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

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## 1. Introduction

A northeast to southwest transect though the Northeast and the North Central regions provides a cross section of undeformed rocks deposited on Precambrian basement to allocthonous 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 Coal Resources Limited's **Brule, Wolverine,** and **Willow Creek** operations. 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, specialty metals, and rare earth elements. These minerals occur mainly in porphyry, epithermal or vein and stockwork, SEDEX, and carbonatite settings. The North Central has one producing mine, the **Mount Milligan** copper-gold operation (Centerra Gold Inc.). Both regions had numerous active exploration projects (Fig. 1). Significant results included those reported for Benchmark Metals Inc.'s **Lawyers** project, NorthWest Copper Corporation's **Kwanika-Stardust** project, FPX Nickel Corp.'s **Decar Nickel District** project, Defense Metal Corp.'s **Wicheeda** project and Evergold Corp.'s **Golden Lion** project.

Noteworthy approvals and mergers were announced in 2021. Artemis Gold Inc.'s **Blackwater Gold** project gained provincial approval for mine construction, allowing initial site preparation and land clearing to start. BW Gold Ltd. (a wholly owned subsidiary of Artemis) plans to commence construction in Q2, 2022. Serengeti Resources Inc. completed an agreement to acquire all issued shares of Sun Metals Corp resulting in a consolidation of the **Kwanika** and **Stardust** projects into a single copper-gold exploration project. A new company name arose from this merger, NorthWest Copper Corp.

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 $77.5 million and exploration drilling was estimated at approximately 170,900 m. For the Northeast Region, exploration expenditures were estimated at $5.3 million and exploration drilling was estimated at approximately 9700 m (Clarke et al., 2022; EY LLP, 2022).

## 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

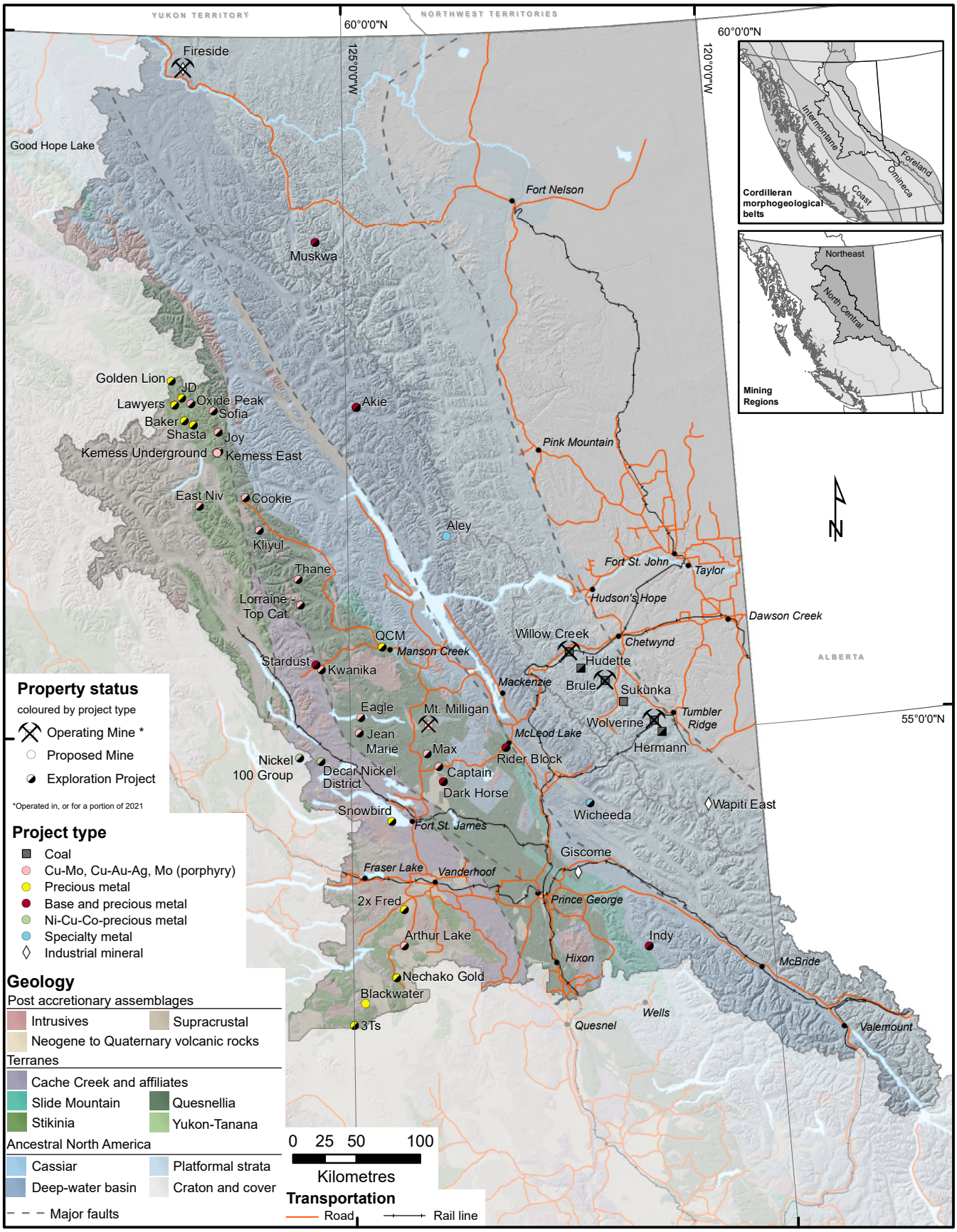


**Fig. 1.** Mines and selected projects, North Central and Northeast regions, 2021. Terranes after Nelson et al. (2013).

are intimately related to the geologic evolution of the terranes (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

For 2021, 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).

**Table 1.** Metal mines, North Central Region.

| Mine | Operator (partner) | Commodity; deposit type; MINFILE | Forecast 2021 Production (based on Q1-Q3) | Reserves | Resources | Comments |
|---|---|---|---|---|---|---|
| **Mt. Milligan** | **Centerra Gold Inc.** | Cu, Au, Ag; Alkalic porphyry Cu-Au; 093N 194, 191 | 70-80 Mlbs Cu 180-200 Koz Au | P+Pr: 170.6 Mt 0.22% Cu, 0.39 g/t Au | M+I: 125.2 Mt 0.19% Cu, 0.35 g/t Au (additional to reserves) | Concentrator design capacity 60,000 tpd. Estimated mine life 9 years. More than 350 employees. |

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

**Table 2.** Coal mines, Northeast Region.

| Mine | Operator (partner) | Commodity; deposit type; MINFILE | Forecast 2021 Production (based on Q1-Q3) | Reserves | Resources | Comments |
|---|---|---|---|---|---|---|
| **Brule** | **Conuma Coal Resources Limited** | PCI; Bituminous coal; 093P 007 | 1.6 Mt | P+Pr: 3.58 Mt | na | About 230 employees. |
| **Willow Creek** | **Conuma Coal Resources Limited** | HCC, PCI; Bituminous coal; 093O 008 | 1.5 Mt | P+Pr: 11.07 Mt | na | About 220 employees, mine and plant. |
| **Wolverine** | **Conuma Coal Resources Limited** | HCC; Bituminous coal; 093P 025 | 1.1 Mt | P+Pr: 4.68 Mt | na | About 300 employees, mine and plant. |

HCC = hard coking coal; PCI = pulverized coal injection; TC = thermal coal; ULV = ultra low volatile
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 2021 Production (based on Q1-Q3) | Reserves | Resources | Comments |
|---|---|---|---|---|---|---|
| **Fireside** (Northeast Region) | **Fireside Minerals Ltd.** | Barite; Vein barite; 094M 003, 19 | na | na | na | Product is bagged and trucked to Fort St. John and to Alberta, where it is used to produce high-density drilling mud. |

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

### 3.1. Metal mines

The one producing metal mine in the North Central Region in 2021 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. Ore is processed through primary and secondary crushers before milling and flotation in a 60,000 tpd design capacity concentrator. The concentrate, averaging about 23% Cu, is moved by truck to Mackenzie, where it is transferred to rail cars and shipped to North Vancouver for transport to markets. Q3 (2021) combined Measured and Indicated mineral resources were reported as 125.2 Mt at 0.19% Cu and 0.35 g/t Au. Q3 (2021) combined Proven and Probable Mineral reserves were reported as 170.6 Mt at 0.22% Cu and 0.39 g/t Au. The mine has a projected nine-year mine life.

