.3 km and a known depth of 915 m; Whale Tail remains open at depth and along strike.

Agnico Eagle received approval for its Type A water licence for operations at Amaruq, including Whale Tail, from the Minister of Crown-Indigenous Relations and Northern Affairs Canada in July 2018. As of December 2018, the Amaruq deposit, including the Whale Tail pit, has a reserve of 2.88 million ounces of gold for its open pit operations. Additional resource estimates include 1.1 million ounces in indicated resources for open pit and underground operations, and an inferred resource of 1.96 million ounces.

Commercial production began at Amaruq in September 2019, with 276,000 tonnes of ore mined at the Whale Tail pit. Maximum gold production in 2019 from the Meadowbank complex, which includes both Amaruq and Meadowbank, is estimated at 200,000 ounces; this is a decrease from the original projection of 230,000 ounces for the year, but is not expected to contribute to a drop in the company’s overall production. Planned maintenance and modifications on the mill and crushing circuits took place in September and October 2019, and ore was stockpiled at Meadowbank. The total capital expenditures at Amaruq totaled $397 million, which was higher than the expected total of $350-$370 million; the overage is due to difficult weather conditions that impacted dewatering activities and mining operations.

Exploration continued at Amaruq in 2019, with 32,800 m of exploration drilling focused on identifying new mineral resources, and 20,300 m of conversion drilling. The total budget for the drill program was $14.9 million. The underground ramp at Amaruq was extended to 1,635 metres from the portal, and to a depth of 225 metres below surface. Exploration drilling from the ramp began in June 2019, with highlights including high-grade mineralization located below the current pit outline of 14.5 grams of gold per tonne (g/t Au) over 7.3 metres at 396 m depth from Whale Tail, and 29.8 g/t gold over 3.4 metres at 357 metres depth from V Zone.

Two prospecting permits covering 31,778 ha were issued to Silver Range in February 2019 over a 21 km² prospective gold target that is underlain by the same rock types as at Agnico Eagle’s Amaruq gold mine, 55 km south-southeast of the Atlantis project. This prospective formation of Archean mafic volcanic rocks was first identified on maps published in 2002 by the Geological Survey of Canada. Although the area was previously included in prospecting permits granted to Uranium North Resources, no exploration is known to have been conducted in the immediate project area. No further information has been released on a program of prospecting, mapping, and sampling that Silver Range indicated it intended to conduct.
Sabina Gold & Silver continued development and exploration activities at its Back River gold project, located approximately 520 km northeast of Yellowknife and encompassing seven properties totaling close to 50,000 ha. Of these seven properties, only two, George and Goose, saw exploration and development activities in the last few years with the latter property being the focus in 2019.

The Back River project is located in the central part of the Slave Structural Province and is underlain by sedimentary rocks of the Beechey Lake Group consisting of oxide and silicate banded iron formation rocks hosted in turbidites with lesser greywackes and mudstones. The sequence is cut by gabbroic and felsic dykes, with the latter ranging in thickness from 0.5 to 5 metres. The bulk of gold mineralization present at the Goose property is structurally controlled, and is associated with quartz and quartz-carbonate veining associated with shearing and accompanied by silicification within banded iron formation rocks and the interbedded sedimentary rocks. Gold is usually associated with pyrite, arsenopyrite, and pyrrhotite with free gold present in quartz and quartz-carbonate veining. Gold mineralization is also found in porphyritic quartz- and quartz-feldspar dykes but not in the younger gabbro dykes that post-date mineralization.

Current measured and indicated resource estimates for the Goose property total 5.33 million ounces of gold with an average grade of 5.87 g/t Au. There is an additional 1.85 million ounces grading at 5.6 g/t Au in the inferred resource category. The George deposit, located approximately 50 km northwest of Goose, contains an indicated mineral resource of 1.1 million ounces at 5.6 g/t with an inferred mineral resource of 980,000 ounces of gold grading at 6.32 g/t.

Sabina had an eventful year in 2018. The company completed 22,500 metres of diamond drilling and the construction of the marine laydown area and landing on Bathurst Inlet. Additionally, Sabina signed its Inuit Impact Benefit Agreement (IIBA) and Long Term Land Tenure Agreement with the Kitikmeot Inuit Association, and received the Type A Water Licence from the Nunavut Water Board allowing for the development of the Umwelt Open Pit and Underground mining projects, as well as the Llama and Goose main open pits. In 2019, Sabina scaled back exploration activities and concentrated on preparation for possible future mining operations by completing a 170-kilometre (km) long winter ice road that was used successfully to transport construction equipment, steel, and supplies for bulk fuel tanks and supplies for activities from the port facility in Bathurst Inlet to the Goose camp.

The company’s spring drilling program consisted of nine diamond drill holes totaling 6,400 metres and targeted the Llama Extension zone, Umwelt, and the newly discovered Nuvuyak target, located approximately 700 metres down-plunge to the west of the main Goose deposit. Up-plunge drilling at Nuvuyak intersected multiple folded zones of mineralized iron formation with highlights including 3.5 metres grading 18.71 g/t Au, 19 metres grading 2.59 g/t Au, and 18 metres grading 10.04 g/t Au. At the Llama Extension target, drilling tested the possible additional underground resource.
expansion in addition to the proposed Llama open pit. Some of the highlights of drilling at Llama include intervals of 4.95 metres grading at 5.48 g/t Au, 4.75 metres at 6.59 g/t Au, and 10.65 metres grading 4.24 g/t Au.

Covering 160 km of the Proterozoic Foxe Fold greenstone belt, the Baffin Gold project is located on central Baffin Island and is comprised of a mixture of Crown mineral tenure and Mineral Exploration Agreements on subsurface Inuit Owned Land. Prior to 2000, the project area was explored for lead-zinc mineralization, and gold was discovered in 2001. Commander Resources Inc. optioned the project in 2003 and identified multiple gold-bearing prospects during work conducted up to 2011. Kivalliq Energy Corporation optioned the project from Commander in 2017, and fulfilled the terms of the agreement to gain 100 per cent ownership of the project in March 2018. Several months later, Kivalliq Energy undertook a share consolidation and name change to ValOre Metals Corp.

Gold mineralization occurs in multiple settings on the property, including silicate and sulphide facies iron formation, in shear zones and in quartz veins hosted in granodiorite, metavolcanic, and metasedimentary rocks. Most work has targeted the Bravo Lake Formation.

