

Exploration and mining in the North Central and Northeast regions, British Columbia



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1. Introduction

A northeast to southwest transect through the Northeast and the North Central regions provides a cross section from undeformed rocks deposited on Precambrian basement to allochthonous terranes accreted to Ancestral North America (Fig. 1). In the Northeast Region, platformal sedimentary rocks transition westward to deep-water basin strata at the eastern limit of Cordilleran deformation, close to the border of the North Central Region. The North Central Region displays a history of ocean opening and closing, island arc volcanism, and terrane accretion onto the western margin of Ancestral North America. Terrane emplacement was followed by continued orogeny, magmatism, and sedimentation. Both regions were extensively glaciated.

The Northeast Region is prospective for coal and industrial minerals and has three producing coal mines: Conuma Resources Limited's **Brule**, **Wolverine**, and **Willow Creek** operations. Conuma Resources Limited recently purchased the closed **Quintette** mine from Teck Resources for \$120 million. Conuma Resources Limited will also pay an ongoing 25% net profits royalty, starting once it recovers its investment. In the far north of the region, Fireside Minerals Ltd. produces barite from its **Fireside** mine to supply the oil and gas drilling industry. The North Central Region is prospective for copper, gold, silver, zinc, lead, niobium, and rare earth elements. These minerals occur mainly in porphyry, epithermal or vein and stockwork, SEDEX, and carbonatite settings. The North Central Region has one producing mine, the **Mount Milligan** copper-gold operation (Centerra Gold Inc.). Both regions had active exploration projects (Fig. 1). Significant work and results included those reported for NorthWest Copper Corporation's **Kwanika** and **Stardust** projects, Pacific Ridge Exploration Ltd.'s **Kliyul** and **RPD** projects, Skeena Resources's **Sofia** project, TDG Gold Corp.'s **Shasta** project, Amarc Resources Ltd.'s **Joy** project, and Defense Metals Corp.'s **Wicheeda** project.

Artemis Gold Inc. announced fulfilling all EA (environmental assessment) conditions to start preparing the plant site for their **Blackwater Gold** project, and this work started in 2022 with clearing, bulk earthworks, and erosion control.

Estimates for exploration expenditures, drilling programs, and other metrics were captured in the British Columbia Mineral and Coal Exploration Survey, a joint initiative of the Province of British Columbia Ministry of Energy, Mines and Low Carbon Innovation, the Association for Mineral Exploration in British Columbia, and EY LLP. For the North Central Region, exploration expenditures were estimated at \$139.0 million and exploration drilling was estimated at approximately 163,220 m. For the Northeast Region, exploration expenditures were estimated at \$1.9 million and no exploration drilling was reported (Clarke et al., 2023; EY LLP, 2023).

2. Geological overview

The Canadian Cordillera records a history of supercontinent rifting followed by collisions between the westward-driven North American continental plate and a succession of island arc volcanosedimentary and intrusive assemblages (terranes) developed outboard of Ancestral North America and accreted to each other and to the continental margin (e.g., Nelson et al., 2013). Terrane evolution continues today as the Juan de Fuca plate slides beneath Vancouver Island. In the Northeast and Central regions, the most easterly rocks are platformal sedimentary units that thicken westward and transition to deep-water basin strata. These rocks are deformed mainly by eastward-vergent thrust faults and folds along northwest-southeast trends. The Rocky Mountain trench marks the site of about 800 km of post-accretion dextral strike slip along the Tintina fault system. Deformed deep-water basin sedimentary rocks immediately west of the Rocky Mountain trench are referred to as the Cassiar terrane (Fig. 1). Outboard of the Cassiar terrane is a group of volcanic assemblages referred to (roughly from east to west) as the Slide Mountain terrane, the Quesnel and Stikine terranes (Quesnellia and Stikinia), and the Cache Creek terrane. The Cache Creek terrane is separated from Quesnellia by the Pinchi fault, another major crustal break, which locally exposes areas of ultramafic rocks. These terranes are intruded by intermediate to felsic plutonic and volcanic rocks that are overlain by younger sedimentary and volcanic rocks. Mineral deposit types and distributions are intimately related to the geologic evolution of the terranes

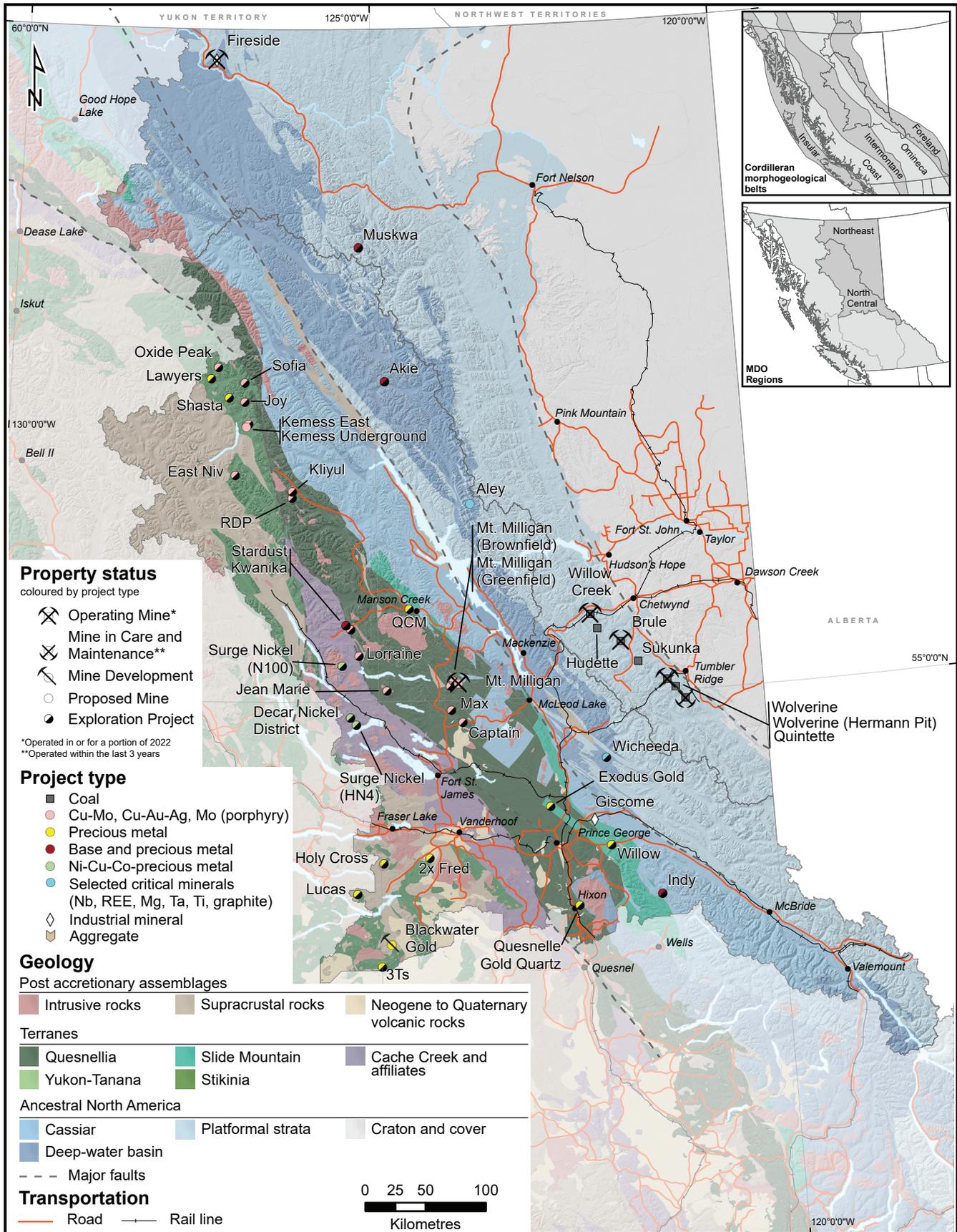


Fig. 1. Mines and selected projects, North Central and Northeast regions, 2022. Terranes after Nelson et al. (2013).