### 3.2. Coal mines

Conuma Coal Resources Ltd. is currently producing from the **Brule**, **Willow Creek**, and **Wolverine** mines (Fig. 2; Table 2). All coal is shipped by rail to Ridley 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 Coal Resources Ltd.)

Forecast production for the **Brule mine** was 1.6 Mt of pulverized coal injection (PCI) coal. Exploration is currently in progress to expand the footprint of the Brule mine pit. A total of 6367 m in 27 reverse circulation drill holes was carried out in 2021. The coal is in folded and thrust-faulted rocks of the Gething Formation. This PCI coal does not need to be processed once mined. The direct-ship coal product is transported by truck to the Willow Creek mine site then sent by rail to Ridley Terminal.

#### 3.2.2. Willow Creek Mine (Conuma Coal Resources Ltd.)

The **Willow Creek** mine forecasted production was 1.5 Mt of hard coking coal (HCC) and pulverized coal injection (PCI) product. Coal is mined from several seams in the Gething Formation. The coal is processed on site then transported by rail to Ridley Terminal.

#### 3.2.3. Wolverine Mine (Conuma Coal Resources Ltd.)

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 Ridley Terminal. Coal is mined from the Gates Formation at the Perry Creek pit (Fig. 3), which is nearing the end of its resources. Conuma has an Environmental Assessment in progress for an amendment that would allow mining from the Hermann pit and using the existing Wolverine processing plant and loadout facilities. The proposed 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 2021, the **Fireside** barite mine was in operation in the Northeast Region (Fig. 1; Table 3). No operations were reported in 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% $BaSO_4$. The product is bagged and trucked to Fort St. John and to Alberta, where it is used to produce high-density drilling mud.

## 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

There were no mines or quarries under development in the North Central and Northeast regions in 2021.

## 6. Selected proposed mines or quarries

Projects at the proposed mine stage (Fig. 1; Table 4) in the North Central Region include three proposed metal mines, Taseko Mines Limited's **Aley** project, Artemis Gold Inc.'s **Blackwater Gold** 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 mine. There is one proposed mine in the Northeast Region (Fig. 1; Table 4), Glencore plc's **Sukunka** coal project.

### 6.1. Proposed metal mines

The three proposed metal mines in the North Central Region are Taseko Mines Limited's **Aley** Niobium project, Artemis

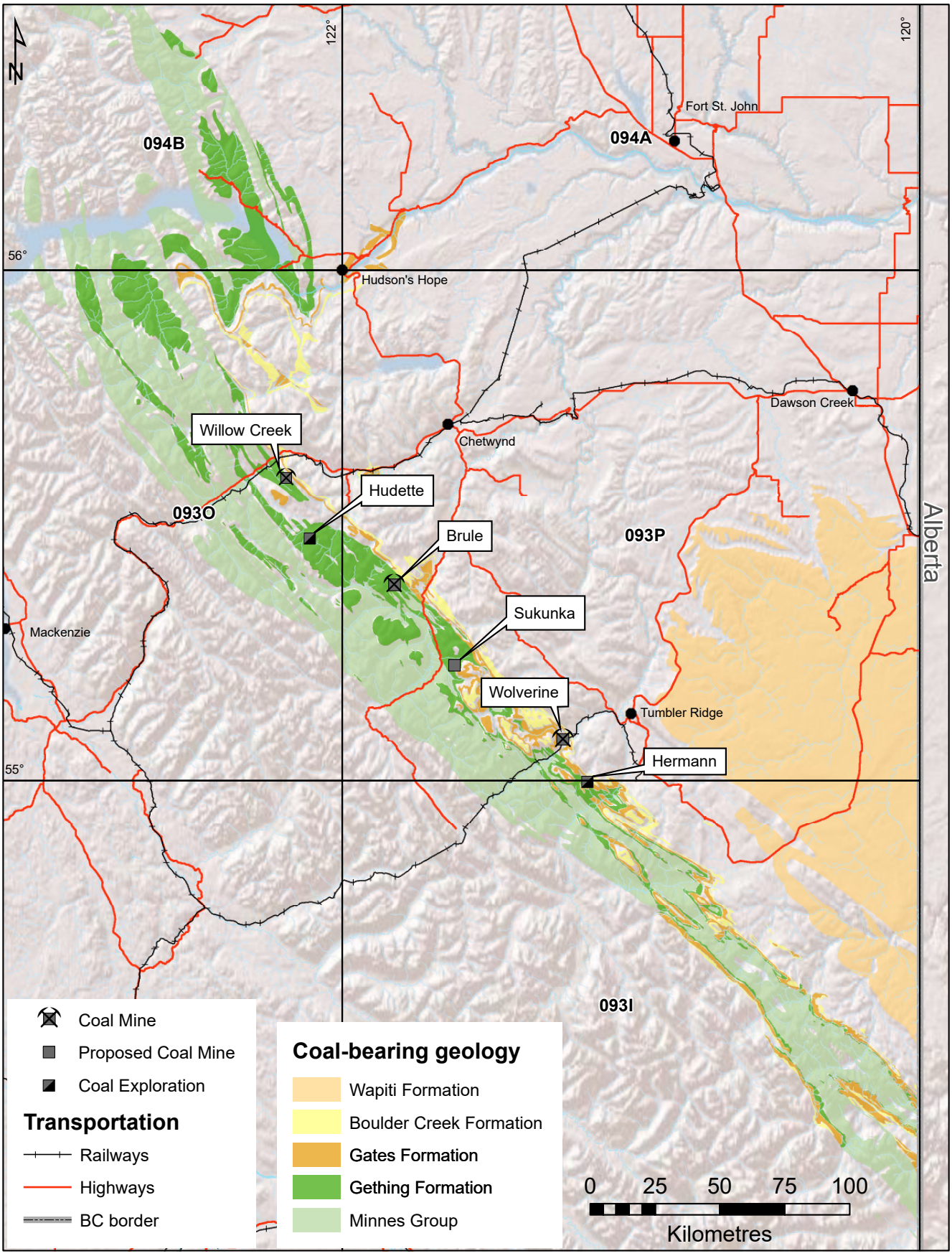


**Fig. 2.** Coal mines, proposed coal mines and coal exploration projects, northeastern British Columbia, 2021.

**Fig. 3.** A syncline with Gates Formation coal seams in the wall of the Perry Creek open pit, Wolverine mine (Conuma Coal Resources Ltd.).

Gold Inc.'s **Blackwater Gold** Au-Ag 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% $Nb_2O_5$. Current plans propose an open-pit mine with 10,000 tpd processing capability to produce ferroniobium. The projected mine life is 24 years with an output of about 9 Mkg of niobium annually, making it among the largest niobium deposits in the world. Environmental assessment is ongoing. In 2021, Taseko continued with environmental monitoring, and product marketing initiatives. Technical analysis and testing of a pilot plant are ongoing.