ValOre conducted two exploration programs on the property, in 2017 and 2018, and has a database containing information resulting from $25 million of work conducted by previous operators. In 2017, ValOre carried out a geochemical program, collecting grab, channel, and till samples, and also generated high resolution imagery of target areas using a drone. About 7,000 line-km of airborne magnetic surveys were flown over the central and western parts of the property, and extended and infilled previous geophysical coverage. The company also continued its sampling programs, collecting 31 grab and 438 till samples. Several grab samples confirmed high-grade gold values in quartz-arsenopyrite veins from the Durette target area, with assay results of up to 67.9 g/t Au. Till sampling delineated two target areas, Emily Lake and West Brent, with anomalous gold values in till.

No work was reported on the property in 2019.

Auryn Resources Inc.’s 100 per cent owned Committee Bay project encompasses over 300,000 ha along the Committee Bay greenstone belt. The project, which was acquired by Auryn along with owner North Country Gold Corp. in 2015, was the focus of the company’s 2019 exploration program in Nunavut. The project area is located approximately 180 km northeast of Agnico Eagle’s Meadowbank mine and extends a further 300 km to tidewater. The Committee Bay greenstone belt can be traced along the entire property and extends between 5 km and 30 km in width. It is generally characterized by poor exposure of the underlying rocks due to an extensive, thick sequence of till cover. Basalts, intermediate to felsic tuffs, komatiites, coarse-grained metasedimentary rocks, and banded iron formation rocks dominate stratigraphy. Gold mineralization in the Committee Bay belt is commonly associated with quartz veining, silicification, and sulphidization within silicate, oxide, and/or sulphide facies banded iron formation rocks of the volcano-sedimentary Archean Prince Albert Group. Gold mineralization is also found in quartz veins associated with shear zones in gabbroic, volcanic, and sedimentary rocks and is generally accompanied by arsenopyrite, pyrite, and pyrrhotite.

Initial mapping of the Committee Bay belt of rocks was conducted by the Geological Survey of Canada in the 1960s. The area was subsequently the focus of base metal, uranium, and gold exploration that led to the discovery of the Three Bluffs deposit in 2003. This deposit, located in the central part of the property, contains a NI 43-101 compliant indicated mineral resource of 524,000 ounces gold at 7.85 g/t and an inferred resource of 720,000 ounces of gold grading at 7.64 g/t. More than 40 other gold prospects have been discovered in the Committee Bay greenstone belt; the Shamrock and Aiviq targets were the company’s focus in 2019.
During the 2019 exploration program, Auryn completed seven diamond drill holes totaling 2,700 metres and tested traditional targets as well as three of twelve “machine learning”-generated targets. These targets, announced in a press release in February 2019, were identified through a computer algorithm, with two of them predicting extensions of the Three Bluffs deposit to the east and west. Several other targets are located beneath shallow lakes and glacio-fluvial cover where surface geochemical surveys were not possible. The three computer-generated targets are non-mineralized, altered ultramafic rocks that commonly give similar geophysical signatures to those of mineralized banded iron formation rocks.

Drilling geologist-selected targets at Shamrock and Aiviq prospects intersected gold mineralization at both locations. At Shamrock, a 30-metre interval was intersected grading 0.67 g/t Au hosted in quartz veins within gabbroic rocks. At Aiviq, Auryn drilled 10.5 metres grading 1.22 g/t Au.

In addition to drilling, Auryn also planned an induced polarization survey over selected targets. No further information was provided.

As a part of the deal signed with Newmont Corporation for the Hope Bay project, TMAC Resources also gained control of the 685 km² land package covering the Elu greenstone belt located approximately 30 km northeast of Hope Bay. The 10 by 80 kilometre belt has similarities to the Hope Bay greenstone belt and may be linked in the southern tip of the Elu belt by a concave structure sharing the same supracrustal rock sequence. Both belts are of similar age and composition, with Elu containing a higher percentage of metasedimentary rocks. The Elu belt is overlain by Paleoproterozoic to Paleozoic sedimentary rock sequences, with a major, carbonate-altered, north-south trending shear zone transecting it. There are known base metal and gold occurrences with traces of platinum group elements mineralization in the mafic-plutonic complex adjacent and to the southwest.

The Elu belt was explored intermittently by various operators in the 1970s and 80s with later work performed by Miramar Mining Corporation in 2001. In 2009, a multi-year (2009-2011) collaborative project of the Geological Survey of Canada under Geo-Mapping for Energy and Minerals (GEM 1) and the University of New Brunswick studied the mineral district of the Elu belt. The Geological Survey of Canada and Canada-Nunavut Geoscience Office conducted a short mapping project in 2015 and 2016 that concentrated on the Proterozoic metasedimentary rocks. TMAC conducted two airborne geophysical surveys, with a Sander AIRgrav survey completed in 2015 and airborne magnetic and electromagnetic survey completed the following year. The last exploration
program took place in 2018 and was conducted over the newly staked “Elu Link” which covers the potential stratigraphic link between the two belts. The company completed a 2,617 line-km airborne magnetic-electromagnetic survey over the link in 2018, but has not publically released results. No other work has since been reported.

In 2017, Auryn Resources Inc. acquired 19 prospecting permits and 57 mineral claims in three blocks that collectively cover an area of 329,000 ha and extend over 120 km of strike-length of the Gibson MacQuoid greenstone belt. This greenstone belt, located between the Meliadine and Meadowbank gold mines, is one of a number of Archean-aged greenstone belts located in the Western Churchill Province of northeastern Canada. The character and history of the rocks, as well as the nature and timing of deformation in this greenstone belt, is considered to be equivalent to other significant belts within the Western Churchill Province that host deposits such as those found at Agnico Eagle’s Amaruq, Meadowbank and Meliadine mines.

Comaplex Minerals Corp. conducted reconnaissance exploration and prospecting between 1989 and 1993 at the property and these programs resulted in the discovery of two gold showings within the Gibson MacQuoid belt.

In 2018, Auryn completed a summer exploration program that consisted of approximately 3,000 tightly spaced glacial till samples and 193 boulder and outcrop rock samples. The results from this exploration program have not been released.

In June 2019, the Auryn completed a small staking program during which 36 claims, totalling 42,641 ha, were staked and have since been filed and approved. The staking of these claims, overlapping with the company’s prospecting permits that expire in 2020, was completed in order to maintain a contiguous land package over the current areas of interest as identified in the previous years’ work programs.