(e.g., Nelson et al., 2013). Thus, platformal rocks deposited above Ancestral North America host coal and potash deposits, and post-accretionary sedimentary rocks overlying the Stikine terrane host coal deposits. Deep-water basin strata host SEDEX and Mississippi Valley-type lead-zinc deposits and are intruded by carbonatite bodies hosting niobium and rare earth elements (REE). The island arc assemblages of Quesnellia and Stikinia host large polymetallic porphyry, epithermal, and orogenic precious metal deposits.

3. Mines and quarries

In 2022, one metal mine operated in the North Central Region; three coal mines and one industrial mineral mine operated in the Northeast Region (Fig. 1; Tables 1-3).

3.1. Metal mines

The one producing metal mine in the North Central Region is **Mount Milligan** (copper-gold) wholly owned by Centerra Gold Inc. (Fig. 1; Table 1).

3.1.1. Mount Milligan (Centerra Gold Inc.)

The **Mount Milligan** mine, in the Quesnel terrane (Fig. 1), is hosted by mafic to intermediate volcanic and pyroclastic rocks of the Takla Group (Triassic to Lower Jurassic) that are intruded by Lower Jurassic monzonite porphyry stocks. The ore body is a silica-saturated alkalic porphyry deposit in which copper and gold (with accessory silver) mineralization is in sulphides across an area of 2500 by 1500 m. The deposit has two principal zones. At the Main zone, mineralization is mostly in volcanic rocks; at the Southern Star zone, mineralization is in a monzonite stock and in volcanic rocks.

The planned mine life is just over 11 years (2022-2033). As of December 31, 2021, the mine has Proven and Probable reserve of 246.2 Mt, grading 0.37 g/t gold and 0.23% copper, with a combined Measured and Indicated resource of 189 Mt at 0.18% Cu and 0.30 g/t Au containing 742 million pounds (lbs) of copper and 1.8 million ounces (oz) of gold, and an Inferred Mineral resource of 4.6 Mt at 0.07% Cu and 0.47 g/t Au. The pit has been planned as a series of seven discrete pushbacks. Within the mine lease 26,873 m of drilling in 46 holes was

completed. The drilling was split between better defining known resources and expanding resources.

3.2. Coal mines

Conuma Resources Limited is currently producing from the **Brule**, **Willow Creek**, and **Wolverine** mines (Fig. 2; Table 2). All coal is shipped by rail to the Trigon Terminal, Prince Rupert. Coal from the three mines can be blended at port to create different quality mixtures for customer needs.

3.2.1. Brule Mine (Conuma Resources Limited)

Forecast production for the **Brule** mine was 1.9 Mt of pulverized coal injection (PCI) coal. The coal is in folded and thrust-faulted rocks of the Gething Formation. The direct-ship coal product is transported by truck to the Willow Creek mine site then sent by rail to the Trigon Terminal.

3.2.2. Willow Creek Mine (Conuma Resources Limited)

The **Willow Creek** mine forecasted production was 1.0 Mt of hard coking coal (HCC) and pulverized coal injection (PCI) product. Coal is mined from several seams in the Gething Formation (Fig. 3). The coal is processed on site then transported by rail to the Trigon Terminal.

3.2.3. Wolverine Mine (Conuma Resources Limited)

Forecast production for the **Wolverine** mine was 1.1 Mt of hard coking coal (HCC). Coal from the mine is processed on site and loaded for rail transport to the Trigon Terminal. Coal is mined from the Gates Formation at the Perry Creek pit, which is nearing the end of its resources. Conuma Resources Limited has an Environmental Assessment in progress for an amendment that would allow mining from the Wolverine Hermann Pit and use the existing Wolverine processing plant and loadout facilities. The proposed Wolverine Hermann Pit is approximately 16 km from the Wolverine mine Perry Creek pit and coal processing plant.

3.3. Industrial mineral mines and quarries

In 2022, the **Fireside** barite mine was in operation in the Northeast Region (Fig. 1; Table 3). No industrial mineral mines

Table 1. Metal mines, North Central Region.

Mine	Operator (partner)	Commodity; Deposit type; MINFILE	Forecast 2022 Production (based on Q1-Q3)	Reserves	Resource	Comments
Mt. Milligan	Centerra Gold Inc.	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093N 194, 191	75.9 Mlbs Cu 181,000 oz Au	P+Pr: 246.2 Mt 0.23% Cu 0.37 g/t Au	M+I: 189 Mt 0.18% Cu 0.30 g/t Au (additional to reserves)	Concentrator design capacity 60,000 tpd. Mine life extended by over four years. More than 350 employees. Approximately 27,000 m of diamond drilling in 46 holes completed in 2022.

P = Proven; Pr = Probable; M = Measured; I = Indicated; Inf = Inferred

Table 2. Coal mines, North Central and Northeast regions.

Mine	Operator (partner)	Commodity; Deposit type; MINFILE	Forecast 2022 Production (based on Q1-Q3)	Reserves	Resource	Comments
Brule	Conuma Resources Limited	PCI; Bituminous coal; 093P 007	1.9 Mt	P+Pr: 2.3 Mt	na	About 300 employees.
Willow Creek	Conuma Resources Limited	HCC, PCI; Bituminous coal; 093O 008	1.0 Mt	P+Pr: 8.6 Mt	na	About 300 employees, mine and plant.
Wolverine	Conuma Resources Limited	HCC; Bituminous coal; 093P 025	1.1 Mt	P+Pr: 2.3 Mt	na	About 300 employees, mine and plant.

HCC = hard coking coal; PCI = pulverized coal injection; TC = thermal coal
P = Proven; Pr = Probable; M = Measured; I = Indicated; Inf = Inferred

Table 3. Selected industrial mineral mines and quarries, North Central and Northeast regions.

Mine	Operator (partner)	Commodity; Deposit type; MINFILE	Forecast 2022 Production (based on Q1-Q3)	Reserves	Resource	Comments
Fireside (Northeast Region)	Fireside Minerals Ltd.	Barite; Vein barite; 094M 003, 19	na	na	na	Fireside Minerals produces 4.1 API spec barite for sale into the western Canadian oil and gas markets.

P = Proven; Pr = Probable; M = Measured; I = Indicated; Inf = Inferred

or quarries operations were reported for the North Central Region.

3.3.1. Fireside (Fireside Minerals Ltd.)

At the **Fireside** mine, Fireside Minerals Ltd. quarries massive white barite from veins cutting Paleozoic sedimentary rocks of the Kechika Group near the Yukon border. The barite veins are steeply dipping, trend north to northeast, and have a combined true thickness of 6.5 m. Barite concentrations in the veins range from 96.0 to 99.4% BaSO₄.

4. Placer operations

Placer exploration is a widespread activity in parts of British Columbia, and permits are required only when surface disturbance is proposed. In the North Central Region, operations are distributed primarily in the Manson Creek, Fort St. James to Mackenzie, and Hixon areas. Larger scale operations are generally sited on abandoned stream channels and benches, and use backhoes and hydraulic excavators to extract gravel, which is then processed through a wash plant, either on site or at a remote location. Due to the number of operations and

because production is not reported, these operations are not tracked. The lack of metal prospects in the Northeast Region means there is currently minimal interest in placer operations.

5. Mine or quarry development

Artemis Gold Inc.'s **Blackwater Gold** Au-Ag project in the North Central Region is at the mine development stage (Table 4).

5.1. Blackwater Gold (Artemis Gold Inc.)

The **Blackwater** deposit is hosted by a sequence of intermediate to felsic volcanic rocks in the Kasalka Group (Upper Cretaceous; Stikine terrane). In this intermediate sulphidation, epithermal system, the host rocks are pervasively fractured and sericitized. Sulphides include pyrite, sphalerite, marcasite, and pyrrhotite as disseminations and pore fillings that are strongly controlled by a set of northeast- and northwest-trending faults. Reserves are reported at 8 million oz Au and 62.3 million oz Ag, with a life-of-mine average annual gold production of 339,000 oz (August 2020). The company has fulfilled all EA (environmental assessment) conditions to start site preparation, which began in 2022 (Fig. 4).