#### 6.1.2. Blackwater Gold (Artemis Gold Inc.)

BW Gold Ltd., a 100% owned subsidiary of Artemis Gold Inc., filed an updated NI 43-101 Feasibility Study for their **Blackwater Gold** project. The study reported a 29% increase for annual gold production for the first five-years compared to a 2020 Prefeasibility Study. Reserves were reported at 8 million oz Au and 60 million oz Ag, with a life-of-mine average annual gold production of 339,000 oz. Approximately 25,840 m of vertical RC drilling was completed for grade control, and technical and metallurgical studies continued. The project gained provincial approval for mine construction, allowing initial site preparation and land clearing to start.

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.

**Table 4.** Selected proposed mines and quarries, North Central and Northeast regions.

| **Project** | **Operator** (partner) | **Commodity; deposit type; MINFILE** | **Reserves** | **Resources** | **Comments** |
|---|---|---|---|---|---|
| **Aley** (North Central Region) | **Taseko Mines Limited** | Nb; Carbonatite-hosted; 094B 027 | P+Pr: 83.8 Mt 0.50% $Nb_2O_5$ (at 0.30% $Nb_2O_5$ cut-off) | M+I: 285.8 Mt 0.37% $Nb_2O_5$ (at 0.20% $Nb_2O_5$ cut-off) | Proposed open-pit mine with 10,000 tpd ore processing rate and average annual production of 9000 t Nb over a 24-year mine life. |
| **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 project gained provincial approval for mine construction, allowing initial site preparation and land clearing to start. Federal and Provincial Environmental Assessment certificates in place. A 25,840 m grade control reverse circulation drill program was completed. |
| **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. |

**Table 4.** Continued.

| | | | | | |
|---|---|---|---|---|---|
| **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 mine life. |
| **Sukunka** (Northeast Region) | **Glencore Canada Corporation** | Coal; Bituminous; 093P 014 | na | 145.0 Mt coal in situ | Permitting in progress. |
| **Wapiti East** (Northeast Region) | **Fertoz International Inc**. | $P_2O_5$; Sedimentary phosphate deposits; 093I 008, 22, 15 | na | I+Inf: 1.54 Mt 21.6% $P_2O_5$ | Work continued in 2021 with geochemical sampling and road upgrades. Permitting is ongoing but has faced delays due to caribou issues. |

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

#### 6.1.3. Kemess Underground (Centerra Gold Inc.)

Centerra Gold Inc.'s **Kemess Underground (KUG)** project is estimated to contain an Indicated resource of 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 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

Glencore plc's **Sukunka** project is listed as 'in progress' by The British Columbia Environmental Assessment Office.

#### 6.2.1. 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 coal from the Gething Formation. The project was continued in 2021 through the Environmental Assessment process and is listed on The British Columbia Environmental Assessment Office website as 'in progress'.

### 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 and Fertoz Ltd.'s **Wapiti East** project in the Northeast Region.

#### 6.3.1. Giscome (Graymont Western Canada Inc.)

At the **Giscome** project, Graymont Western Canada proposes to mine a high-purity limestone deposit 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.

#### 6.3.2. Wapiti East (Fertoz Ltd.)

Fertoz Ltd.'s **Wapiti East** project is a proposed phosphate mine. Combined Indicated and Inferred resources are 1.54 Mt grading 21.6% $P_2O_5$ (at a 7% cut-off). Work continued in 2021 with geochemical sampling and road upgrades. Permitting is ongoing but has faced delays due to caribou issues.

## 7. Selected exploration activities and highlights

Exploration activity and expenditures were down in the Northeast Region but up significantly in the North Central Region (Fig. 1; Tables 5, 6) compared to 2020. Large programs included drilling at **Lawyers** (Benchmark Metals Inc.), **Kwanika-Stardust (**NorthWest Copper Corporation), **Baker-Shasta** (TDG Gold Corp.), **2X Fred** (Centerra Gold Inc.), and **Decar Nickel District** (FPX Nickel Corp.).

**Table 5.** Selected exploration projects, North Central Region.

| Project | Operator (partner) | Commodity; Deposit type; MINFILE | Resources (NI 43-101 compliant unless indicated otherwise) | Comments |
|---|---|---|---|---|
| **2X Fred** | **Centerra Gold Inc.** | Au, Ag;<br>Epithermal Au-Ag: low sulphidation;<br>093F 089 | na | Drilling, 25 DDH, 6796 m. IP and CSAMT ground geophysical surveys, aeromagnetic survey, lidar survey. |
| **3Ts** | **Independence Gold Corp.** | Au, Ag;<br>Epithermal Au-Ag: low sulphidation;<br>093F 055 | Tommy and Ted-Mint veins<br>Inf: 5.45 Mt<br>2.52 g/t Au, 71.5 g/t Ag (at a cut-off grade of 1 g/t Au) | Drilling, DDH, 4783 m. Results included 14.1 m grading 2.22 g/t Au, and 22.78 g/t Ag and 11.65 m grading 1.75 g/t Au and 198.0 g/t Ag. |
| **Akie** | **ZincX Resources Corp.** | Zn, Pb, Ag;<br>Sedimentary exhalative Zn-Pb-Ag;<br>094F 031 | I: 22.7 Mt of 8.32% Zn, 1.81% Pb, 14.1 g/t Ag<br><br>Inf: 7.5 Mt of 7.04% Zn, 1.24% Pb, 12.0 g/t Ag (at 5% Zn cut-off) | Drilling, DDH, 2669 m. Highlight results: 6.20% Zn+Pb and 9.6 g/t Ag across 32.76 m, which included 10.77% Zn+Pb and 14.5 g/t Ag along 5.99 m. Ground-based gravity geophysical survey. |
| **Arthur Lake** | **Millbank Mining Corp.** | Cu, Au;<br>Alkalic porphyry Cu-Au;<br>093F 102 | na | Filed a NI 43-101 technical report, 16 line-km IP survey. |
| **Baker-Shasta** | **TDG Gold Corp.** | Au, Ag;<br>Epithermal Au-Ag: low sulphidation;<br>094E 050, 26 | na | Drilling, 55 DDH, 8048 m. Highlights: 33.5 m of 1.03 g/t Au and 41 g/t Ag; 29.0 m of 1.78 g/t Au and 89 g/t Ag, which includes 4.0 m of 8.18 g/t Au and 396 g/t Ag. 95 km ground magnetic survey, prospecting, relogging core, and channel sampling programs. |
| **Captain** | **Orestone Mining Corp.** | Cu, Au;<br>Alkalic porphyry Cu-Au;<br>093J 026, 094C 180 | na | Drilling, 3 DDH, 2132 m. Results included 85.7 m of 0.37 g/t Au and 0.06 % Cu. 2 line-km MT geophysical survey. |
| **Cookie** | **Wedgemount Resources Corp.** | Cu, Au, Ag, Mo;<br>Porphyry Cu±Mo±Au;<br>na | na | Rock and alteration rock chip sampling and soil sampling. Highlight rock sample results included up to 14.8% Cu and 88 g/t Ag in the Overstall zone. |
| **Dark Horse** | **IAMGOLD Corporation** | Au, Cu;<br>Cu Skarn;<br>093K 083 | na | Soil sampling, IP survey. |