Auryn focused most of its 2019 exploration in Nunavut at its Committee Bay project (p. 42).
In late 2018, Canarc Resources Corporation entered into an option agreement with Silver Range Resources to acquire the Hard Cash and Nigel properties, located within the Ennadai greenstone belt in the southwestern corner of the territory. The Hard Cash property consists of two mineral claims covering an area of more than 2,000 ha. Since the discovery of gold on the property in 1946, additional showings have been discovered during exploration conducted by Giant Yellowknife Mines, Phelps Dodge, Panarc Resources, and Silver Range Resources. This showing is a typical Archean lode type of gold occurrence, with gold mineralization occurring in late, laminated quartz veins and associated with pyrite, galena, chalcopyrite, and tellurides.

In January 2019, Canarc announced completion of a 970 line-kilometres Total Magnetic Intensity and radiometric survey that shows the presence of major structures appearing to control gold distribution. The company obtained a land use permit in May for a multi-phase exploration program, and announced plans to conduct a $200,000 summer field program consisting of mapping and rock and soil sampling surveys designed to further the understanding of mineralization controls and to define possible drill targets. No further information on this program has been released.

With financing in hand, Blue Star Gold Corp., which was rebranded in January 2019 from WPC Resources Inc., resumed activities on the Hood River property that covers over 8,000 ha of the southern portion of the High Lake greenstone belt within the Slave Structural Province. This project is located entirely on Inuit administered land with the company acquiring rights to the property through a 20-year, renewable MEA with Nunavut Tunngavik Incorporated (NTI). Historical prospecting and exploration, conducted intermittently in the region since 1969, has identified 22 gold showings on the property. Five gold mineralization styles have been identified and include gold mineralization associated with silicified sediments as well as stratabound massive sulphide and three different types of auriferous polymetallic quartz veining. Gold occurs in association with arsenopyrite, pyrrhotite, pyrite, sphalerite, and chalcopyrite.

In August 2019, Blue Star received a land use license from the Kitikmeot Inuit Association and a water license from the Nunavut Water Board allowing for exploration and drilling programs to proceed on the property. At the beginning of September 2019, Blue Star announced the commencement of mapping and sampling, as well as a 2,000-metre exploration drilling program. The exploration work focused on the North...
Fold Nose zone. In total, 698 drill core and rock samples were collected during the program, which was completed by the end of September with the camp demob completed by early October. All of the drill holes with results reported by press time intersected significant gold mineralization with notable grades of 15.37 g/t Au over 5.0 metres and 6.93 g/t Au over 3 metres. Results from the remaining drill holes and the field program are pending.

Development and exploration activities continued at TMAC Resources’ 1,101 km² Hope Bay project. In addition to resource expansion and exploration at the Doris Mine, the company advanced its development activities at the Madrid North deposits and commenced a regional exploration program testing some of the targets in the Hope Bay greenstone belt. TMAC announced a 60,000 metre, $25 million exploration program that included 10,000 metres of drilling at Madrid North, and a program of 7,000 metres of regional exploration drilling, till and lake-bottom sediment sampling, mapping, and prospecting.

The north-south trending Hope Bay belt is located in the Bathurst Block in the northeastern portion of the Slave Structural Province covering an area roughly 80 km long and up to 20 km wide. Archean mafic metavolcanic rocks and intermediate to felsic metavolcanic rocks with interbedded metasedimentary units dominate the belt, with lesser amounts of ultramafic rocks. Felsic intrusions along the eastern flank of the Hope Bay belt separate it from the Elu greenstone belt. Gold mineralization is found along the entire length of the Hope Bay greenstone belt and is classified as Archean lode-gold type. At the Doris mine, located near the northern end of the belt, mineralization is hosted in a steeply dipping quartz vein system within a sequence of folded and metamorphosed pillow basalts, at the contact between iron-titanium tholeiite and magnesium tholeiite. Gold mineralization at the Madrid Trend, located mid-way in the belt, is generally associated with structural breaks and breccia zones, while mineralization at the Boston deposit, located in the southern end of the belt, is found within deformed quartz-carbonate veins hosted in a complex series of altered sedimentary-volcanic sequences. The current total combined measured and indicated mineral resource for...
Since the commencement of commercial production at Doris Mine in May 2017, TMAC has faced challenges in achieving projected gold recovery levels. The company modified its concentrator lines and installed additional gravity concentrators in 2018 in an effort to achieve viable rates of recovery. In the first three quarters of 2019, ore recoveries averaged 82 per cent. The company is pursuing additional methods such as installation of an additional concentrator and introducing scavenger columns to the process to achieve acceptable levels of metal recovery from the ore.

In October, TMAC announced the commencement of the Madrid North underground portal that will enable access to the Naartok West zone where production stopes will provide ore to the mill by the end of 2020. This will be the first zone to go into production from the 2.17 million ounce Madrid North deposit. Mining at the Naartok East crown pillar is to provide ore to the plant in Q4 of 2019, potentially allowing the company to reach 45,000 ounces of gold production in Q4 of 2019. Production over the first three quarters of 2019 totaled 114,860 ounces of gold, with 36,290 ounces produced in Q3 alone.

Solstice Gold Corp. was spun out of Dunnedin Ventures Inc. in late 2017 to focus on the gold potential of the Kahuna project area, with the latter company continuing to explore for diamonds (p. 38). The property is located between the communities of Rankin Inlet and Chesterfield Inlet, and is adjacent to Agnico Eagle’s Meliadine gold mine. Solstice has primary mineral title to 66 claims within the Kahuna project area, a 50 per cent interest in another 12 claims, and secondary rights to 67 claims held by Dunnedin Ventures.

Gold was discovered in 1972 in the region, and on what is now the Meliadine property. Additional prospecting for gold took place in claims adjacent to Kahuna between 1990 and 2006. Shear Minerals Ltd. and Stornoway Diamond Corporation carried out work focused on diamonds on Kahuna between 2001 and 2009. Recognizing the gold potential of the area, the companies undertook a technical evaluation in 2004, and returned anomalous results from re-analyses of drill core samples and till samples.

Geologically, the Kahuna Gold project lies within the Hearne Domain of the Churchill Province, and is underlain by metasedimentary and granitic rocks of the Ennadai-Rankin granite-greenstone belt. Numerous northwest and east-west trending faults occur on the property and are of similar orientation to the Pyke Fault system that is spatially related to the known gold deposits at Meliadine.

