



# Provincial Overview of Exploration and Mining in British Columbia, 2021



Ministry of  
Energy, Mines and  
Low Carbon Innovation

Information Circular 2022-01





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**Ministry of Energy, Mines and Low Carbon Innovation  
Mines, Competitiveness, and Authorizations Division  
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**Front Cover:**

Drill site at Quartz lake, Sofia property, North Central Region. **Photo by Nate Corcoran.**

**Back Cover:**

Bastnäsite LREE mineralization in carbonatite core, Wicheeda project, North Central Region. **Photo by Nate Corcoran.**

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Victoria  
British Columbia  
Canada

January 2022



# Foreword

This volume is the latest in a series of annual reviews that dates back to 1874, when the first Annual Report of the Minister of Mines was published. To prepare the details in the district chapters, the Regional Geologists visit project sites to view outcrops and drill core and to discuss results and progress. A significant amount of information is gleaned from corporate press releases, websites and reports. Exploration expenditures, drilling estimates and other metrics for British Columbia were captured in the British Columbia Mineral and Coal Exploration Survey. The survey is a joint initiative between the Province of British Columbia Ministry of Energy, Mines and Low Carbon Innovation, the Association for Mineral Exploration, and EY LLP.

Despite forest fires, heat waves, floods, and resultant temporary transport infrastructure collapse, and the continuing Covid 19 pandemic, the forecasted value of total provincial mining production reached an all-time high of \$12.6 billion, and total exploration expenditures reached a near record of \$659.8 million.

## As used in this volume

- grassroots exploration refers to activities that are typically below Mines Act permit thresholds and commonly include mapping, sampling and prospecting
- early-stage exploration includes activities such as geophysics, geochemistry, trenching, and drilling
- advanced-stage exploration is concerned with resource definition, emphasizing drilling and bulk sampling, and may include baseline environmental studies, economic pre-feasibility work, and secondary target exploration
- mine evaluation begins with a commitment to develop a resource and usually coincides with government applications to open a mine and environmental, social, engineering, and financial assessment activities
- mine lease exploration represents work on a mining property beyond known reserves and commonly has characteristics of early-stage or advanced exploration

Founded in 1895, the British Columbia Geological Survey integrates historical data with active research programs and, drawing on continuously advancing concepts and technologies in the Earth sciences, informs the mineral and coal industries. The British Columbia Geological Survey preserves, archives, and provides free web-based access to more than a century's worth of geoscience information.

British Columbia Geological Survey geoscientists work and live on the traditional lands of many First Nations. The Survey looks forward to enhancing relationships and exchanging knowledge with Indigenous communities.

We appreciate the information and access to project sites provided by industry representatives and thank George Owsiacki of Total Earth Science Services for desktop publishing.



Gordon Clarke  
Director, Mineral Development Office  
British Columbia Geological Survey  
January, 2022

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# Exploration and Mining in British Columbia, 2021: A summary



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## 1. Introduction

Reflecting its complex geological history, British Columbia is endowed with diverse minerals and deposit types (Fig. 1). British Columbia is Canada's largest exporter of coal, leading producer of copper, and only producer of molybdenum. Also produced are significant amounts of gold, silver, lead, and zinc, and more than 30 industrial minerals including gypsum, magnesite, limestone, and dimension stone. Numerous quarries produce sand and gravel or crushed aggregate. Flanked by the Pacific Ocean, British Columbia offers easy access to global markets. Mine operations benefit from tax incentives and a well-developed infrastructure, including low-cost electricity, an integrated road and rail network, and large deep-water ports. Exploration benefits from an extensive geoscience database and a web-based mineral tenure system.

The following report summarizes the chapters prepared by the British Columbia Geological Survey Regional Geologists that are presented elsewhere in this volume. The Regional Geologists (Fig. 2; Table 1) represent the provincial government on geological matters at a regional level. Within their communities, they provide information on exploration trends, possible investment opportunities, land use processes, First Nation capacity building, and public outreach.

In 2021, numerous acquisitions, earn ins, proposed mergers and permitting approvals were announced. The most significant was the offer by Newcrest Mining Limited to purchase Pretium Resources Inc. for approximately \$3.5 billion. Newmont Corporation purchased GT Gold Corp. for an estimated \$456 million. Assets included the **Tatogga** project's Saddle North deposit. Hochschild Mining PLC announced their intent to earn a 60% interest in the **Snip Gold** project from Skeena Resources Limited by spending approximately \$100 million during the option period. Scottie Resources Corp. and AUX Resources Corporation amalgamated, which consolidated their advanced projects in the Stewart mining camp. In early December, Ascot Resources Ltd. received a Mines Act permit for construction and operation of their **Premier Gold** mine

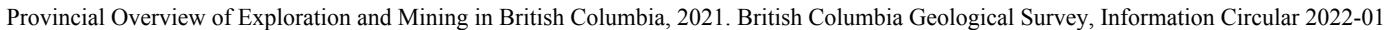
project. Ascot reported planning for the transition from early works to full-scale construction. The target date for initial gold production is Q1 2023. Artemis Gold Inc.'s **Blackwater Gold** project gained provincial approval for mine construction, allowing initial site preparation and land clearing to start. BW Gold Ltd. (a wholly owned subsidiary of Artemis) plans to commence construction in Q2 2022.

Forest fires in the summer and unusually intense rainstorms in November, which resulted in the temporary collapse of transport infrastructure due to floods and slope failures, interfered with programs in the South Central and Southeast regions. These disruptions caused temporary suspensions and curtailed some late fall programs. Because of staffing shortages and protocols related to the Covid pandemic, laboratories had difficulty keeping up with the high volume of samples submitted by exploration companies, causing delays in the release of analytical results. Despite these challenges, the value of provincial mining production reached an all-time high, and exploration expenditures improved for the second year in a row, reaching a near-record level.

## 2. Mine production

The Ministry of Energy, Mines and Low Carbon Innovation forecasts the total value of mine production for 2021 at \$12.6 billion including coal, copper, gold, industrial minerals, aggregate, zinc, silver, molybdenum, and lead (Fig. 3). This forecast is \$5.3 billion higher than the 2020 preliminary estimate of \$7.3 billion made by the Ministry using Natural Resources Canada values (Fig. 4) and is mostly due to increased commodity prices, in particular for coal and copper.

Metallurgical coal prices skyrocketed in 2021 with spot prices reaching a high of 408 US\$/t on September 23, 2021. As of January 2022, prices were 350 US\$/t, a significant increase relative to prices at the start of 2021 of around 140 US\$/t. Price increases have been attributed to strong global steel production and increased imports by China arising from limits to domestic production. Coking coal prices are forecasted to decrease in



**Fig. 1.** Mines, mine development, selected proposed mines, and selected exploration projects in British Columbia, 2021. Based on Clarke et al., 2022, British Columbia Geological Survey Open File 2022-01.





Fig. 2. Geographic regions and Regional Geologist offices.

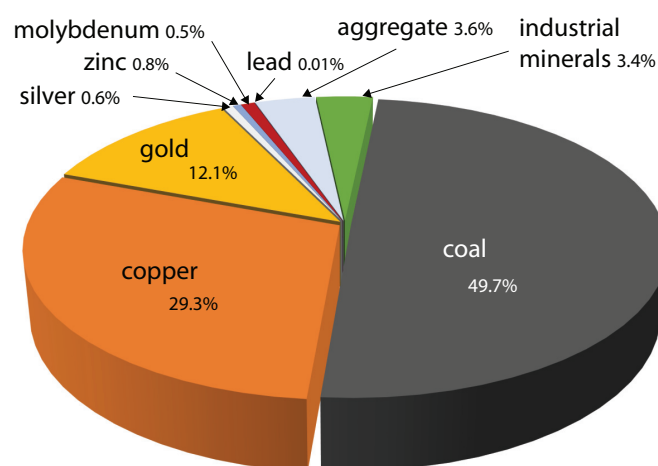


Fig. 3. 2021 forecast value of British Columbia mineral production by commodity; total is \$12.6 billion.

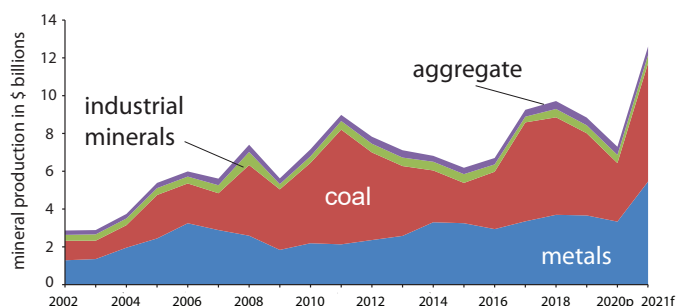


Fig. 4. Value of British Columbia mineral production by year 1999-2021; value for 2020 is preliminary estimate, value for 2021 is forecast.

the next few years as the surge in steel production caused by the post-pandemic global recovery is expected to diminish. The reopening of the Mongolian border might also allow China to source coal from a relatively low-priced supplier. In the long term, metallurgical coal prices are expected to find support from expanding infrastructure in China and India. India has recently launched a \$1.35 trillion infrastructure plan, focussing on expanding transport infrastructure.

At the start of 2021, the price of copper was about US\$3.60/lb. The price rose to US\$4.70/lb by early May and finished the year at about US\$4.40/lb. Gold started 2021 at about US\$1940/oz, then fell to US\$1684/oz in late March, and closed out the year at US\$1806/oz.

As in previous years, coal was the highest value mine product (49.7%), followed by copper (29.27%). In 2021, ten metal mines operated during at least part of the year (Fig. 1; Table 2). Metallurgical coal was produced at four open-pit operations in the southeastern part of the province and three open-pit operations in the northeastern part (Fig. 1; Table 2). About 30 industrial mineral mines and more than 1000 aggregate mines and quarries were in operation.

### 3. Mining highlights

#### 3.1. Metal mines

Metal mines accounted for \$5.46 billion (forecast) of all mine production in 2021, representing about 43.3% of total

Table 1. Mineral Development Office and Regional Geologist contact information.

Region	Community	Regional Geologist	Phone	email
Northwest	Smithers	vacant	-	-
Northeast and North Central	Prince George	Nate Corcoran	250-645-9238	Nathan.Corcoran@gov.bc.ca
South Central	Kamloops	vacant	-	-
Southeast	Cranbrook	Fiona Katay	250-952-0372	Geological.Survey@gov.bc.ca
Southwest	Vancouver	Bruce Northcote	604-660-2713	Bruce.Northcote@gov.bc.ca
Mineral Development Office	Vancouver	Gordon Clarke	604-660-2094	Gordon.Clarke@gov.bc.ca

**Table 2.** Operating metal mines, 2021, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1-Q3)	Reserves	Resources	Comments
<b>Brucejack</b>	Northwest	<b>Pretium Resources Inc.</b>	Au, Ag; IS- epithermal; 104B 193	346,000 oz Au 464,000 oz Ag	P+Pr: 14.4 Mt 8.3 g/t Au, 63.8 g/t Ag	M+I: 22.5 Mt 10.0 g/t Au, 67.5 g/t Ag  Inf: 9.4 Mt 10.3 g/t Au, 44.3 g/t Ag	Discovered new high-grade North Block and Marmot zones. Results for North Block included 12.0 m grading 80.7 g/t Au with 1.0 m grading 941.0 g/t Au. Results for Marmot zone included 53.5 m grading 72.5 g/t Au, including 6700 g/t Au along 0.5 m. Newcrest Mining Limited makes an offer to purchase Pretium for ca. \$3.5 billion.
<b>Red Chris</b>	Northwest	<b>Newcrest Mining Limited (70%), Imperial Metals Corporation (30%)</b>	Cu, Au, Ag; Hybrid calc-alkalic to alkalic porphyry; 104H 005	67.6 Mlbs Cu 62,100 oz Au	P+Pr: 301.5 Mt 0.36% Cu, 0.27 g/t Au	M+I: 980 Mt 0.38% Cu, 0.41 g/t Au  Inf: 190 Mt 0.30% Cu, 0.31 g/t Au	Infill drilling beneath East Zone continued to intersect high-grade mineralization. Results included 198 m grading 0.89 g/t Au and 0.83% Cu, and 254 m grading 1.0 g/t Au and 1.1% Cu. A Prefeasibility Study confirmed a low cost, long life for proposed block cave mining.
<b>Mt. Milligan</b>	North Central	<b>Centerra Gold Inc.</b>	Cu, Au, Ag; Alkalic porphyry Cu- Au; 093N 194, 191	75.0 Mlb Cu 182,545 oz 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.
<b>Bonanza Ledge II</b>	South Central	<b>Osisko Development Corp.</b>	Au; Au-quartz veins; 093H 140	na	na	Bonanza Ledge II M: 240,000 t 5.1 g/t Au  I: 1.671 Mt 4.3 g/t Au  Inf: 2.398 Mt 3.1 g/t Au	Production at Bonanza Ledge resumed in March 2021. Target rate of 650 tpd.



Table 2. Continued.

<b>Copper Mountain</b>	South Central	<b>Copper Mountain Mining Corporation 75%, Mitsubishi Materials Corporation 25%</b>	Cu, Au, Ag; Porphyry Cu-Au, Alkalic; 092HSE001	97.9 Mlb Cu 31,017 oz Au 591,258 oz Ag	P+Pr: 403.4 Mt 0.24% Cu, 0.11 g/t Au, 0.76 g/t Ag	M+I: 597.1 Mt 0.23% Cu, 0.10 g/t Au, 0.70 g/t Ag  Inf: 311.0 Mt 0.20% Cu, 0.10 g/t Au, 0.50 g/t Ag	Third ball mill commissioned for 45 ktpd throughput. Exploration drilling ongoing. Resources inclusive of reserves.
<b>Elk</b>	South Central	<b>Gold Mountain Mining Corp.</b>	Au, Ag; Au quartz veins; 092HNE009, 295, 41, 261	na	na	Combined Elk property M+I: 4.359 Mt 5.6 g/t Au, 11.0 g/t Ag  Inf: 1.497 Mt 5.3 g/t Au, 14.4 g/t Ag	Began mining in November. Ore is to be trucked to New Afton. Exploration drilling and updated resource estimates.
<b>Gibraltar</b>	South Central	<b>Taseko Mines Limited 75%, Cariboo Copper Corp. 25%</b>	Cu, Mo; Porphyry Cu±Mo±Au; 093B 012	111.3 Mlb Cu 2.0 Mlb Mo	P+Pr: 538 M short tons 0.25% Cu, 0.008% Mo	M+I: 1048 M short tons 0.25% Cu, 0.007% Mo	Resources inclusive of reserves.
<b>Highland Valley</b>	South Central	<b>Teck Resources Limited</b>	Cu, Mo; Porphyry Cu±Mo±Au; 092ISW012, 45	130,400 t Cu 1.07 Mlb Mo	P+Pr: 401.6 Mt 0.31% Cu, 0.007% Mo	M: 724.1 Mt 0.28% Cu, 0.008% Mo  I: 999.7 Mt 0.24% Cu, 0.009% Mo  Inf: 406.0 Mt 0.23% Cu, 0.007% Mo	2040 extension plan under consideration which would yield 4.3 Blbs Cu and extend mine life.
<b>New Afton</b>	South Central	<b>New Gold Inc.</b>	Au, Ag, Cu; Porphyry Cu-Au, Alkalic; 092INE023	63.3 Mlb Cu 52,980 oz Au	P+Pr: 46.6 Mt 0.66 g/t Au, 1.8 g/t Ag, 0.74% Cu	M+I: 66.5 Mt 0.61 g/t Au, 2.1 g/t Ag, 0.74% Cu  Inf: 18.3 Mt 0.36 g/t Au, 1.1 g/t Ag, 0.36% Cu	M+I resources are exclusive of reserves. Exploration is ongoing at Cherry Creek 3 km west of mine and regionally.
<b>Myra Falls</b>	Southwest	<b>Trafigura Group Pte. Ltd. (Trafigura Mining Group)</b>	Zn, Cu, Pb, Au, Ag; Noranda/Kuroko massive sulphide; 092F 330, 71, 72, 73	Not reported	P+Pr: 4.7 Mt 7.11% Zn, 0.78% Pb, 0.92% Cu, 76.55 g/t Ag, 1.78 g/t Au	M+I: 7.64 Mt 6.59% Zn, 0.72% Pb, 0.99% Cu, 72.52 g/t Ag, 1.79 g/t Au	Resumed production in April 2019, continued to ramp up 2020-21. Continuing multi-year underground drilling.

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

output (Fig. 3). Ten mines produced in 2021 (Fig. 1; Table 2).

**Brucejack** (Pretium Resources Inc.) and **Red Chris** (Newcrest Mining Ltd. 70% and Imperial Metals Ltd. 30%) were the producing metal mines in the Northwest Region. At the **Brucejack** mine, production for the first three quarters totalled 259,551 oz of Au at a head grade of 8.4 g/t Au and 347,956 oz Ag. The mill throughput in the first nine months of the year totalled 3735 tpd for a total of 1,019,563 t milled. As of January 1, 2021, Pretium reported Indicated and Measured mineral resources totalling 22.5 Mt grading 10.0 g/t Au and 67.5 g/t Ag and Proven and Probable mineral reserves totalling 14.4 Mt grading 8.3 g/t Au and 63.8 g/t Ag. Resource expansion underground diamond drilling was carried out north of the Valley of the Kings deposit in a new area referred to as the North Block zone. Numerous high-grade intersections were reported including: 1 m grading 2,100.0 g/t Au; 12.0 m grading 80.7 g/t Au with a 1.0 m intersection grading 941.0 g/t Au; and 15.0 m grading 493.2 g/t Au, with a 1.0 m intersection grading 7,360 g/t Au. A new high-grade discovery was made in exploration drilling 3.5 km north of the mine, at the Marmot zone. Highlights included intersections of 53.5 m grading 72.5 g/t Au, including 6,700 g/t Au along 0.5 m, 5.8 m grading 46.1 g/t Au, and 38.0 m grading 22.8 g/t Au.

At the **Red Chris** mine, production to the end of the third quarter of 2021 totalled 46,550 oz Au and 50.7 Mlbs Cu. A new mineral resource estimate was released with 980 Mt of Measured and Indicated, grading 0.41 g/t Au, 0.38% Cu, and 190 Mt of Inferred, grading 0.31 g/t Au, 0.30% Cu. A Prefeasibility Study confirmed a low cost, long life for a proposed block cave mining operation. Diamond drilling near the ore body discovered new zones of high-grade mineralization. Results included 198 m grading 0.89 g/t Au, and 0.83% Cu, and 254 m grading 1.0 g/t Au and 1.1% Cu. Further studies were ongoing to assess opportunities close to the mine.

In the North Central Region, the **Mt. Milligan** open-pit copper-gold mine is in its eighth year. Production to the end of the 3rd quarter totalled 56.3 Mlb of Cu and 136,909 oz Au from 15.45 Mt of ore grading 0.22% Cu and 0.43 g/t Au. Metal recoveries averaged 79.4% for Cu and 65.8% for Au.

In the South Central Region, operating mines included **Bonanza Ledge II**, **Copper Mountain**, **Elk**, **Gibraltar**, **Highland Valley**, and **New Afton**. **Bonanza Ledge II** and **Elk** are both small precious metal mines.

Barkerville Gold Mines Ltd. (now under Osisko Development Corp.) restarted the Bonanza Ledge mine (Fig. 1; Table 2) in 2017 as an underground long-hole and cemented fill operation below the existing pit. Osisko Development Corp. began a second phase of underground mining at Bonanza Ledge in 2021. **Bonanza ledge II** will exploit the BC vein at a targeted rate of 650 tpd. Bonanza Ledge is part of the larger Cariboo Gold project, a proposal for a larger 15-year mining operation to the north. A permit amendment allows for production of up to 215,000 tpy of ore. The mine life of phase II is an anticipated 18 months.

At the **Copper Mountain** mine, production to the end of

the third quarter totalled 73.4 Mlbs Cu, 23,263 oz Au and 443,444 oz Ag, more than the same period in 2020. Guidance for 2021 is 90-100 million pounds Cu. Mill expansion to 65,000 tpd is to be commissioned in 2024. In 2022, the mine will conduct trial use of electric trolley assist haul trucks to reduce diesel use. Copper Mountain Mining Corporation reported exploration drilling at Copper Mountain. At the New Ingerbelle deposit, results extended mineralization below the current projected reserve pit shell to twice its previously known vertical extent. Drilling was also designed to expand resources and reserves at Copper Mountain North. Drilling continued into late 2021 at the Copper Mountain Main pit, North pit and New Ingerbelle deposit. Based on current reserves, the mine life is another 21 years; longer if resources are included.

Gold Mountain Mining Corp. began mining operations at the **Elk mine** in November. Ore is to be shipped to New Gold Inc.'s New Afton mill. A 2021 updated Preliminary Economic Assessment considers a 70,000 tpy open pit-only operation expanding to 324,000 tpy open pit and underground after three years, which they anticipate would require an environmental assessment. The total mine life would be 11 years. The open pit schedule plans for 2.5 Mt ore at an approximate grade of 7 g/t Au and 11 g/t Ag. Ore is trucked to New Afton for processing under an agreement with New Gold Inc.

At the **Gibraltar** mine, production to the end of the 3<sup>rd</sup> quarter totalled 83.5 Mlb Cu and 1.50 Mlb Mo. As of December, transport infrastructure disruptions resulting from unusually intense rainstorms had affected shipments but not production. Current Proven and Probable reserves can support mining until 2038.

At the **Highland Valley** mine, production to the end of the third quarter totalled 97,800 t Cu and 0.8 Mlb Mo at a copper grade of 0.36% and 88.3.0% recovery. Operations were suspended briefly due to a wildfire evacuation. Heavy November rains and resulting floods and landslides did not immediately affect production although Teck announced disruption of logistics between all its British Columbia operations and coastal terminals. Teck is proposing an extension to the mine's projected life from about 2028 to at least 2040. The project is in the pre-application stage of environmental assessment. Teck submitted an update to the project description as engineering and design advanced.

At the **New Afton** mine, production to the end of the third quarter produced 39,735 oz Au and 47.5 Mlb Cu from 3.678 Mt of ore grading 0.72% Cu and 0.42 g/t Au. Metal recoveries averaged 82% for Cu and 81% for Au. The company reported both underground exploration drilling at the mine site and surface drilling within the mine footprint and on the Cherry Creek trend 3 km to the west. Work in the Cherry Creek trend area included drilling for deep porphyry and shear-hosted gold mineralization.