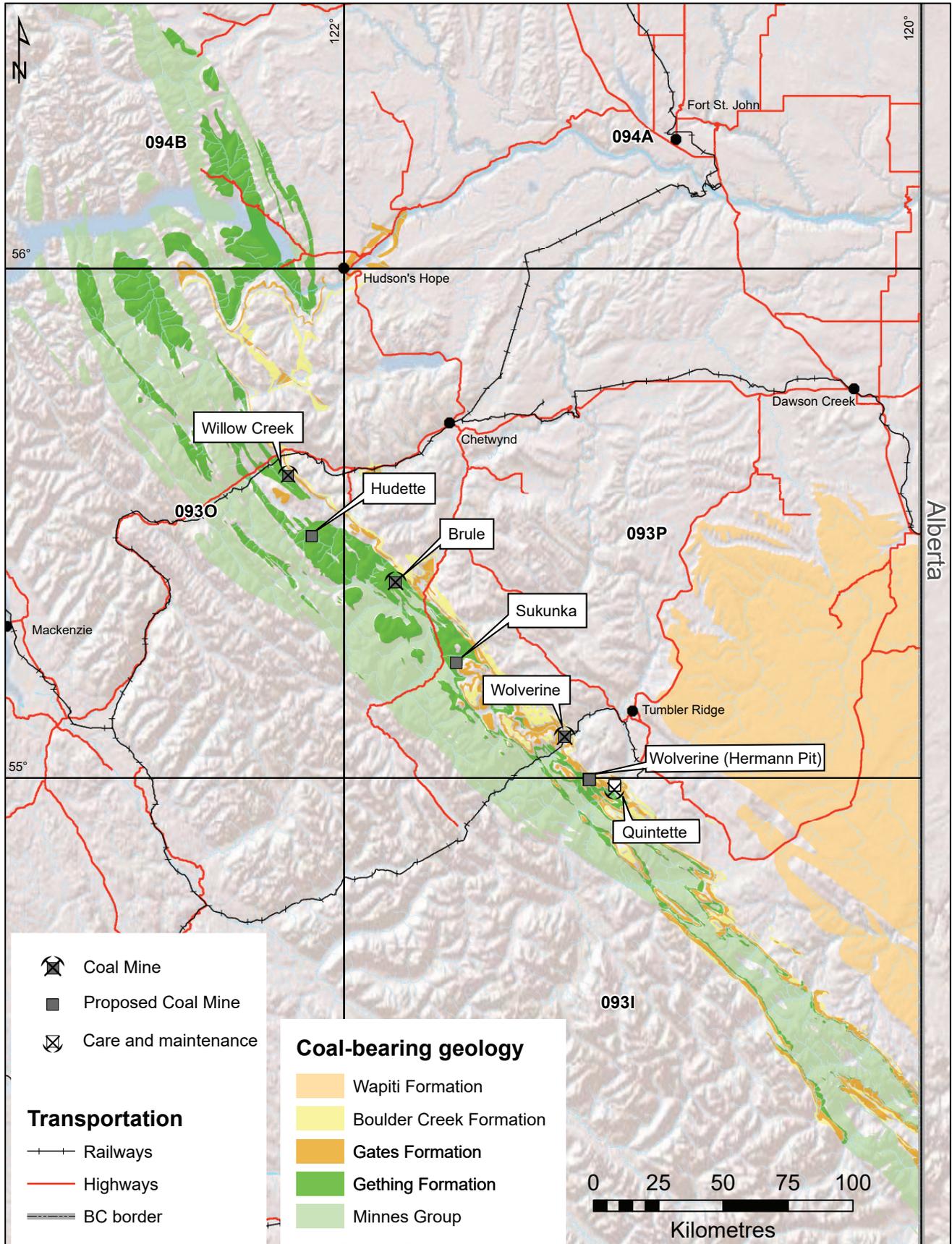


Fig. 2. Coal mines, proposed coal mines, and coal exploration projects, northeastern British Columbia, 2022.



Fig. 3. East-dipping thrust and folded Gething Formation strata, Willow Creek Mine, 4N2 pit (Conuma Resources Limited).



Fig. 4. Construction activities at the Blackwater Gold project site (Artemis Gold Inc.).

6. Selected proposed mines or quarries

Projects at the proposed mine stage (Fig. 1; Table 5) in the North Central Region include two proposed metal mines, Taseko Mines Limited’s **Aley** project, and Centerra Gold Inc.’s **Kemess Underground** project. Also in the North Central Region, Greymont Western Canada Inc.’s **Giscome** project is a proposed industrial mineral mine (limestone). There are three proposed mines in the Northeast Region (Figs. 1, 2; Table 5): Glencore plc’s **Sukunka** coal project and Conuma Resources Limited’s **Wolverine Hermann Pit**, and **Hudette** projects.

6.1. Proposed metal mines

The two proposed metal mines in the North Central Region are Taseko Mines Limited’s **Aley** Niobium project, and Centerra Gold Inc.’s **Kemess Underground** project.

6.1.1. Aley (Taseko Mines Limited)

Taseko Mines Limited’s wholly-owned **Aley** niobium-bearing carbonatite project is near the western extremity of platformal strata. The carbonatite intrusion is oval in map view, measuring about 2.0 by 2.8 km. Reserves are calculated

at 84 Mt grading 0.5% Nb₂O₅. The proposed processing plant would have a nominal capacity of 10,000 tpd. Single-stage crushing followed by three stages of grinding and a multi-stage flotation process would produce a Nb₂O₅ concentrate. The concentrate would then be processed in an on-site converter to produce FeNb as a saleable product. Expected process recovery is 63% with annual production averaging 9 million kg of niobium over the mine life. Environmental monitoring and product marketing initiatives continue. A converter pilot test to support the design of the commercial facilities is ongoing.

6.1.2. Kemess Underground (Centerra Gold Inc.)

Centerra Gold Inc.’s **Kemess Underground** (KUG) project is estimated to contain an Indicated resource of 173.7 Mt grading 0.182% Cu, 0.3 g/t Au, and 1.55 g/t Ag. Within this resource are Probable reserves of 107.4 Mt grading 0.27% Cu, 0.54 g/t Au, and 1.99 g/t Ag. Although the former Kemess South mine closed in 2011, infrastructure remains in place and both the camp and ore processing plant will be used to service KUG. KUG is considered a stand-alone operation, to be mined by panel caving, with crushed ore conveyed underground to

Table 4. Mine development projects, North Central Region.

Project	Operator (partner)	Commodity; Deposit type; MINFILE	Reserves	Resource	Comments
Blackwater (North Central Region)	Artemis Gold Inc.	Au, Ag; Epithermal Au-Ag-Cu, intermediate sulphidation; 093F 037	P+Pr: 334.4 Mt 0.75 g/t Au 5.8 g/t Ag at a 0.20 g/t AuEq cut off containing 8.0 Moz Au 62.3 Moz Ag	M+I: 597 Mt (including reserves) 0.61 g/t Au 6.4 g/t Ag at a 0.20 g/t AuEq cut off containing 11.7 Moz Au 122.4 Moz Ag	The company has fulfilled environmental assessment conditions to start site preparation, which began in 2022. Reserves (August 2020) are reported at 8 million oz Au and 62.3 million oz Ag, with a life-of-mine average annual gold production of 339,000 oz.

P = Proven; Pr = Probable; M = Measured; I = Indicated; Inf = Inferred

Table 5. Selected proposed mines and quarries, North Central and Northeast regions.