**Table 5.** Continued.

| | | | | |
|---|---|---|---|---|
| **Decar Nickel District** | **FPX Nickel Corp.** | Ni, Fe;<br>Podiform chromite;<br>093K 116 | Baptiste deposit<br>I: 1996 Mt<br>0.122% Ni, DTR (Davis Tube Recoverable)<br><br>Inf: 593 Mt<br>0.114% Ni, DTR Ni<br>(0.06% Ni cut-off) | Drilling, 10 DDH, 2710 m. The mine plan in the Baptiste preliminary economic assessment has total of approx. 1.5 Bt of material for processing during 35-year mine life. Drilling (2600 m) at new Van target, results included total nickel of 0.21% along 287 m, 0.197% along 270 m, 0.207% along 101 m, and 0.215% along 103 m. |
| **Eagle** | **Wedgemount Resources Corp.** | Cu, Au, Ag, Mo;<br>Porphyry Cu±Mo±Au;<br>093N 091 | na | Geological mapping, prospecting, rock sampling, 22 line-km IP survey. Highlight rock grab samples results included grading up to 9.86% Cu, 2.5 g/t Au, and 77.7 g/t Ag in the Nighthawk zone and 1.63% Cu and 1.24 g/t gold from the Vector zone. |
| **East Niv** | **NorthWest Copper Corp.** | Cu, Au;<br>Alkalic porphyry Cu-Au;<br>na | na | Drilling, 11 DDH, 2915 m. Results included 81.6 m grading 0.41% Cu, 0.2 g/t Au, 0.9 g/t Ag and 72.3 m with grades of 0.10% Cu, 0.21 g/t Au, and 0.3 g/t Ag. 16 new claims added. |
| **Golden Lion** | **Evergold Corp.** | Au, Ag;<br>Epithermal Au-Ag: low sulphidation;<br>094E 077 | na | Drilling, 9 DDH, 1813 m and IP surveying. Drill results included 40.3 m grading 2.0 g/t Au, 24 g/t Ag and 66.0 m grading 1.36 g/t Au, 11 g/t Ag. |
| **Indy** | **InZinc Mining Ltd.** | Zn, Pb, Ag;<br>Sedimentary exhalative Zn-Pb-Ag;<br>093H 072 | na | Soil sampling results outlined a 1.9 km long zinc-in-soil target. |
| **JD** | **Volatus Capital Corp.** | Au, Ag;<br>Epithermal vein Au-Ag;<br>094E 171 | na | Airborne and ground-based geophysical surveys, rock sampling and mapping. |
| **Jean Marie** | **Pacific Empire Minerals Corp.** | Cu, Au, Ag, Mo;<br>Porphyry Cu±Mo±Au;<br>na | na | Rock sampling, geological mapping, 128 km$^2$ magnetic gradient, radiometric, and VLF-EM airborne geophysics survey, core relogging. |
| **Joy** | **Amarc Resources Ltd.** | Cu, Au;<br>Porphyry Cu±Mo±Au;<br>094E 016, 57 | Pine deposit<br>I: historic non NI 43-101 compliant: 40 Mt<br>0.15% Cu, 0.57 g/t Au<br>(Stealth Mining Corporation 1997) | Drilling, 9 DDH, 4300 m. 42 line-km IP geophysical survey rock and soil sampling. Entered into an agreement with Freeport-McMoRan Inc. whereby Freeport can acquire up to 70% ownership. |

**Table 5.** Continued.

| | | | | |
|---|---|---|---|---|
| **Kliyul** | **Pacific Ridge Exploration Ltd.** | Cu, Au, Ag;<br>Alkalic porphyry Cu-Au;<br>094D 023 | I: historic non NI 43-101 compliant: 2.3 Mt<br>1.30 g/t Au, 0.45% Cu, 6.9 g/t Ag | Drilling, DDH, 1542 m. Highlights: 437 m of 0.22% Cu, and 0.6 g/t Au including 141 m of 0.36% Cu and 1.11 g/t Au. Geological mapping discovered a previously unmapped copper skarn prospect. |
| **Kwanika** | **NorthWest Copper Corp.** | Cu, Au, Ag;<br>Alkalic porphyry Cu-Au;<br>093N 073 | Central zone pit<br>M+I: 104.6 Mt<br>0.23% Cu, 0.21 g/t Au, 0.78 g/t Ag (at a cut-off grade of 0.13% CuEq)<br><br>Central zone underground<br>M+I: 118.9 Mt<br>0.30% Cu, 0.29 g/t Au, 0.96 g/t Ag (at a confining shape basis of 0.27% CuEq)<br><br>South zone pit<br>Inf: 33.3 Mt<br>0.26% Cu, 0.08 g/t Au, 1.64 g/t Ag, 0.01% Mo | Drilling, 25 DDH, 10,972 m. Results included 230 m grading 0.70% Cu, 0.84 g/t Au, 2.3 g/t Ag, and 235.45 m with grades of 2.0% Cu, 1.21 g/t Au, and 5.3 g/t Ag, which includes 153.25 m at 2.84% Cu, 1.69 g/t Au, 7.5 g/t Ag. |
| **Lawyers** | **Benchmark Metals Inc.** | Au, Ag;<br>Epithermal Au-Ag: low sulphidation;<br>094E 066 | Inf: Cliff Creek N zone, 550 Kt 4.51 g/t Au, 209.15 g/t Ag<br><br>Duke's Ridge zone, 58 Kt 4.30 g/t Au, 139.13 g/t Ag | Highlight drilling results included 41.15 m of 1.31 g/t Au and 30.77 g/t Ag; 10.67 m of 3.45 g/t Au, 181.81 g/t Ag; 68.58 m of 3.07 g/t Au, 11.72 g/t Ag; and 25.91 m of 2.40 g/t Au, 47.99 g/t Ag. An initial Mineral Resource Estimate reported total I of 1.546 Moz Au and 50.2 Moz Ag and a total Inf of 620,000 oz Au and 18.1 Moz Ag. |
| **Lorraine-Top Cat** | **NorthWest Copper Corp.** | Cu, Au, Ag;<br>Alkalic porphyry Cu-Au;<br>093N 002, 094C 069, 174 | Lorraine<br>I: historic non NI 43-101 compliant: 6.42 Mt<br>0.61% Cu, 0.23 g/t Au<br><br>Inf: 28.82 Mt 0.45% Cu, 0.19 g/t Au<br>(Lorraine Copper Corp. 2012) | Mapping, soil and rock sampling, and ground and airborne geophysical surveys. |
| **Max** | **Centerra Gold Inc.** | Cu, Au, Ag;<br>Alkalic porphyry Cu-Au;<br>093K 020 | na | Drilling, Backpack drill till sampling, 80 holes, 160 m. |
| **Mount. Milligan Brownfield** | **Centerra Gold Inc.** | Cu, Au, Ag;<br>Alkalic porphyry Cu-Au;<br>093N 194 | na | Drilling, 72 DDH, 41,000 m. Exploration and resource expansion drilling. Highlight drilling results included 302.3 m of 0.40 g/t Au, 0.27% Cu, and 119 m of 0.46 g/t Au, 0.37% Cu. |