The Southwest Region has one operating metal mine, **Myra Falls**. Trafigura Mining Group, part of Trafigura Group Pte. Ltd. acquired the Myra Falls underground Zn-Cu-Pb-Ag-Au mine in 2020 from Nyrstar N.V. Trafigura is a private



multinational commodity trading company and is not required to publish compliant production or reserves figures. However, they reported continuing to ramp up to a target throughput of 800,000 tpy of ore and estimate the operation has 10 years of reserves.

### 3.2. Coal mines

Seven coal mines (Fig. 1; Table 3) accounted for a forecast production of \$6.26 billion for 2021. This production represents about 49.7% of all total mineral output in the province. Coal was produced at four large open-pit operations of Teck Coal Limited in southeastern British Columbia and three open-pit operations of Conuma Coal Resources Limited in northeastern British Columbia.

### 3.3. Industrial minerals and aggregates

About 30 industrial mineral mines and more than 1000 aggregate operations are active in British Columbia (selected operations are listed in Table 4). With forecast production figures for industrial minerals of \$428 million (3.4% of total mineral production) and for aggregates of \$454 million (3.6% of total mineral production), these operations are important to the economy of the province.

In the Northeast Region, Fireside Minerals Ltd. mines veins of massive white barite. The barite is crushed and bagged on site and trucked to Fort St. John and Alberta for use in the drilling industry. In the South Central Region, industrial mineral commodities produced include roofing granules (from basalt), limestone, dimension stone, opal, railway ballast, diatomaceous earth, and zeolite. The Southeast Region hosts several industrial mineral mines, the largest of which are in the Rocky Mountain foreland belt. Commodities produced include magnesite, silica, gypsum, graphite, mineral wool, and abrasives. In the Southwest Region a number of operations remained in steady production and continue to be a major employer.

## 4. Mine development projects

As used herein, the term ‘mine development projects’ refers to those where the decision to produce has been made, necessary permits have been acquired, financing has been secured, and on-site construction has started. In 2021, Sinova Global’s **Horse Creek Silica** project, CertainTeed Gypsum Canada Inc.’s **Kootenay West** project and Ascot Resources Ltd.’s **Premier Gold** project (Fig. 1; Table 5) were considered under development. The **Horse Creek** and **Kootenay West** projects are in the Southeast Region and the **Premier Gold** project is in the Northwest Region.

### 4.1. Horse Creek Silica (Sinova Global)

At the **Horse Creek Silica** project, Sinova Global operates a seasonal quarry in Mount Wilson Formation orthoquartzites (Middle to Upper Ordovician). In 2021, the company continued with permit updates road construction, rail siding development,

and mine site preparation. The mine is expected to produce up to 400,000 tpy of >99% SiO<sub>2</sub> with an estimated resource of 1.4 Mt.

### 4.2. Kootenay West (CertainTeed Gypsum Canada Inc.)

CertainTeed Gypsum continued development work on its **Kootenay West** mine. Most work was on developing and improving road access to the mine site and environmental mitigation. The mine reported a resource of 17 Mt gypsum at a blended quality of 83%, with annual projected production of 400,000 tpy. The deposit is in evaporites of the Burnais Formation (Devonian) in a section 20-25 m thick grading 75-95% gypsum. With expected transition to active mining in 2022, the projected mine life is 43 years.

## 5. Selected proposed mine or quarry projects

Projects at the proposed mine or quarry (or mine evaluation) stage have a resource defined or largely defined and are preparing to submit a project description to initiate the environmental assessment process or are waiting on permit amendments. Projects that have permits in place but have yet to obtain financing to begin site construction are also considered to be at the proposed stage. Selected projects (Fig. 1; Table 6) discussed below are grouped by region and commodity types.

### 5.1. Northwest Region

Proposed metal mines include Blue Lagoon Resources Inc.’s **Dome Mountain** project, Galore Creek Mining Corporation’s **Galore Creek** project, Seabridge Gold Inc.’s **KSM** project, Kutcho Copper Corp.’s **Kutcho** project and Ascot Resources Ltd.’s **Red Mountain** project. Telkwa Coal Ltd., a subsidiary of Allegiance Coal Ltd., is proposing to develop the **Tenas** coal mine project.

#### 5.1.1. Proposed metal mines

The **Dome Mountain Gold** project contains an Indicated resource of 175,980 t grading 12.45 g/t Au, 60.41 g/t Ag and an Inferred resource of 408,105 t grading 8.32 g/t Au, 36.12 g/t Ag (with a cut and fill method at 3.42 g/t Au cut-off). The company entered into a milling agreement with Nicola Mining Inc. in which ore will be trucked for processing at a mill west of Merritt.

Blue Lagoon Resources Inc. carried out a 20,000 m diamond drilling program. The first phase tested deep targets and results included 3.0 m grading 24.07 g/t Au and 127.92 g/t Ag, and 4.13 m grading 11.08 g/t Au and 34.39 g/t Ag. The second phase targeted geophysical and geochemical anomalies. Results included 0.65 m grading 40 g/t Au, and 441 g/t Ag.

The **Galore Creek** Cu-Au project is operated by the Galore Creek Mining Corporation and is jointly owned by Teck Resources Limited and Newmont Corporation. The Galore Creek project contains a Proven and Probable Reserve of 528 Mt grading 0.59% Cu, 0.32 g/t Au, and 6.02 g/t Ag and a Measured plus Indicated resource of 1.103 Bt grading

**Table 3.** Operating coal mines, 2021, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1-Q3)	Reserves	Resources	Comments
<b>Brule</b>	Northeast	<b>Conuma Coal Resources Limited</b>	PCI; Bituminous coal; 093P 007	1.6 Mt	P+Pr: 3.58 Mt	na	About 230 employees.
<b>Willow Creek</b>	Northeast	<b>Conuma Coal Resources Limited</b>	HCC, PCI; Bituminous coal; 093O 008	1.5 Mt	P+Pr: 11.07 Mt	na	About 220 employees (mine and plant).
<b>Wolverine</b>	Northeast	<b>Conuma Coal Resources Limited</b>	HCC; Bituminous coal; 093P 025	1.1 Mt	P+Pr: 4.68 Mt	na	About 300 employees (mine and plant).
<b>Elkview</b>	Southeast	<b>Teck Coal Limited (95%);</b> Nippon Steel & Sumitomo Metal Corp. (2.5%), POSCO (2.5%)	HCC; Bituminous coal; 082GNE017	9.0 Mt clean	na	na	Teck estimates a remaining reserve life of approximately 30 years at the current production rate.
<b>Fording River</b>	Southeast	<b>Teck Coal Limited</b>	HCC; Bituminous coal; 082JSE012	9.5 Mt clean	na	na	The focus for development drilling in 2021 was the Fording River Extension project. Proven and Probable reserves sufficient for 28 years mine life; increase to 48 years including the Fording River Extension project.
<b>Greenhills</b>	Southeast	<b>Teck Coal Limited (80%);</b> POSCAN (20%)	HCC Bituminous coal; 082JSE007	5.4 Mt clean	na	na	Proven and Probable reserves are projected to support another 47 years of mining at planned production rates.
<b>Line Creek</b>	Southeast	<b>Teck Coal Limited</b>	HCC, TC; Bituminous coal; 082GNE020	4.0 Mt clean	na	na	Proven and Probable reserves at Line Creek are projected to support planned production rates for a further 15 years.

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 4.** Selected operating industrial mineral mines and quarries, 2021, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1-Q3)	Reserves	Resources	Comments
<b>Anyox</b>	Northwest	<b>True-Grit Abrasives</b>	Slag steel	80,000 t	na	na	Slag is mined, cleaned, and barged for roofing and sand for sand blasting.
<b>Kalum</b>	Northwest	<b>Kalum Quarry Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN Railway and others.
<b>Rainbow Lake South</b>	Northwest	<b>Spring Creek Aggregates Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN Railway and LNG projects.
<b>Ridley Island</b>	Northwest	<b>Terus Construction Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN Railway and LNG projects.
<b>Robinson Lake Trail</b>	Northwest	<b>Haisla &amp; Progressive Ventures Construction Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN Railway and LNG projects.
<b>Sand Hill</b>	Northwest	<b>Terus Construction Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Crushing for CN Railway and LNG projects.
<b>Fireside</b>	Northeast	<b>Fireside Minerals Ltd.</b>	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.
<b>Ashcroft</b>	South Central	<b>IG Machine and Fibers Ltd. (IKO Industries Ltd.)</b>	Basalt (roofing granules); 092INW104	300,000 t (approx. target)	na	Approx. 13.3 Mt in 2002	Typically mines 500,000 t with 60% processed into granule products.
<b>Bud</b>	South Central	<b>Absorbent Products Ltd.</b>	Bentonite; 092HSE162	na	na	na	
<b>Falkland</b>	South Central	<b>Lafarge Canada Inc.</b>	Gypsum; 082LNW001	na	na	na	Finding alternate uses since closure of Lafarge's Kamloops cement plant.
<b>Nazo</b>	South Central	<b>Can Lava Mining Corporation</b>	Lava Rock; Cinder cone; 093B 060	na	na	Historical: 45 Mt	
<b>Red Lake</b>	South Central	<b>Absorbent Products Ltd.</b>	Diatomaceous earth, lacustrine diatomite; 092INE081	na	na	na	



Table 4. Continued.

<b>Z-1</b>	South Central	<b>Progressive Planet Solutions Inc.</b>	Zeolite; Open system zeolites; 092INW095	na	na	Approx. 800,000 t	Historical resource.
<b>Elkhorn</b>	Southeast	<b>CertainTeed Gypsum Canada Inc.</b>	Gypsum, anhydrite; Bedded gypsum; 082JSW021	na	na	na	Elkhorn site nearing end of mine life.
<b>Grand Forks Slag</b>	Southeast	<b>Pacific Abrasives and Supply Inc.</b>	Slag; Tailings; 082ESE264	na	na	na	Seasonal.
<b>Mount Brussilof</b>	Southeast	<b>Baymag Inc.</b>	Magnesite; Hydrothermal sparry magnesite; 082JNW001	230,000 t	P: 50 Mt	na	Material is coarse crushed on site and trucked to processing facility in Exshaw, AB.
<b>Winner</b>	Southeast	<b>Rockwool Inc.</b>	Gabbro/basalt; Crushed rock for mineral wool; 082ESE265	na	na	na	Seasonal.
<b>Bute Inlet</b>	Southwest	<b>Ironwood Clay Company Inc.</b>	Clay; Sedimentary kaolin? (or illite)	na	na	na	Intermittent mining as needed.
<b>Cabin Group</b>	Southwest	<b>Northwest Landscape and Stone Supply Ltd.</b>	Landscaping stone	na	na	na	
<b>Cox Station</b>	Southwest	<b>Mainland Construction Materials</b>	Aggregate; Crushed rock; 092GSE103	Approx. 3-4 Mtpy	na	na	
<b>CTCT</b>	Southwest	<b>Vancouver Island Marble Quarries Ltd.</b>	Marble; Limestone; 092E 020	Typically, about 400 t annually	na	na	Supplies Matrix Marble and Stone Inc.
<b>Earle Creek</b>	Southwest	<b>Lafarge Canada Inc.</b>	Sand and Gravel	Typically >1 Mtpy	na	na	Supplies Matrix Marble and Stone Inc.
<b>Haddington Island</b>	Southwest	<b>Adera Natural Stone Supply Ltd.</b>	Dimension stone, building stone; 092L 146	na	na	na	Not active every year.
<b>Hardy Island</b>	Southwest	<b>Hardy Island Granite Quarries Ltd.</b>	Dimension stone, building stone; Dimension stone-granite; 092F 425	3000-5000 tpy	na	Approx. 100,000 t	

Table 4. Continued.

<b>Imperial Limestone</b>	Southwest	<b>Imperial Limestone Co. Ltd.</b>	Limestone; Limestone; 092F 394	Approx. 600,000 t	na	na	250,000 to 275,000 t high purity product + cement feedstock.
<b>K2</b>	Southwest	<b>K2 Stone Quarries Inc.</b>	Dimension stone, flagstone; 092C 159	15,000-20,000 t annually	na	na	Production number represents material extracted.
<b>Mount Meager Pumice</b>	Southwest	<b>Great Pacific Pumice Inc.</b>	Pumice; Volcanic ash; 092JW 039	na	na	na	
<b>Orca</b>	Southwest	<b>Polaris Minerals Corporation</b> (US Concrete Inc. and 'Namgis First Nation)	Sand and Gravel	Up to 6 Mtpy	na	na	Planning increased production, targeting up to 8.5 Mtpy.
<b>Pipeline Road (2)</b>	Southwest	<b>Lehigh Hanson Materials Ltd., Allard Contractors Ltd.</b>	Sand and Gravel	na	na	na	Two adjacent operating sites.
<b>Pitt River</b>	Southwest	<b>Lafarge Canada Inc.</b>	Aggregate; Crushed rock; 092GSE007	Typically >1 Mtpy	na	na	
<b>Sechelt</b>	Southwest	<b>Lehigh Hanson Materials Limited</b>	Sand and Gravel	Typically 5-6 tpy	na	Several decades	
<b>Spumoni</b>	Southwest	<b>Northwest Landscape and Stone Supply Ltd.</b>	Flagstone; Flagstone; 092GNW100	na	na	na	Seasonal quarry.
<b>Sumas Shale</b>	Southwest	<b>Sumas Shale Ltd.</b> (Lafarge Canada Inc., Clayburn Industrial Group)	Shale, clay, sandstone; Residual kaolin; 092GSE024	About 500,000 t annually	na	50+ years	Approximately 55% shale, 45% sandstone for cement production.
<b>Texada Quarry</b>	Southwest	<b>Texada Quarrying Ltd.</b> (Lafarge Canada Inc.)	Limestone, aggregate; Limestone; 092F 395	Typically, approx. 3.5 to 4.5 Mtpy	na	100+ years	Mostly produces limestone for cement manufacture.
<b>Vulcan/ Salal</b>	Southwest	<b>Garibaldi Pumice Ltd.</b>	Pumice; Volcanic ash; 092JW 039	Typically 10,000-20,000 m <sup>3</sup>	na	11,396,000 m <sup>3</sup> pumice 4,990,000 m <sup>3</sup> pumicite (fines)	2014 resource. Additional exploration 2015, 2018, 2019.

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

**Table 5.** Mine development projects.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resources	Comments
<b>Horse Creek Silica</b>	Southeast	<b>Sinova Global</b>	Silica; Silica sandstone; 082N 043	na	1.4 Mt est.	High purity silica >99.9% SiO <sub>2</sub> , permit updates, road and rail construction, mine site preparation. Drilling; 3 DDH (2272 m), 29 RC (2275 m). Planned production up to 400,000 tpy.
<b>Kootenay West</b>	Southeast	<b>CertainTeed Gypsum Canada Inc.</b>	Gypsum; Evaporitic bedded gypsum; 082JSW005, 20	na	North and South quarries: Total 16.9 Mt (at average quality of 83-85%)	Mine construction; granted a conditional EA certificate in January 2018; environmental baseline and geotechnical work, permitting, and modifications to mine design; construction began in 2019; 400,000 tpy; 43-year mine life.
<b>Premier Gold</b>	Northwest	<b>Ascot Resources Ltd.</b>	Au, Ag; Epithermal; 104B 054	P+Pr: 3.63 Mt 5.45 g/t Au, 19.11 g/t Ag	I: 4.14 Mt 8.01 g/t Au, 35.1 g/t Ag  Inf: 5.06 Mt 7.25 g/t Au, 28.7 g/t Ag	Received Mines Act permit for construction and operation in December. Planning full-scale construction. Initial gold production target is Q1 2023. Exploration drilling (18,074 m) near defined resources. The proposed mine is considered a precious metal project, but the company reported discovering new high-grade copper, gold, silver, lead, and zinc. Highlights included 4.0 m grading 0.17 g/t Au, 137.8 g/t Ag, 3.62% Cu, and 0.65% Zn, and 7.0 m grading 21.13 g/t Au, 110.61 g/t Ag, 2.76% Pb, and >17.14% Zn, and 7.1 m grading 36.2 g/t Au.

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

**Table 6.** Selected proposed mine projects.

Project	Region	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resources	Comments
<b>Dome Mountain</b>	Northwest	<b>Blue Lagoon Resources Inc.</b>	Au, Ag; Au-quartz veins; 093L 276	na	I: 176,000 t 12.45 g/t Au, 60.41 g/t Ag  Inf: 408,000 t 8.32 g/t Au, 36.12 g/t Ag (resource based on cut and fill method at 3.42 g/t Au cut-off)	20,000 m of drilling. Highlights include 3.0 m grading 24.07 g/t Au and 127.92 g/t Ag, and 4.13 m grading 11.08 g/t Au and 34.39 g/t Ag.



Table 6. Continued.

<b>Galore Creek</b>	Northwest	<b>Galore Creek Mining Corporation</b> (Teck Resources Limited (50%), Newmont Goldcorp Corporation (50%))	Cu, Au, Ag; Alkaline porphyry; 104G 090	P+Pr: 528 Mt 0.59% Cu, 0.32 g/t Au, 6.02 g/t Ag	M+I: 1.103 Bt 0.47% Cu, 0.26 g/t Au, 4.2 g/t Ag  Inf: 198 Mt 0.27% Cu, 0.21 g/t Au, 2.7 g/t Ag	8000 m, 31-hole diamond drilling.
<b>KSM</b>	Northwest	<b>Seabridge Gold Inc.</b>	Cu, Au, Ag, Mo; Porphyry; 104B 191	P+Pr: 2.20 Bt 0.55 g/t Au, 0.21% Cu, 2.6 g/t Ag, 42.6 g/t Mo	M+I: 3.04 Bt 0.52 g/t Au, 0.21% Cu, 2.8 g/t Ag, 48 g/t Mo  Inf: 4.60 Bt 0.38 g/t Au, 0.32% Cu, 2.2 g/t Ag, 29 g/t Mo (Total for KSM deposits)	9450 m of drilling including 3484 m at Snowfield and Mitchell deposits. In late 2020, Snowfield acquired from Pretium Resources Inc. Results from Snowfield confirm prior drilling results; Snowfield might be incorporated in a new mining plan.
<b>Kutcho</b>	Northwest	<b>Kutcho Copper Corp.</b>	Cu, Pb, Zn; Noranda/Kuroko VMS; 104I 060	Pr: 17.3 Mt 1.58% Cu, 2.31% Zn, 27.9 g/t Ag, 0.39 g/t Au	M+I: 22.8 Mt 1.52% Cu, 2.18% Zn, 0.39 g/t Au, 28.1 g/t Ag  Inf: 12.9 Mt 1.10% Cu, 1.58% Zn, 0.25 g/t Au, 20.0 g/t Ag	Favourable feasibility study released. The project would have an eleven-year open-pit and underground mine life.
<b>Red Mountain</b>	Northwest	<b>Ascot Resources Ltd.</b>	Au, Ag; Subvolcanic and precious metal veins; 103P 086	P+Pr: 2.54 Mt 6.52 g/t Au, 20.60 g/t Ag	M+I: 3.19 Mt 7.63 g/t Au, 21.02 g/t Ag  Inf: 0.41 Mt 5.32 g/t Au, 7.33 g/t Ag	Environmental baseline monitoring.
<b>Tenas</b>	Northwest	<b>Allegiance Coal Ltd. (95%), Itochu Corp. (5%)</b>	PCI; Bituminous coal; 093L 156	P+Pr: 62.9 Mt coal	na	Geotechnical drilling, continued finalizing Environmental Assessment Certificate application. Proposed production 775-825 kt of steelmaking coal annually with a mine-life of 22 years.
<b>Sukunka</b>	Northeast	<b>Glencore Canada Corporation</b>	Coal; Bituminous; 093P 014	na	145.0 Mt coal in situ	Permitting in progress.
<b>Wapiti East</b>	Northeast	<b>Fertoz International Inc.</b>	P <sub>2</sub> O <sub>5</sub> ; Sedimentary phosphate deposits; 093I 008, 22, 15	na	I+Inf: 1.54 Mt 21.6% P <sub>2</sub> O <sub>5</sub>	Work continued in 2021 with geochemical sampling and road upgrades. Permitting is ongoing but has faced delays due to caribou issues.

Table 6. Continued.

<b>Aley</b>	North Central	<b>Taseko Mines Ltd.</b>	Nb; Carbonatite-hosted; 094B 027	P+Pr: 83.8 Mt 0.50% Nb <sub>2</sub> O <sub>5</sub> (at 0.30% Nb <sub>2</sub> O <sub>5</sub> cut-off)	M+I: 285.8 Mt 0.37% Nb <sub>2</sub> O <sub>5</sub> (at 0.20% Nb <sub>2</sub> O <sub>5</sub> 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.
<b>Blackwater Gold</b>	North Central	<b>Artemis Gold Inc.</b>	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	Provincial approval for mine construction, allowing initial site preparation and land clearing to start. Federal and Provincial Environmental Assessment certificates in place. Completed 25,840 m grade-control reverse circulation drilling.
<b>Giscome</b>	North Central	<b>Graymont Western Canada Inc.</b>	CaCO <sub>3</sub> ; 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 over a 50+ year mine life.
<b>Kemess Underground (KUG)</b>	North Central	<b>Centerra Gold Inc.</b>	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.
<b>Ajax</b>	South Central	<b>KGHM Ajax Mining Inc.</b> (KGHM Polska Miedź SA 80%, Abacus Mining and Exploration Corporation 20%)	Cu, Au; Alkalic porphyry; 092INE012, 13	P+Pr (NSR cut-off US\$7.10/t): 426 Mt 0.29% Cu, 0.19 g/t Au, 0.39 g/t Ag	M+I (NSR cut-off US\$7.10/t): 568 Mt 0.26% Cu, 0.18 g/t Au, 0.35 g/t Ag	Environmental certification denied by provincial (2017) and federal ministers (2018). Proponents are investigating a possible re-submission.
<b>Cariboo Gold</b>	South Central	<b>Osisko Development Corp.</b>	Au; Au-quartz veins; 093H 140, 139, 19, 6	na	M+I: 21.441 Mt 4.6 g/t Au  Inf: 21.649 Mt 3.9 g/t Au	Updated project description has average production of 4750 tpd and mine life up to 15 years. Ongoing exploration drilling.
<b>New Prosperity</b>	South Central	<b>Taseko Mines Limited</b>	Cu, Au; Porphyry; 092O 041	P+Pr (NSR cut-off \$5.50/t): 831 Mt 0.23% Cu, 0.41 g/t Au containing (recoverable) 3.6 Blb Cu, 7.7 Moz Au	M+I: 1010 Mt 0.24% Cu, 0.41 g/t Au (at 0.14% Cu cut-off)	Granted provincial Environmental Certificate and time extensions but denied federal approval. Taseko and Tsilhqot'in Nation in discussion.