Project	Operator (partner)	Commodity; Deposit type; MINFILE	Reserves	Resource	Comments
Aley (North Central Region)	Taseko Mines Limited	Nb; Carbonatite-hosted; 094B 027	P+Pr: 83.8 Mt 0.50% Nb ₂ O ₅ (at 0.30% Nb ₂ O ₅ cut off)	M+I: 285.8 Mt 0.37% Nb ₂ O ₅ (at 0.20% Nb ₂ O ₅ cut off)	Proposed open-pit mine with 10,000 tpd ore processing rate and average annual production of 9000 t Nb. Environmental monitoring and product marketing.
Giscome (North Central Region)	Graymont Western Canada Inc.	CaCO ₃ ; Limestone; 093J 041, 25	na	I: >100 Mt of limestone (>95% calcium carbonate, <5% magnesium carbonate) in situ	Environmental assessment in place. Proposed 600,000 tpy limestone quarry to feed a vertical lime kiln producing 198,000 t of lime annually during a 50+ year mine life.
Hudette (Northeast Region)	Conuma Resources Limited	Coal; Bituminous coal; 093O 060	P+Pr: 15.6 Mt	na	Prefeasibility study completed, EA application started. Continued baseline monitoring.
Kemess Underground (KUG) (North Central Region)	Centerra Gold Inc.	Cu, Au, Ag; Porphyry Cu±Mo±Au; 094E 021	Pr: 107.38 Mt 0.27% Cu 0.54 g/t Au 1.99 g/t Ag containing 629.6 Mlbs Cu 1.87 Moz Au 6.88 Moz Ag	I: 173.7 Mt (including reserves) 0.182% Cu 0.3 g/t Au 1.55 g/t Ag containing 1195 Mlbs Cu 3.33 Moz Au 13.87 Moz Ag	Permitted, proposed underground panel cave mine with 24,600 tpd ore processing rate and life-of-mine average annual production of 106,000 oz Au and 47 Mlbs Cu over a 12-year life of mine.
Sukunka (Northeast Region)	Glencore Canada Corporation	Coal; Bituminous coal; 093P 014	na	145.0 Mt coal in situ	The Government of Canada determined the project would have significant adverse environmental effects and declined to approve the project.
Wolverine (Hermann Pit) (Northeast Region)	Conuma Resources Limited	Coal; Bituminous coal; 093I 031	na	M+I: 24.36 Mt	Environmental Management Act Permits Amendments; continued baseline monitoring.

P = Proven; Pr = Probable; M = Measured; I = Indicated; Inf = Inferred

the processing plant. Processing rate would be 24,600 tpd with an average production of 106,000 oz gold and 47 Mlbs copper during a 12-year mine life. Kemess East (KE), about 1 km east of KUG, is an underground operation that could be integrated into the KUG project. KE has an Indicated resource of 177.5 Mt grading 0.36% Cu, 0.4 g/t Au, and 1.97 g/t Ag and an Inferred resource of 29.3 Mt grading 0.314% Cu, 0.3 g/t Au, and 2.00 g/t Ag. The KUG project has approval for development, but Centerra has not declared a timeline.

6.2. Selected proposed coal mines

Conuma Resources Limited is continuing to work towards receiving a Mines Act Permit Amendment for their **Wolverine Hermann Pit** project and started the Environmental Assessment process for their **Hudette** project. Glencore plc's **Sukunka** project is listed as 'in the referral stage' by the British Columbia Environmental Assessment Office.

6.2.1. Wolverine Hermann Pit (Conuma Resources Limited)

For its **Wolverine (Hermann Pit)** project, Conuma continued to make progress with Environmental Management Act Permits Amendments. This will be a new pit operation using current Wolverine mine infrastructure. The company continued baseline environmental monitoring. The project contains 24.36 Mt Measured and Indicated resources of coal in the Gates Formation. Coal seams are mostly in folds with moderate to steep (40-70°) dips of the Gates Formation (Fort St. John Group; Lower Cretaceous).

6.2.2. Hudette (Conuma Resources Limited)

Conuma Resources Limited competed a prefeasibility study and started working on their environmental assessment application for their **Hudette** project.

6.2.3. Sukunka (Glencore plc and JX Nippon Oil and Energy Corporation)

The **Sukunka** project has been planned as both an open-pit and underground operation, extracting steel-making coal from the Gething Formation. The expected mine life is up to 20 years. The British Columbia Environmental Assessment Office completed its assessment of Glencore's application and provided its assessment to the Impact Assessment Agency of Canada. The Government of Canada determined the project would have significant adverse environmental effects that could not be mitigated and declined to approve the project.

6.3. Selected proposed industrial mineral mines or quarries

Proposed industrial mineral mines or quarries include Graymont Western Canada Inc.'s **Giscome** project in the North Central Region.

6.3.1. Giscome (Graymont Western Canada Inc.)

At the **Giscome** project, Graymont Western Canada proposes to mine high-purity limestone in basaltic rocks of the Antler Formation (Triassic; Slide Mountain Group). Crushed stone would be transported about 5 km by truck to lime kilns at a former stone quarry, owned and operated by CN Rail, in the community of Giscome. An existing CN Rail line would be used for transporting the product. The project has Environmental Assessment approval. Due to weak markets for lime in the region, Graymont has not yet decided to initiate construction.

7. Selected exploration activities and highlights

Exploration activity and expenditures were down in the Northeast Region but increased in the North Central Region (Fig. 1; Tables 6, 7) compared to 2021. Large programs included drilling at the **Kwanika** and **Stardust** (NorthWest Copper Corporation), **Kliyul** and **RDP** (Pacific Ridge Exploration Ltd.), **Lawyers** (Benchmark Metals Inc.), **Mount Milligan Brownfield** (Centerra Gold Inc.), **Sofia** (Skeena Resources), **Shasta** (TDG Gold Corp.), **Joy** (Amarc Resources Ltd.), and **Wicheeda** (Defense Metals Corp.) projects.

7.1. Selected precious metal projects

In 2022, the North Central Region saw numerous precious metal projects (Fig. 1; Table 6) including **2X Fred** (Centerra Gold Inc.), **3Ts** (Independence Gold Corp.), **Shasta** (TDG Gold Corp.), **Exodus Gold** (Exodus Mineral Exploration Ltd.), **Holy Cross** (Evergold Corp.), **Lawyers** (Benchmark Metals Inc.), **QCM** (Kestrel Gold Inc.), **Quesnelle Gold Quartz** (Golden Cariboo Resources Ltd.), and **Willow** (Exodus Mineral Exploration Ltd.).

7.1.1. 2X Fred (Centerra Gold Inc.)

Centerra Gold Inc. carried out diamond drilling at their **2X Fred** project with 1533 m of diamond drilling in five holes and 965 m RC drilling in six holes. **2X Fred** is an epithermal target with fine-grained layered pyrite and other sulphides in quartz veins.

7.1.2. 3Ts (Independence Gold Corp.)

Independence Gold Corp. completed a winter drill program of 4185 m in 17 holes at their **3Ts** project. Ten holes were drilled at the Ted-Mint target, five holes at the Tommy target, and two holes at the new Balrog target. Highlight results included 30.0 m grading 4.99 g/t Au, and 53.3 g/t Ag. The company announced a fall surface mapping and sampling program between the Ted-Mint and Tommy targets. A recent technical report (August 18, 2022) disclosed combined in-pit and underground components of the Tommy and Ted-Mint vein systems containing a total Inferred resource estimate of 4.47 Mt grading 3.64 g/t Au and 96.26 g/t Ag, at a cut off grade of 0.4 g/t AuEq in-pit and 2.0 g/t AuEq underground, containing 522,000 ounces of gold and 13,800,000 ounces of silver.

7.1.3. Exodus Gold (Exodus Mineral Exploration Ltd.)

At their **Exodus Gold** project, Exodus Mineral Exploration Ltd. conducted rock sampling, prospecting, geological mapping, and reclamation work in 2022. Rock sampling of mineralized veins returned values including 39.8 g/t Au and 27.9 g/t Au.

7.1.4. Holy Cross (Evergold Corp.)

In the fall, Evergold Corp. completed an inaugural 1556 m diamond drilling program in four holes on its **Holy Cross** project. Drilling intersected intervals of sulphide-mineralized rhyolite breccia and quartz stockwork veining.