In 2018, Solstice carried out a ground magnetic survey, regional geological mapping, rock sampling, and till sampling across the Kahuna property, collecting more than 2,800 rock and 2,000 till samples. The company also completed a series of rotary air-blast drill holes across the South Westernos prospect that identified the presence of favourable metavolcanic and banded iron formation units for future work. Gold mineralization was identified in outcrop and surface boulders, believed to be locally sourced, at the Qaïqtuq target. Outcrop grab samples returned highlights of 66.6 g/t Au and 5.74 g/t Au. Qaïqtuq is associated with east-west trending fault structures and similarly trending magnetic and electromagnetic anomalies.
Six drill holes were completed during the 2019 program on the Megafold, Grizzly, Westshore Enterprise Lake, and South Enterprise targets. Results released indicated that three of the six holes had anomalous gold results, including 5.6 m at 0.25 g/t Au and 1.14 g/t Au over 0.94 m at South Enterprise. Multiple occurrences of sulphidized iron formation were found in five out of six holes.

The company has not announced a follow-up program to date, but future work may include drill-testing the gold-in-surface boulder anomalies southwest of the Enterprise targets, and along the previously undrilled 12-km long Grizzly Fault.

Gold mineralization in the Kiyuk Lake area was discovered by prospectors in 1991. A succession of operators have explored this area since that time, with most work carried out by Newmont Mining between 2006 and 2008 and by Prosperity Goldfields between 2011 and 2013. Margaret Lake Diamonds optioned the property from Cache Exploration in 2019, and, among other considerations, gained the right to acquire a 50 per cent interest in Kiyuk upon spending $3 million on the property before the third anniversary of the agreement. The project is located in the southwestern corner of the Kivalliq region near the Nunavut-Manitoba border, and comprises 51 mineral claims and three mining leases with a total area of 46,345 ha.

Gold mineralization on the property is hosted within Paleoproterozoic clastic metasedimentary rocks of the Kiyuk and Hurwitz groups. Sodic and calcic alteration is found within the host rocks, and gold mineralization is associated with pyrrhotite, pyrite, arsenopyrite, and magnetite. More than 12 prospects have been identified on the property, with most work focused on the Rusty Zone, Gold Point, and Cobalt targets.

In 2017, Cache carried out an exploration program consisting of till sampling, prospecting, and a five-hole diamond drill program which resulted in better definition of the distribution of mineralization at Rusty Zone, and the successful testing of the East Gold point target. No work was carried out in 2018.

In 2019, Margaret Lake Diamonds commissioned a NI 43-101 technical report on the property as part of its due diligence regarding the transaction with Cache. The company undertook a program of field reconnaissance, historic drill core review, and legal surveying to convert claims to mineral leases. However, the company did not complete the full program proposed in the technical report, which also included 2,000 m of diamond drilling and collection of 1,000 till samples. No results from the field program have been released.

<table>
<thead>
<tr>
<th>321</th>
<th>Kiyuk</th>
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<tr>
<td>OPERATOR/ PARTNER</td>
<td>Margaret Lake Diamonds Inc., Cache Exploration Inc.</td>
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<tr>
<td>COMMODITY</td>
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</tr>
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<td>LAND TENURE</td>
<td>Crown</td>
</tr>
<tr>
<td>LOCATION</td>
<td>345 km west of Arviat</td>
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</table>

The Meadowbank mine has been in operation since 2010, and has produced over three million ounces of gold. Although mining at the site is scheduled to cease in Q4 of 2019, the mill will continue operating, processing ore trucked from the newly opened Amaruq mine (p. 40) northwest of Meadowbank along a 64 km all-weather road.

At its peak of operations, the mine employed approximately 700 people. The mine infrastructure and deposits are all located on IOL with grandfathered Crown mining leases, with the tenure covering 68,735 ha. The Vault deposit, including the Vault extension, is also located on subsurface IOL and covered by a Mineral Production Lease with NTI.

Gold production at Meadowbank over the first nine months of 2019 was 96,548 ounces, a significant but expected decrease in production due to the winding down of mining operations and the processing of stockpiled material and marginal grade ores. Total cash costs per ounce produced at Meadowbank were $1,035 US. This is a significant increase over 2018 costs of $694/ounce, but was expected due to planned lower gold production. Mine-site costs per tonne decreased by approximately 15 per cent from 2018. Mining at the Portage pit was expected to continue at Meadowbank into October 2019.

Geologically, the Meadowbank deposits are underlain by the Woodburn Lake Group, which is comprised of structurally complex quartzite, ultramafic to felsic volcano-sedimentary rocks, and banded iron formations that have been intruded by later granitoids and lamprophyre dykes. Gold is hosted in rocks of greenschist to amphibolite metamorphic grade. At the Goose and Portage pits, both now depleted, mineralization occurs in the sulphides in deformed iron formation units, and in gold-bearing quartz-sulphide veins in volcano-sedimentary rocks. The Vault deposit is hosted in gently dipping volcanic rocks and porphyry dykes that exhibit metre-scale zones of hydrothermal alteration.
The Meadowbank area project consists of three non-contiguous blocks of claims that were staked adjacent to the all-weather road that connects Agnico Eagle’s Meadowbank and Amaruq gold mines to Baker Lake. The properties are underlain by the supracrustal rocks of the Woodburn Lake Group, part of the Rae Domain of the Churchill Province. The property geology is comprised of strongly foliated intermediate to felsic metavolcanic rocks, epiclastic sedimentary rocks, ultramafic units, and magnetite-iron formation units; many of these units are intruded by large granitic plutons.

Western Atlas carried out programs on these claims blocks in both 2017 and 2018. Initial work in 2017 included a 3,800 line-km airborne magnetic survey, a program of prospecting and grab sampling, and release of a NI 43-101 technical report for the project. This was followed in 2018 by a 1,518 line-km airborne electromagnetic survey, ground induced polarization surveys targeting the A and B Blocks, geological mapping, rock and till sampling, and shallow rotary air-blast drilling on select targets within the B Block.

Early in 2019, the company announced it had defined its first and second set of drill targets based on the 2017 and 2018 exploration program data sets. Both targets are in the B Block. Target B1 will test a 15 km strike length of iron formation and a 6 km strike length of shear zones. Target B2 will test a shorter interval (3 km) of iron formation and shear zones (2 km).