Table 6. Continued.

<b>Ruddock Creek</b>	South Central	<b>Ruddock Creek Mining Corporation (Imperial Metals 100%)</b>	Pb, Zn, Ag; Broken Hill-type; 082M 082	na	M+I: 6.2 Mt 6.50% Zn, 1.33% Pb  Inf: 6.678 Mt 6.33% Zn, 1.20% Pb  (resources at a 4.0% Pb+Zn cut-off)	Project at environmental assessment pre-application stage. Feb. 2013 resource, prior to 2018-19 drilling. Imperial Metals now owns 100%.
<b>Bingay Main</b>	Southeast	<b>Centermount Coal Ltd.</b>	Coal; Bituminous coal; 082JSE011	na	na	Pre-application stages of EA; letter submitted in 2020 for project to remain in EA. Proposed 1Mt per year; 12 to 14 year mine life.
<b>Black Crystal</b>	Southeast	<b>Eagle Graphite Corp.</b>	Graphite; Crystalline flake graphite; 082FNW260, 283	na	Regolith + calcsilicate; M+I: 19.23 Mt at 1.35% fixed carbon  Inf: 23.92 Mt at 1.3% fixed carbon (2018)	Research and development; possible application for Li-ion batteries.
<b>Bull River</b>	Southeast	<b>Braveheart Resources Inc.</b>	Cu, Au, Ag; Cu±Ag quartz veins; 082GNW002	na	I: 2.26 Mt 2.13% Cu, 0.44 g/t Au  Inf: 1.36 Mt 1.60% Cu, 0.42 g/t Au	Six underground drill holes. Best intersection with 1.71% Cu, 17.6 g/t Au, and 11.6 g/t Ag along 4.9 m.
<b>Crown Mountain</b>	Southeast	<b>NWP Coal Canada Limited</b> (Jameson Resources Limited (80%), Bathurst Resources Limited (20%))	Coal (HCC and PCI); Bituminous coal; 082GNE018	HCC: P: 42.60 Mt Pr: 4.91 Mt  PCI: P: 7.13 Mt Pr: 1.19 Mt (2014)	HCC + PCI: M: 68.9 Mt  I: 6.0 Mt (2014)	Pre-Application EA stage, 2021 extended First Nations consultation to 2022. Proposed 2 Mt per year operation (86% HCC and 14% PCI) with 15-year mine life.
<b>Michel Coal</b>	Southeast	<b>North Coal Limited</b>	Coal (HCC and PCI); Bituminous coal; 082GSE050	na	HCC: M: 44.6 Mt  I: 42.5 Mt  open-pit and underground (2015)	Entered pre-application of EA in 2015; received AIR requirements in September 2020; geotechnical studies and updates to mine design; coal quality testing indicates coal has similar characteristics to Elk Valley hard coking coal; environmental baseline and mine design.



Table 6. Continued.

<b>Record Ridge</b>	Southeast	<b>West High Yield (W.H.Y.) Resources Ltd.</b>	Mg; Alaskan-type Pt±Os±Rh±Ir; 082FSW398	na	M: 28.4 Mt 24.82% Mg  I: 14.6 Mt 24.12% Mg  Inf: 1.07 Mt 24.37% Mg	Restarted Mines Act permit application, metallurgical testing.
<b>Black Bear and Orca</b>	Southwest	<b>Polaris Materials Corporation</b> (US Concrete, Inc. and 'Namgis First Nation)	Aggregate; na	na	20 years (proposed life)	Orca environmental certificate amendment application withdrawn. Proposed 250,000 tpy near the Orca quarry revised to 3-4 Mtpy. Indicate intention to re-apply under 2018 Act.
<b>BURNCO Aggregate</b>	Southwest	<b>BURNCO Rock Products Ltd.</b>	Aggregate; Sand and Gravel; na	na	Approx. 20 Mt	Has environmental certification, would require Mines Act and other permits.
<b>Sechelt Carbonate</b>	Southwest	<b>Ballinteer Management Inc.</b>	Limestone, dolostone, aggregate; Limestone, dolomite, crushed rock; 093GNW031	na	Carbonate Rock: 76.1 Mt  Gabbro: >700 Mt	Proponent requests project remain in environmental assessment preapplication stage.

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

0.47% Cu, 0.26 g/t Au, and 4.2 g/t Ag, with an additional Inferred resource of 198 Mt grading 0.27% Cu, 0.21 g/t Au, and 2.7 g/t Ag. An 8000 m, 31-hole diamond drilling program was carried out in 2021.

The **KSM** project consists of four porphyry Cu-Au deposits: Kerr, Sulphurets, Mitchell, and Iron Cap. It is the largest undeveloped gold project in the world by resources: Measured and Indicated resources 3.04 Bt grading 0.52 g/t Au, 0.21% Cu, 2.8 g/t Ag, and 0.0048% Mo and an Inferred resource of 4.59 Bt grading 0.38 g/t Au, 0.32% Cu, 2.4 g/t Ag, and 0.0029% Mo. The total KSM Proven and Probable reserves are 2.198 Bt grading 0.55 g/t Au, 0.21% Cu, 2.6 g/t Ag and 0.0043% Mo. A Preliminary Economic Assessment (April, 2020) proposed a mine life of 44 years producing 27.6 Moz Au and 17.0 Blbs Cu. The initial capital for mine construction and development is \$5.2 billion, with a four-year payback period. In late 2020, Seabridge acquired the **Snowfield** property from Pretium Resources Inc. Seabridge has announced plans to integrate Snowfield into the KSM project. In 2021 Seabridge carried out 9450 m of drilling, including 3484 m at Snowfield and Mitchell. Drilling results at Snowfield matched grades previously reported by Pretium, suggesting that blending Snowfield ore with Mitchell production could lead to extension of open pit mining before underground block-cave mining is

needed. A new KSM Preliminary Feasibility Study is scheduled for completion mid-2022.

The **Kutcho** project is accessible by a 100 km-long seasonal gravel road and an airstrip 10 km from the deposit. Kutcho Copper Corp. entered the environmental assessment process late in 2019 and has received a Section 11 Order that defines the scope of the assessment and the Indigenous Nations that the company will engage with. The project is not required to undertake a federal environmental assessment. A 2021 Feasibility Study announced favourable economics using US\$3.50/lb Cu and US\$1.15/lb Zn. The project would have an eleven-year open pit and underground mine life. Reported Proven and Probable mineral reserves are 17.3 Mt grading 1.58% Cu, 2.31% Zn, 27.9 g/t Ag, 0.39 g/t Au. Mineral resources Measured and Indicated (inclusive of reserves) are reported as 22.8 Mt grading 1.52% Cu, 2.18% Zn, 28.1 g/t Ag, 0.39 g/t Au.

**Red Mountain** is a proposed underground mine 18 km east-northeast of Stewart. A provincial and federal Environmental Assessment Certificate was received in 2018. The project was purchased by Ascot Resources from IDM Mining in 2019 for \$45 million. A Feasibility Study was completed in 2020. Red Mountain is estimated to contain Measured and Indicated resources of 3.19 Mt grading 7.63 g/t Au and 21.02 g/t Ag and

an additional Inferred resource of 405,000 t grading 5.32 g/t Au and 7.33 g/t Ag (reported at 3.0 g/t Au cut-off for long hole stoping). Environmental baseline monitoring continued this year, although no exploration work was done as Ascot concentrated on developing their Premier Gold project.

### 5.1.2. Proposed coal mines

Telkwa Coal Ltd., a subsidiary of Allegiance Coal Ltd., is proposing to develop the **Tenas** project, which is road accessible, approximately 17 km south of Smithers. Itochu Corp. has a 10% interest. The project entered the provincial environmental assessment process in 2018 and the project proposes to produce 775,000-825,000 t of steelmaking coal annually with a mine-life of 22 years. In 2017, Allegiance Coal Ltd. released a reserve estimate of Proven plus Probable reserves of 62.9 Mt of coal. Currently there are four conceptual pits (from south to north: Tenas, Goathorn West, Goathorn East, and Telkwa North) on approximately 1050 ha. The current environmental assessment application is only for production of metallurgical coal from the Tenas pit. Proven plus Probable reserves for Tenas are 29.1 Mt. In 2021, Telkwa carried out geotechnical drilling to support the planned management ponds and continued finalizing their environmental assessment certificate application.

## 5.2. Northeast Region

In the Northeast Region Glencore plc proposes to develop their **Sukunka** coal project. Ferto International Inc. proposes the **Wapiti East** industrial mineral mine (phosphate).

### 5.2.1. Proposed coal mines

Glencore Canada Corporation and JX Nippon Oil and Energy Corporation's **Sukunka** project has been planned as both an open-pit and underground operation. The project continued through the Environmental Assessment process in 2021 and is listed on The British Columbia Environmental Assessment Office website as 'in progress'.

### 5.2.2. Proposed industrial mineral mines or quarries

Ferto 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.

## 5.3. North Central Region

There are four proposed mines in the North Central Region. Three are proposed metal mines: Taseko Mines Limited's **Aley** Niobium project; Artemis Gold Inc.'s **Blackwater** Au-Ag project and Centerra Gold Inc.'s Cu-Au-Ag **Kemess Underground** project. Graymont Western Canada Inc.'s **Giscome** project is a proposed industrial mineral mine (limestone).

### 5.3.1. Proposed metal mines

Taseko Mines Limited's wholly-owned **Aley** niobium-bearing carbonatite project is near the western extremity of platform strata. The carbonatite intrusion is oval in map view, measuring about 2.0 by 2.8 km. Within that body, reserves stand at 84 Mt grading 0.5%  $Nb_2O_5$ . An open-pit mine is proposed, processing 10,000 tpd and producing 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.

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.

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. The former Kemess South mine closed in 2011. However, infrastructure remains in place, and both the camp and ore processing plant will be used to service KUG, which is about 6.5 km north of the former processing plant. 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 a life of mine average production of 106,000 oz Au and 47 Mlbs Cu over 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 and use facilities developed for KUG. 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.

### 5.3.2. Proposed industrial mineral mines or quarries

At their **Giscome** limestone project, Graymont Western Canada Inc. plans to exploit a high-purity Paleozoic limestone deposit. Crushed stone would be transported about 5 km by conveyor 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.

#### 5.4. South Central Region

Proposed mine projects in the South Central Region include KGHM Ajax Mining Inc.'s **Ajax**, Osisko Development Corp.'s **Cariboo Gold**, Taseko Mines Limited's **New Prosperity** and, Ruddock Creek Mining Corporation's **Ruddock Creek** projects. All are metal mine projects.

##### 5.4.1. Proposed metal mines

The **Ajax** porphyry copper-gold project, owned by KGHM Ajax Mining Inc., is an 80:20 joint venture between KGHM Polska Miedź S.A. and Abacus Mining and Exploration Corporation. A revised feasibility study released in 2016 modelled Ajax as a 65,000 tpd open-pit mine with a projected 18-year life. In December 2017, the project was denied certification by the British Columbia Ministries of Environment and Climate Change Strategy and Energy, Mines and Petroleum Resources. In June 2018, Natural Resources Canada, Fisheries and Oceans Canada, and the Canadian Coast Guard denied federal certification. Although KGHM Ajax has not announced plans for the site, Abacus issued an update stating that the project remains a priority and that they have begun re-engaging those potentially affected by it and considering whether to reapply for environmental certification. With a Kamloops office that opened in 2020, KGHM is considering resubmitting an application.

Osisko Development Corp. acquired the **Cariboo Gold** project in 2019 through a purchase of Barkerville Gold Mines. The property consolidates several historic gold mines. The company initiated the British Columbia environmental assessment process in 2019, and the application is now in the development and review phase. The current project description is for a 4750 tpd underground mine with a 16-year life. Ore crushing, sorting, and a flotation circuit on site would produce flotation concentrate to be trucked to the Quesnel River mill. Tailings would be disposed of as paste backfill on site and at the QR with a filtered stack tailings storage facility. A feasibility study is to be completed in 2022. Measured and Indicated resources stood at approximately 3 Moz with a similar amount in the Inferred category before 2020-21 drilling. The company is permitted to begin underground development at Cow Mountain, separate from the **Bonanza Ledge II** mine which is on the property and produced in 2021 (see above). This underground development will serve as access for a bulk sample and underground drilling. The company completed 152,000 m of resource conversion and exploration drilling at Cariboo Gold in 2021.

Taseko Mines Limited's **New Prosperity** project received a 12 month extension of its provincial environmental certificate for a 70,000 tpd open pit copper-gold mine. New Prosperity received provincial certification in 2010 but in 2014 the Government of Canada refused to authorize the project. Taseko

has a standstill agreement with the T̓silhqot'in Nation pending a dialogue between the parties to arrive at a long-term resolution of differences about the project.

Imperial Metals Corporation increased its ownership of the **Ruddock Creek** project to 100% by purchasing the interest held by Japanese partners in Ruddock Creek Mining Corporation. Although they reported no 2021 exploration, the project remains in the British Columbia Environmental Assessment process. A 2014 revised project description referred to a 3000 tpd underground lead-zinc mine with an 8-year life. A mineral resource estimate, released in February 2013, reported 6.246 Mt grading 6.5% Zn and 1.33% Pb (Indicated) and 6.678 Mt grading 6.33% Zn and 1.20% Pb (Inferred), using a 4.0% combined Pb+Zn cut-off.

#### 5.5. Southeast Region

The Southeast Region has two proposed metal mines (**Bull River**, **Record Ridge**), three proposed coal mines, (**Bingay Main**, **Crown Mountain**, **Michel Coal**), and one proposed industrial mineral mine **Black Crystal** (Fig. 1; Table 6).

##### 5.5.1. Proposed metal mines

Braveheart Resources Inc. is continuing development of its **Bull River** mine project. Work included full dewatering of all mine levels and assessment and refurbishment of all surface facilities. Underground drilling in six holes (1050 m), below known mineralization, identified extensions to the mineralization. In early December the company updated the mineral resource, reporting Indicated at 2,261,000 t with 2.13% Cu, and 0.44 g/t Au, and Inferred at 1,356,000 t with 1.60% Cu and 0.42 g/t Au.

West High Yield Resources Ltd.'s **Record Ridge** magnesium project is in a variably serpentinized and locally carbonatized ultramafic cumulate body. The company restarted its application for a Mines Act permit and continued metallurgical studies to develop high-purity MgO and Mg(OH)<sub>2</sub> products and possible nickel chloride, nickel oxide, iron oxide and pure silica byproducts. Reported mineral resources as of 2013 include 28.4 Mt at 24.82% Mg Measured, 14.6 Mt at 24.21% Mg Indicated, and 1.07 Mt at 24.37% Mg Inferred.

##### 5.5.2. Proposed coal mines

The **Bingay Main** project, proposed by Centerpoint Resources Inc., remains in the Pre-Application process at the Environmental Review Office. The company has proposed a mine with a production capacity of 1 Mt per year and a mine life of 12 to 14 years.

The **Crown Mountain** mine proposed by NWP Coal Canada Ltd. (Jameson Resources Limited (80%), Bathurst Resources Limited (20%)) is in the Pre-Application process. The company was granted an extension to the expiry of the Application Information Requirements (AIR) for the project from October 26, 2021 to April 26, 2022 to accommodate First Nations concerns. The company has proposed a mine with production capacity for 3.7 Mt per year and a mine life of 16 years.



The **Michel Coal** project proposed by North Coal Ltd. a wholly owned subsidiary of CoalMont Pty Ltd., is in the Pre-Application process. The company has proposed a mine with production capacity of 2.3-4 Mt per year and a mine life of 30 years.

### 5.5.3. Proposed industrial mineral mines or quarries

Eagle Graphite Inc.'s **Black Crystal** project has an active mining lease. No work was reported for the site in 2021.

## 5.6. Southwest Region

The Southwest Region has no proposed major metal mine or coal mine projects. Proposed industrial mineral mines or quarries include the **BURNCO Aggregate** Project and the **Sechelt Carbonate** project, which has been inactive apart from a request by the owner to remain in the provincial environmental assessment process. The **Black Bear** aggregate project near Port McNeill was the subject of an application to amend the **Orca** Environmental Certificate. This was withdrawn with a request for review under new legislation.

### 5.6.1. Proposed quarries

Polaris Materials Corporation included the **Black Bear** project near its **Orca** sand and gravel quarry in an Environmental Certificate amendment for Orca. If the project proceeds, it will be a source of up to 3-4 Mtpy of crushed basalt, an increase over the 250,000 tpy proposed in a 2017 project description. Mine life would be extended from 10 to 20 years. This application was withdrawn with a request by the proponent to re-apply under the 2018 Environmental Assessment Act.

The **BURNCO Aggregate** project in the McNab Creek Valley received environmental certification in 2018 and may proceed with British Columbia Mines Act and other permitting. Certifications are valid for 5 years. Fisheries and Oceans Canada concluded that the project is unlikely to cause significant environmental harm. The proposed sand and gravel mine would ramp up to a 1.6 Mtpy operation, initially barging product to BURNCO Rock Products Ltd.'s ready-mix concrete plants in South Burnaby and Port Kells. BURNCO submitted revisions to the project in 2014, changing production rate, relocating some facilities, and specifying a mine life of 16 years.

Ballinteer Management Inc. now holds the property comprising the **Sechelt Carbonate** project. They filed engineering, archeological, and baseline environmental studies for assessment in 2016; activity was not reported for 2017-2021. The property contains resources of calcite- and dolomite-bearing carbonate rock and gabbroic rock for potential use as aggregate. The original proposal was for a 4-6 tpy carbonate quarry producing both limestone and dolostone. Product was to be shipped from a barge load out on Sechelt Inlet.

## 6. Exploration expenditures

In 2021, exploration expenditures, drilling estimates, and other metrics for British Columbia were captured in the British

Columbia Mineral and Coal Exploration Survey. The survey is a joint initiative between the Province of British Columbia Ministry of Energy, Mines and Low Carbon Innovation, the Association for Mineral Exploration, and EY LLP. A full report will be available in March. The new survey does not capture exploration expenditures for aggregates.

Total metal, industrial mineral, and coal exploration expenditures are estimated at \$659.8 million for 2021, up \$237.1 million from the 2020 survey total of \$422.7 million. Of this, \$30.6 million was from coal projects and \$629.2 million was from metal and industrial mineral projects (Fig. 5). This is the largest recorded expenditure for metal and industrial mineral projects; the previous high in 2012 was \$544.9 million. Coal exploration expenditures in 2012 were \$136.1 million.

Exploration expenditures by region (Fig. 6) can be further divided into five categories: grassroots, early stage, advanced stage, mine evaluation, and mine lease (Figs. 7, 8). The provincial combined total for grassroots and early-stage

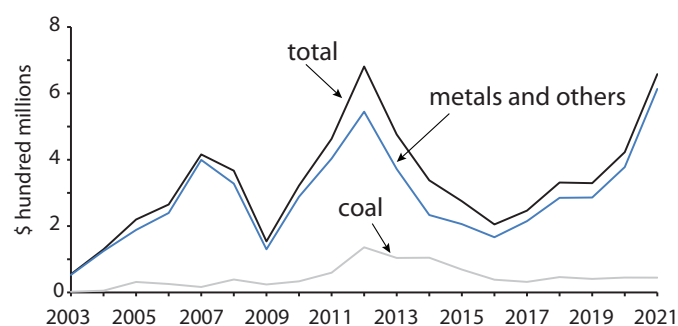


Fig. 5. Exploration expenditures per year, by type.

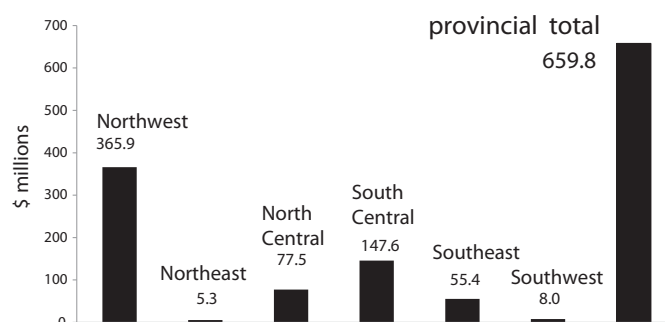


Fig. 6. 2021 exploration expenditures by region.

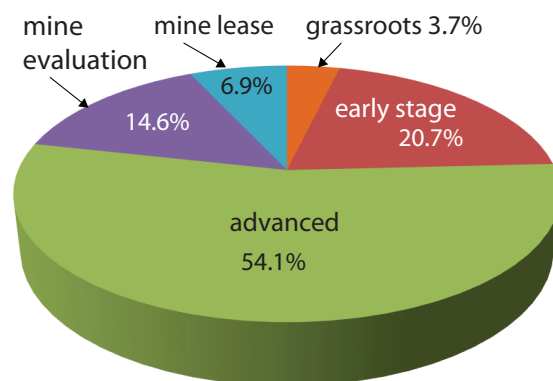
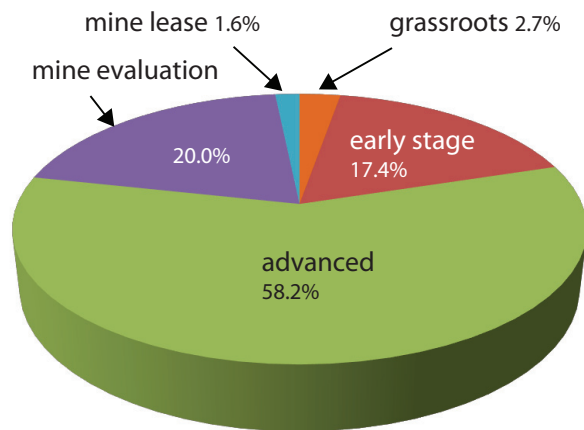
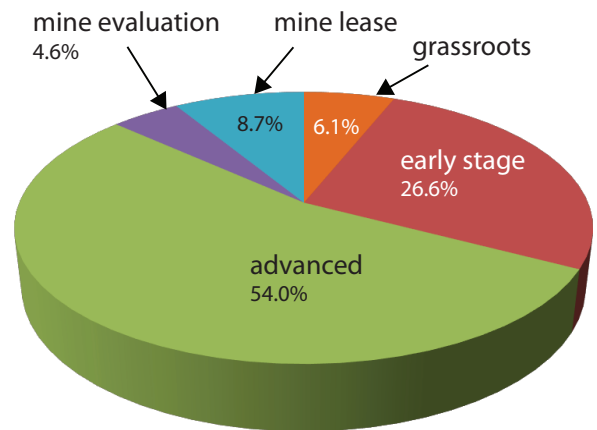


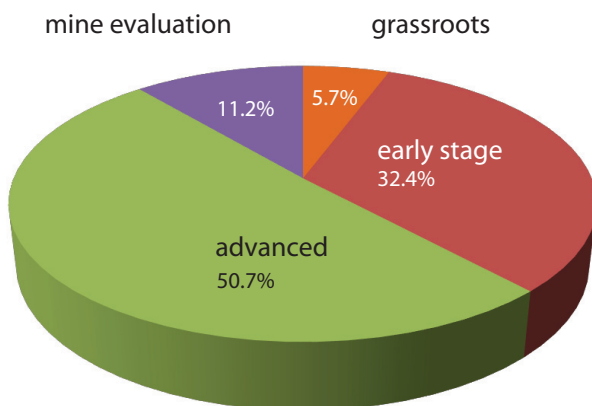
Fig. 7. 2021 exploration expenditures by category.