**Table 5.** Continued.

| | | | | |
|---|---|---|---|---|
| **Nechako Gold** | **Tower Resources Ltd.** | Au, Ag;<br>Epithermal Au-Ag: low sulphidation;<br>093F 060, 4 | na | Drilling, 13 DDH, 2020 m. Results included 14.7 m of 1.3 g/t Au and 0.6 m of 18.9 g/t Au. |
| **Nickel 100 Block** | **Nickel Rock Resources Ltd.** | Ni, Fe;<br>Podiform chromite;<br>na | na | Soil sampling. |
| **Oxide Peak** | **TDG Gold Corp.** | Cu, Au, Ag;<br>Porphyry Cu±Mo±Au;<br>Epithermal Au-Ag-Cu: low sulphidation;<br>094E 181 | na | Drilling, 2 DDH, 1029 m. |
| **QCM** | **Kestrel Gold Inc.** | Au, Cu;<br>Au-quartz veins;<br>093N 200 | na | Drilling, 7 RCD, 992 m. |
| **Rider Block** | **Golden Planet Mining Corp.** | Cu, Au, Ag;<br>Porphyry Cu±Mo±Au;<br>Epithermal Au-Ag-Cu: low sulphidation;<br>na | na | Drilling, 7 DDH, 850 m. |
| **Stardust** | **NorthWest Copper Corp.** | Cu, Au, Ag, Zn;<br>Cu Skarn;<br>093N 009 | Canyon Creek<br>I:1.96 Mt 1.31% Cu, 1.44 g/t Au, 27.1 g/t Ag<br>Inf: 5.84 Mt 0.86% Cu, 1.17 g/t Au, 20.0 g/t Ag | Updated Mineral Resource Estimate filed. |
| **Snowbird** | **Element 79 Gold Corp.** | Au;<br>Epithermal: in quartz veins;<br>093K 036 | na | Drilling, DDH, 3000 m. |
| **Sofia** | **QuestEx Gold & Copper Ltd.** | Cu, Au, Ag;<br>Porphyry Cu±Mo±Au;<br>Epithermal Au-Ag-Cu: low sulphidation;<br>094E 208 | na | Drilling, 7 DDH, 1611 m. Rock and soil sampling and prospecting. |
| **Thane** | **Interra Copper Corp.** | Cu, Au, Ag;<br>Alkalic porphyry Cu-Au;<br>094C 181, 72 | na | Drilling, 12 DDH, 2783 m. Results included 5.07 m grading 0.14% Cu, 14.9 m of 0.14% Cu, 0.31 g/t Au, 0.6 g/t Ag. Ground geophysics, geological mapping, rock and soil sampling. |
| **Wicheeda** | **Defense Metals Corp.** | Nb, REE;<br>Carbonatite-hosted deposits;<br>093J 014 | I: 5.0 Mt<br>2.95% TREO<br>Inf: 29.5 Mt<br>1.83% TREO<br><br>Resources at a cut-off grade 0.5% TREO<br>Total metal % = sum of Ce+La+Nd+Pr+Sm+Nb percentages | Filed a Preliminary Economic Assessment which reported a 36% increase on a contained metal basis in comparison to the previous 2020 Mineral Resource Estimate. |

M = Measured; I = Indicated; Inf = Inferred

**Table 6.** Selected exploration projects, Northeast Region.

| Project | Operator | Commodity; Deposit type; MINFILE | Resources (NI 43-101 compliant unless indicated otherwise) | Comments |
|---|---|---|---|---|
| **Hermann** | **Conuma Coal Resources Ltd.** | Coal; Bituminous coal; 093I 031 | P+Pr: 24.36 Mt | Environmental Assessment in-progress. Drilling, 5 RC holes, 592 m. |
| **Hudette** | **Conuma Coal Resources Ltd.** | Coal; Bituminous coal; 093O 060 | P: 24.6Mt<br>Pr: 465,000 t | Drilling, 16 RC holes, 2742 m. Working towards a PEA. |
| **Muskwa** | **Fabled Copper Corp.** | Cu, Ag, Pb, Co; Cu ±Ag quartz veins; 094K 012, 50 | na | Rock sampling, mapping, drone surveys, and site reclamation. |

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

### 7.1. Selected precious metal projects

In 2021, the North Central Region saw numerous precious metal projects (Fig. 1; Table 5) including **2X Fred** (Centerra Gold Inc.), **3Ts** (Independence Gold Corp.), **Baker-Shasta** (TDG Gold Corp.), **Dark Horse** (IAMGOLD Corporation), **Golden Lion** (Evergold Corp.), **JD** (Volatus Capital Corp.), **Lawyers** (Benchmark Metals Inc.), **Nechako Gold** (Tower Resources Ltd.), **QCM** (Kestrel Gold Inc.), **Rider Block** (Golden Planet Mining Corp.), and **Snowbird** (Element 79 Gold Corp.). The only precious metal project in the Northeast Region (Table 6) was **Muskwa** (Fabled Copper Corp.).

#### 7.1.1. 2X Fred (Centerra Gold Inc.)

Centerra Gold Inc. carried out greenfield exploration at the **2X Fred** project that the company acquired early this year. 6796 m of diamond drilling was completed along with IP and CSAMT ground geophysical surveys, an aeromagnetic survey, and a lidar survey. 2X Fred is an epithermal project with fine-grained layered pyrite and other sulphides in quartz veins (Fig. 4).

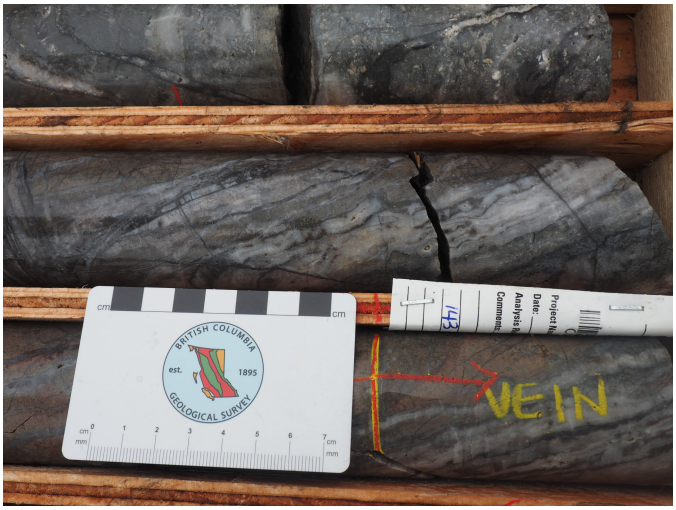


**Fig. 4.** Layered quartz-adularia veins with very fine grained sulphides, 2X Fred property (Centerra Gold Inc.).

#### 7.1.2. 3Ts (Independence Gold Corp.)

Independence Gold Corp. carried out 4783 m of drilling at its **3Ts** project in winter-spring 2021, and announced 3000 m of drilling for the fall and into the winter of 2022. The drilling focussed on previously untested targets and gaps in historical drilling of the Tommy and Ted-Mint vein systems. Highlight intersections include: 11.65 m of 1.75 g/t Au and 127.26 g/t Ag; and 14.1 m of 2.22 g/t Au and 22.78 g/t Ag, which includes 1.0 m of 20.66 g/t Au and 198.0 g/t Ag. Additional work included soil sampling, 3D-IP resistivity and MT ground geophysical surveys across an 8 $km^2$ area, and a lidar survey of the entire property.

#### 7.1.3. Baker-Shasta (TDG Gold Corp.)

TDG Gold Corp. was active at its **Baker-Shasta** property, acquired from Talisker Resources in 2020. Approximately 8050 m was drilled in 55 holes at the Shasta project for resource infill and definition to support a mineral resource estimate. Highlight intersections included: 33.5 m of 1.03 g/t Au and 41 g/t Ag; 29.0 m of 1.78 g/t Au and 89 g/t Ag, which includes 4.0 m of 8.18 g/t Au and 396 g/t Ag. Exploration included a 95 km ground magnetic survey, prospecting, relogging of historical drill core, and channel sampling at the Shasta (JM pit, Creek pit) and Baker (Baker B' pit) mine pits, which was accompanied by bench mapping.

#### 7.1.4. Dark Horse (IAMGOLD Corporation)

IAMGOLD Corporation completed soil sampling and an IP survey at their **Dark Horse** project.

#### 7.1.5. Golden Lion (Evergold Corp.)

At their **Golden Lion** project, Evergold Corp. drilled 1813 m in nine holes. Drilling focussed on the shallow, GL1 Main gold-silver zone containing base metal sulphide-bearing quartz-carbonate veins, veinlets, stockworks and breccias, and short intervals of semi-massive to massive sulphides. Exploration also included mapping, soil and rock sampling, and an IP survey. Highlight intersections from one hole included 40.3 m

of 2.0 g/t Au, 24 g/t Ag, 1.2% Zn, and 0.5% Pb. Within this interval was 11.3 m of 5.4 g/t Au, 62 g/t Ag, 3.2% Zn, and 1.3% Pb, including 1.0 m of 26.1 g/t Au, 619 g/t Ag, 10.0% Zn, 3.5% Pb. Another hole intersected 66.0 m of 1.36 g/t Au, 11 g/t Ag, 0.3% Zn, and 0.2% Pb. This interval intersected 3.3 m of 11.30 g/t Au, 12 g/t Ag, 1.9% Zn, and 2.3% Pb, including 1.0 m of 29.10 g/t Au, 19 g/t Ag, 2.7% Zn, and 1.6% Pb within which was 0.5 m of 44.70 g/t Au, 24 g/t Ag, 4.3% Zn, and 2.8% Pb.