No work was reported on the property in 2019.
Agnico Eagle Mines Limited acquired Meliadine as an exploration project from Comaplex Minerals Corp. in 2010. Pre-production ore processing, including the first gold bar pour for the mine, began in February 2019. In May 2019, Agnico Eagle announced the start of commercial production. The entire property currently consists of 111,358 ha of Crown mineral claims and grandfathered Crown mineral leases on IOL, and an additional 4,827 ha under a MEA with NTI. Surface rights for the grandfathered lease and MEA are administered by the Kivalliq Inuit Association. The mine is accessible from the community of Rankin Inlet by a 25 km all-season-road, and the mine site facilities can accommodate up to 690 employees. Rankin Inlet is the primary hub for transport of personnel and goods to the mine. The company holds an Inuit Impact Benefit Agreement, signed in 2015, with the Kivalliq Inuit Association for the project. Meliadine is expected to operate for 14 years, with a total estimated gold production of five to seven million ounces. However, the mine life could be extended, as many of the known deposits at the site remain open at depth, and Agnico Eagle has stated that there is significant potential for further discoveries in the greenstone belt.

Meliadine is located in the northern portion of the Archean-aged Rankin Inlet greenstone belt that includes deformed mafic volcanic rocks, felsic pyroclastic rocks, sedimentary rocks, and gabbro sills, and is locally metamorphosed from lower to middle greenschist grade. Known deposits and highly prospective areas within the Meliadine trend are mainly located along the Pyke Fault, a high-strain shear zone several kilometres wide and over 80 km in length. Locally, gold mineralization occurs in association with quartz-carbonate shear zones and/or laminated quartz vein systems. The highest-grade ore is hosted in structurally controlled, multi-deformed and sulphidized iron formation units of the Tiriganiaq and Upper Oxide formations. Most of the major deposits at Meliadine – Normeg, Wesmeg, Wolf, Pump, and F Zone – occur within a five-kilometre radius of the main Tiriganiaq deposit, with the Discovery deposit located 17 km to the southeast.

As of December 2018, the Meliadine deposits include combined proven and probable reserves of 3.8 million ounces of gold in 16.7 million tonnes of ore at an average grade of 6.97 g/t. The measured and indicated resources of the total open pit and underground mines are estimated at 25.9 million tonnes of ore grading 3.81 g/t Au; the inferred resources are 13.5 million tonnes of ore grading 6.00 g/t Au. The estimated average metallurgical recovery is approximately 96 per cent.

There will be two phases of operation at Meliadine. Mill throughput during Phase 1 has been greater than the expected initial capacity of 3,750 tonnes per day, sourced solely from underground via two access ramps. As a result, the planned increase to Phase 2 of production has been advanced by two years and is now expected to take place in 2021. This second phase will consist of an increase to approximately 6,000 tonnes of ore processed per day, with the additional ore sourced from an open pit. Production for 2019 was expected to be 230,000 ounces gold at a cash cost of $612 US per ounce.

Underground exploration drilling at Meliadine continued in 2019, and has extended the depth of known mineralization at Tiriganiaq significantly. Highlights from one drill hole include 15.8 g/t Au over 3.1 m at 750 metres depth, and 21.5 g/t Au over 2.9 m at 760 metres depth. A total of 10,000 metres of underground exploration drilling was planned for 2019, along with 12,500 metres of conversion drilling, and 5,000 metres of regional exploration drilling. The total budget for all three programs is $6.6 million.
Since optioning the initial three claims in 2010, the Pistol Bay project has expanded to 89 claims covering more than 78,000 ha. Northquest, a subsidiary of NordGold SE since 2016, is the owner of the project and carried out annual exploration programs from 2011 to 2019.

The project area is underlain by the Kaminak Group in the Rankin-Ennadai greenstone belt within the Hearne Domain of the Churchill geological province. The Kaminak Group is comprised of volcanic and volcanioclastic rocks, iron formations, mudstones, and siltstones. Numerous syn-volcanic to late tectonic igneous intrusions are found on the property, and are dated at roughly 2.7 billion years old. The tectonic setting is interpreted as a series of back-arc islands accreted to the Rae Craton. Minor Paleoproterozoic rocks of the Hurwitz Group also underlie the property.

Numerous gold occurrences have been identified on the property, but the majority of the work has focused on the Vickers gold deposit, which has an NI 43-101 open pit-constrained inferred resource of 739,000 ounces of gold at an average grade of 2.95 g/t Au. Mineralization at Vickers is found predominantly along the southeast-plunging northeastern contact of a gabbroic/quartz-dioritic intrusion known as the Gereghty Plug, which is hosted within sub-vertical felsic and intermediate metavolcanic and metavolcanioclastic strata. Gold mineralization is found within and adjacent to the intrusion to at least 300 m vertical depth, and remains open at depth.

The 2018 program included geological mapping, rock chip sampling, and till sampling, mainly in the eastern half of the property. Historic drill core re-logging was also carried out to assist with a planned update of the Vickers deposit model. Building on that work, the 2019 program consisted of 4,608 m of diamond drilling in 10 holes focused on expanding the Vickers resource. This work targeted the southward and westward continuations of high-grade mineralization, and demonstrated that the gold mineralization at Vickers does extend past the previously modelled limits.
No exploration activities took place in 2019 at Silver Range Resources’ Tree River prospect. The 39,250 ha property comprises three prospecting permits issued to the company in February 2018 and covers an area with known gold mineralization hosted in a monomictic, clast-supported quartz pebble conglomerate, similar to that found at Witwatersrand in South Africa and Pilbara in Australia. The conglomerate found at Tree River is also of similar age to the two above-mentioned gold mineralization settings.

The Tree River property is located in the northern portion of the Analik greenstone belt, straddling the mafic volcanic-sedimentary contact with the quartz pebble conglomerate located within 80 metres up-section from the contact. The unit, traceable over a 4.8 km strike length, ranges between 15 and 20 metres in thickness with the gold bearing horizon between 4 and 8 metres. Gold is associated with pyrite and to a lesser degree with arsenopyrite, chalcopyrite, stibnite, and sphalerite. The area was explored by BHP Billiton and Strongbow Exploration in the 1990s and early 2000s with Prospecting, channel sampling, airborne magnetic surveys, geological mapping, and petrographical studies conducted. BHP concentrated its exploration efforts on structurally controlled veins, but the Strongbow Exploration geologists recognized the Witwatersrand-style mineralization. Some of the highlights of sampling by these two companies included grab samples assaying up to 142 g/t Au and chip samples grading up to 63.15 g/t Au over 0.35 metres. The property has not been drilled.