7.1.5. Lawyers (Benchmark Metals Inc.)

Benchmark Metals Inc. completed more than 18,829 m of resource and exploration drilling and 1447 m of geotechnical and hydrogeological drilling at their **Lawyers** project. As well, they announced a Preliminary Economic Assessment and an updated mineral resource estimate. The economic assessment results included a pre-tax NPV 5% of \$939 million, with IRR of 31.4%, and 2-year payback. The updated resource estimate reported on pit-constrained and out-of-pit resources. Pit-constrained resources at a 0.4 g/t AuEq cut off were reported as Measured 20.3 Mt grading 2.21 g/t Au, 30.5 g/t Ag, Indicated 45.5 Mt grading 1.09 g/t Au, 18.2 g/t Ag, and Inferred 2.3 Mt grading 0.91 g/t Au, 12.8 g/t Ag. Out-of-pit resources at a 1.5 g/t AuEq cut off were reported as Indicated 1.6 Mt grading 2.74 g/t Au, 60.6 g/t Ag, Inferred 2.6 Mt grading 3.32 g/t Au, 56.3 g/t Ag.

7.1.6. Lucas (Centerra Gold Inc.)

Centerra Gold Inc. is using a low sulphidation epithermal gold deposit model to guide their exploration at their **Lucas** project. The target is largely masked by glacial till. Mineralization is in the hanging wall of the Natalkuz Fault and the predominant host rock is Ootsa Lake Group (Eocene) flow-banded rhyolite. The company drilled 1065 m in 5 holes.

7.1.7. QCM (Kestrel Gold Inc.)

Kestrel Gold Inc. continued to explore at their **QCM** project.

Table 6. Selected exploration projects, North Central Region.

Project	Operator (partner)	Commodity; Deposit type; MINFILE	Resource	Comments
2X Fred	Centerra Gold Inc.	Au, Ag; Epithermal Au-Ag: low sulphidation; 093F 089	na	Drilling, 5 DDH (1533 m), 6 RC (965 m).
3Ts	Independence Gold Corp.	Au, Ag; Epithermal Au-Ag: low sulphidation; 093F 055	2022 estimate. Tommy and Ted-Mint veins Inf: 4.47 Mt 3.64 g/t Au, 96.26 g/t Ag (at a cut off grade of 0.4 g/t AuEq in-pit, 2.01 g/t AuEq underground)	Drilling, 17 DDH (4185 m) at Ted-Mint, Tommy and Balrog. Highlight results included 30.0 m grading 4.99 g/t Au, 53.3 g/t Ag.
Akie	ZincX Resources Corp.	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb- Ag; 094F 031	I: 22.7 Mt 8.32% Zn, 1.81% Pb, 14.1 g/t Ag Inf: 7.5 Mt 7.04% Zn, 1.24% Pb, 12.0 g/t Ag (at 5% Zn cut off)	The company completed high-resolution lidar over Akie and Mt. Alcock properties.
Captain	Orestone Mining Corp.	Cu, Au; Alkalic porphyry Cu-Au; 093J 026, 094C 180	na	1 DDH, 774 m. Airborne MT survey.
Decar Nickel District	FPX Nickel Corp.	Ni, Fe; Podiform chromite; 093K 116	2022 resource estimate Baptiste deposit I: 1815 Mt 0.129% DTR Ni, 0.211% Total Ni, 0.0035% DTR Co, 2.40% DTR Fe Inf: 339 Mt 0.131% DTR Ni, 0.212% Total Ni, 0.0037% DTR Co, 2.55% DTR Fe	2504 m drilling (10 holes) at Van target. Ni in all holes; assays included 346.3 m grading 0.133% DTR Ni and 334.5 m grading 0.12% DTR Ni. Drilling expanded mineralization 1 km along strike; area of mineralization 2 km along strike and 1 km across. Mineralization is open laterally and at depth.
East Niv	NorthWest Copper Corp.	Cu, Au; Alkalic porphyry Cu-Au	na	Drilling, 8 DDH, 4390 m. 31.1 line-km of ground IP, 1260 line-km of airborne magnetics, 206 surface rock samples, 745 soil samples. Highlight rock sample results included 11 samples grading from 1.08 to 6.55% Cu with Ag grades between 3.7 g/t and 262.0 g/t.
Exodus Gold	Exodus Mineral Exploration Ltd.	Au; Au-quartz veins, Epithermal Au, Ag, Cu, Pb, Zn; 093J 043	na	Rock sampling of high-grade gold veins returned values including 39.8 g/t Au and 27.9 g/t Au.
Holy Cross	Evergold Corp.	Au, Ag, Cu; Rhyolite breccia and quartz stockwork veining; 093F 029	na	Drilling, 4 DDH, 1556 m. Drilling intersected intervals of sulphide-mineralized rhyolite breccia and quartz stockwork veining.

Table 6. Continued.

Indy	InZinc Mining Ltd.	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb- Ag; 093H 072	na	Drilling, 17 DDH (2616 m), 1100 line-km airborne geophysics. Highlight results included 3.0 m grading 2.8% Zn, 0.6% Pb, and 3.8 g/t Ag and 3.6 m grading 3.5% Zn, 0.6% Pb, and 6.4 g/t Ag.
Jean Marie	Pacific Empire Minerals Corp.	Cu, Au, Ag, Mo; Porphyry Cu±Mo±Au; 093N 079	na	Drilling, 2 DDH (700 m). Results included: 155 m grading 0.18% Cu, 19 ppm Mo, and 1.0 g/t Ag, and 282 m interval grading 0.21% Cu, 27 ppm Mo, and 1.3 g/t Ag including 76 m grading 0.45% Cu, 71 ppm Mo, and 3.0 g/t Ag.
Joy	Amarc Resources Ltd.	Cu, Au; Porphyry Cu±Mo±Au; 094E 016, 57	Pine deposit I: historic non NI 43-101 compliant: 40 Mt 0.15% Cu, 0.57 g/t Au (Stealth Mining Corporation 1997)	Drilling, 37 DDH (15,427 m) at the Pine deposit and at several district porphyry copper-gold deposit targets. 2648 soil and 313 surface rock sampling.
Kliyul	Pacific Ridge Exploration Ltd.	Cu, Au, Ag; Alkalic porphyry Cu-Au; 094D 023	I: historic non NI 43-101 compliant: 2.3 Mt 1.30 g/t Au, 0.45% Cu, 6.9 g/t Ag	12 DDH (7015 m). Highlight results included 588.0 m grading 0.12% Cu, 0.39 g/t Au, 0.90 g/t Ag, and 527.8 m grading 0.19% Cu, 0.30 g/t Au, 1.35 g/t Ag.
Kwanika	NorthWest Copper Corp.	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093N 073	Central zone pit M+I: 104.6 Mt 0.23% Cu, 0.21 g/t Au, 0.78 g/t Ag (at a cut off grade of 0.13% CuEq) Central zone underground M+I: 118.9 Mt 0.30% Cu, 0.29 g/t Au, 0.96 g/t Ag (at a confining shape basis of 0.27% CuEq) South zone pit Inf: 33.3 Mt 0.26% Cu, 0.08 g/t Au, 1.64 g/t Ag, 0.01% Mo	Drilling, 29 DDH (11,871.80 m). Highlights included 304.20 m grading 0.47% Cu, 0.53 g/t Au, 1.7 g/t Ag, and 364.20 m grading 0.17% Cu, 0.17 g/t Au, 0.8 g/t Ag.
Lawyers	Benchmark Metals Inc.	Au, Ag; Epithermal Au-Ag: low sulphidation; 094E 066	Open pit M: 20.3 Mt 2.21 g/t Au, 30.5 g/t Ag I: 45.5 Mt 1.09 g/t Au, 18.2 g/t Ag Inf: 2.3 Mt 0.91 g/t Au, 12.8 g/t Ag Out of Pit I: 1.6 Mt 2.74 g/t Au, 60.6 g/t Ag Inf: 2.6 Mt 3.32 g/t Au, 56.3 g/t Ag	Drilling, 20,276 m. PEA and updated mineral resource assessment. The PEA results included a pre-tax NPV 5% of \$939 million, with IRR of 31.4%, and 2-year payback.