#### 7.1.6. JD (Volatus Capital Corp.)

In 2021, Volatus Capital Corp. acquired 16,311 Ha of mineral claims including the **JD** epithermal gold-silver project which hosts the Finn zone. The zone is east-trending and contains gold-silver and native gold mineralization with associated galena, sphalerite, pyrite, and minor chalcopyrite in a structurally controlled silicified zone. Volatus carried out airborne and ground-based geophysical surveys, rock sampling, and geological mapping.

#### 7.1.7. Lawyers (Benchmark Metals Inc.)

Benchmark Metals Inc. continued resource definition and expansion drilling with 70,000 m of diamond drilling and 10,000 m of reverse circulation drilling at their **Lawyers** project (Fig. 5). In May, an initial Mineral Resource Estimate reported a total Indicated resource of 1.546 million oz Au and 50.2 million oz Ag and a total Inferred resource of 620,000 oz Au and 18.1 million oz Ag. The project has regional-scale northwest-trending linear magnetic and radiometric anomalies with multiple gold-silver showings along a strike length of 20 km. The project has four discrete zones (Cliff Creek, Duke's Ridge, Phoenix and AGB) targeted for their bulk tonnage potential. Environmental and engineering work continued for environmental assessment and a feasibility-level mine design for the Cliffs Creek and AGB deposits. Benchmark signed an Exploration Cooperation and Benefit Agreement with the Tsay Keh Dene, Kwadacha and Takla First Nations. Drill results delineated along-strike, near-surface continuation of gold and silver mineralization for 300 m between the Cliff Creek and Dukes Ridge deposits. Highlight results included intersections from three holes: 68.58 m of 3.07 g/t Au and 11.72 g/t Ag; 41.15 m of 1.31 g/t Au and 30.77 g/t Ag; and 25.91 m of 2.40 g/t Au and 47.99 g/t Ag.

**Fig. 5.** Drill site at Lawyers project (Benchmark Metals Inc.).

#### 7.1.8. Muskwa (Fabled Copper Corp.)

Fabled Copper Corp. conducted aerial drone surveys, geological mapping, prospecting, rock sampling, and site reclamation at its **Muskwa** project in the Northeast Region. The project contains vein-hosted copper, silver, lead, and cobalt mineralization.

#### 7.1.9. Nechako Gold (Tower Resources Ltd.)

Tower Resources Ltd. drilled 2020 m in 13 holes at its **Nechako Gold** project to expand the April trend and the Pond trend, a new zone discovered in the first hole drilled. Highlight results from the Pond trend included 1.3 g/t Au across 14.7 m, 18.9 g/t Au across 0.6 m, and 17.5 g/t Au across 0.6 m.

#### 7.1.10. QCM (Kestrel Gold Inc.)

At their **QCM** project, Kestrel Gold Inc. completed 992 m of reverse circulation drilling in seven holes. Mineralization is spatially related to the Manson Creek fault zone, a northwest-striking dextral regional structure that extends through the projects claims. The gold at QCM occurs with minor chalcopyrite and pyrite, both in quartz veins and altered groundmass and is interpreted to be orogenic. The altered mineralized zone (QCM zone) extends across an area 300 by 1000 m, elongate in a northwest direction.

#### 7.1.11. Rider Block (Golden Planet Mining Corp.)

Golden Planet Mining Corp. completed 850 m of diamond drilling in 7 holes at its **Rider Block** claims. Recent fieldwork identified numerous prospective areas of mineralization that includes epithermal-style veins and breccias.

#### 7.1.12. Snowbird (Element79 Gold Corp.)

Element79 Gold Corp. acquired 100% of Plutus Gold Corp. in August and holds the option to acquire the **Snowbird** gold project. Element79 completed 3000 m of drilling to assess mineralization below a vertical depth of 400 m, deeper than previously tested.

### 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 5). The 15 selected projects include Millbank Mining Corp.'s **Arthur Lake** property, Orestone Mining Corp.'s **Captain** project, Wedgemount Resources Corp.'s **Eagle** and **Cookie** projects, NorthWest Copper Corp.'s. **Kwanika**, **Lorraine-Top Cat**, and **East Niv** projects, Pacific Empire Minerals Corp.'s **Jean Marie** project, Amarc Resources Ltd.'s **Joy** project, Pacific Ridge Exploration Ltd.'s **Kliyul** project, Centerra Gold's **Max** and **Mount**

**Milligan** Brownfields projects**,** TDG Gold Corp.'s **Oxide Peak** project, Interra Copper Corp.'s **Thane** project and QuestEx Gold & Copper Ltd.'s **Sofia** property.

### 7.2.1. Arthur Lake (Millbank Mining Corp.)

Soil sampling at the **Arthur Lake** property in 2020 identified copper soil anomalies: the Copper enrichment (1800 by 500 m); the Granite plug (450 by 350 m, centred on a granitic plug); and the Southwest (900 by 400 m). Millbank Mining Corp. started a 16 km IP survey in late November to test these anomalies. In February, the company also filed a NI 43-101 technical report.

### 7.2.2. Captain (Orestone Mining Corp.)

Orestone Mining Corp. drilled 2132 m in three holes and carried out a 2 line-km MT geophysical survey at the **Captain** gold-copper project. The holes intersected sericite alteration along an 800 m strike length that is approximately 500 m wide. Highlight drill results included 85.7 m of 0.37 g/t Au and 0.06% Cu. The Captain project is 30 km south of the Mount Milligan mine. Mineralization is hosted in an altered alkalic monzonite porphyry. Target areas are outlined by strong magnetic anomalies with spatially associated moderate IP chargeability anomalies that are potentially related to mineralized monzonite porphyries and breccias.

### 7.2.3. Cookie (Wedgemount Resources Corp.)

At their **Cookie** project, Wedgemount Resources completed rock and alteration rock chip sampling and soil sampling. Porphyry-related potassic, propylitic, and phyllic alteration as well as spatially associated copper-bearing sulphide mineralization were identified. Highlight rock sample results included up to 14.8% Cu and 88 g/t Ag from veins in the Overstall zone. The Cookie copper-gold porphyry project is 40 km south of the past-producing Kemess copper-gold mine.

### 7.2.4. Eagle (Wedgemount Resources Corp.)

At **Eagle**, exploration included mapping, prospecting, rock sampling and a 22 line-km IP survey. Highlight results included rock grab samples grading up to 9.86% Cu, 2.5 g/t Au, and 77.7 g/t Ag from the Nighthawk zone and up to 1.63% Cu and 1.24 g/t gold from the Vector zone. Eagle is a porphyry copper-gold project between the Mount Milligan mine and the Kwanika deposit.

### 7.2.5. East Niv (NorthWest Copper Corp.)

NorthWest Copper Corp. carried out 2915 m of drilling in 11 holes, geological mapping, and rock sampling at their **East Niv** project. The company added 16 new claims to include ground underlain by faults and targets from geophysical and geochemical anomalies. Highlight drill results included 81.6 m of 0.41% Cu, 0.20 g/t Au, and 0.9 g/t Ag within which was 14.8 m of 0.75% Cu, 0.35 g/t Au, and 2.5 g/t Ag.