Silver Range’s exploration program at Tree River was limited to a short sampling and prospecting program conducted by a 2-person crew in August 2018. Eighty-eight rock samples were collected including 57 samples of the gold-bearing quartz pebble conglomerate with grab samples assaying up to 14.05 g/t Au. Four of the quartz pebble conglomerate samples assayed over 9 g/t Au with the remaining samples averaging 0.2 g/t Au.
Iron

**LOCATION**
160 km south of Pond Inlet

**LAND TENURE**
Crown, Subsurface IOL, Surface IOL

**COMMODITY**
Iron

**OPERATOR/OWNER**
Baffinland Iron Mines Corporation

**NTS**
037C09, 037C10, 037C16, 037D13, 037E04, 037F01, 037F10, 037F12 – 037F16, 037G01 – 037G07, 037G11, 047H08

Baffinland Iron Mines Corporation’s (BIMC) Mary River iron mine located on northern Baffin Island has been in production since late 2014. The property consists of 330 claims and three mineral exploration agreements covering 305,339 hectares (ha) and 48,826 ha, respectively. In 2019, 57,984 ha of new claims were staked, increasing the total land holdings to 411,949 ha.

The initial iron ore discovery in the Mary River region occurred in 1962 with exploration continuing until 1965. There was no further exploration until BIMC acquired the property in 2004.

Nine deposits and several additional prospects are hosted in metasedimentary and metavolcanic rocks within the Neoarchean 2.76-2.71 billion year old (Ga) Mary River Group. The area has been variably affected by three major tectonic events, the most important being the Trans-Hudson orogeny at 1.8 Ga. The stratigraphic position of lithological units most commonly consists of a lower sequence of metavolcanic rocks, and an upper sequence of metasedimentary rocks, with iron formation forming a prominent marker. In the vicinity of Mary River, all known high-grade iron mineralization is associated with large scale fold structures along structural boundaries. The high-grade iron ore is associated with footwall chlorite schist, and occurs as hematite, magnetite, or specularite in banded iron formation. Iron mineralization at Deposit No. 1, the main deposit, averages 64% iron.

Baffinland’s 2019 exploration program was based out of the Mary River mine site. The budget for the 2019 program was $12.6 million, and the field program focused on claims in the central region. Exploration and infill drilling activities resumed with the objective of upgrading and expanding the resource at Deposits 1 and 3. Infill, condemnation, and ore characterization drilling comprising 3,757 m in 19 holes was undertaken along the North Limb Extension of Deposit No. 1 (1,997 metres in ten holes), the Axial Zone of Deposit No. 1 (448 metres in three holes) and the western end of Deposit No. 3 (1,312 metres in six holes). Drilling of Deposit 1 was to characterize the grade of iron ore and the extension of the mineralization to the north. Very high-grade magnetite and iron ore were intersected. About two thirds of Deposit 1 has now been drilled and the orebody remains open at depth.

Other exploration activities during the 2019 season included mapping, prospecting, grab sampling, soil and till sampling, geophysics, geochemistry, a backpack drill program, and a hyperspectral survey.

Legal surveys were completed for 10 claims that cover the fold structure that hosts the mineralized zones known as Glacier Lake, North Cockburn River, and North Rowley River. Prospects, to transition them into mining leases (total 25,826 ha). Forty-nine claims were staked covering area of 57,984 ha in the area of Nivalis and Rimrock Lakes to cover the Magnetite Hill fold belt. There was a focused follow-up surface sampling program at several key prospects to characterize further anomalous precious metal trends, the results of which are pending.

For 2019, BIMC had permission to ship 6 million tonnes (Mt) of iron ore from the Milne Inlet port but ultimately shipped 5.93 Mt. This represents an increase of almost one million tonnes over the 5.1 Mt shipped in 2018. Ore was transported by truck along the company’s tote road throughout the year to the port where it was stockpiled. Shipping from the Milne Inlet port occurred from July 17 to the end of October 2019, consisting of 82 shipments averaging 72,300 tonnes each.

BIMC is in the process of amending its Phase 2 proposal with the Nunavut Impact Review Board (NIRB). The current proposal involves increasing the quantity of ore shipped through Milne Inlet Port to 12 Mt, via the construction of a railway (the North Railway) running parallel to the existing tote road. Additionally, to accommodate the increased shipping from the Milne Inlet port, infrastructure at the mine site will be re-arranged. If the amendment is approved, the total planned mine production will ultimately increase to 30 Mt, with 12 Mt being transported via the North Railway to Milne Port and 18 Mt transported via the previously approved, though currently unconstructed, South Railway to Steensby Inlet Port.

Technical meetings concerning the Phase 2 amendment took place in March 2019 in Iqaluit. Follow-up public hearings, in support of NIRB’s assessment of BIMC’s Phase 2 Development Proposal, were arranged by NIRB in November 2019 in both Iqaluit and Pond Inlet. However, after four days, the hearings ended amidst significant community concerns, with the NIRB ultimately filing a motion to adjourn the hearings in Iqaluit and cancel the hearings in Pond Inlet. Regulatory talks about the proposed expansion plan now face delays of up to one year.
Inactive projects