Table 6. Continued.

Lorraine	NorthWest Copper Corp.	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093N 002, 094C 069, 174	Lorraine I: 12.95 Mt 0.55% Cu, 0.16 g/t Au Inf: 45.45 Mt 0.43% Cu, 0.1 g/t Au	Drilling, 7 DDH (2867 m). Filed an updated NI 43-101 mineral resource estimate.
Lucas	Centerra Gold Inc.	Au, Ag; LS Epithermal gold; 093F 121	na	Drilling, 5 DDH (1068 m).
Max	Centerra Gold Inc.	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093K 020	na	Drilling, 7 DDH (2511 m).
Mount Milligan Brownfield	Centerra Gold Inc.	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093N 194	na	Drilling, 54 DDH (28,266 m).
Mount Milligan Greenfields	Centerra Gold Inc.	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093N 194	na	Drilling, 2 DDH (804 m).
Oxide Peak	TDG Gold Corp.	Cu, Au, Ag; Porphyry Cu±Mo±Au, Epithermal Au- Ag-Cu: low sulphidation; 094E 181	na	Drilling, 2 DDH (1021 m).
QCM	Kestrel Gold Inc.	Au, Cu; Au-quartz veins; 093N 200	na	Drilling, 14 RCD (1272 m). Highlight results included 2.33 g/t Au along 44.19 m and 2.39 g/t Au along 21.33 m.
Quesnelle Gold Quartz	Golden Cariboo Resources Ltd.	Au, Ag; Quartz ±carbonate veins in greenstone and sedimentary rocks; 093G 015	na	Drilling, 2 DDH (733.9 m). Highlight results included 0.6 m grading 17.5 g/t Au, 61.5 g/t Ag and 0.5 m grading 1.94 g/t Au.
RDP	Pacific Ridge Exploration Ltd.	Cu, Au, Ag; Alkalic porphyry Cu-Au; 094D 065	na	Drilling, 6 DDH (1861 m). Highlight results included 497.2 m of 0.37% Cu, 0.40 g/t Au, 1.6 g/t Ag, and 107.2 m of 0.63% Cu, 1.10 g/t Au, 2.91 g/t Ag.
Shasta	TDG Gold Corp.	Au, Ag; Epithermal Au-Ag: low sulphidation; 094E 050, 26	Inf: 22.0 Mt 0.79 g/t Au, 26.7 g/t Ag	5034 m of oriented HQ diamond drilling (21 holes). Filed a NI 43-101 Mineral Resource. Reported results for late 2021 drilling included 34 m grading 7.19 g/t Au, 105 g/t Ag.

Table 6. Continued.

Sofia	Skeena Resources Limited	Cu, Au, Ag; Porphyry Cu±Mo±Au, Epithermal Au-Ag-Cu: low sulphidation; 094E 208	na	Drilling, 11 DDH, 4397.90 m.
Stardust	NorthWest Copper Corp.	Cu, Au, Ag, Zn; Cu skarn; 093N 009	Canyon Creek I: 1.96 Mt 1.31% Cu, 1.44 g/t Au, 27.1 g/t Ag Inf: 5.84 Mt 0.86% Cu, 1.17 g/t Au, 20.0 g/t Ag	Drilling, 10 DDH (6698 m). Highlight results of 44.20 m grading 0.84% Cu, 0.51 g/t Au, 13.7 g/t Ag, and 75.95 m grading 0.55% Cu, 0.50 g/t Au, 10.9 g/t Ag.
Surge Nickel	Surge Battery Metals Inc. (80%); Nickel Rock Resources (20%)	Ni, Fe; Podiform chromite; 093N 035		At HN4, geological mapping and sampling (600 soil, 190 rock); 300 m DDH drilling completed by early November. At N100, geological mapping and sampling (304 rock).
Wicheeda	Defense Metals Corp.	Nb, REE; Carbonatite-hosted deposits; 093J 014	I: 5.0 Mt 2.95% TREO Inf: 29.5 Mt 1.83% TREO Resources at a cut off grade 0.5% TREO Total metal % = sum of Ce+La+Nd+Pr+Sm+Nb percentages	Drilling, 18 DDH (4357 m) and 1153 m geotechnical 2022 drilling. Results included 124 m grading 3.58% total rare earth oxides (TREO).
Willow	Exodus Mineral Exploration Ltd.	Au, Ag; Gold- and silver-bearing quartz veins with anomalous copper	na	Grab samples included 1.56 g/t Au, 535 ppm Sb; 0.226 g/t Au, 219 ppm Sb; 0.112 g/t Au, 11.6 g/t Ag, and 786 ppm Cu.

P = Proven; Pr = Probable; M = Measured; I = Indicated; Inf = Inferred

Table 7. Selected exploration projects, Northeast region.

Project	Operator (partner)	Commodity; Deposit type; MINFILE	Resource (NI 43-101 compliant unless indicated otherwise)	Comments
Muskwa	Fabled Copper Corp.	Cu, Ag, Pb, Co; Cu ±Ag quartz veins; 094K 012, 50	na	Applied for five-year land use permit for drilling.

M = Measured; I = Indicated; Inf = Inferred

A total of 1272 m of reverse circulation drilling was completed in 14 holes. Highlight results included 44.19 m grading 2.33 g/t Au and 21.33 m grading 2.39 g/t Au.

7.1.8. Quesnelle Gold Quartz (Golden Cariboo Resources Ltd.)

Golden Cariboo Resources Ltd. completed two diamond-drill holes totalling 733.9 m at their **Quesnelle Gold Quartz** project.

One hole intersected two quartz veins in a 15.2 m interval (true width estimated at 10 m). The widths of the veins were not announced. Reported assays were 0.6 m grading 17.5 g/t Au, and 61.5 g/t Ag, and 0.5 m grading 1.94 g/t Au.

7.1.9. Shasta (TDG Gold Corp.)

TDG Gold Corp. completed 5034 m of oriented core diamond drilling in 21 drill holes at its **Shasta** project. They

also filed an initial NI 43-101 mineral resource estimate based on a combination of historic drilling and 2021 drilling. At a cut off grade of 0.3 g/t AuEq they reported an Inferred resource of 22.01 Mt grading 0.79 g/t Au and 26.7 g/t Ag. Reported results for late 2021 drilling included 34 m grading 7.19 g/t Au and 105 g/t Ag.

7.1.10. Willow (Exodus Mineral Exploration Ltd.)

At their **Willow** project, Exodus Mineral Exploration Ltd. discovered gold- and silver-bearing quartz veins with anomalous copper, arsenic, and antimony. Sample highlights from selected grab samples included 1.56 g/t Au, 9350 ppm As, and 535 ppm Sb; 0.226 g/t Au, 5050 ppm As, and 219 ppm Sb; and 0.112 g/t Au, 11.6 g/t Ag, and 786 ppm Cu.

7.2. Selected porphyry projects

Porphyry projects continued to be an important focus of mineral exploration in the Quesnel and Stikine terranes of the North Central Region (Fig. 1; Table 6). Selected projects include Orestone Mining Corp.'s **Captain** project, NorthWest Copper Corp.'s **Kwanika**, **Lorraine**, and **East Niv** projects, Pacific Empire Minerals Corp.'s **Jean Marie** project, Amarc Resources Ltd.'s **Joy** project, Pacific Ridge Exploration Ltd.'s **Kliyul** and **RDP** projects, Centerra Gold Inc.'s **Max** and **Mount Milligan Brownfields** projects, TDG Gold Corp.'s **Oxide Peak** project, and Skeena Resources Limited's **Sofia** property.

7.2.1. Captain (Orestone Mining Corp.)

Orestone Mining Corp. completed a 774 m diamond-drill hole at its **Captain** project and failed to intersect significant mineralization. Orestone also completed an airborne MobileMT survey over a 40 km² area and reported that results better defined their T1 porphyry target.