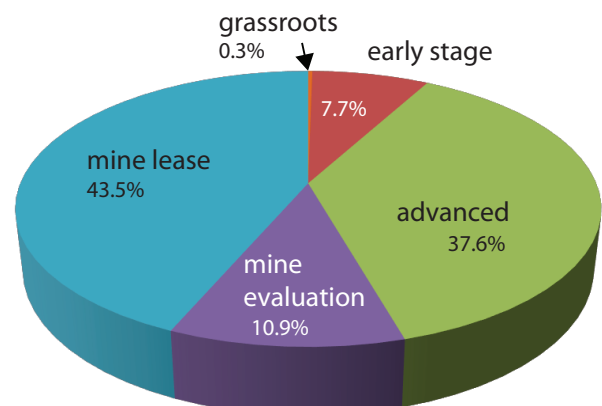
Northwest



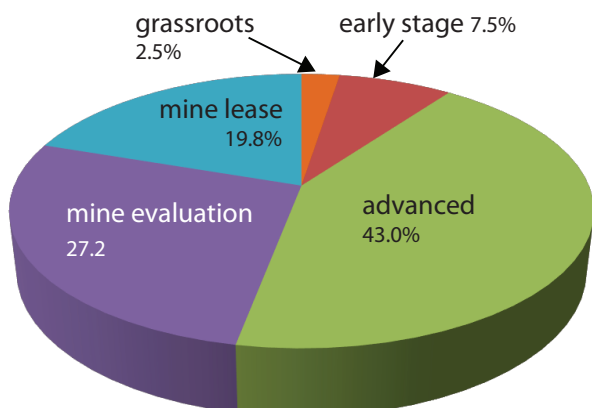
South Central



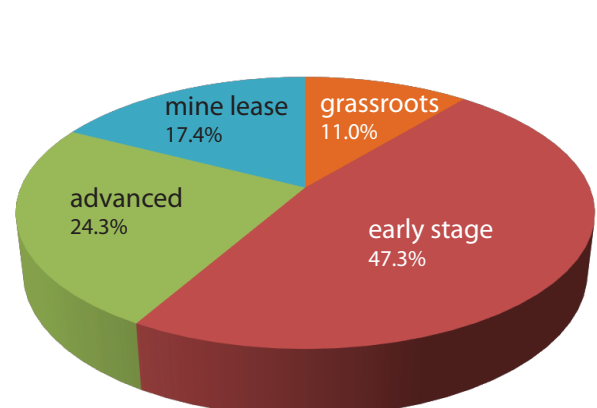
North Central



Southeast



Northeast



Southwest

**Fig. 8.** 2021 exploration expenditures by category for regions.

exploration in the 2021 survey is 24.4%, down from the 2020 total of 33.4%.

The total reported drilling for the province was 1,442,300 m, up 450,950 m from the 2020 total of 991,350 (see Fig. 9 for regional breakdown).

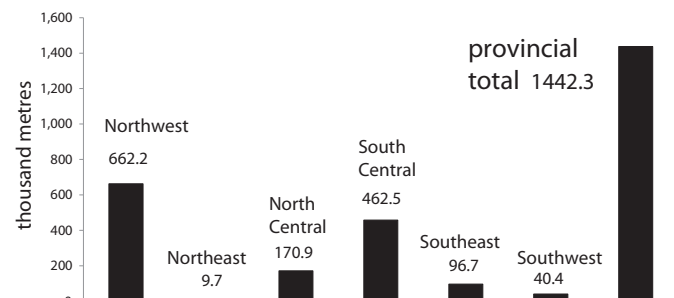


Fig. 9. 2021 exploration drilling by region.

## 7. Exploration land tenure

Acquisition of new mineral claims in 2021 was up significantly compared to 2020 (Fig. 10). The total for 2021 was 3,888,552 hectares vs. 1,895,560 hectares for the previous year. New coal licenses issued in 2021 totalled 3462 hectares, up from the 2020 total of 811 hectares (Fig. 11).

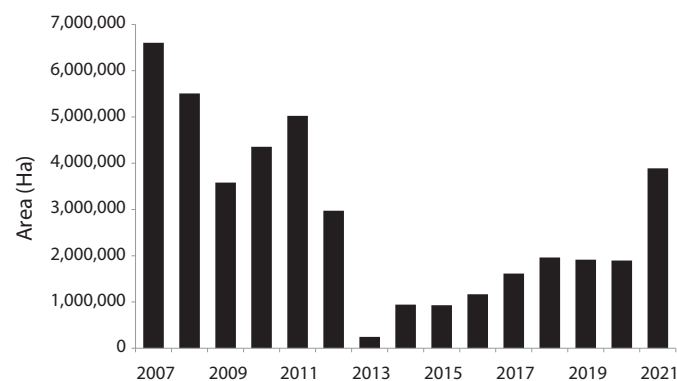


Fig. 10. New mineral claims by year.

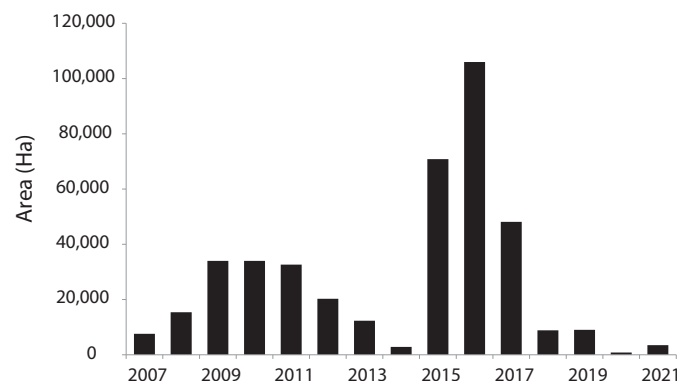


Fig. 11. New coal license issuances by year.

## 8. Selected exploration project highlights

There was a significant increase of \$237.1 million in expenditures in 2021 compared to 2020. Explorationists had adapted to Covid-19 protocols in 2020 and continued to discover, define, and expand porphyry and porphyry-related copper-gold and copper-molybdenum deposits, gold deposits of various types, and stratiform base-metal, specialty metals, industrial minerals, and coal deposits. Expenditures benefitted from availability of venture capital spurred by increases in the price of gold, copper, and other commodities. Data from the British Columbia Mineral and Coal Exploration Survey show a decrease in grassroots and early-stage projects (combined). Below, selected exploration projects (Fig. 1; Table 7) are grouped by project type and region; the individual regional sections of this volume provide further details.

### 8.1. Selected precious metal projects

#### 8.1.1. Northwest Region

At Trailbreaker Resources Ltd.'s **Atsutla Gold** project, sampling identified multiple high-grade gold zones. Highlight results include 222.05 g/t Au and 165.4 g/t Au with 1894 g/t Ag.

P2 Gold Inc. drilled six holes totalling 835.9 m at their **BAM** project. Four of the six holes were drilled at the **Monarch Gold** zone. Results included 45.85 m grading 2.63 g/t gold, including 9.2 m grading 7.3 g/t Au. A 2022 exploration program is financed, and planned work includes a ZTEM airborne survey and 8000 to 10,000 m of diamond drilling.

Sun Summit Minerals Corp. is exploring the 15,000 ha **Buck** property. Sulphides are in veinlets, disseminations, or coarse fracture fillings, mainly in rhyolitic breccias. Sun Summit carried out more than 10,000 m of drilling in 50 holes targeting high-grade and bulk tonnage gold mineralization across an area of more than 500 by 500 m. The drilling was to follow up on a 2020 discovery hole that intersected 17 m grading 5.86 g/t Au. Initial assay results indicated both high-grade and bulk tonnage mineralization. Results included 4.0 m grading 31.6 g/t Au and 109 m grading 1.07 g/t Au.

Cassiar Gold Corp. expected to complete up to 14,000 m of diamond drilling at their **Cassiar Gold** project. At the Taurus deposit 4000 m of drilling was completed; at the Cassiar South target drilling was ongoing. Results from the Taurus deposit included 23.2 m grading 3.56 g/t Au, 13.1 m grading 3.53 g/t Au, and 37.8 m grading 1.8 g/t Au. Results from Cassiar South included 4.8 m grading 35.1 g/t Au and 6.4 m grading 12.6 g/t Au.

Since 1932, **Eskay Creek** has been the focus of considerable exploration. An underground mine operated from 1994 to 2008 and produced 3.3 Moz of Au and 160 Moz of Ag (average grades of 45 g/t Au and 2224 g/t Ag). In the spring, Skeena Resources Ltd. carried out 4375 m of drilling and results included an 8.20 m intersection grading 3.99 g/t Au and 71 g/t Ag. In late summer, a planned 35,000 m of regional and near-mine drilling began. Soil sampling included 116 line-km on 100 m line spacing and 25 m sample intervals. In parallel with the soil sampling, regional mapping and lithogeochemical sampling



Table 7. Selected exploration projects.

Project	Region	Operator (partner)	Commodity; Deposit type MINFILE	Resources (NI 43- 101 compliant unless indicated otherwise)	Comments
<b>American Creek</b>	Northwest	<b>Mountain Boy Minerals Ltd.</b>	Ag, Pb, Zn, Au; Polymetallic veins; 104A 011	na	866 m of drilling at High-Grade zone. Results included 3.9 m grading 24.61 g/t Ag, 0.020 g/t Au, 0.085% Cu, 2.15% Pb, and 2.19% Zn.
<b>Atsutla Gold</b>	Northwest	<b>Trailbreaker Resources Ltd.</b>	Au, Ag; Polymetallic veins; 104O 007	na	Sampling identified high-grade zones. Rock sample results include 222.05 g/t Au and 165.4 g/t Au with 1894 g/t Ag.
<b>BA</b>	Northwest	<b>Mountain Boy Minerals Ltd.</b>	Ag, Cu, Pb, Zn; Subaqueous hot spring Ag-Au; 104A 180	na	650 m of drilling tested northern extension of Barbara zone. Results included 7.67 m grading 38.06 g/t Ag, 0.013% Cu, 0.86% Pb, 2.67% Zn, and 1.09 m grading 84.66 g/t Ag, 0.017% Cu, 3.76% Pb, 6.30% Zn.
<b>BAM (Jan Copper)</b>	Northwest	<b>P2 Gold Inc.</b>	Cu, Au; Epithermal Au-Ag-Cu	na	Two holes drilled. Results included 39.25 m grading 0.01 g/t Au, 1.10% Cu including 9.15 m grading 0.04 g/t Au, and 3.23% Cu.
<b>BAM (Monarch Gold)</b>	Northwest	<b>P2 Gold Inc.</b>	Au; Epithermal Au-Ag-Cu	na	Four holes drilled. Results included 45.85 m grading 2.63 g/t Au, including 9.2 m grading 7.3 g/t Au.
<b>Big Red</b>	Northwest	<b>Libero Copper &amp; Gold Corp.</b>	Cu, Au; Alkalic porphyry; 104G 208	na	4571 m of drilling at Terry porphyry target. Results included 118.7 m grading 0.26% Cu, 0.06 g/t Au, and 1.83 g/t Ag within 510.0 m grading 0.18% Cu, 0.04 g/t Au, and 1.23 g/t Ag.
<b>Buck</b>	Northwest	<b>Sun Summit Minerals Corp.</b>	Au, Ag, Zn, Pb, Cu; Polymetallic veins; 093L 009	na	17,464 m of drilling. Results included 4.0 m grading 31.6 g/t Au and 109 m grading 1.07 g/t Au.
<b>Cassiar Gold</b>	Northwest	<b>Cassiar Gold Corp.</b>	Au; Precious metal veins; 104P 012	Inf: 21.83 Mt 1.43 g/t Au (0.7 g/t Au cut-off)	14,000 m of drilling. Results from Taurus included 23.2 m grading 3.56 g/t Au, 13.1 m grading 3.53 g/t Au, and 37.8 m grading 1.8 g/t Au. Results from Cassiar South included 4.8 m grading 35.1 g/t Au and 6.4 m grading 12.6 g/t Au.
<b>Dardanelle</b>	Northwest	<b>Decade Resources Ltd.</b>	Au, Ag, Pb; Polymetallic veins; 103I 107	na	Grab samples returned high-grade results including 695.6 g/t Au, 206 g/t Ag, 2.3% Pb and 102.9 g/t Au, 112.0 g/t Ag, 3.42% Pb.

Table 7. Continued.

<b>Del Norte</b>	Northwest	<b>Decade Resources Ltd.</b>	Au, Ag; Polymetallic veins; 103P 301	na	4147 m of drilling. Partial assay highlight results included 3.05 m grading 13.77 g/t Au, and 2661 g/t Ag within 9.91 m grading 4.28 g/t Au, and 1091.6 g/t Ag.
<b>Dolly Varden</b>	Northwest	<b>Dolly Varden Silver Corporation</b>	Cu, Pb, Zn, Ag, Au; Kuroko VMS with polymetallic veins; 103P 188	I: 3.42 Mt 299.8 g/t Ag  Inf: 1.29 Mt 277.0 g/t Ag	10,506 m of drilling. Early results included 1532 g/t Ag, 0.44 g/t Au, 2.11% Pb, and 1.07% Zn along 1.22 m core length in a brecciated sulphide-rich quartz vein hosted in a broader pyrite stockwork breccia zone of 17.50 m grading 214 g/t Ag, and 0.47% Pb.
<b>Eskay Creek</b>	Northwest	<b>Skeena Resources Limited</b>	Au, Ag, Cu, Pb, Zn; VMS and precious metal veins; 104B 008	I: 12.7 Mt 4.3 g/t Au, 110 g/t Ag (pit constrained)  Inf: 14.4 Mt 2.3 g/t Au, 47 g/t Ag (pit constrained)  I: 819 kt 6.4 g/t Au, 139 g/t Ag (underground)  Inf: 295 kt 7.1 g/t Au, 82 g/t Ag (underground)	4375 m of drilling in the spring. Results included 8.20 m grading 3.99 g/t Au and 71 g/t Ag. 35,000 m drill program started in late summer. 116 km of soil sampling. Positive Prefeasibility Study released. Drilling of historic waste pile returned results including 22.80 m grading 4.16 g/t Au, and 204 g/t Ag and 16.77 m grading 5.90 g/t Au and 317 g/t Ag.
<b>Eskay-Corey</b>	Northwest	<b>Eskay Mining Corp. (80%) and Kirkland Lake Gold Ltd. (20%)</b>	Au, Ag, Cu, Zn; Noranda/Kuroko massive sulphide; 104B 385	na	Property wide SkyTEM helicopter- borne electromagnetic survey and completed 23,500 m of diamond drilling. Highlight intersections included 92.29 m grading 1.1 g/t Au, and 124.0 g/t Ag including 24.09 m grading 2.2 g/t Au, and 374.0 g/t Ag, and 35.5 m grading 2.2 g/t Au, and 28.2 g/t Ag including 3.39 m grading 12.6 g/t Au, 50.8 g/t Ag.
<b>Golddigger</b>	Northwest	<b>Goliath Resources Limited</b>	Au, Cu, Pb, Zn; Polymetallic veins	na	6000 m of diamond drilling planned at Surebet target. Reported results included 35.7 m grading 4.46 g/t Au, and 122.13 g/t Ag, along with base metal mineralization.
<b>Hat</b>	Northwest	<b>Doubleview Gold Corp.</b>	Cu, Au; Alkalic porphyry; 104J 021	na	2476 m of diamond drilling. Drilling results included 907.8 m grading 0.31 g/t Ag, 0.12 g/t Au, 4.74 g/t Co, 0.15% Cu, 0.3 g/t Pd, and 28.64 g/t Sc.

Table 7. Continued.

<b>Homestake Ridge</b>	Northwest	<b>Dolly Varden Silver Corporation</b>	Au, Ag, Cu, Pb, Zn; Epithermal; 103P 216	I: 0.736 Mt 7.02 g/t Au, 74.8 g/t Ag, 0.18% Cu, 0.077% Pb  Inf: 5.55 Mt 4.58 g/t Au, 100 g/t Ag, 0.13% Cu, 0.142% Pb	Definitive agreement announced, Dolly Varden Silver Corporation would acquire the project from Fury Gold Mines Ltd.
<b>New Polaris</b>	Northwest	<b>Canagold Resources Ltd.</b>	Au; Au-quartz ; 104K 003	I: 1.69 Mt 10.8 g/t Au  Inf: 1.48 Mt 10.2 g/t Au	28,000 m of diamond drilling started. Results included 6.6 m grading 24.2 g/t Au, 3.9 m grading 30.8 g/t Au, 17.8 m grading 11.1 g/t Au, and 8.4 m grading 17.1 g/t Au.
<b>Newmont Lake</b>	Northwest	<b>Enduro Metals Corporation</b>	Au, Cu, Ag; Intrusion-related Au pyrrhotite veins; 104B 126	na	10,000 m of diamond drilling planned. IP and MT surveys. Drill results from Burgundy ridge target included 331.43 m grading 0.35 g/t Au, 5.5 g/t Ag, 0.29% Cu, and 0.49% Zn.
<b>Ootsa</b>	Northwest	<b>Surge Copper Corp.</b>	Cu, Au, Ag, Mo; Calc-alkaline porphyry; 093E 105	M+I: 224 Mt 0.22% Cu, 0.15 g/t Au, 0.021% Mo, 2.8 g/t Ag  Inf: 5.2 Mt 0.18% Cu, 0.09 g/t Au, 0.019% Mo, 2.6 g/t Ag  (2016 Prefeasibility Study)	26,556 m of diamond drilling. Highlight results from the West Seel deposit included 495 m grading 0.25% Cu, 0.21 g/t Au, 3.4 g/t Ag, and 0.021% Mo.
<b>Ranch</b>	Northwest	<b>Thesis Gold Inc.</b>	Au, Ag; Epithermal; 094E 267	na	16,139 m of diamond drilling. Initial results: 34 m grading 19.56 g/t Au (including 7 m grading 82.48 g/t Au) and 25 m grading 9.53 g/t Au.
<b>Schaft Creek</b>	Northwest	<b>Teck Resources Ltd. (75%), Copper Fox Minerals Inc. (25%)</b>	Cu, Mo, Au, Ag; Porphyry Cu±Mo±Au; 104G 015	M+I: 1.346 Bt 0.26% Cu, 0.16 g/t Au, 0.017% Mo, 1.25 g/t Ag  Inf: 343.6 Mt 0.17% Cu, 0.11 g/t Au, 0.013% Mo, 0.84 g/t Ag	Updated Mineral Resource estimate released. Favourable Preliminary Economic Assessment released. Drilling of 835 m completed to collect samples for metallurgical testing. Environmental baseline studies carried out.
<b>Scottie Gold Mine</b>	Northwest	<b>Scottie Resources Corp.</b>	Au, Ag, Cu; Intrusion-related and polymetallic veins; 104B 034	na	Diamond drilling at the Blueberry zone. Results included 10.0 m grading 16.5 g/t Au, 4.94 m grading 28.8 g/t Au, and 6.05 m grading 12.0 g/t Au. Drilling increased the zone's known strike length by 650 m.
<b>Silvertip</b>	Northwest	<b>Coeur Mining Inc.</b>	Ag, Pb, Zn; Manto carbonate-replacement; 104O 038	M+I: 1.18 Mt at 222.73 g/t Ag, 4.09% Pb, 8.58% Zn  Inf: 0.53 Mt at 271.04 g/t Ag, 5.02% Pb, 9.31% Zn	100,000 m of drilling. Discovered manto mineralization at the Southern Silver zone. Highlight results included 20.0 m grading 92.5 g/t Ag, 16.9% Zn, and 0.5% Pb, and 10.8 m grading 445.7 g/t Ag, 19.4% Zn, and 7.5% Pb.

Table 7. Continued.