### 7.2.6. Jean Marie (Pacific Empire Minerals Corp.)

Pacific Empire Minerals Corp. completed a 128 km$^2$ high-resolution magnetic gradient, radiometric, and VLF-EM airborne geophysical survey at its **Jean Marie** property. The company also re-logged historical drill core, undertook surficial and detailed bedrock mapping, and completed the first phase of a soil sampling program.

### 7.2.7. Joy (Amarc Resources Ltd.)

Amarc Resources Ltd. conducted an exploration program on its **Joy** project. The program included 4300 m of diamond drilling in 9 holes, modelling of the Pine copper-gold deposit, geological mapping, geochemical and rock sampling, and geophysical surveys. A 42 line-km IP survey was completed over and north of the Pine deposit, and over the Canyon, Twins, SW Takla and Central Takla exploration targets. The intention was to expand on potential drill targets. The company entered into a four-way exploration agreement with Takla, Tsay Keh Dene, and Kwadacha First Nations. Amarc also entered into an agreement with Freeport-McMoRan Inc. whereby Freeport can acquire up to 70% ownership by making staged investments.

### 7.2.8. Kliyul (Pacific Ridge Exploration Ltd.)

At their **Kliyul** project, Pacific Ridge completed 1542 m of drilling in the early fall. All holes intersected porphyry-style sulphide-bearing mineralization. Drill results discovered a new copper skarn prospect to the southeast and extended mineralization at the Kliyul Main zone to the west and at depth. Highlight results includes: 437 m of 0.22% Cu, and 0.6 g/t Au including 141 m of 0.36% Cu and 1.11 g/t Au.

### 7.2.9. Kwanika-Stardust (NorthWest Copper Corp.)

NorthWest Copper Corp. combined the **Kwanika** and **Stardust** deposits into a single advanced-stage project and drilled about 1100 m at **Kwanika**. The drilling was designed to expand the resource and better define high grade Cu-Au mineralization. One highlight result included: a 235.45 m interval with grades of 2.0% Cu, 1.21 g/t Au, and 5.3 g/t Ag, which included 153.25 m at 2.84% Cu, 1.69 g/t Au, 7.5 g/t Ag; and 9.40 m of 29.85% Cu, 4.34 g/t Au, and 70.5 g/t Ag. A second highlight was a 230.95 m interval with grades of 0.56% Cu, 0.58 g/t Au, and 1.9 g/t Ag, with 94.6 m at 0.8% Cu, 1.1 g/t Au, and 2.6 g/t Ag.

The **Stardust** property has historically been regarded as a skarn deposit and was explored intermittently for many years. Historic work included more than 80,000 m of drilling, 5800 soil samples, airborne magnetic surveys, mapping, and prospecting. Mineralization is hosted by the Sowchea, Pope and Copely successions west of the Pinchi fault, in the Cache Creek terrane.

### 7.2.10. Lorraine-Top Cat (NorthWest Copper Corp.)

NorthWest Copper Corp. consolidated the Lorraine and Top Cat properties into one project. At the **Lorraine-Top Cat** project, exploration included geological mapping, soil and rock sampling, and IP and airborne magnetic surveys.

#### 7.2.11. Max (Centerra Gold Inc.)

Centerra Gold Inc. carried out 160 m of backpack drill till sampling in 80 holes at their **Max** project. This porphyry target is 21 km south of the Mount Milligan mine and consists of twelve mineral claims (4869 ha).

#### 7.2.12. Mount Milligan Brownfield (Centerra Gold Inc.)

Brownfield exploration at the **Mount Milligan** mine site included more than 41,000 m in 72 holes of infill and resource expansion drilling at the Great Eastern fault zone and the MBX Deep zone below the ultimate pit boundary of the mine.

#### 7.2.13. Oxide Peak (TDG Gold Corp.)

TDG Gold Corp. completed 1029 m in 2 holes at their **Oxide Peak** project. The company drilled the Drybrough target about 3.5 km northeast of their Baker project and historical mine. Drill targeting was based on gossanous surface alteration that coincides with anomalous magnetic values. Mineralization at the Oxide Peak project contains both epithermal and porphyry mineralization.

#### 7.2.14. Sofia (QuestEx Gold & Copper Ltd.)

QuestEx Gold & Copper Ltd completed 1611 m of diamond drilling in seven holes at its **Sofia** property to test grassroots targets, porphyry copper-gold at Alexandra and Tranquillo, and epithermal gold at Quartz lake. Soil sampling and prospecting were also carried out. Highlight results included 11 m of 1.13 g/t Au and 7.9 g/t Ag, and 4 m of 2.93 g/t Au and 13.0 g/t Ag.

#### 7.2.15. Thane (Interra Copper Corp.)

Interra Copper Corp. (Previously IMC International Mining Corp.) completed 2783 m of drilling in 12 holes at the Cathedral and Pinnacle zones of the **Thane** copper-gold project. A NI 43-101 technical report was filed for the project in September. IP and magnetic geophysical surveys, geological mapping, and soil sampling were completed at the Gail showing to generate drill targets for exploration in 2022.

### 7.3. Selected polymetallic base and precious metal projects

Active projects included ZincX Resources Corp.'s **Akie**, NorthWest Copper Corp.'s **Stardust** and InZinc Mining Ltd.'s **Indy**, all of which are in the North Central Region (Fig. 1; Table 5).

#### 7.3.1. Akie (ZincX Resources Corp.)

ZincX Resources Corp. continued exploration on its **Akie** SEDEX project, which includes the Cardiac Creek deposit. This deposit is hosted by siliceous, carbonaceous, fine-grained siliciclastic rocks of the Gunsteel Formation (Middle to Late Devonian). At a base case 5% zinc cut-off, the deposit has an Indicated resource of 22.7 Mt grading 8.32% Zn, 1.61% Pb, and 14.1 g/t Ag and an Inferred resource of 7.5 Mt grading 7.04% Zn, 1.24% Pb and 12.0 g/t Ag. In 2021, ZincX drilled 5 holes totalling 2669 m at the Cardiac Creek deposit. A ground-based gravity survey was conducted on both Akie and the Mt. Alcock property to enhance and infill existing airborne gravity data over the area from Akie, north to Mt. Alcock. Highlight drill results included 22.61 m of 4.83% Zn+Pb, 7.7 g/t Ag, and 32.76 m of 20% Zn+Pb and 9.6 g/t Ag, which included 10.77% Zn+Pb and 14.5 g/t Ag along 5.99 m.

#### 7.3.2. Indy (InZinc Mining Ltd.)

At the **Indy** SEDEX project, InZinc Mining Ltd. reported new soil geochemical results that outlined a 1.9 km long zinc-in-soil target and multi-element (Zn, Pb, Ba) along part of the 7 km Main trend. Silver-in-soil responses identified two new silver targets, one named Fox about 1.0 km long, another 700 m long named Hat.

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

FPX Nickel Corp.'s **Decar Nickel District** project and Nickel Rock Resources **Nickel 100 Group** are in the North Central Region (Fig. 1; Table 5). These projects contain ultramafic rocks mineralized with a nickel-iron alloy, awaruite.