7.2.2. East Niv (NorthWest Copper Corp.)

NorthWest Copper Corp. continued exploration on their **East Niv** project with 4390 m drilling in eight diamond-drill holes, a 31.1 line-km ground-based induced polarization survey, 1260 line-km of airborne magnetic surveying, rock (206) and soil (745) sampling, and geological mapping. Rock chip samples along a 13 km trend returned copper and silver assays. Highlight results included 11 samples grading from 1.08% Cu to 6.55% Cu with Ag grades between 3.7 g/t and 262.0 g/t.

7.2.3. Jean Marie (Pacific Empire Minerals Corp.)

Pacific Empire Minerals Corp. continued exploration on its **Jean Marie** project. The company completed two diamond-drill holes totalling 700 m. Both holes intersected copper mineralization. One hole intersected 155 m grading 0.18% Cu, 19 ppm Mo, and 1.0 g/t Ag. The other intersected a 282 m interval grading 0.21% Cu, 27 ppm Mo, and 1.3 g/t Ag including 76 m grading 0.45% Cu, 71 ppm Mo, and 3.0 g/t Ag. These results extended known copper mineralization along strike and at depth.

7.2.4. Joy (Amarc Resources Ltd.)

Amarc Resources Ltd. carried out geological mapping, sampling (2648 soil, 313 surface rock), induced polarization ground surveys, and diamond drilling at their **Joy** project. Amarc is the project operator, but Freeport-McMoRan Properties Canada Inc. is funding the exploration under an earn-in agreement. Diamond drilling consisted of 15,427 m in 37 holes at the Pine deposit and at several district porphyry copper-gold targets. More than 56 line-km of IP surveying was completed.

7.2.5. Kliyul (Pacific Ridge Exploration Ltd.)

Pacific Ridge Exploration Ltd. completed 7015 m of drilling in 12 drill holes at their **Kliyul** project. Drilling intersected porphyry copper-gold style mineralization, including pyrite, chalcopyrite, and lesser bornite in veins and as disseminations. The Kliyul Main zone (KMZ) was extended to the north, south, and at depth across and area approximately 550 by 200 m and 600 m deep. Highlight results included 588.0 m grading 0.12% Cu, 0.39 g/t Au, and 0.90 g/t Ag, and 527.8 m grading 0.19% Cu, 0.30 g/t Au, and 1.35 g/t Ag.

7.2.6. Kwanika (NorthWest Copper Corp.)

NorthWest Copper Corp. completed 29 diamond-drill holes totalling 11,871.80 m at their **Kwanika** project. Results expanded the footprint of the deposit and increased the confidence of the mineral resource estimate. High-grade intersections from the core of the deposit included 304.20 m grading 0.47% Cu, 0.53 g/t Au, and 1.7 g/t Ag. Drill results from the northern extension of the deposit included 364.20 m grading 0.17% Cu, 0.17 g/t Au, and 0.8 g/t Ag.

7.2.7. Lorraine (NorthWest Copper Corp.)

Northwest Copper Corp. announced 2867 m of diamond drilling in seven holes at their **Lorraine** project. Other work included induced polarization and electromagnetic surveys. Before the drilling, NorthWest announced an updated mineral resource estimate for the project's mineralized zones (Lower Main, Upper Main, and Bishop). At a cut off grade of 0.2% Cu, total Indicated resources are 12.95 Mt grading 0.55% Cu, 0.16 g/t Au, and total Inferred resources are 45.45 Mt grading 0.43% Cu, 0.1 g/t Au.

7.2.8. Max (Centerra Gold Inc.)

Centerra Gold Inc. drilled 2511 m in 7 holes at their **Max** project to test three target areas 22 km south of the Mount Milligan mine facilities.

7.2.9. Mount Milligan Brownfield (Centerra Gold Inc.)

Brownfield exploration at the **Mount Milligan** mine site included more than 28,266 m in 54 holes. The drilling focussed on six target areas up to 1 km west of the 2020 ultimate pit boundary and within the M-236 mine reclamation boundary.

7.2.10. Mount Milligan Greenfield (Centerra Gold Inc.)

Centerra Gold Inc. was active on their **Mount Milligan Greenfield** project with 804 m of diamond drilling in two holes at the Fugro-2 target 6 km south of the Mount Milligan mine. Exploration continued for new porphyry copper-gold deposits and low-sulphidation epithermal gold-silver deposits in the Mount Milligan tenement package.

7.2.11. Oxide Peak (TDG Gold Corp.)

TDG Gold Corp. completed 1021 m of drilling in two drill holes at their **Oxide Peak** project. Both drill holes intersected strongly broken, altered volcanic rocks with pyrite and chalcocite. Magnetite was reported in the top 120 m of both holes.

7.2.12. RDP (Pacific Ridge Exploration Ltd.)

Pacific Ridge Exploration Ltd. completed 1861 m of diamond drilling in six holes at their **RDP** project. Pacific Ridge was the operator, but the program was funded by Antofagasta Minerals S.A., a subsidiary of Antofagasta PLC, who can earn a 75% interest in the project by spending \$10,000,000 on exploration over eight years and delivering a Preliminary Economic Assessment report. Starting near surface one hole returned 497.2 m grading 0.37% Cu, 0.40 g/t Au, and 1.60 g/t Ag including an interval of 107.2 m grading 0.63% Cu, 1.10 g/t Au, and 2.91 g/t Ag.

7.2.13. Sofia (Skeena Resources Limited)

Skeena Resources Limited was active at its **Sofia** property, acquired from QuestEx Gold & Copper Ltd. in 2022. Skeena drilled 4397.90 m in 11 holes. Previous work focussed on epithermal targets, but Skeena was targeting a potential porphyry system. Additional work included locating and relogging historic core, outcrop mapping, and collecting rock samples.

7.3. Selected polymetallic base and precious metal projects

In the North Central Region active projects included ZincX Resources Corp.'s **Akie**, NorthWest Copper Corp.'s **Stardust** and InZinc Mining Ltd.'s **Indy**. In the Northeast Region, Fabled Copper Corp. was active at their **Muskwa** project (Fig. 1: Tables 6, 7).

7.3.1. Akie (ZincX Resources Corp.)

ZincX Resources Corp. completed high-resolution lidar surveys over their **Akie** project area. The data were processed to produce a high-resolution (0.5 m) digital elevation model, a digital surface model, a bare earth point dataset, and a fully detailed topographic dataset. The data will be used to assist further exploration and for engineering design.

7.3.2. Indy (InZinc Mining Ltd.)

At their **Indy** project, InZinc Mining Ltd. completed 2616 m of diamond drilling in 17 holes. Drilling tested three new areas with soil geochemistry anomalies (Fox East, Keel, and

Echo central area) and their known B-9 zone. Reported results included 3.0 m grading 2.8% Zn, 0.6% Pb, and 3.8 g/t Ag and 3.6 m grading 3.5% Zn, 0.6% Pb, and 6.4 g/t Ag. InZinc also completed 1100 line-km of airborne geophysics.

7.3.3. Muskwa (Fabled Copper Corp.)

Fabled Copper Corp. carried out prospecting, mapping, sampling, magnetic and VLF ground surveying, unmanned aerial vehicle photogrammetry surveying, and lidar surveying at historic underground workings at their **Muskwa** project. The project consists of the Neil, Toro, and Bronson properties. A surface sample at Bronson assayed 23.10% Cu, 36.50 g/t Au. Four of five samples from the Brad vein at the Toro project returned values of more than 0.5% Cu. The highest value was 13.85% Cu with 0.15 g/t Au and 7.42 g/t Ag. North of the Brad vein a sample assayed 13.85% Cu. West of the Toro vein; eight of twelve samples assayed over 0.5% Cu; the highest value was 10.55% Cu. A new discovery at Toro (Target 11 vein) assayed 1.52% Cu. Fabled Copper has applied for a five-year land use permit to allow diamond drilling. Fabled Copper also contributed to the Gataga River Basin cleanup project managed by the Northeastern British Columbia Wildlife Fund. Fabled Copper supplied helicopter time and manpower to remove legacy waste in the project area, including 2360 kg of fuel drums and 1896 kg of miscellaneous waste.