<b>Silver Queen</b>	Northwest	<b>Equity Metals Corporation</b>	Ag, Pb, Zn, Au; Transitional porphyry-epithermal; 093L 002	I: 815,000 t 6.4% Zn, 3.2 g/t Au, 201.4 g/t Ag, 0.26% Cu, 1.0% Pb  Inf: 801,000 t 5.2% Zn, 2.5 g/t Au, 184 g/t Ag, 0.31% Cu, 0.9% Pb (resources at NSR cut-off of C\$100/t)	4991 m of diamond drilling. Highlight results included 0.3 m grading 14,035 g/t Ag, 0.1 g/t Au, 0.5% Cu, 1.3% Pb, and 3.3% Zn within a 7.7 m interval grading 919 g/t Ag, 0.1 g/t Au, 0.1% Cu, 1.3% Pb, and 1.8% Zn. Drilling resumed in the fall with 4500 m planned. Initial results included 1.4 m grading 1097 g/t Ag, 0.1 g/t Au, 0.2% Cu, 0.5% Pb, 2.2% Zn, and 3.7 m grading 1143g/t Ag, 0.1% Zn.
<b>Silver Vista</b>	Northwest	<b>Norseman Silver Inc.</b>	Cu, Ag; Cu±Ag quartz veins; 093M 195	na	1507 m of diamond drilling. Results included 47.82 m grading 37 g/t Ag and 0.21% Cu and 46 m grading 48 g/t Ag and 0.62% Cu.
<b>Snip Gold</b>	Northwest	<b>Hochschild Mining PLC</b>	Au, Ag; Intrusion-related, mesothermal; 104B 250	I: 539,000 t 14.0 g/t Au  Inf: 942,000 t 13.3 g/t Au	High-grade intersections from drilling included 3.22 m grading 155.76 g/t Au, 4.41 m grading 110.22 g/t Au, and 12.5 m grading 27.04 g/t Au. In October, it was announced that Hochschild Mining PLC intended to take over as operator, earning a 60% interest from Skeena Resources Limited by spending approximately \$100 million during the option period.
<b>Snowfield</b>	Northwest	<b>Seabridge Gold Inc.</b>	Cu, Au, Ag, Mo, Re; Porphyry Cu±Mo±Au; 104B 179	M+I: 1.37 Bt 0.59 g/t Au, 1 72 g/t Ag, 0.10% Cu, 85.5 ppm Mo, 0.57 ppm Re  Inf: 833 Mt 0.34 g/t Au, 1.90 g/t Ag, 0.06% Cu, 69.5 ppm Mo, 0.43 ppm Re (2011 Pretium Technical Report)	Diamond drilling. Results matched grades previously reported by Pretium Resources Inc. suggesting that blending Snowfield ore with Mitchell production could lead to extension of open-pit mining before underground block-cave mining is needed.
<b>Tatogga (Saddle North)</b>	Northwest	<b>Newmont Corporation</b>	Cu, Au, Ag; Porphyry; 104G 432	I: 298 Mt 0.28% Cu, 0.36 g/t Au, 0.8 g/t Ag  Inf: 543 Mt 0.25% Cu, 0.31 g/t Au, 0.7 g/t Ag	Asset included in purchase of GT Gold Corp. for estimated \$456 million. Newmont worked with the Tahltan Heritage Resources Environmental Assessment Team on a Tahltan land use study and with Tahltan Environmental Management to begin environmental studies.
<b>Thorn (Camp Creek)</b>	Northwest	<b>Brixton Metals Corporation</b>	Cu, Ag, Au; Porphyry Cu±Mo±Au	na	Diamond drilling. Results included 821.25 m grading 0.24% Cu, 0.10 g/t Au, 2.44 g/t Ag, and 174 ppm Mo, with a 318.25 m interval grading 0.42% Cu, 0.17 g/t Au, 3.87 g/t Ag, and 294 ppm Mo.



Table 7. Continued.

<b>Thorn (Trapper)</b>	Northwest	<b>Brixton Metals Corporation</b>	Au; Epithermal	na	3107 m diamond drilling. Initial results: one hole 139 m grading 2.14 g/t Au, with 11.0 m interval grading 19.25 g/t Au; second hole 146 m grading 0.74 g/t Au with 31 m interval grading 2.0 g/t Au.
<b>Treaty Creek</b>	Northwest	<b>Tudor Gold Corp. (60%),</b> (Teuton Resources Corp. (20%), American Creek Resources Ltd. (20%))	Cu, Au; Porphyry; 104A 004	na	30,108 m of diamond drilling. Results included 556.5 grading 0.73 g/t Au, 6.27 g/t Ag, and 0.489% Cu and 1320 m grading 0.67 g/t Au, 3.70 g/t Ag, and 0.216% Cu.
<b>Turnagain</b>	Northwest	<b>Giga Metals Corp.</b>	Ni, Co, Pt, Cu, Mo; Alaskan-type, magmatic; 104I 014	M+I: 1.073 Bt 0.220% Ni, 0.013% Co  Inf: 1.142 Bt 0.217% Ni, 0.013% Co	Archaeological surveys, wildlife surveys, resource infill drilling (6295 m), geotechnical drilling, seismic refraction surveys, test pits excavated. Work was to collect exploration, geotechnical, and other data to advance project engineering to the Pre-Feasibility level.
<b>Williams</b>	Northwest	<b>CopAur Minerals Inc.</b>	Au; Epithermal; 094E 028	na	3150 m of diamond drilling. Property-wide VTEM airborne survey. Soil sampling and rock sampling. Soil samples typically assayed up to 320 ppb Au; with one sample assaying up to 6.88 g/t Au. Rock samples assayed up to 79.7 g/t Au. Drilling results included 41.57 m grading 1.38 g/t Au and 0.70 m grading 22.00 g/t Au.
<b>Willoughby</b>	Northwest	<b>Strikepoint Gold Inc.</b>	Au, Ag, Zn, Pb; Precious and polymetallic veins; 103P 006	na	4050 m of diamond drilling. Surface chip sampling, mapping. Drill results included 6.16 m grading 7.34 g/t Au, 202.84 g/t Ag.
<b>3Ts</b>	North Central	<b>Independence Gold Corp.</b>	Au, Ag; Epithermal Au-Ag; low sulphidation; 093F 055	Tommy and Ted-Mint veins Inf: 5.45 Mt 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.
<b>Akie</b>	North Central	<b>ZincX Resources Corp.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb- Ag; 094F 031	I: 22.7 Mt of 8.32% Zn, 1.81% Pb, 14.1 g/t Ag  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 survey.

Table 7. Continued.

<b>Baker-Shasta</b>	North Central	<b>TDG Gold Corp.</b>	Au, Ag; Epithermal Au-Ag; low sulphidation; 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.
<b>Decar Nickel District</b>	North Central	<b>FPX Nickel Corp.</b>	Ni, Fe; Podiform chromite; 093K 116	Baptiste deposit I: 1996 Mt 0.122% Ni, DTR (Davis Tube Recoverable)  Inf: 593 Mt 0.114% Ni, DTR Ni (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 11 m, and 0.215% along 103 m.
<b>East Niv</b>	North Central	<b>NorthWest Copper Corp.</b>	Cu, Au; Alkalic porphyry Cu-Au; 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.
<b>Golden Lion</b>	North Central	<b>Evergold Corp.</b>	Au, Ag; Epithermal Au-Ag; low sulphidation; 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.
<b>Kliyul</b>	North Central	<b>Pacific Ridge Exploration Ltd.</b>	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	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.
<b>Kwanika</b>	North Central	<b>Kwanika Copper Company</b> (NorthWest Copper Corp. 69%, Posco International Corporation 31%)	Cu, Au, Ag; Porphyry Cu±Mo±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, 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.

Table 7. Continued.

<b>Lawyers</b>	North Central	<b>Benchmark Metals Inc.</b>	Au, Ag; Epithermal Au-Ag: low sulphidation; 094E 066	Inf: Cliff Creek N zone 550 Kt 4.51 g/t Au, 209.15 g/t Ag  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.
<b>Stardust</b>	North Central	<b>NorthWest Copper Corp.</b>	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	Updated Mineral Resource Estimate filed.
<b>Wicheeda</b>	North Central	<b>Defense Metals Corp.</b>	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	Filed a Preliminary Economic Assessment which reported a 36% increase on a contained metal basis in comparison to the previous 2020 Mineral Resource Estimate.
<b>Herman</b>	Northeast	<b>Conuma Coal Resources Limited</b>	Coal; Bituminous coal; 093I 031	P & Prob: 24.36 Mt	Environmental Assessment in progress. Drilling, 5 RC holes, 592 m.
<b>Hudette</b>	Northeast	<b>Conuma Coal Resources Limited</b>	Coal; Bituminous coal; 093O 060	P: 24.6Mt Prob: 465,000 t	Drilling, 16 RC holes, 272 m. Working towards a PEA.
<b>Muskwa</b>	Northeast	<b>Fabled Copper Corp.</b>	Cu, Ag, Pb, Co; Cu $\pm$ Ag quartz; 094K 012, 50	na	Rock sampling, mapping, drone surveys, and site reclamation.
<b>Alwin Mine</b>	South Central	<b>GSP Resource Corp.</b>	Cu, Ag; Cu $\pm$ Ag quartz veins, Porphyry Cu $\pm$ Mo $\pm$ Au; 092ISW010, 21	Historical: 390,000 t 2.5% Cu, 11.7 g/t Ag, 0.69 g/t Au	Drilling, 8 holes, 2334.5 m; highlight 164.6 m grading 0.61% CuEq (0.5% Cu).
<b>Beaver-Lynx</b>	South Central	<b>Inomin Mines Inc.</b>	Ni, Co; Ultramafic; 093B 073, 285	na	Ground magnetic survey. Drilling 5 holes, 715 m.
<b>Blackdome-Elizabeth (Blackdome)</b>	South Central	<b>Tempus Resources Ltd.</b>	Au, Ag; Epithermal Au-Ag-Cu low sulphidation; 092O 053	I: 144,500 t 11.29 g/t Au, 50.01 g/t Ag  Inf: 90,600 t 8.79 g/t Au, 18.61 g/t Ag	Alteration study.

Table 7. Continued.

<b>Blackdome-Elizabeth (Elizabeth)</b>	South Central	<b>Tempus Resources Ltd.</b>	Au, Ag; Au quartz veins; 092O 012	Inf: 522,843 t 12.26 g/t Au	7740 m drilled in 28 holes.
<b>Bralorne</b>	South Central	<b>Talisker Resources Ltd.</b>	Au; Au-quartz veins; 092JNE001	M+I: 260,000 tons 0.351 oz/ton Au  Inf: 317,000 tons 0.231 oz/ton Au	Drilling, 100,000 m planned by year end. Objectives include new surface and underground resource estimates.
<b>Gold Bridge</b>	South Central	<b>Blackstone Minerals Ltd.</b>	Cu, Ni, Co, Au; Five-element veins?; 092JNE068, 108	na	Drilling commenced at the Jewel target in December. First hole encountered visible Cu-Ni-Co mineralization.
<b>Gold Range</b>	South Central	<b>Kingfisher Metals Corp.</b>	Au, Ag; Au and Cu±Ag quartz veins; 092N 058, 59, 47, 57, 48	na	14 holes, 4925.3 m drill program. Highlight 9 m of 6.88 g/t Au 13.6 g/t Ag, 0.28% Cu.
<b>Lac La Hache</b>	South Central	<b>Engold Mines Ltd.</b>	Cu, Au, Ag, Fe; Alkalic porphyry Cu-Au, Cu skarn; 092P 120, 108, 2, 153	Aurizon Inf: 1.99 Mt 2.32 g/t Au, 0.6% Cu, 5.37 g/t Ag  Spout zone open pit I: 6.5 Mt 0.33% Cu, 1.34 g/t Ag, 0.05 g/t Au, 11.62% magnetite  Spout zone open pit Inf: 7.66 Mt 0.27% Cu, 0.99 g/t Ag, 0.04 g/t Au, 9.5% magnetite  Spout zone underground Inf: 0.39 Mt 1.0% Cu, 2.58 g/t Ag, 0.13 g/t Ag, 0.33% magnetite  G1 underground Inf: 1.71 Mt 1.25% Cu, 6.45 g/t Ag, 0.19 g/t Au, 30.94% magnetite	Drilling (5277.4 m) at Ann North, G1, G1 south and Road Gold zone. Updated resource estimates, maiden resource for G1.
<b>Miner Mountain</b>	South Central	<b>Sego Resources Inc.</b>	Cu, Au; Alkalic porphyry Cu-Au; 092HSE203, 78	na	Drilling, 2200 m in 11 holes. Highlights include 59 m 1.03 g/t Au, 88 m 1.08 g/t Au, and 94.2 m of 0.86 g/t Au.
<b>MPD</b>	South Central	<b>Kodiak Copper Corp.</b>	Cu, Au; Alkalic porphyry Cu-Au; 092HNE243, 55, 191, 244	na	Drilled 21,675 m of a planned 30,000 m before weather-related suspension. Highlights included 504 m 0.37% Cu, 0.15 g/t Au, 1.11 g/t Ag at Gate zone.
<b>New Craigmont</b>	South Central	<b>Nicola Mining Inc.</b>	Cu, Au; Cu skarns; 092ISE035	Inf: 18.669 Mt 0.13% Cu	1460 m drilling in 5 holes. Highlights 11.5 m 2.19% Cu and 71.35 m 0.29 % Cu.



Table 7. Continued.

<b>Reliance Gold</b>	South Central	<b>Endurance Gold Corporation</b>	Au, Sb, Ag; Au quartz veins, stibnite veins and disseminations; 092JNE033, 136, 191	na	Reverse circulation drilling (35 holes, highlight 15.24 m 14.08 g/t Au), IP and 4329 m (22 holes) diamond drilling. Initial results 5.4 m 11 g/t Au, 9 m 7.5 g/t Au.
<b>Shovelnose</b>	South Central	<b>Westhaven Gold Corp.</b>	Au, Ag; Epithermal Au-Ag- Cu low sulphidation; 092HNE309, 308	na	Drilling (41,000 m) before suspended due to floods. Metallurgical testing.
<b>Spanish Mountain</b>	South Central	<b>Spanish Mountain Gold Ltd.</b>	Au, Ag; Au-quartz veins; 093A 043	M+I: 294 Mt 0.50 g/t Au, 0.72 g/t Ag  Inf: 18 Mt 0.63 g/t Au, 0.76 g/t Ag	Prefeasibility study, sonic drilling (1226 m, 21 holes). P+Pr: 95.9 Mt 0.76 g/t Au, 0.71 g/t Ag.
<b>Spitfire-Sunny Boy</b>	South Central	<b>Falcon Gold Corp.</b>	Au, Ag, Cu; Polymetallic veins, epithermal; 092ISE049, 48, 118, 119	na	Packsack drilling highlights 0.86 m of 29.7 g/t Au, 0.47 m 68.7 g/t Au. Grab samples up to 168 g/t Au.
<b>Wingdam</b>	South Central	<b>Omineca Mining and Metals Ltd.</b>	Au; Au-quartz veins; 093H 012	na	Drilling, targeting 8000 m, 27 holes (continuation of 2020 program).
<b>Woodjam</b>	South Central	<b>Consolidated Woodjam Copper Corp.</b>	Cu, Au; Alkalic porphyry Cu-Au; 093A 269, 78	Inf: 227.5 Mt 0.31% Cu (Woodjam South)  Inf: 32.8 Mt 0.22% Cu, 0.49 g/t Au (Deerhorn)  Inf: 8.3 Mt 0.22% Cu, 0.26 g/t Au (Takom)	Drilling 4000 m (planned) at Deerhorn. Early released highlight 142.4 m 0.56% Cu, 0.23 g/t Au.
<b>Yellowhead</b>	South Central	<b>Taseko Mines Limited</b>	Cu, Au, Ag; Noranda/Kuroko; 082M 008, 9	M+I: 1292 Mt 0.25% Cu, 0.028 g/t Au, 1.2 g/t Ag  Inf: 109 Mt 0.21% Cu, 0.024 g/t Au, 1.2 g/t Ag	Engineering and baseline environmental work. Community engagement. Proven+Probable reserves are 817 Mt grading 0.28% Cu.
<b>Jersey-Emerald</b>	Southeast	<b>Apex Resources Inc.</b>	W; Irish-type carbonate- hosted Zn-Pb; 082FSW009	I: 1.4 Mt 0.173% WO <sub>3</sub> , 0.021% Mo, 0.05 g/t Au  Inf: 5.1 Mt 0.227% WO <sub>3</sub> , 0.026% Mo, 0.08 g/t Au	New resource estimate released in September. Combined best case open pit and underground.
<b>Kootenay</b>	Southeast	<b>Wealth Minerals Ltd.</b>	Au; Polymetallic veins Ag-Pb-Zn±Au; 082KSW088	na	Helicopter-borne VTEM and magnetic geophysical survey, 12,014 line-km.
<b>Kootenay Clay</b>	Southeast	<b>Hi Ho Silver Resources Inc.</b>	Clay; Sedimentary kaolin	na	A 7000 kg bulk sample was shipped to China for evaluation.

Table 7. Continued.

<b>Revel Ridge</b>	Southeast	<b>Rokmaster Resources Corp.</b>	Pb, Zn, Ag; Irish-type carbonate-hosted Zn-Pb; 082M 003	All zones M+I: 6.74 Mt 50.0 g/t Ag, 3.7 g/t Au, 1.93% Pb, 3.68% Zn  Inf: 6.00 Mt 37.0 g/t Ag, 4.7 g/t Au, 1.19% Pb, 2.20% Zn  (at a \$110 NSR cut-off)	Drilling, (28,000 m); 44 holes underground, 39 surface. Rock and soil sampling; new resource calculation in progress.
<b>Texas</b>	Southeast	<b>Troubadour Resources Inc.</b>	Au, Ag; Polymetallic veins Ag-Pb-Zn±Au; 082ESW235	na	2093 m DD in 25 holes; new vein found, best assay: 0.8 m with 8.79 g/t Au.
<b>Thor</b>	Southeast	<b>Taranis Resources Inc.</b>	Ag-Pb-Zn±Au; Polymetallic veins and breccia, stratiform volcanogenic massive sulphide; 082KNW030, 31, 60, 61	I: 640,000 t 0.88 g/t Au, 187 g/t Ag, 0.14% Cu, 2.51% Pb, 3.51% Zn  Inf: 424,000 t 0.98 g/t Au, 176 g/t Ag, 0.14% Cu, 2.26% Pb, 3.2% Zn (2013)	10 DDH, 1500 m, line cutting, VLF and resistivity; permit for 10,000 t bulk sample in 2022.
<b>Empire Mine</b>	Southwest	<b>Coast Copper Corp.</b>	Au, Ag, Cu, Fe, Co; Fe skarn, Cu skarn; 092L 044, 45, 46	M+I: 960,000 t 2 g/t Au, 5.6 g/t Ag, 0.34% Cu, 0.013% Co  Inf: 120,000 t 1.2 g/t Au, 2.8 g/t Ag, 0.13% Cu, 0.008% Co	Rock, soil and silt geochemistry, IP surveys, drilling (2346 m, 19 holes).
<b>Gold Standard</b>	Southwest	<b>Juggernaut Exploration Ltd.</b>	Au, Ag; Au quartz veins	na	Drilling 11 holes, 1203 m. Grab sample 34.6 g/t Au, 149 g/t Ag.
<b>Gold Valley</b>	Southwest	<b>Privateer Gold Ltd.</b>	Au, Ag; Au-quartz veins; 092L 008, 311, 155	na	Drilling 4474 m in 14 holes.
<b>Goldstar</b>	Southwest	<b>Juggernaut Exploration Ltd.</b>	Au, Ag; Au quartz veins	na	Drilling 5 holes, 285 m. Highlight 5.5 m grading 10.8 g/t Au, 260.8 g/t Ag.
<b>Harrison Gold</b>	Southwest	<b>Bear Mountain Gold Mines Ltd.</b>	Au, Ag; Au quartz veins; 092HSW092	Historical I: 1.845 Mt 2.79 g/t Au  Inf: 0.6 Mt 2.8 g/t Au	Geology, surveying, access, drilling 8 holes, 460 m.
<b>North Island</b>	Southwest	<b>Northisle Copper and Gold Inc.</b>	Cu, Au, Mo, Re; Porphyry Cu±Mo±Au; 092L 185, 240, 200	I: 527,344,000 t 0.20% Cu, 0.24 g/t Au, 0.008% Mo, 0.31 ppm Re  Inf: 417,272,000 t 0.15% Cu, 0.18 g/t Au, 0.06% Mo, 0.29 ppm Re	Drilling at 4 sites (18 holes, 9293 m as of mid December.), IP and ground magnetic surveys, geological and clay analysis mapping, soil surveys.

M = Measured; I = Indicated; Inf = Inferred

was also completed. Skeena released a positive Prefeasibility Study for the project. Air rotary drilling was used to sample the historic “Albino Waste Facility”. Former operators deposited mineralized footwall rocks (estimated 2 Mt) considered uneconomic due to high cut-off grades required at the time. Highlight results included 22.80 m grading 4.16 g/t Au, and 204 g/t Ag and 16.77 m grading 5.90 g/t Au and 317 g/t Ag.

At their **Eskay-Corey** property, Eskay Mining Corp. carried out a property wide SkyTEM helicopter-borne electromagnetic survey and completed 23,500 m of diamond drilling. Drilling was reported to have intersected massive sulphide mineralization at the TV and Jeff deposits. The deposits are interpreted as precious metal-rich VMS systems. Highlight intersections included 92.29 m grading 1.1 g/t Au, and 124.0 g/t Ag including 24.09 m grading 2.2 g/t Au, and 374.0 g/t Ag, and 35.5 m grading 2.2 g/t Au, and 28.2 g/t Ag including 3.39 m grading 12.6 g/t Au, 50.8 g/t Ag.

Canagold Resources Ltd. began 28,000 m of diamond drilling at their **New Polaris** gold project. Drilling was designed to upgrade Inferred resources to Indicated and target gold mineralization down plunge. Results included 6.6 m grading 24.2 g/t Au, 3.9 m grading 30.8 g/t Au, 17.8 m grading 11.1 g/t Au, and 8.4 m grading 17.1 g/t Au.

Thesis Gold Inc. completed 16,139 m of diamond drilling in 106 holes, geochemical sampling, mapping, airborne VTEM, and ground magnetic and IP surveys at their **Ranch** project. Initial drilling results of 34 m grading 19.56 g/t Au, including 7 m grading 82.48 g/t Au, and 25 m grading 9.53 g/t Au.

Scottie Resources Corp.’s **Scottie Gold** Mine project, is centred on the past-producing Scottie Gold mine, which operated from 1981 to 1985, producing 95,426 oz of Au at 16.2 g/t Au. Gold is in steeply dipping pyrrhotite-pyrite-quartz-calcite veins. Scottie Resources carried out drilling at the Blueberry zone. Results included 10.0 m grading 16.5 g/t Au, 4.94 m grading 28.8 g/t Au, and 6.05 m grading 12.0 g/t Au. Drilling increased the zone’s known strike length by 650 m.

The Snip deposit is another past-producing mine with renewed interest. Skeena Resources Ltd. carried out a diamond drilling program at the **Snip Gold** project. High-grade intersections from drilling included 3.22 m grading 155.76 g/t Au, 4.41 m grading 110.22 g/t Au, and 12.5 m grading 27.04 g/t Au. In October, it was announced that Hochschild Mining PLC intended to take over as operator, earning a 60% interest from Skeena Resources Limited by spending approximately \$100 million during the option period.