#### 7.4.1. Decar Nickel District (FPX Nickel Corp.)

FPX Nickel Corp. announced a new nickel discovery at their **Decar Nickel District** project with initial drilling of 2688 m at its Van target. Results included 0.21% total nickel along 287 m, 0.197% total nickel along 270 m, 0.207% total nickel along 101 m, and 0.215% total nickel along 103 m. The Van target displays disseminated nickel-iron alloy mineralization, like the Baptiste deposit, and in similar peridotites (Fig. 6). Drilling at the Baptiste deposit included 2710 m in 10 drill holes for resource definition and expansion. The Baptiste deposit is reported to have 1.996 billion tonnes of Indicated resources with an average grade of 0.122% Davis Tube Recovery (DTR) nickel, 593 million tonnes of Inferred resources with an average grade of 0.114% DTR nickel, at a cut-off grade of 0.06% DTR

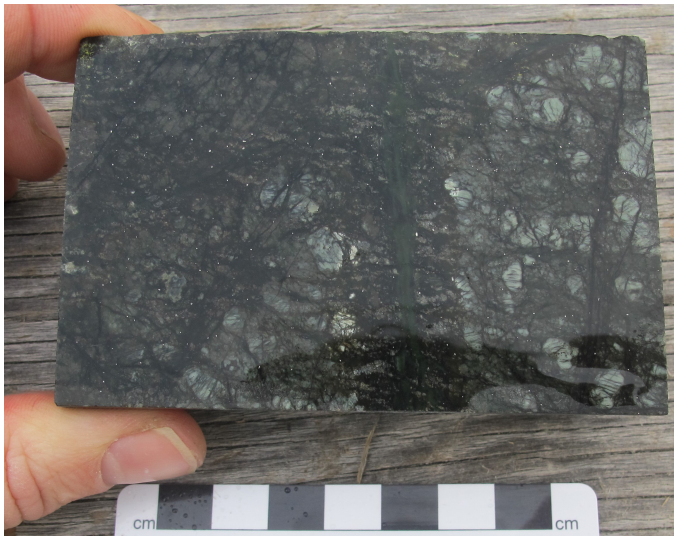


**Fig. 6.** Polished core displaying disseminated awaruite (nickel-iron alloy) in peridotite, Decar Nickel District project (FPX Nickel Corp.).

nickel. Tailings produced by the proposed mining and milling process at Decar have potential to sequester $CO_2$.

### 7.4.2. Nickel 100 Group (Nickel Rock Resources Inc.)

Nickel Rock Resources Inc. optioned their Nickel South claim block, which is part of their **Hard Nickel Group** project, and their **Nickel 100 Group** project to Surge Battery Metals Inc. Surge can earn up to an 80% interest. Before optioning the claims, Nickel Rock had carried out soil sampling on the Nickel South block.

## 7.5. Selected specialty metal projects

Deep-water basin strata east of the Rocky Mountain Trench host a number of specialty metal projects, including 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 5).

### 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 (Fig. 7). 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 flourocarbonates, ancylite (cerium, lanthanum) and monazite (cerium, lanthanum, neodymium). Minor concentrations of niobium are present as well.

In 2021, Defense Metals Corp. drilled 5349 m in 29 holes for resource expansion and definition. A Preliminary Economic Assessment was filed with an Indicated mineral resource of 5.0 Mt averaging 2.95% Total Rare Earth Oxide (TREO), and an Inferred mineral resource of 29.5 Mt averaging 1.83% TREO, reported at a cut-off grade of 0.5% TREO. This estimate represents a 36% increase on a contained metal basis in comparison to an estimate made in 2020. The assessment included a detailed data review, pit optimization plans, and evaluations of hydrometallurgy, mineral processing, and separation costs. The average annual REO production is estimated at 25,423 t for a 16-year mine life.

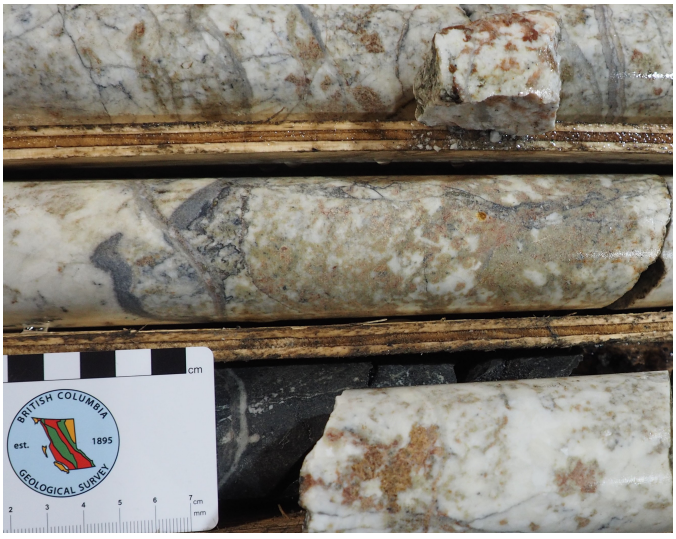


**Fig. 7.** LREE mineralization in carbonatite: monzonite, pink-brown-red; parasite, rusty red brown; bastnäsite, dull grey-brown. Wicheeda project (Defense Metals Corp.).

## 7.6. Selected coal projects

In 2021, coal exploration in the Northeast Region included Conuma Coal Resources Ltd.'s **Hermann** and **Hudette** projects. The two main coal-bearing units in the Northeast Region (Gething and Gates formations) consist of interbedded shale, sandstone, siltstone, conglomerate, and coal.

### 7.6.1. Hermann (Conuma Coal Resources Ltd.)

Conuma completed geotechnical drilling and large-diameter core drilling on its **Hermann** project early in 2021. The program included a total of 592 m in 5 reverse circulation drill holes. The project contains 24.36 Mt Proven and Probable reserves of coal in the Gates Formation. Coal seams are mostly found in folds with moderate to steep (40-70°) dips of the Gates Formation (Fort St. John Group; Lower Cretaceous).

### 7.6.2. Hudette (Conuma Coal Resources Ltd.)

The **Hudette** project has an ongoing exploration program that included a total of 2742 m in 16 reverse circulation drill holes. Historical Reports from 2014 include Hudette containing a Proven reserve of 24.6 Mt and a Probable reserve of 465,000 tonnes of coal. The coal-bearing units are in the Gething Formation (Bullhead Group; Lower Cretaceous).

## 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

Colpron and Nelson (2021) published an updated review that summarized the physiography, neotectonics, crustal structure, geology, natural resources, and evolution of the northern Cordillera. Work on a multi-year mapping project in the northern part of Hogem batholith designed to better understand the origin and timing of batholith emplacement and base- and precious-metal mineralization continued with a detrital zircon U-Pb, Lu-Hf isotope, and trace element study evaluating the nature of the basement to Quesnellia (Ootes et al., 2022). Milidragovic et al. (2021) examined the chalcophile element geochemistry at the Polaris Alaskan-type mafic-ultramafic complex and concluded that two styles of PGE mineralization reflect the evolution of strongly oxidized, hydrous ultramafic parental magma(s) in the absence of wallrock assimilation. Depth to bedrock data for parts of the regions were presented by Arnold (2021). Riddell et al. (2021) examined the mineral content of some Gething Formation coals from the Willow Creek mine. Jackman et al. (2021) produced new surficial geology maps, reanalyzed archived till samples, and conducted new till geochemical and mineralogical surveys in an area from the Gibraltar mine (Williams Lake) to northwest of

the Mount Milligan (Mackenzie) mine in the North Central Region. Surficial geology maps, reports, and data were released by Johnson et al. (2021a, b), McGregor et al. (2021a, b), and Sacco et al. (2021a, b, c). Bouzari et al. (2021) examined advanced argillic-alteration zones in the upper parts of porphyry copper systems at the Kemess North and Alunite Ridge properties in the Toodoggone district. Cutts et al. (2021) examined variations between the physical properties (density and magnetic susceptibility) and mineralogy and geochemistry of Cache Creek terrane serpentinized ultramafic ophiolites near Decar and Hogem batholith to develop models for geophysical mapping. Integrating aeolian landform analysis with optical dating and macrofossil radiocarbon dating, Hickin et al. (2021) examined the paraglacial to non-glacial transition following the Late Wisconsinian separation of the Cordilleran and Laurentide ice sheets in northeastern British Columbia, and Dulfer and Marigold (2021) used remotely sensed data to map glacial landforms across much of northern British Columbia.

## 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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