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<thead>
<tr>
<th>Number</th>
<th>Project</th>
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<tbody>
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<td>205, 206</td>
<td>Contwoyto-205, Muskox-206</td>
<td>Benchmark Metals Inc.</td>
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<tr>
<td>207</td>
<td>Naujaat</td>
<td>North Arrow Minerals Inc.</td>
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<tr>
<td>329 - 332</td>
<td>Cone Hill-329, Fox Lake-330, Parker Lake-331, Peter Lake-332</td>
<td>Agnico Eagle Mines Limited</td>
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<tr>
<td>333</td>
<td>Contwoyto Gold</td>
<td>Benchmark Metals Inc.</td>
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<tr>
<td>334</td>
<td>Grumpy</td>
<td>Silver Range Resources Ltd.</td>
</tr>
<tr>
<td>335</td>
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<td>336</td>
<td>Meadow River</td>
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<td>337</td>
<td>Nigel</td>
<td>Canarc Resource Corp., Silver Range Resources Ltd.</td>
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<td>Noomut-338, Quartzite-339, Yandle-340</td>
<td>Silver Range Resources Ltd.</td>
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<td>341 - 345</td>
<td>South Kitikmeot Gold (Bling-341, Esker Lake-342, Goldbugs-343, Qannituq-344, Uist-345)</td>
<td>Amaroq Gold Corp., Silver Range Resources Inc.</td>
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<td>501</td>
<td>Angilak</td>
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<td>502</td>
<td>Mountain Lake</td>
<td>IsoEnergy Limited</td>
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Benchmark Metals Inc. holds two diamond projects within the northern Slave province in the Kitikmeot Region. The properties, acquired in 2015 under the company’s former name, Crystal Exploration Inc., each contain one or more kimberlites discovered by other operators in the 1990s and early 2000s. The Contwoyto diamond project contains a kimberlite of the same name, and is located east of the past-producing Jericho diamond mine and northeast of the past-producing Lupin gold mine. To the west of Jericho, the Muskox project includes the Muskox and Rush kimberlites. The last work reported at these projects included ground magnetic surveys, till sampling, prospecting, and mapping carried out in 2016. Benchmark also holds the Contwoyto Gold project south of Lupin, purchased from North Arrow Minerals in 2017. The company conducted a 198 metre, 3 drill hole program at the Butterfly prospect late in 2017 during which several intervals of gold-mineralized iron formation were intersected. Two claims were added to the project in 2018, but no exploration was conducted.

Since optioning the project in 2014, North Arrow Minerals has been seeking to advance the Naujaat diamond project, located near the community of the same name in the Kivalliq region. The focus of work has been the Q1-4 kimberlite complex, with a surface area of 12.5 hectares and a NI 43-101 inferred resource of 26.1 million carats of diamonds in 48.8 million tonnes of kimberlite. North Arrow has extracted two bulk samples from the kimberlite in 2014 and 2017, and has been working to improve its understanding of the two separate populations of stones recovered. Though no field work has been conducted since 2017, North Arrow has been working with the hamlet of Naujaat on plans for a community access trail that would pass within 1.5 km of the project. The company also initiated a study on the viability of a bulk sample diamond recovery plant to be placed on site as part of a proposed 10,000 tonne bulk sampling program.

Agnico Eagle holds several properties between its Meliadine gold mine and the hamlet of Baker Lake. These properties are located along the western extension of the Pyke Fault, the main structural control for Meliadine, in the Rankin greenstone belt and the Gibson-MacQuoid greenstone belt. Cone Hill is the most northerly property; the last reported work was in 2017 and consisted of a magnetic survey, grab and till sampling, and 1,814 metres of diamond drilling over 14 holes. About 80 km to the south, the Parker Lake gold project is located along
the projected western extent of the Pyke Fault. The company carried out prospecting, geochemical sampling, and diamond drilling at Parker Lake in 2017. Fox Lake had a limited prospecting survey completed in 2017, but no follow up work has been reported. Recent work at Peter Lake is limited to prospecting and collection of about 90 grab samples.

The Meadow River gold project, also held by Agnico Eagle, is located on Crown land surrounding the Amaruq mine property. The last reported work was in 2017, consisting of prospecting, the collection of more than 900 till samples, and close to 400 line-km of ground magnetic surveys.

Silver Range Resources Ltd. is a project generator company with a portfolio of gold projects in Nunavut and other jurisdictions. The Grumpy project is located in the northern portion of the High Lake greenstone belt in the Kitikmeot region. The property contains two showings documented in the Nunavut Minerals (NUMIN) showings database that have vein-hosted gold mineralization. No work has been conducted on the project by Silver Range. The Nigel project is located near the Nunavut-Northwest Territories border in the Kivalliq region and within the Ennadai greenstone belt. This project consists of a single mineral claim that includes three showings documented in NUMIN with Archean lode gold mineralization. Silver Range carried out prospecting on the property at time of staking in 2016. Both Nigel and the Hard Cash project (p. 45) were optioned to Canarc Resources Corp. in 2018. Silver Range also has three projects, Noomut, Quartzite, and Yandle, located in the central Kivalliq region. Noomut is west of Arviat and was previously explored by Comaplex Minerals Corp. in 1994 and 1995. Silver Range has not reported any work on the property. The Quartzite showing is located near Kaminak Lake, southwest of Rankin Inlet, and includes ten structurally hosted gold showings over a nine-kilometre trend. Noble Peak Resources previously explored the area in the 1990s. Silver Range carried out prospecting in 2016. Yandle includes two showings documented in NUMIN that were explored by Comaplex and Cumberland Resources Inc. in the 1990s and early 2000s. Yandle is located west of Arviat, and includes iron formation-hosted gold mineralization. Silver Range carried out mapping, prospection, and ground geophysical surveys in 2017.

Amaroq Gold Corp. optioned the South Kitikmeot Gold project from Silver Range in 2018. The project comprises five (formerly seven) properties across the southern Kitikmeot region: Bling, Esker Lake, Goldbugs, Uist, and Qannituuq. Aside from Bling, where gold is associated with arsenopyrite, gold mineralization is hosted in iron formation at the other properties. Silver Range carried out limited work at Bling, Uist, and Qannituuq in 2016 and 2017 before the option agreement was signed. No further work has been announced by either company.

Since optioning the Kuulu, formerly Peter Lake, gold project from Meliadine Gold Ltd. in 2016, NxGold has faced challenges in obtaining the necessary authorizations to explore. The project is located on subsurface Inuit Owned Land northwest of Rankin Inlet, adjacent to Agnico Eagle’s Meliadine gold mine. Previous exploration on the property used till and boulder sampling to identify gold-mineralized quartz boulders and quartz vein stock-work float, as well as areas with gold-in-till anomalies. NxGold proposed a 2017 program that included drilling and sampling, but in the absence of authorization to carry out surface work, only completed airborne magnetic and electromagnetic surveys. NxGold delivered a notice of force majeure to Meliadine Gold Ltd. in November 2017 and to Nunavut Tunngavik Inc. in September 2018. This notice suspended its obligations under the option agreement and Mineral Exploration Agreement, respectively, based on the continued delay in the renewal of its land use licence. No further work has been carried out on the project.