Brixton Metals Corporation completed 3107 m of diamond drilling in 12 holes at the Trapper gold target of their **Thorn** project. Initial results from one hole included 139 m grading 2.14 g/t Au, with a 11.0 m interval grading 19.25 g/t Au that included 0.50 m of 160 g/t Au. Results from a second hole included 146 m grading 0.74 g/t Au within which a 31 m intersection graded 2.0 g/t Au.

The **Treaty Creek** project is owned by Tudor Gold Corp. (60%), Teuton Resources Corp. (20%) and American Creek Resources Ltd. (20%). An initial mineral resource estimate

was released at 815.7 Mt Measured and Indicated, grading 0.66 g/t Au, 3.6 g/t Ag, and 0.06% Cu, and 311.7 Mt Inferred, grading 0.72 g/t Au, 4.0 g/t Ag, and 0.05% Cu. The project is in Jurassic volcanic and intrusive rocks that also host the KSM deposits 5 km to the southwest. The project is defined by its bulk tonnage resource. In 2021, 30,108 m of resource expansion and definition drilling was carried out. Results included 556.5 m grading 0.73 g/t Au, 6.27 g/t Ag, and 0.489% Cu and 1320 m grading 0.67 g/t Au, 3.70 g/t Ag, and 0.216% Cu.

Previous exploration at CopAur Minerals Inc.’s **Williams** copper-gold project identified the T-Bill Gold zone and the GIC copper gold zone. This year a property-wide VTEM airborne geophysical survey was completed. Soil sampling was done over the T-Bill Gold zone and reconnaissance soil and rock sampling was done in surrounding prospective areas. The reconnaissance sampling discovered a new north-trending zone of surface mineralization, 1.1 km west of historic gold-in-soil anomalies, that extends 1000 m along strike. Soil samples typically assayed up to 320 ppb Au; with one sample assaying up to 6.88 g/t gold. Rock samples southeast of the T-Bill Gold zone assayed up to 79.7 g/t Au. Diamond drilling totalled 3150 m in 7 holes and results included 41.57 m grading 1.38 g/t Au and 0.70 m grading 22.00 g/t Au.

At the **Willoughby** project, Strikepoint Gold Inc. completed 4050 m of drilling in 17 holes, surface chip-channel sampling, and mapping of well-exposed, gold-silver mineralization. Results included 6.16 m grading 7.34 g/t Au, 202.84 g/t Ag.

### 8.1.2. North Central Region

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<sup>2</sup> area, and a lidar survey of the entire property.

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.

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.

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. In May, an initial Mineral Resource Estimate reported a total Indicated resource of 1.546 Moz Au and 50.2 Moz Ag and a total Inferred resource of 620,000 oz Au and 18.1 Moz 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.

### 8.1.3. South Central Region

Tempus Resources Ltd.'s linked **Blackdome** and **Elizabeth** properties were the subject of a 2010 Preliminary Economic Assessment in which mining would occur at both sites, with processing at an existing mill at Blackdome. Tempus is focussed on verifying and expanding the existing resource. Tempus drilled at their **Elizabeth** property (7740 m, 28 holes) and reported early highlights of 3.4 m (true thickness) grading 34.4 g/t Au and 1.28 m grading 68.30 g/t Au. A newly discovered vein, which returned 1.0 m grading 33.7 g/t Au and 0.5 m grading 26.4 g/t Au, has been traced along a 380 m strike length. At their **Blackdome** property Tempus conducted an alteration study and identified new target areas. Blackdome is a low-sulphidation epithermal deposit in Cenozoic intermediate to felsic volcanic rocks. Elizabeth, 30 km south, is a series of veins in a Paleocene quartz diorite intrusion in the Shulaps ultramafic complex. Historically they have been compared to the Bralorne-Pioneer orogenic deposits.

Talisker Resources Ltd. is targeting 100,000 m of drilling at the **Bralorne** mine to help prepare a resource estimate in 2022. Drilling for an underground resource is from surface to a

depth of about 700 m. They are also developing a near-surface (<350 m deep) bulk-tonnage resource. The company reported numerous narrow high-grade vein intersections, but also notable were longer, lower grade near-surface intersections to be incorporated in a surface resource. They also reported intersections of 2.25 m grading 90.71 g/t Au at the BRX target, 5.5 km north of the Bralorne mine and 1.25 m grading 81.09 g/t Au between the Bralorne and Pioneer mines. Talisker acquired the Bralorne project in 2019 and subsequently assembled a larger contiguous land position in the Bridge River Camp which comprises the Congress and Royale properties. The camp produced more than 4 Moz of gold between 1900 and 1971 at average grades of about 15 g/t Au. Veins have characteristics typical of orogenic gold deposits.

Kingfisher Metals Corp. drilled 4925 m in 14 holes at the **Goldrange** project, which had hitherto seen little modern exploration. Highlight results include a 9 m intersection grading 6.88 g/t Au, 13.6 g/t Ag, and 0.28% Cu in a hydrothermal breccia. One vein returned 1 m of 14.8 g/t Au. Work also included geochemical and IP surveys.

Endurance Gold Corporation conducted an IP geophysical survey, reverse circulation drilling, and RC and diamond drilling at the **Reliance** project, focussing on the Eagle zone, where 2020 and 2021 returned several high-grade intersections, including 15.24 m grading 14.08 g/t Au. Endurance Gold Corporation reported 4329 m diamond drilling (22 holes) in addition to reverse circulation drilling (35 holes), and surface exploration. Initial diamond drilling results included 5.4 m grading 10.94 g/t Au and 9.0 m grading 7.49 g/t Au at the Eagle zone. A highlight of RC drilling was 15.24 m grading 14.08 g/t Au. The Reliance targets are orogenic gold veins in shear zones in volcanic rocks and cherts of the Bridge River complex. The property has an historical resource of 410,916 t grading 5.96 g/t Au.

Westhaven Gold Corp. focussed on its **Shovelnose** project in the Spences Bridge gold belt with 41,000 m of drilling completed. The planned drilling was substantially completed before being suspended in November due to flooding in Merritt. In addition to step out and infill drilling at the South zone, they tested more recently discovered zones along the mineralized trend. One objective is an initial resource estimate for the South zone early in 2022. Preliminary metallurgical testing demonstrated 95% recovery of gold and 96% recovery of silver in South zone quartz veins. Drilling highlights at the South zone include: 85.45 m grading 1.09 g/t Au and 2.43 g/t Ag including 3.14 m grading 10.8 g/t Au, and 24.8 g/t Ag; 76.33 m grading 2.93 g/t Au and 11.3 g/t Ag including 2 m grading 26.6 g/t Au and 98.37 g/t Ag; 41.55 m grading 8.17 g/t Au and 34.64 g/t Ag including 0.45 m grading 614 g/t Au and 2070 g/t Ag.

Spanish Mountain Gold Ltd. completed a Prefeasibility study on its **Spanish Mountain** sediment-hosted vein gold project and continued with project optimization, environmental assessment, and sonic drilling (1226 m in 21 holes). The company withdrew the project from the environmental assessment process in 2019. The study, with an effective date



of May 10, estimated Proven and Probable reserves of 95.9 Mt grading 0.76 g/t Au and 0.71 g/t Ag for 2.34 Moz Au. The main zone reserves would supply a 20,000 tpd open-pit operation with a 14-year life. The deposit consists of disseminated gold in graphitic argillite and gold-bearing quartz veins in siltstone, greywacke, and tuff.

Falcon Gold Corp. following up 2020 sampling at the **Spitfire-Sunny Boy** project with packsack drilling. Highlights included 0.47 m grading 68.7 g/t Au, and 11.8 g/t Ag, and 0.86 m grading 29.7 g/t Au and 2.1 g/t Ag. A grab sample returned 168 g/t Au, 17.5 g/t Ag, and 0.7% Cu. Falcon Gold also acquired the Gaspard gold project and reported reconnaissance mapping and geochemical sampling.

Omineca Mining and Metals Ltd.'s **Wingdam** project saw 8000 m of surface drilling in 2020-21, exploring for bedrock sources from which placer gold was derived. In addition to drilling, work included rock, soil and stream-sediment sampling and magnetic surveys. The underground placer bulk sampling program also proceeded with dewatering and rehabilitation ahead of underground development.

#### 8.1.4. Southeast Region

Wealth Minerals Ltd. planned a helicopter-borne VTEM and magnetic geophysical survey covering 5456 hectares (12,014 line-km) over its **Kootenay** project that comprises the Goldsmith, Lardeau and Legend claim blocks. The targets are known gold mineralization in listwanite-altered ultramafic rocks at Goldsmith and possible nickel-cobalt mineralization associated with ultramafic bodies.

#### 8.1.5. Southwest Region

Juggernaut Exploration Ltd. drilled 1203 m in 11 shallow holes to test the Goldzilla Hinge zone at the **Gold Standard** project, a section of the Goldzilla vein. Drilling highlights included 6.5 m grading 2.1 g/t Au and 7.6 g/t Ag. Surface grab samples ranged up to 34.6 g/t Au and 149 g/t Ag.

Privateer Gold Inc. continued to drill its Zeballos area project, formerly the New Privateer project, now called **Gold Valley**. As a private company operating on Crown granted claims, they have no obligation to make public details of their work or results, but the company maintains a web page with contact information. The target is vein mineralization like that mined historically. Privateer Gold holds a land position including Crown grants covering the Privateer mine and other past producers in the historic Zeballos gold camp.

Juggernaut Exploration Ltd. drilled 285 m in 5 shallow holes testing the Goldilocks zone at the **Goldstar** project. All five holes intersected gold mineralization; a highlight included 5.5 m grading 10.8 g/t Au and 260.8 g/t Ag.

Bear Mountain Gold Mines Ltd. reported geological work, surface and underground surveying, and drilling (460 m, 8 holes) at **Harrison Gold**. An historical (1989) resource estimate has 1.845 Mt grading 2.79 g/t Au in the indicated category and 0.6 Mt grading 2.8 g/t Au in the inferred category.

## 8.2. Selected porphyry (Cu-Au, Cu-Mo, Mo) projects

### 8.2.1. Northwest Region

At Libero Copper & Gold Corporation's **Big Red** project, porphyry Cu-Au-Mo, epithermal Au-Ag, and VMS-style mineralization have been recognized. Libero carried out a 4571 m, 10-hole drill program. The primary target was the Terry porphyry, which was discovered in 2020. Results included 118.7 m grading 0.26% Cu, 0.06 g/t Au, and 1.83 g/t Ag within 510.0 m grading 0.18% Cu, 0.04 g/t Au, and 1.23 g/t Ag. Doubleview Gold Corp. describes their **Hat** project as a gold-rich copper porphyry with additional critical metals including cobalt, silver, palladium, and scandium. This year, 2476 m total was drilled in four holes. Drilling results included 907.8 m grading 0.31 g/t Ag, 0.12 g/t Au, 4.74 g/t Co, 0.15% Cu, 0.03 g/t Pd, and 28.64 g/t Sc.

Enduro Metals Corporation discovered new mineralization at their **Newmont Lake** project. Results from the Burgundy ridge target area included 331.43 m grading 0.35 g/t Au, 5.5 g/t Ag, 0.29% Cu, and 0.49% Zn. A total of 10,000 m of diamond drilling was planned, along with deep penetrating IP and MT geophysical surveys.

Surge Copper Corp.'s **Ootsa** project is at the southeast end of a southeast- trending belt of porphyry Cu-Au deposits and prospects including (from northwest-southeast) the Lucky Ship, Berg, Whiting Creek, Huckleberry, Ox, and Seel deposits. Similar to other deposits in the region, mineralization at Ootsa is temporally associated with the Bulkley suite intrusive rocks (Cretaceous). Calc-alkaline mineralization is reported as mineral resources for three separate deposits: Ox, East Seel, and West Seel. This year, Surge completed 41,088 m of diamond drilling. Results have the potential to expand the deposit and to improve grade within existing volumes. Drilling consistently intersected broad, continuous zones of mineralization within and outside of a 2016 resource-constraining pit. Highlights for West Seel included 495 m grading 0.25% Cu, 0.21 g/t Au, 3.4 g/t Ag, and 0.021% Mo.

**Schaft Creek** is an advanced-stage exploration project owned by Teck Resources Limited (75%) and Copper Fox Metals Inc. (25%). In March, an updated Mineral Resource estimate was released. Measured and Indicated resources are 1.346 Bt grading 0.26% Cu, 0.16 g/t Au, 0.017% Mo, and 1.25 g/t Ag. Inferred resources are 343.6 Mt grading 0.17% Cu, 0.11 g/t Au, 0.013% Mo, and 0.84 g/t Ag. In September a favourable Preliminary Economic Assessment was released. A drilling program of 835 m was completed to collect samples for metallurgical testing, and environmental baseline studies were carried out.

Newmont Corporation purchased GT Gold Corp. for an estimated \$456 million. Assets included the **Tatogga** project's Saddle North deposit. The deposit has an Indicated resource of 298 Mt grading 0.28% Cu, 0.36 g/t Au, and 0.8 g/t Ag and an Inferred Resource of 543 Mt grading 0.25% Cu, 0.31 g/t Au, and 0.7 g/t Ag. Newmont worked with the Tahltan Heritage Resources Environmental Assessment Team on a Tahltan land use study and with Tahltan Environmental Management to

begin environmental studies.

Brixton Metals Corporation continued to drill the Camp Creek target of their **Thorn Project**. Results included 821.25 m grading 0.24% Cu, 0.10 g/t Au, 2.44 g/t Ag, and 174.27 ppm Mo, with a 318.25 m interval grading 0.42% Cu, 0.17 g/t Au, 3.87 g/t Ag, and 294.12 ppm Mo.

### 8.2.2. North Central Region

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.

At their **Kliyul** project, Pacific Ridge Exploration Ltd. 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.

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.

### 8.2.3. South Central Region

GSP Resource Corp. drilled at the **Alwin Mine** project. Highlights of the first phase of 2021 drilling (1439 m) included 164.6 m grading 0.61% CuEq (0.5% Cu, +Ag, Au, Mo, Re). They remobilized in the fall for an additional 896 m. Between 1916 and 1981, exploration targeted high-grade mineralization described as replacement type and of limited extent. However, the 2021 program encountered potentially larger zones of lower grade material.

Engold Mines Ltd. drilled deep holes at the Ann North and G-1 south porphyry targets on their **Lac La Hache** project, encountering visible mineralization and alteration, including potassic alteration. Two holes had been completed at Ann North as of December. While G-1 is a skarn target, drilling encountered disseminated mineralization to the southeast, which they continue to explore.

Sego Resources Inc.'s **Miner Mountain** project has several alkalic porphyry Cu-Au and Au targets in a roughly 2 by 3 km area, much of which is buried by drift. The Southern gold zone is a gold-rich target at the southern end of the property. Sego

drilled the Southern gold zone, with highlights including 59 m grading 1.03 g/t, 88 m grading 1.08 g/t and 94.2 m grading 0.86 g/t Au. Drilling (approximately 2200 m) was interrupted by weather but continued in late November.

Kodiak Copper Corp. undertook a 30,000 m (planned) drill program at its **MPD** project. They completed 21,675 m before suspending work in response to flooding in nearby Merritt. Results included 504 m grading 0.37% Cu, 0.15 g/t Au, 1.11 g/t Ag at the Gate zone and a step out (242 m grading 0.38% Cu, 0.22 g/t Au, 0.63 g/t Ag), which extended the zone by several 100 m. Drilling was scheduled to move to the Dillard target before the interruption. MPD is a consolidation of the Man, Prime, and Dillard alkalic porphyry Cu-Au targets, which had historically been explored to about 200 m depth.

Consolidated Woodjam Copper Corp.'s **Woodjam project** comprises six zones in a cluster approximately 5 km in diameter. Early results from a planned 4000 m of drilling included 142.4 m grading 0.56% Cu and 0.23 g/t Au at the Southeast zone. Consolidated Woodjam Copper Corp. also drilled at the Deerhorn zone and an IP target at the Megaton. The Deerhorn zone has an Inferred resource of 32.8 Mt at 0.49 g/t Au and 0.22% Cu.

### 8.2.4. Southwest Region

NorthIsle Copper and Gold Inc.'s **North Island** property includes an approximately 50 by 8 km block extending west-northwest from the past-producing Island Copper porphyry deposit. Within this area are several porphyry Cu-Au-Mo targets, four of which were drilled in 2021. The most developed targets are the Hushamu and Red Dog deposits, for which there are resource estimates and a Preliminary Economic Assessment. The North West Expo and Pemberton Hills areas were also drilled. In addition, the company reported work at Goodspeed and South Mackintosh targets. Surface work included geologic mapping, mapping of clays using TerraSpec infrared spectroscopy, soil geochemistry, and IP and ground magnetic surveys. Work was continuing as of mid-December 2021. An update to the PEA prepared before the 2021 exploration considers a 75,000 tpd, 22-year, two open-pit operation with life of mine average yearly production of 95.9 million lbs Cu and 99.9 koz Au.

Teck Resources drilled two holes for a total of 1116 m at the **Teeta Creek** project, a Neogene porphyry occurrence. Highlights included 2.4 m grading 1.27 g/t Au, 3.35 m grading 47.2 g/t Ag, and 1.09 m grading 1.05% Cu. The holes intersected quartz-sericite-pyrite alteration. Teck also carried out reconnaissance mapping and sampling on the adjacent NVI project. Teck relinquished its option and its interest returned to ArcWest Exploration Inc.

## 8.3. Selected polymetallic base and precious metal projects

### 8.3.1. Northwest Region

The **American Creek** project is immediately adjacent to the past-producing Premier mine. Mountain Boy Minerals Ltd. completed surface sampling and began diamond drilling

in July to follow up on surface samples from an interpreted extension of the High-Grade zone. Surface sample results included 949 g/t Ag, 0.3% Cu, and 2.7% Pb. Drilling consisted of 866 m total in eight holes. Highlight results included 3.9 m grading 24.61 g/t Ag, 0.020 g/t Au, 0.085% Cu, 2.15% Pb, and 2.19% Zn.

At Mountain Boy Mineral Ltd.'s **BA** project, six diamond-drill holes totalling 650 m were completed. Holes tested the northern extension of the Barbara zone. Results included 7.67 m grading 38.06 g/t Ag, 0.013% Cu, 0.86% Pb, 2.67% Zn, and 1.09 m grading 84.66 g/t Ag, 0.017% Cu, 3.76% Pb, 6.30% Zn.

The **Dardanelle** project is part of Decade Resources Ltd.'s Terrace properties. The Dardanelle showing consists of two quartz veins 0.3 to 2.0 m wide that occur intermittently along both contacts of a rhyolite dike for 700 m and to a depth of 180 m. Sulphides in the veins include pyrite, sphalerite, chalcopyrite, argentite, galena, arsenopyrite, bornite, covellite, and gold. Grab samples returned high-grade results including 695.6 g/t Au, 206 g/t Ag, 2.3% Pb and 102.9 g/t Au, 112.0 g/t Ag, 3.42% Pb.

Decade Resources Ltd. has an option to earn up to a 55% interest in the **Del Norte** property and can earn an additional 20% interest by carrying the property to commercial production. Decade carried out 4147 m of diamond drilling and reported visible gold, silver minerals, and strong base metal mineralization. Partial assay highlight results included 3.05 m grading 13.77 g/t Au, and 2661 g/t Ag within 9.91 m grading 4.28 g/t Au, and 1091.6 g/t Ag. Base metal assays were not reported.

The immediate area of Dolly Varden Silver Corporation's **Dolly Varden** property has a long history of mining. The Dolly Varden mine produced more than 20 Moz of silver between 1910 and 1959. The property is underlain by Hazelton Group volcanic and volcanoclastic rocks and historic and recent exploration suggest the potential for epithermal precious metal and volcanogenic massive sulphide deposits. This year Dolly Varden completed 10,506 m of diamond drilling in 31 holes. Drilling is the start of a two-year goal to expand and upgrade the Torbrit Silver deposit and multiple silver-rich satellite zones and deposits including the Wolf. Early results included a hole testing 94 m down plunge from known resources at the Wolf deposit. The hole returned 1532 g/t Ag, 0.44 g/t Au, 2.11% Pb, and 1.07% Zn along 1.22 m in a brecciated sulphide-rich quartz vein hosted within a broader pyrite stockwork breccia zone of 17.50 m averaging 214 g/t Ag, and 0.47% Pb.

Goliath Resources Ltd.'s **Golddigger** property is 7 km west of the Dolly Varden mine access road. At the Sure Bet and Main zone, stratabound massive sulphide mineralization (galena-sphalerite-pyrite) and silica alteration are in highly folded Hazelton Group sedimentary rocks along northwest-trending faults. Goliath planned 6000 m of diamond drilling at the Surebet target. Reported results included 35.7 m grading 4.46 g/t Au, and 122.13 g/t Ag, along with base metal mineralization.

Dolly Varden Silver Corporation's **Homestake Ridge** project

has a total Indicated resource of 0.736 Mt grading 7.02 g/t Au, 74.8 g/t Ag, 0.18% Cu and 0.077% Pb and a total Inferred resource of 5.55 Mt grading 4.58 g/t Au, 100 g/t Ag, 0.13% Cu and 0.142% Pb. The project is adjacent to Dolly Varden Silver Corporation's Dolly Varden project. In December, Fury Gold Mines Ltd. announced that it had entered into a definitive agreement with Dolly Varden whereby Dolly Varden would acquire a 100% interest in the project from Fury's wholly owned subsidiary, Homestake Resource Corporation. Terms include a \$5 million cash payment and the issuance of 76,504,590 common shares of Dolly Varden.

At the **Silver Queen** project Equity Metals Corp. completed winter-spring diamond drilling of 4991 m. Highlight results included 0.3 m grading 14,035 g/t Ag, 0.1 g/t Au, 0.5% Cu, 1.3% Pb, and 3.3% Zn within a 7.7 m interval grading 919 g/t Ag, 0.1 g/t Au, 0.1% Cu, 1.3% Pb, and 1.8% Zn. Drilling renewed in the fall with 4500 m planned. Initial results included 1.4 m grading 1097 g/t Ag, 0.1 g/t Au, 0.2% Cu, 0.5% Pb, 2.2% Zn, and 3.7 m grading 1143 g/t Ag, 0.1% Zn.

At their **Silver Vista** property, Norseman Silver Inc. completed 1507 m of diamond drilling to define the strike length and down-dip extensions of previously identified silver-copper mineralization. Results included 47.82 m grading 37 g/t Ag and 0.21% Cu and 46 m grading 48 g/t Ag and 0.62% Cu.