7.3.4. Stardust (NorthWest Copper Corp.)

NorthWest Copper Corp. was active at its **Stardust** project (Fig. 5), a high-grade carbonate replacement deposit 7 km from the Kwanika deposit. NorthWest completed 6698.20 m in ten diamond-drill holes to expand the known resource. Highlight results include 44.20 m grading 0.84% Cu, 0.51 g/t Au, and 13.7 g/t Ag and 75.95 m grading 0.55% Cu, 0.50 g/t Au, and 10.9 g/t Ag.



Fig. 5. Logging core at the Stardust project (NorthWest Copper Corp.).

7.4. Selected Ni-Cu-Co-precious metal projects

FPX Nickel Corp.'s **Decar Nickel District** project and the **Surge Nickel** project (Surge Battery Metals Inc. 80%; Nickel

Rock Resources 20%) are in the North Central Region (Fig. 1; Table 6). These projects contain ultramafic rocks mineralized with a nickel-iron alloy, awaruite.

7.4.1. Decar Nickel District (FPX Nickel Corp.)

FPX Nickel Corp. reported an updated mineral resource estimate (MRE) for their **Decar Nickel District** project's Baptiste deposit and carried out diamond drilling at the Van target approximately 6 km north of Baptiste. The updated MRE reported a 6% davis tube recoverable (DTR) nickel increase in the Indicated category and a 15% increase in the Inferred category. The report also included DTR cobalt and DTR iron grades. Indicated resources are now reported as Indicated 1815 Mt grading 0.129% DTR Ni, 0.211% total Ni, 0.0035% DTR Co, and 2.40% DTR Fe, and Inferred 339 Mt grading 0.131% DTR Ni, 0.212% total Ni, 0.0037% DTR Co, and 2.55% DTR Fe. At the Van target, 2504 m of drilling was completed in ten holes. Holes were spaced to test along strike from the initial 2021 discovery area. Nickel mineralization was in all holes, and highlight assays included 346.3 m grading 0.133% DTR Ni and 334.5 m grading 0.12% DTR Ni. Drilling expanded mineralization along strike for 1 km and the area of mineralization is now defined as extending for 2 km along strike and 1 km across. Mineralization is open both laterally and at depth.

7.4.2. Surge Nickel (Surge Battery Metals Inc. 80%; Nickel Rock Resources Inc. 20%)

Surge Battery Metals Inc.'s **Surge Nickel** project consists of two claim blocks separated by about 40 km, **Surge Nickel (HN4)** and **Surge Nickel (N100)**. At **HN4** Surge carried out geological mapping and sampling (600 soil, 190 rock). In the fall, the company began a planned 900 m of diamond drilling of which 300 m was completed by early November. At **N100**, Surge carried out geological mapping and collected 304 rock samples.

7.5. Selected REE and niobium projects

Deep-water basin strata east of the Rocky Mountain Trench host Taseko Mine Ltd.'s **Aley** niobium-bearing carbonatite proposed mine (see section 6.1.1.) and Defense Metals Corporation's **Wicheeda** rare earth element project (Fig. 1; Table 6).

7.5.1. Wicheeda (Defense Metals Corp.)

The **Wicheeda** carbonatite is a deformed intrusion that hosts light rare earth elements (LREE) in the Kechika Group. The core of the intrusion is a dolomite carbonatite, which transitions outward to a calcite carbonatite. Hydrothermal veins and plugs in the dolomite carbonatite are mineralized with REE fluorocarbonates, ancylite (cerium, lanthanum) and monazite (cerium, lanthanum, neodymium). Minor concentrations of niobium are also present. Defense Metals completed 4357 m of diamond drilling in 18 holes, 1153 m of geotechnical drilling as part of a resource delineation and pit geotechnical

program (Fig. 6) and conducted flotation tests. Drilling results consistently demonstrated continuity of mineralization and high-grade results including 124 m grading 3.58% total rare earth oxides (TREO) were reported. The deposit consists of three main rock types, dolomite carbonatite (73%), xenolithic carbonatite (24%), and syenite (3%). Flotation tests on dolomite carbonatite and composite samples produced a high-grade mineral concentrate with more than 40% TREO at a recovery rate greater than 80% xenolithic carbonatite material produced a 38% TREO concentrate at approximately 70% recovery and the syenitic material produced a 14.6% TREO concentrate at approximately a 79% recovery rate.



Fig. 6. Transferring core boxes at the Wicheeda project (Defense Metals Corp.).

7.6. Selected coal projects

In 2022, no significant coal exploration was carried out. Conuma Resources Limited concentrated on better defining known resources and permitting for new proposed pit operations. The two main coal-bearing units in the Northeast Region (Gething and Gates formations) consist of interbedded shale, sandstone, siltstone, conglomerate, and coal.

7.7. Selected industrial mineral projects

Apart from the proposed Giscome limestone quarry (see section 6.3.1.), no significant industrial mineral exploration projects were tracked.

8. Geological research

Jones et al. (2002) continued generating results from the British Columbia Geological Survey northern Hogem batholith project, releasing in situ zircon U-Pb, Lu-Hf, $\delta^{18}\text{O}$, and trace-element data from intrusive units, and Ootes et al. (2022) presented igneous and detrital zircon U-Pb, Lu-Hf, and trace-element data and the first radiolarian ages from the Asitka Group (basement to eastern Stikinia). This work showed that, although an enigmatic older crustal fragment may have been nearby, eastern Stikinia formed on an ocean floor during the Carboniferous to early Permian from entirely

juvenile magmatic sources. Ootes (2023) examined regional stratigraphic relationships in the eastern part of central Stikinia to identify a major synclorium-anticlinorium pair that extends along strike for more than 100 km into the northern Toodoggone region where the hinge zone of the anticlinorium coincides with the Black Lake intrusion (Early Jurassic). Epithermal mineralization (e.g., Baker, Lawyers, Shasta deposits) is distributed along the axial trace of the anticlinorium, which is apparently unique to this part of Stikinia, leading to the hypothesis of a causal relationship between folding, intrusion, and Au-Ag±Cu epithermal mineralization. Also working in the northern Toodoggone region, Voegeli and Lecumberri-Sanchez (2022) examined clay alteration assemblages at the Silver Pond prospects and concluded that they likely formed in a high-sulphidation epithermal setting. Working with material from the Baptiste deposit, Seiler et al. (2022a) tested the possibility of separating awaruite, a native nickel-iron alloy (Ni₃Fe), from gangue minerals in serpentinite ores using flotation with a xanthate collector, and Seiler et al. (2020b) examined the chemical composition, crystallographic structure, and magnetic properties of the awaruite to determine a flow sheet for large-scale processing. Based on detailed stratigraphic and sedimentologic work in the Northeast Region, Bergen et al. (2022) established flow mechanisms and resultant geometries of deep-water channel and levee deposits in turbidites of the Isaac Formation (Windermere Supergroup, Neoproterozoic). Also working in the Northeast Region, Brookfield et al. (2022) examined rocks that record the great extinction across the Permian-Triassic boundary, concluding that environmental changes were driven by global changes in atmospheric and oceanic chemistry rather than by physical changes like sea-level fluctuations. Sacco et al. (2022) reported on a long-term project to evaluate the use of tills to detect mineralization buried beneath drift cover in the Interior Plateau, with surficial geology maps (including till sampling suitability and drift thickness), and re-analysis of archived till samples.

9. Summary

The North Central and Northeast regions are highly prospective for discovering mineral deposits. The North Central Region has three proposed metal mine projects and one proposed industrial mineral mine project. The Northeast Region has several proposed coal mine projects and one proposed industrial mineral mine project. The North Central Region has several active mineral exploration projects whereas in the Northeast Region the predominant commodity explored for is coal.

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