Located west of Yathkyed Lake, the Angilak project has an inferred NI 43-101 resource estimate of 43.3 million pounds of U3O8 at a grade of 0.69% from the polymetallic, basement-hosted, hydrothermal vein-type, unconformity-associated Lac 50 uranium deposit. The resource also includes an estimated 15.6 million pounds of copper, 10.4 million pounds of molybdenum, and 1.88 million ounces of silver. Angilak was the focus of exploration by Kivalliq Energy Corporation from 2008 through 2016; this property is, as stated by the company, “Canada’s highest-grade uranium resource outside of Saskatchewan”. The last work reported on the project was in 2016, consisting of soil sampling and trenching at the Yat and Dipole polymetallic targets. The company underwent share consolidation and a name change to ValOre Metals Corp. in 2018.

In 2016, IsoEnergy Ltd. staked the Mountain Lake uranium project, located in the Hornby Bay basin southwest of Kugluktuk. The project has a historic inferred resource of 8.2 million pounds of U3O8 at an average grade of 0.23%. Proposed prohibitions on mineral exploration for the project area, included in the 2016 draft Nunavut Land Use Plan, has created uncertainty and made it challenging to raise funds to explore at Mountain Lake. Consequently, IsoEnergy was granted a suspension of work requirements under Section 51 of the Nunavut Mining Regulations.
Glossary

**Base metal** - a metal that corrodes or oxidizes easily, such as iron, lead, copper, or zinc.

**Breccia** - a type of rock made up of angular rock or mineral fragments that have been fractured by forces within the Earth and then cemented together. Breccias can be good hosts for mineral deposits because the fractures in the rock provide spaces for mineralization to occur.

**Bulk sample** - the collection of a large amount of mineralized material from a deposit to determine its average metal or mineral content. Bulk samples are usually several hundred kilograms to several tonnes in size.

**Carat** – a unit of weight used for diamonds and other gemstones. One carat is equivalent to 0.2 grams.

**Deposit** - a natural concentration of a metal, gemstone or other mineral substance, which may be economically extracted but which needs more detailed study to be classified as a resource. Also known as a mineral deposit.

**Drilling** - the extraction of a sample of bedrock or other surface material such as glacial till or clay, in order to examine the occurrence of rock types, understand an area’s geological structure, or verify the presence or absence of ore minerals.

**Element** – a pure substance that contains only one type of atom. Gold, copper, iron, and other metals are elements.

**Environmental impact statement (EIS)** - a document outlining the effects of a development project on the environment, prepared by the proponent of that project, and presented to regulators, decision makers, and the public.

**Fee simple** - a type of private land ownership in which the owner has the right to use, control access to, and transfer the land. Inuit hold fee simple title to Inuit Owned Land.

**Geochemical survey** – the collection of rock, soil, or water samples from a defined area and their subsequent chemical analysis in a laboratory, to identify abnormal concentrations of chemical elements that indicate the presence of metals or gemstones. Also referred to as geochemical exploration.
**Geophysical survey** - the collection of information associated with bedrock using sensing instruments. These surveys can be conducted from the air or the ground to detect physical properties of rocks such as magnetism, gravity or conductivity.

**Grab sample** - a rock sample, collected by hand, that is examined for its physical characteristics and chemically analyzed to determine whether valuable minerals or metals are present.

**Greenstone belt** - a linear zone or “belt” of metamorphosed volcanic rocks that often host deposits of gold and other valuable metals. Their characteristic colour comes from several different green minerals that make up the volcanic rocks. These belts can be tens to hundreds of kilometres in length and are found in several places across Nunavut.

**Kimberlite** - a type of igneous rock that sometimes contains diamonds. Kimberlites can be composed of intrusive and/or extrusive rock. Kimberlite indicator minerals (KIMs) are minerals found in glacial or other sediments that suggest the nearby presence of a kimberlite.

**Mafic rock** - any igneous rock composed primarily of dark-coloured minerals, usually with a high iron and magnesium content. Ultramafic rocks are rocks made up of greater than 90 per cent mafic minerals, and some can be used as carving stone.

**Mineral Exploration Agreement** – an agreement signed between Nunavut Tunngavik Inc. and exploration companies, which allows exploration on Inuit Owned Lands.

**National Instrument 43-101 (NI 43-101)** – a set of rules and guidelines for reporting information related to mineral exploration projects that are listed on Canadian stock exchanges.

**Ore** – a rock or mineral that contains an economically important metal, that can be mined and processed to produce that metal.

**Platinum-group elements (PGE)** - a group of metals including iridium, osmium, palladium, platinum, rhenium, rhodium, and ruthenium, that are highly resistant to tarnishing and corrosion. They are used in both industrial applications and in jewellery.

**Precious metal** – a metal such as gold or silver, which has high economic value and does not corrode.

**Preliminary economic assessment** – an initial economic study done on a mineral deposit to determine whether or not the project can be profitable under current market conditions.

**Reserve** - a published estimate of the amount of naturally occurring metal, gemstone, or other mineral substance in a deposit that can be economically extracted at the time of publication of the estimate. Classifying a deposit as a reserve indicates that a company has strong confidence in the quantity and quality of ore in that deposit. Mineral deposits must meet specific legal criteria to be classified as reserves.

**Resource** - a published estimate of the amount of naturally occurring metal, gemstone, or other mineral substance in a deposit, which is present in an amount that could allow for economic extraction of the material in the future. Classifying a deposit as a resource indicates that a company has moderate confidence in the quantity and quality of ore in that deposit, but that more exploration is needed to consider it a reserve. Mineral deposits must meet specific legal criteria to be classified as resources.

**Shear** - a type of deformation resulting from forces within the earth that cause parts of a rock mass to stretch, compress, or fracture. This deformation can form shear zones, bodies of rock with many parallel fractures that can be good hosts for hydrothermal mineral deposits.

**Sulphide** - a group of minerals that contain the element sulphur, including a large number of metal-bearing minerals that are sources for metals such as gold, zinc, and copper. They are commonly referred to as economic minerals. Sulphide deposits can be massive (minerals are concentrated over small areas) or disseminated (minerals are distributed over large areas).
Guide to Abbreviations

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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>CIRNAC</td>
<td>Crown-Indigenous Relations and Northern Affairs Canada</td>
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DISCOVER THE GEOSCIENCE OF NUNAVUT THROUGH THREE INTERACTIVE TOOLS

EXPLORATION OVERVIEW
The online version of this annual publication of exploration activities throughout Nunavut.

REFERENCES
A downloadable library of scientific publications, maps and data.

SHOWINGS
For browsing the mineral occurrences database with links to supporting references.