Coeur Mining Inc. announced that exploration diamond drilling (100,000 m) on their **Silvertip** mine property discovered manto mineralization at the Southern Silver zone. Highlight results included 20.0 m grading 92.5 g/t Ag, 16.9% Zn, and 0.5% Pb, and 10.8 m grading 445.7 g/t Ag, 19.4% Zn, and 7.5% Pb.

### 8.3.2. North Central Region

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.

Northwest Copper Corp.'s **Stardust** property has historically been regarded as a skarn deposit. 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. Stardust has an Indicated resource of 1.963 Mt grading 1.31% Cu, 1.44 g/t Au, 27.1 g/t Ag and an Inferred resource grading 0.86% Cu,



1.17 g/t Au, 20 g/t Ag. Metallurgical test work completed in early 2021 reported copper recoveries from 94.2% to 98.6% and gold recoveries of 93 to 93.9%.

### 8.3.3. Northeast Region

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

### 8.3.4. South Central Region

Nicola Mining Inc. reported results from 1460 m of drilling (5 holes) at their **New Craigmont** project. Highlights included 11.5 m grading 2.19% Cu and 71.35 m grading 0.29% Cu, both within longer mineralized intervals. The company is conducting surface work while awaiting a permit for further drilling.

In an effort to restart environmental assessment for **Yellowhead**, a feasibility-stage bulk-tonnage copper project, Taseko Mines Limited is focussing on advancing into the environmental assessment process through engineering work and engagement with local communities including First Nations. The company is also collecting baseline data and developing models that will be used to support environmental assessment and permitting. Taseko announced results of an updated Feasibility Study in 2020, including a new development plan and resource estimate (Table 7). Proven and Probable reserves now stand at 817 Mt grading 0.28% Cu at a 0.17% cut-off. Although porphyry-like in tonnage and grade, Yellowhead is generally considered a marine volcanogenic and syngenetic deposit. It is hosted by metavolcanic and metasedimentary rocks of the Eagle Bay assemblage (Lower Cambrian to Mississippian).

### 8.3.5. Southeast Region

Apex Resources Inc.'s **Jersey-Emerald** mine is a sedimentary exhalative carbonate hosted lead-zinc deposit. The former mine is in lower Cambrian limestones of the Laib Formation. Skarn-hosted tungsten mineralization is also present. In September, the company released a resource estimate for its Jersey Emerald tungsten project that includes open pit and underground operations, with an Indicated resource of 1.4 Mt with 0.173% WO<sub>3</sub>, 0.021% Mo, and 0.05 g/t Au and an Inferred resource of 5.1 Mt with 0.227% WO<sub>3</sub>, 0.026% Mo, and 0.08 g/t Au.

Rokmaster Resources Corp. completed underground drilling at its **Revel Ridge** project. Results from the Main zone indicated continuity of zinc-silver mineralization along a 1200 m length and a vertical extent of the same amount. Drilling highlights included RR21- 28 with 26.2 m grading 1.73 g/t Au, 14.38 g/t Ag, 0.75% Pb, and 4.95% Zn, and RR21-23 with 1.0 m grading 7.22 g/t Au, 4.00 g/t Ag, 0.32% Pb, and 0.41% Zn. Surface drilling of 10,747 m was completed in the fall and results extended the limits of known mineralization. Highlights included 3.60 m grading 0.19 g/t Au, 244.28 g/t Ag,

6.25% Pb, and 18.09% Zn at the Main zone, and 2.70 m grading 0.03 g/t Au, 83.69 g/t Ag, 4.20% Pb, and 8.64% Zn at the Yellowjacket zone. Underground drilling resumed in November. A resource update is in progress using information from 39 NQ surface holes completed this summer. Rock and soil sampling identified mineralized float and outcrops well beyond the known mineralized zones.

Troubadour Resources Inc. completed 2093 m of drilling in a total of 25 holes at its **Texas** project. Drilling intersected several polymetallic veins near the Cabin target. Results included 5.9 m grading 1.78 g/t Au. A newly discovered vein yielded a highlight of 0.8 m with 8.79 g/t Au. The property is underlain by a Nelson suite granodiorite pluton (Middle Jurassic) that is cut by quartz and lesser carbonate veins with strong chlorite-carbonate-clay-silica alteration envelopes.

Taranis Resources Inc. planned a 1200 m drill program on its **Thor** property. A total of ten holes were drilled on the Ridge target, now named the Thunder zone. Drilling intersected Jowett Formation volcanic rocks containing abundant quartz veins with tetrahedrite, sphalerite, galena, and pyrite mineralization. The best assays reported from the first three holes drilled include 10.30 m with 0.07% Cu, 1.07% Pb, 2.13% Zn, 103.42 g/t Ag, and 0.35 g/t Au. Within the interval was a 3.96 m with 0.15% Cu, 2.63% Pb, 3.63% Zn, 253.8 g/t Ag and 0.61 g/t Au. The company received permits for a 10,000 t bulk sample. The property is underlain mostly by Cambrian to Devonian carbonate and fine-grained sedimentary rocks of the Lardeau Group.

### 8.3.6. Southwest Region

Coast Copper Corp. completed rock, soil, and silt geochemistry, and extended IP surveys at the **Empire Mine** Cu-Au-Fe skarn property. Drilling (2346 m, 19 holes) late in the year tested targets at the Merry Widow pit, Copper Knob, Raven pit, North Notch and the Benson Lake Mine-Old Sport horizon. The property hosts iron-copper-gold-cobalt skarn mineralization where mafic Island Plutonic suite rocks intrude Vancouver Group Quatsino Formation limestone. Several of these skarns were mined for iron, copper, silver, and gold from the late 1950s to early 1970s.

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

### 8.4.1. Northwest Region

Giga Metals Corp.'s **Turnagain** nickel-cobalt deposit is in an Alaskan-type Pt-(Os-Rh-Ir) ultramafic. The deposit has maximum dimensions of 3 by 8.2 km and displays a dunite core surrounded by peripheral peridotites, pyroxene-rich peridotite, wehrlite, and olivine pyroxene. Sulphide mineralization includes pyrrhotite, pentlandite, chalcopyrite, and trace bornite. Giga Metals carried out archaeological surveys, wildlife surveys, resource infill drilling (6295 m), geotechnical drilling, and seismic refraction surveys, and excavated test pits. Work was to collect exploration, geotechnical, and other data to advance project engineering to the Pre-Feasibility level.



### 8.4.2. North Central Region

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. 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 Bt of Indicated resources with an average grade of 0.122% Davis Tube Recovery (DTR) nickel, 593 Mt of Inferred resources with an average grade of 0.114% DTR nickel, at a cut-off grade of 0.06% DTR nickel. Tailings produced by the proposed mining and milling process at Decar have potential to sequester CO<sub>2</sub>.

### 8.4.3. South Central Region

Inomin Mines Inc. carried out a ground magnetic survey and drilled 715 m in five holes at their **Beaver-Lynx** nickel-cobalt project. The target is disseminated sulphide nickel and cobalt mineralization. They reported visible mineralization.

## 8.5. Selected cobalt, base, and precious metal projects

### 8.5.1. South Central Region

Blackstone Minerals Limited announced the start of drilling at the Jewel prospect on their **Gold Bridge** project at the end of November. The first hole intersected visible Cu-Ni-Co sulpharsenide mineralization.

## 8.6. Selected specialty metal projects

### 8.6.1. North Central Region

Defense Metals Corp. continued to work at their **Wicheeda** project. The Wicheeda carbonatite is a deformed intrusion that hosts light rare earth elements (LREE). 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 present as well. In 2021, Defense Metals 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.

## 8.7. Selected coal projects

### 8.7.1. Northeast Region

Conuma Coal Resources Ltd. 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).

Conuma Coal Resources Ltd.'s **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).

## 8.8. Selected industrial mineral projects

### 8.8.1. Southeast Region

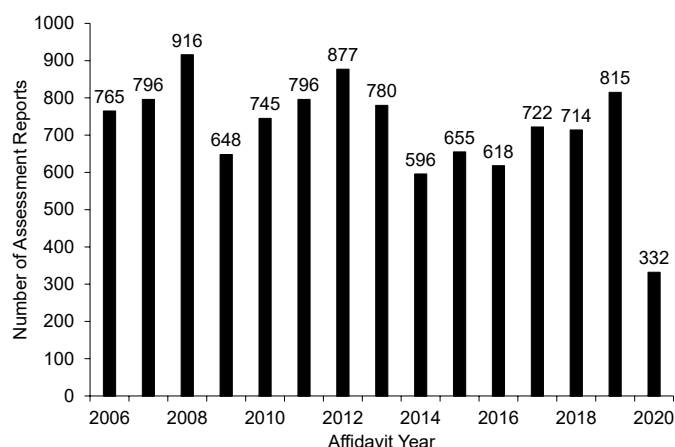
Hi Ho Silver Resources Inc.'s **Kootenay Clay** project consists of an outcrop of illite-rich lacustrine clay exposed on a road cut of the Skookumchuk Creek forest service road, near Buhl Creek. The clay extends for at least 110 m along the road cut and about 28 m back from it. Grab samples yielded about 78 wt.% illite. Hi Ho Silver shipped a 7000 kg bulk sample to China to be evaluated for use in cosmetics.

## 9. Summary of assessment work, 2020

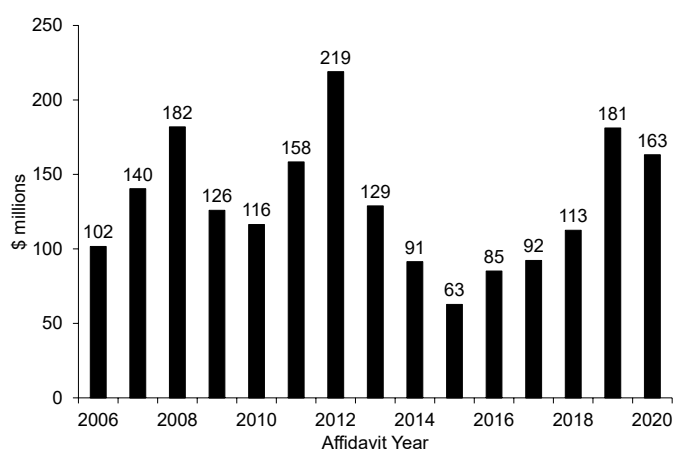
Results of mineral exploration programs are submitted by industry in assessment reports to the government in compliance with the Mineral Tenure Act. After a one-year confidentiality period, the reports become an open resource for mineral exploration, investment, research, land use, and resource management. The British Columbia Geological Survey maintains these reports in the Assessment Report Indexing System (ARIS) database. This database provides information about the location, mineral occurrences, commodities, claims, work types, and expenditures as presented in the assessment reports. ARIS contains more than 38,000 reports dating from 1947; all are available online as PDF documents through the British Columbia Geological Survey website.

The present summary includes assessment work registered with a Statement of Work affidavit dated to the end of 2020 and does not include work that may have been conducted in 2020 but registered in 2021. The expenditures recorded in assessment reports are registered to maintain claims beyond their expiry date and thus reported costs may represent only part of the total amount spent.

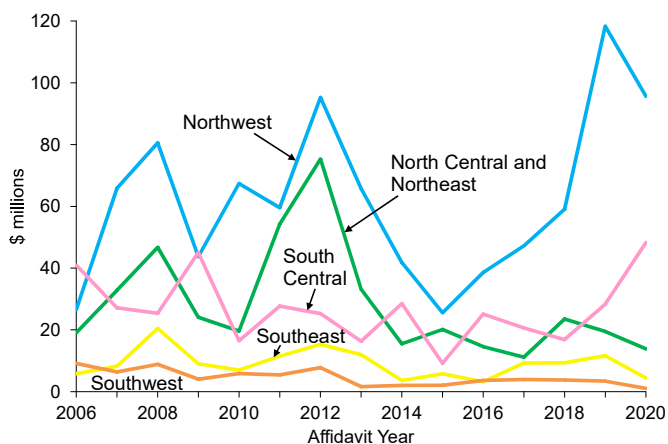
The number of approved assessment reports with an affidavit date of 2020 totalled 332 (Fig. 12), with declared costs of \$163 million (Fig. 13), a 10% decrease in expenditures from 2019 (Table 8). The Northwest Region accounted for 59% of the province-wide exploration costs in 2020 (Fig. 14). Drilling



**Fig. 12.** Assessment reports approved between 2006 and 2020 by work affidavit year.

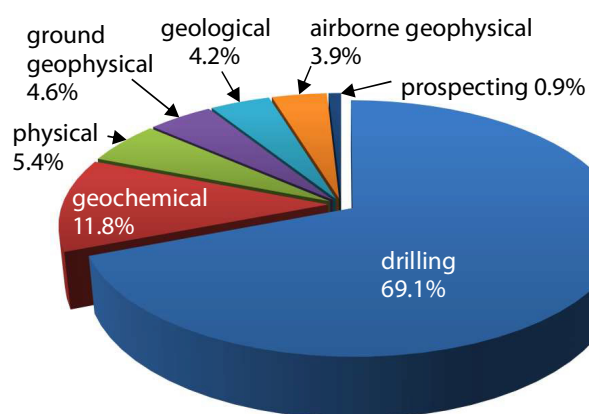


**Fig. 13.** Expenditures approved for assessment credit between 2006 and 2020 by work affidavit year.



**Fig. 14.** Expenditures approved for assessment credit between 2006 and 2020 by work affidavit year and region.

accounted for 69% of the expenditures (Fig. 15); the remainder was spent on geochemical sampling (12%), geophysical surveys (9%), physical work (5%), geological mapping (4%), and prospecting (1%). Physical work expenditures only



**Fig. 15.** Proportion of value of exploration work type in the work affidavit year 2020.

include work submitted as part of a technical work report, not expenditures reported in a physical work report. Average exploration costs by work type (Table 9) are from report statements for labour, consulting, food, accommodation, transport, camp equipment rentals and supplies, laboratory analyses, report preparation, direct administration, and project management.

Traditionally, data in assessment reports have been embedded in paper or scanned .PDF files, making them difficult to extract and use. To resolve this problem, the British Columbia Geological Survey has embarked on a program to encourage submission of digital data files such as spreadsheets, databases, GIS maps, and grids, which can be easily retrieved, integrated, recalculated, and recast for specific needs. These files can be uploaded through the ARIS Data Submission page (<http://ardata.bcgeologicalsurvey.ca>), submitted by CD/ DVD/ USB when an assessment report is filed, or e-mailed to ARIS. [digital@gov.bc.ca](mailto:digital@gov.bc.ca).

## 10. The British Columbia Geological Survey

Part of the Ministry of Energy, Mines and Low Carbon Innovation, the British Columbia Geological Survey (BCGS) is the steward of provincial geoscience and mineral resource information. The Survey creates and disseminates public geoscience information that supports effective mineral exploration, sound land use management, and responsible governance. Applied research by Survey geoscientists uses established and emerging technologies to assess the geological evolution and mineral resources of the province. To deliver its programs, the Survey collaborates extensively with federal, provincial, and territorial geoscience agencies, including the Geological Survey of Canada and Geoscience BC, and other national and international organizations. The results of these programs are freely accessible from the BCGS website and via MapPlace, the Survey's geospatial web service. The array of information, services, and products provided by the Survey informs decisions that balance the economy, the environment, and community interests. By connecting government with the

**Table 8.** Summary of assessment work, 2020.

Reports			Value \$	Core drilling		Non-core drilling		Soil samples	Stream sediment samples	Rock samples
				Holes	m	Holes	m			
Northwest	2020	101	\$95,615,837	759	202,050	9	1048	11,736	215	7015
North Central and Northeast	2020	37	\$13,838,837	87	27,418	13	206	663	95	403
South Central	2020	96	\$48,291,364	782	139,995	15	359	24,794	540	2833
Southeast	2020	56	\$4,418,677	87	8779	0	0	3562	59	896
Southwest	2020	42	\$1,048,674	10	125	0	0	341	262	757
Provincial total	2017	722	\$92,215,514	1199	205,434	173	3458	30,188	1450	14,648
Provincial total	2018	714	\$112,528,518	869	246,484	112	3665	49,736	1993	19,762
Provincial total	2019	815	\$181,186,301	1379	314,962	389	9654	44,926	3489	22,266
Provincial total	2020	332	\$163,213,389	1725	378,368	37	1613	41,096	1171	11,904

**Table 9.** Average exploration project costs, 2017-2020.

	Cost	2017	2018	2019	2020
Core drilling	\$ per m	252	297	425	342
Non-core drilling	\$ per m	284	361	387	334
Stream sediments	\$ per sample	355	348	502	488
Soil samples	\$ per sample	152	152	139	159
Rock samples	\$ per sample	371	371	332	429
Trenching	\$ per m	163	78	168	35
Ground EM	\$ per km	3700	2187	4101	1900
Ground magnetics	\$ per km	906	807	858	428
Induced polarization	\$ per km	4879	8362	8233	8379
Airborne magnetics	\$ per km	40	91	72	107
Airborne EM	\$ per km	126	83	191	214
Geological mapping	\$ per ha	59	16	21	49
Prospecting	\$ per ha	19		39	6

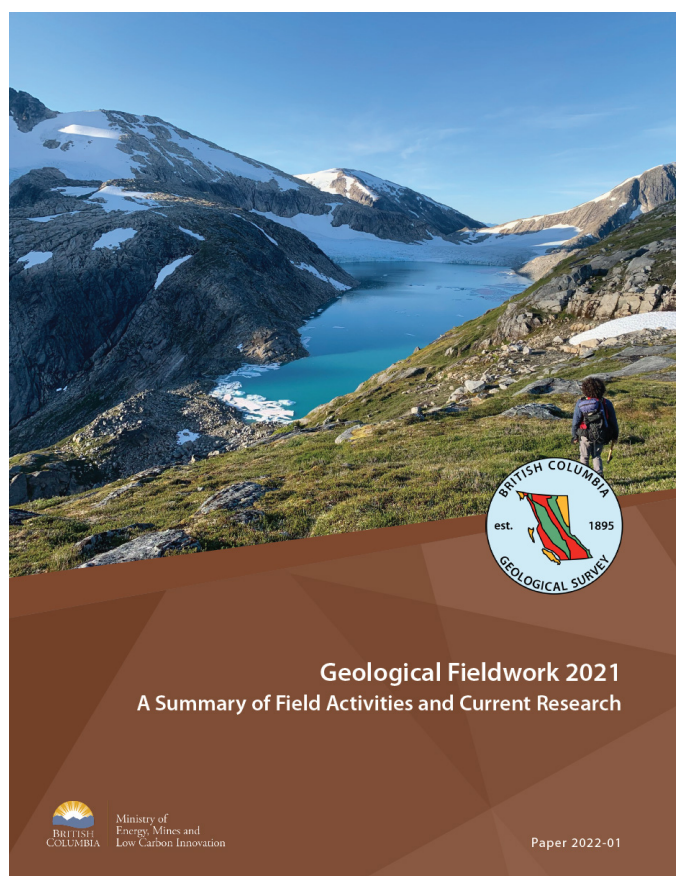
minerals industry and local communities, the Survey supports the growth of British Columbia as a competitive jurisdiction for mineral exploration.

Planning for field projects in 2021 was again affected by the pandemic, mainly due to uncertainties about evolving public health orders and associated safe working practices, and wildfires forced modifications to field programs. Nonetheless, Survey geologists successfully executed several projects (Fig. 16). Continuing a multi-year project in the northwest, the Survey extended bedrock mapping in the Kitsault area focussing on units of particular importance for copper, gold, and silver in this region of remarkable mineral endowment. In the southeast near Kaslo, mapping focussed on rocks of the Lardeau Group and their potential for copper-molybdenum-

nickel mineralization. As part of the BCGS commitment to support emerging technologies and assist mineral exploration, the Survey tested unmanned aerial vehicles in areas of central British Columbia where bedrock is buried by thick surficial cover. The surveys took advantage of recent sensor miniaturization that permit ‘drones’ to gather photogrammetric, lidar, radiometric, and aeromagnetic data. In addition, work continued to test technologies that measure atmospheric mercury to detect buried mineralized bedrock.

The Survey continues to engage with First Nations, facilitated through government colleagues, mining councils, and resource stewardship forums, and seeks to expand engagement opportunities for future field seasons.

In the office, ongoing map compilations continue to



**Fig. 16.** Geological Fieldwork contains peer-reviewed papers that summarize field activities and current research by the British Columbia Geological Survey.

consolidate knowledge from recent field mapping and historic published maps for the digital provincial database. BCGS is also initiating a multi-year project to incorporate all published surficial geology maps into the provincial database. An extensive program of laboratory analysis, using recently collected and archived samples, continues to build geoscience knowledge across a range of initiatives.

Mineral potential assessment is now a renewed focus for the Survey, with an emphasis on supporting government, First Nations, and stakeholders in land use planning and policy development. The Survey pioneered mineral potential assessment in Canada during the early 1990s, but the more recent development of analytical techniques and machine learning technology offers the opportunity to update methods and greatly improve results. A pilot study focussed on method development using three mineral systems: porphyry copper-gold; volcanic massive sulphide copper-lead-zinc; and magmatic nickel. A weights-of-evidence method was adopted, which produced data-driven mineral potential maps for each mineral system. This method allowed for a comprehensive review of outputs at every stage of the modelling process to ensure that the maps were geologically sensible and statistically valid.

As the steward of mineral and coal resources in the province, the Survey has an important role in stimulating activity, attracting investment, and providing continuous research based on a corporate memory that extends back more than 125 years. Custodian of all provincial public geoscience data, the BCGS preserves, archives, and provides free web-based access to information. The BCGS houses, maintains, and regularly updates numerous databases, including MINFILE, COALFILE, Property File, the Assessment Reports Indexing System (ARIS), digital bedrock geology, regional geochemical surveys, geochronologic data, and a publications catalogue. MapPlace, the BCGS geospatial web service, provides open geoscience data and custom map-making tools to help decisionmakers from diverse disciplines reduce the costs of accessing and analyzing information. The BCGS is modernizing core information systems to increase efficiency in operating and updating geoscience databases, applications, and geospatial web services. The modernization is part of transformation efforts to improve digital capabilities by completing a geoscience ‘SDI’ or Spatial Data Infrastructure. This infrastructure follows the ‘FAIR’ principles: Findable, Accessible, Interoperable, and Reusable.

With public attention increasing on how low-carbon technologies can help mitigate climate change, the topic of ‘critical minerals’ has gained much attention, and in March, Natural Resources Canada released a national list of critical minerals. In late November, and in collaboration with the Geological Survey of Canada, the United States Geological Survey, Geoscience Australia, and the Pacific Section of the Geological Association of Canada, BCGS hosted an international online workshop about critical minerals, which attracted more than 700 attendees. The Survey continues to maintain an active critical minerals research program and inventory opportunities in the province.

## 11. Foreign investment initiatives

Opportunities exist for companies to attract foreign investment using government services and staff. The province participates in international investment missions showcasing mineral and coal opportunities. If you are interested in profiling your projects or investment opportunities in upcoming events, connect with the Mineral Development Office in Vancouver for more information.

## 12. Concluding remarks

Despite forest fires, heat waves, floods, and resultant transport infrastructure damage, and the continuing Covid 19 pandemic, the forecasted value of total provincial mining production reached an all-time high of \$12.6 billion, and total exploration expenditures reached a near record of \$659.8 million.

New discoveries, excellent exploration results, acquisitions and earn ins, confirmed British Columbia’s reputation as a premier jurisdiction for mineral exploration and mine development opportunities. Most significant was the offer by Newcrest Mining Limited to purchase Pretium Resources



Inc. for approximately \$3.5 billion. Newmont Corporation purchased GT Gold Corp. for an estimated \$456 million. Assets included the Tatogga project's **Saddle North** deposit. Hochschild Mining PLC announced their intent to earn a 60% interest in the **Snip Gold** project from Skeena Resources Limited by spending approximately \$100 million during the option period.

### **Acknowledgment**

Jessica Norris and Bronwen Wallace provided the summary of assessment work. We thank George Owsjacki of Total Earth Science Services (Victoria) for desktop publishing of this volume.



# Exploration and mining in the Northwest Region, British Columbia



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## 1. Introduction

The Northwest Region includes about 263,000 km<sup>2</sup> of British Columbia, approximately 25% of the province (Fig. 1). The region has a long history of mining and is prospective for a wide range of commodities including precious metals, base metals, and coal. Exploration in the region is concentrated in a loosely defined area in the northern part of the region popularly known as the 'Golden Triangle'; several other projects were underway to the southeast. High metal prices in 2021 encouraged financing of many projects.

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 Northwest Region, exploration expenditures were estimated at \$365.9 million and exploration drilling was estimated at 662,200 m (Clarke et al., 2022; EY LLP, 2022).

The Northwest Region contains two operating metal mines (**Brucejack** and **Red Chris**). The region also contains four proposed metal mines (**Dome Mountain**, **Galore Creek**, **KSM**, **Kutcho** and **Red Mountain**), and one proposed coal mine (**Tenas**). There is one mine development project (**Premier Gold**). Numerous early- to advanced-stage projects were tracked, and selected projects are discussed herein. Large industrial projects in the region are driving demand for aggregate, and placer gold mining continues throughout the region. Small-scale jade mining, both in situ and placer, has a long history in the region. However, in 2021 a provincial government Order in Council was announced restricting jade mining until at least May 11, 2023.

Noteworthy acquisitions, earn ins and proposed mergers were announced in 2021. The most significant was the offer by Newcrest Mining Limited to purchase Pretium Resources Inc. for approximately \$3.5 billion. Newmont Corporation purchased GT Gold Corp. for an estimated \$456 million. Assets included the Tatogga project's **Saddle North** deposit. Hochschild Mining PLC announced their intent to earn a 60% interest in the **Snip Gold** project from Skeena Resources

Limited by spending approximately \$100 million during the option period. Scottie Resources Corp. and AUX Resources Corporation amalgamated, which consolidated their advanced projects in the Stewart mining camp. Because of staffing shortages and protocols related to the Covid pandemic, laboratories had difficulty keeping up with the high volume of samples submitted by exploration companies, causing delays in the release of analytical results.

## 2. Geological overview

Metallogeny in British Columbia is intimately linked to the tectonic evolution of the Canadian Cordillera, first as an accretionary orogen consisting of allochthonous terranes that were welded to, and deformed with, the western margin of ancestral North America primarily during the Jurassic and then as the site of post-accretionary tectonism and magmatism (e.g., Nelson et al., 2013). The Northwest Region provides a transect across the Cordilleran orogen (Fig. 1) and from east to west it is underlain by: 1) autochthonous and parautochthonous carbonate and siliciclastic strata deposited on the flank of Ancestral North America (Laurentia); 2) the Intermontane terranes, including the Slide Mountain terrane (back-arc basin); the Yukon-Tanana terrane (a rifted Devonian pericratonic arc); the Quesnel and Stikine volcanic arc terranes (formed outboard of Ancestral North America starting in the Late Paleozoic and accreted in the Middle Jurassic); and the Cache Creek oceanic terrane, which intervenes between Quesnellia and Stikinia; 3) the Alexander terrane; 4) post-accretionary rocks; and 5) younger cover rocks. All of the allochthonous terranes initially accreted to each other and to western North America in the Jurassic. Since then, the mosaic has been intruded by post accretion plutonic suites and covered, in part, by Jurassic and younger syn- and post-accretionary siliciclastic deposits. For details about the geology, metallogeny, and tectonics of the Northwest Region see Nelson et al. (2013).

## 3. Mines and quarries

In 2021, two metal mines operated in the Northwest Region (**Brucejack** and **Red Chris**). One industrial mineral mine and numerous aggregate operations supplied large-scale industrial

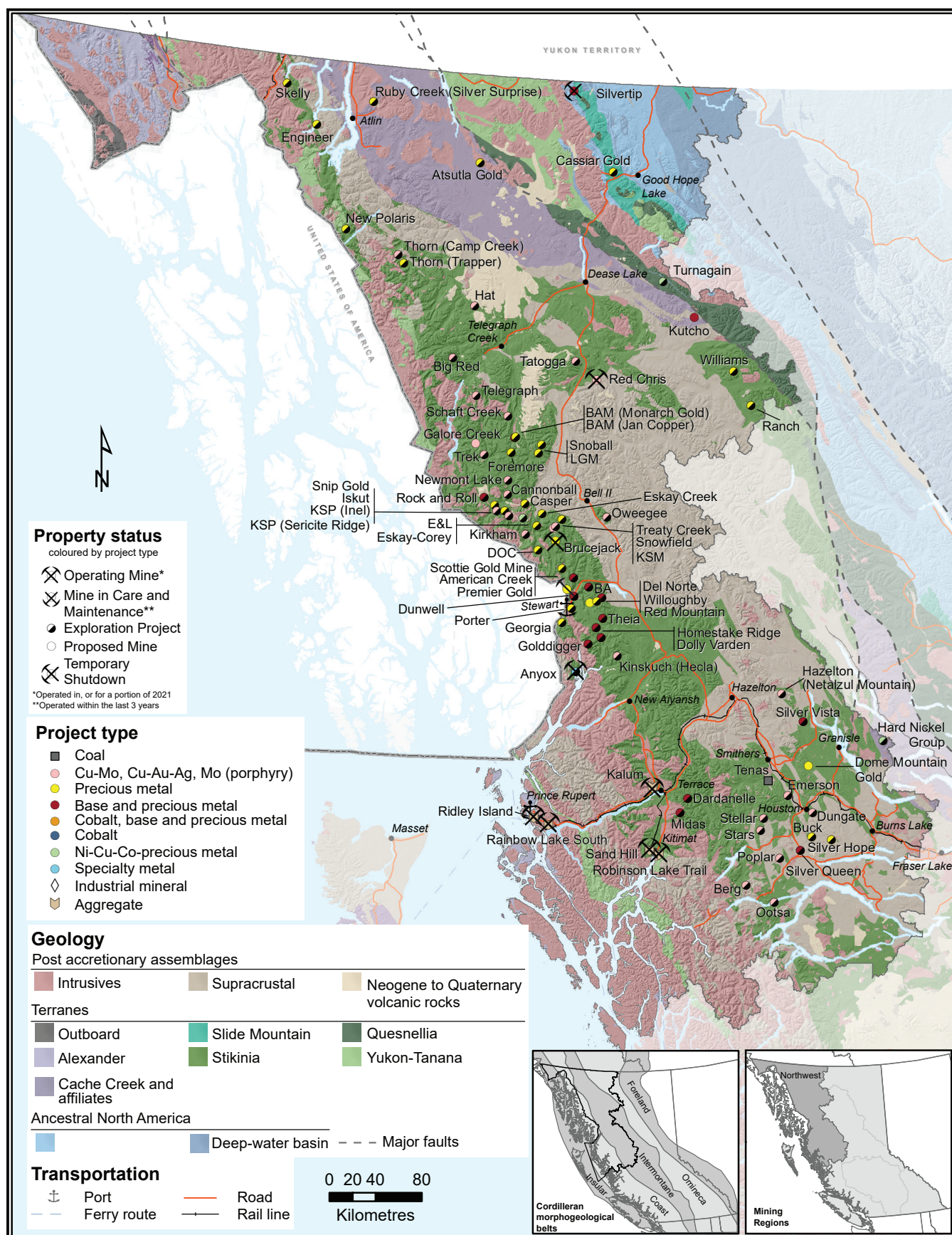


Fig. 1. Mines, proposed mines, and selected exploration projects, Northwest Region, 2021. Terranes after Nelson et al. (2013).



projects and local townships throughout the region (Fig. 1; Tables 1-2). Placer gold mining is ongoing, predominantly in the Atlin and Turnagain areas.

### 3.1. Metal mines

The **Brucejack** and **Red Chris** mines operated in 2021 (Fig. 1; Table 1).

#### 3.1.1. Brucejack (Pretium Resources Inc.)

The **Brucejack** gold-silver mine operated throughout 2021. Access to the underground mine is via a 75 km all-season mining road off of Highway 37; the last 16 km is across a glacier. Power is supplied by a 57 km-long transmission line that was built specifically for the mine. Production for the first three quarters totalled 259,551 oz of Au at a head grade of 8.4 g/t Au and 347,956 oz Ag. The mill throughput in the first nine months of the year totalled 3735 tpd for a total of 1,019,563 t milled. As of January 1, 2021, Pretium reported Indicated and Measured mineral resources totalling 22.5 Mt grading 10.0 g/t Au and

67.5 g/t Ag, and Proven and Probable mineral reserves totalling 14.4 Mt grading 8.3 g/t Au and 63.8 g/t Ag.

The Brucejack ore body incorporates the Valley of the Kings (VOK) and West zones. Several other mineralized zones in phyllic-altered rocks extend across an area 5 by 1.5 km (from south to north: Bridge, Waterloo, Shore, SG, Gossan Hill, Golden Marmot, and Hanging Glacier). Interpreted as an intermediate-sulphidation epithermal gold-silver deposit, mineralized sheeted veins, breccia veins, and vein stockworks cut Lower Jurassic metasedimentary and volcanic rocks of the Hazelton Group. Gold and silver at both the VOK and West zones are mainly in electrum and lesser sulphosalts. Chalcopyrite, galena, and sphalerite are also common. Resource expansion underground diamond drilling was carried out north of the Valley of the Kings deposit in a new area referred to as the North Block zone. Numerous high-grade intersections were reported including: 1 m grading 2100.0 g/t Au; 12.0 m grading 80.7 g/t Au with a 1.0 m intersection grading 941.0 g/t Au; and 15.0 m grading 493.2 g/t Au, with a 1.0 m intersection

**Table 1.** Metal mines, Northwest Region.

Mine	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1-Q3)	Reserves	Resources	Comments
<b>Brucejack</b>	<b>Pretium Resources Inc.</b>	Au, Ag; Epithermal; 104B 193	346,000 oz Au 464,000 oz Ag	P+Pr: 14.4 Mt 8.3 g/t Au, 63.8 g/t Ag	M+I: 22.5 Mt 10.0 g/t Au, 67.5 g/t Ag  Inf: 9.4 Mt 10.3 g/t Au, 44.3 g/t Ag	Discovered the new high grade North Block and Marmot zones. Results for the North Block zone included 12.0 m grading 80.7 g/t Au with a 1.0 m intersection grading 941.0 g/t Au. Results for the Marmot zone included 53.5 m grading 72.5 g/t Au, including 6700 g/t Au along 0.5 m. Newcrest Mining Limited makes an offer to purchase Pretium for approximately \$3.5 billion.
<b>Red Chris</b>	<b>Newcrest Mining Ltd. (70%), Imperial Metals Corp. (30%)</b>	Cu, Au, Ag; Hybrid calc-alkalic to alkalic porphyry; 104H 005	67.6 Mlbs Cu 62,100 oz Au	P+Pr: 301.5 Mt 0.36% Cu, 0.27 g/t Au	M+I: 980 Mt 0.38% Cu, 0.41 g/t Au  Inf: 190 Mt 0.30% Cu, 0.31 g/t Au	Infill drilling beneath East Zone continued to intersect high-grade mineralization. Results included 198 m grading 0.89 g/t Au and 0.83% Cu, and 254 m grading 1.0 g/t Au and 1.1% Cu. A Prefeasibility Study confirmed a low cost, long life for a proposed block cave mining operation.

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

**Table 2.** Selected industrial mineral and aggregate mines and quarries, Northwest Region.

Mine	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1-Q3)	Reserves	Resources	Comments
<b>Anyox</b>	<b>Tru-Grit Abrasives</b>	Slag Steel	unknown	na	na	Slag is mined, cleaned, and barged for roofing and sand for sand blasting.
<b>Kalum</b>	<b>Kalum Quarry Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN Railway and others.
<b>Rainbow Lake South</b>	<b>Spring Creek Aggregates Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN Railway and LNG projects.
<b>Ridley Island</b>	<b>Terus Construction Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN Railway and LNG projects.
<b>Robinson Lake Trail</b>	<b>Haisla &amp; Progressive Ventures Construction Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN Railway and LNG projects.
<b>Sand Hill</b>	<b>Terus Construction Ltd.</b>	Industrial rock; Crushed rock	unknown	na	na	Crushing for CN Railway and LNG projects.

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

grading 7360 g/t Au. A new high-grade discovery was made in exploration drilling 3.5 km north of the mine at the Marmot zone. Highlights included intersections of 53.5 m grading 72.5 g/t Au, including 6700 g/t Au along 0.5 m, 5.8 m grading 46.1 g/t Au, and 38.0 m grading 22.8 g/t Au.

### 3.1.2. Red Chris (Newcrest Mining Ltd. 70% and Imperial Metals Ltd. 30%)

The **Red Chris** open-pit copper-gold mine is 17 km east-southeast of the community of Iskut. The Northwest Transmission Line powers the site, and access is from Highway 37. Production to the end of the third quarter of 2021 totalled 46,550 oz Au and 50.7 Mlbs Cu. A new mineral resource estimate was released with 980 Mt of Measured and Indicated, grading 0.41 g/t Au, 0.38% Cu, and 190 Mt of Inferred, grading 0.31 g/t Au, 0.30% Cu.

The deposit is hosted by the Red stock (U-Pb zircon 203.8 Ma; Rees et al., 2015), which intrudes and alters Upper Triassic Stuhini Group rocks, and is faulted against Middle Jurassic rocks of the Bowser Lake Group. Rees et al. (2015) described multiple igneous phases, alteration, and controls on mineralization.

A Prefeasibility Study confirmed a low cost, long life for a proposed block cave mining operation. Diamond drilling near

the ore body discovered new zones of high-grade mineralization. Results included 198 m grading 0.89 g/t Au, and 0.83% Cu, and 254 m grading 1.0 g/t Au and 1.1% Cu. Further studies were ongoing to assess opportunities close to the mine.

### 3.2. Coal mines

In 2021, no coal mines operated in the Northwest Region; the **Tenas** project is listed below as a proposed mine.

### 3.3. Industrial mineral mines and quarries

Tru-Grit Abrasives (Fig. 1; Table 2) is recycling the slagheap at the historic **Anyox** site, where slag was created from smelting copper. The slag is mined, cleaned, separated, and barged south for roof shingles and sand blasting; the material is also used to add iron into Portland cement. The operation has been active for more than 30 years and more than 2.5 Mt has been reclaimed from the 4.5 Mt abandoned by smelting operations in the 1930s.

### 3.4. Aggregate and industrial rock quarries

Numerous aggregate and quarry operations supply sand and gravel and blasted stone for large-scale industrial projects and towns throughout the region (Fig. 1; Table 2). Several large aggregate pits operate near Kitimat (**Robinson Lake Trail**

and **Sand Hill**) and others operate near Prince Rupert (**Ridley Island** and **Rainbow Lake South**). Owned by the Kitsumkalum First Nation's, **Kalum** is an industrial rock quarry. It is the only pit in the region with a rail spur, and it supplies the Canadian National Railway Company with ballast.

#### 4. Placer operations

Placer gold mining operations have been ongoing for more than a century in the Northwest Region and continue today with a focus in the Atlin and Turnagain areas and, to a lesser extent, north of Dease Lake and near Cassiar. Due to the large number of operations and difficulty in obtaining information, these projects are not tracked.

#### 5. Mine development

When a project acquires the necessary permits (Mines Act permit from the Ministry of Energy, Mines and Low Carbon Innovation and an Environmental Management Act permit from the Ministry of Environment) and secures the working capital to begin mine construction, the mine development stage is reached. The Northwest Region has one mine development project (Fig. 1; Table 3).

##### 5.1. Premier Gold (Ascot Resources Ltd.)

In early December, Ascot Resources Ltd. received a Mines Act permit for construction and operation of their **Premier Gold** mine project. Ascot reported planning for the transition from early works to full-scale construction. The target date

for initial gold production is Q1 2023. Ascot also carried out 18,074 m of exploration drilling near existing defined resources. The proposed mine is considered a precious metal project, but the company reported discovering new high-grade copper, gold, silver, lead, and zinc mineralization. Highlight intersections included 4.0 m grading 0.17 g/t Au, 137.8 g/t Ag, 3.62% Cu, and 0.65% Zn, and 7.0 m grading 21.13 g/t Au, 110.61 g/t Ag, 2.76% Pb, and >17.14% Zn, and 7.1 m grading 36.2 g/t Au.

The **Premier** underground mine operated between 1918 and 1952 and was one of the largest gold mines in North America, producing 2 Moz Au and 45 Moz Ag. Mineralization is hosted by andesitic tuffs, lapilli tuffs, and andesitic flows of the Unuk River Formation (Hazelton Group) that are cut by early Jurassic calc-alkaline plutons of the Texas Creek suite. Electrum is the principal gold-bearing mineral and is in quartz breccias, veins, and stockworks generally surrounded by an alteration envelope of quartz-sericite-pyrite. Base metal mineralization, as sphalerite and galena associated with argentite and freibergite, is also in quartz veins. The nature of mineralization and metal composition suggest an intermediate-sulphidation epithermal genesis.

#### 6. Proposed mines or quarries

Proposed mines are feasibility-stage projects for which proponents have begun or completed the environmental certification process (generally for late-stage projects) or have submitted or received approvals for Mines Act permits (for

**Table 3.** Mine development projects, Northwest Region.

Project	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resources	Comments
<b>Premier Gold</b>	<b>Ascot Resources Ltd.</b>	Au, Ag; Epithermal; 104B 054	P+Pr: 3.63 Mt 5.45 g/t Au, 19.11 g/t Ag	I: 4.14 Mt 8.01 g/t Au, 35.1 g/t Ag  Inf: 5.06 Mt 7.25 g/t Au, 28.7 g/t Ag	Received a Mines Act permit for construction and operation in December. Plan to transition from early works to full-scale construction. The target date for initial gold production is Q1 2023. Carried out 18,074 m of exploration drilling near existing defined resources. The proposed mine is considered a precious metal project, but the company reported discovering new high-grade copper, gold, silver, lead, and zinc mineralization. Highlight intersections included 4.0 m grading 0.17 g/t Au, 137.8 g/t Ag, 3.62% Cu, and 0.65% Zn, and 7.0 m grading 21.13 g/t Au, 110.61 g/t Ag, 2.76% Pb, and >17.14% Zn, and 7.1 m grading 36.2 g/t Au.

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



projects below British Columbia Environmental Assessment Act thresholds). The Northwest Region contains five proposed metal mines and one proposed coal mine (Fig. 1; Table 4).

### 6.1. Proposed metal mines

The Northwest Region contains five proposed metal mines. **Galore Creek**, **KSM** and **Red Mountain** have been granted an Environmental Assessment Certificate and the **Kutcho** project has begun the environmental assessment process with the

Environmental Assessment Office. The **Dome Mountain Gold** project has both an Environmental Management Act Permit and a Mining Permit, providing for an annual production of up to 75,000 t.

#### 6.1.1. Dome Mountain Gold (Blue Lagoon Resources Inc.)

The **Dome Mountain Gold** project contains an Indicated resource of 175,980 t grading 12.45 g/t Au, 60.41 g/t Ag and an Inferred resource of 408,105 t grading 8.32 g/t Au, 36.12 g/t Ag

**Table 4.** Selected proposed mines, Northwest Region.

Project	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resources	Comments
<b>Dome Mountain</b>	<b>Blue Lagoon Resources Inc.</b>	Au, Ag; Au-quartz veins; 093L 276	na	I: 176,000 t 12.45 g/t Au, 60.41 g/t Ag  Inf: 408,000 t 8.32 g/t Au, 36.12 g/t Ag (resource based on cut and fill method at 3.42 g/t Au cut-off)	20,000 m of drilling. Highlights include 3.0 m grading 24.07 g/t Au and 127.92 g/t Ag, and 4.13 m grading 11.08 g/t Au and 34.39 g/t Ag.
<b>Galore Creek</b>	<b>Galore Creek Mining Corp. (Teck Resources Ltd. 50%, Newmont Corporation 50%)</b>	Cu, Au, Ag; Alkaline porphyry; 104G 090	P+Pr: 528 Mt 0.59% Cu, 0.32 g/t Au, 6.02 g/t Ag	M+I: 1.103 Bt 0.47% Cu, 0.26 g/t Au, 4.2 g/t Ag  Inf: 198 Mt 0.27% Cu, 0.21 g/t Au, 2.7 g/t Ag	8000 m, 31-hole diamond drilling.
<b>KSM</b>	<b>Seabridge Gold Inc.</b>	Cu, Au, Ag, Mo; Porphyry Cu±Mo±Au; 104B 191	P+Pr: 2.20 Bt 0.55 g/t Au, 0.21% Cu, 2.6 g/t Ag, 42.6 g/t Mo	M+I: 3.04 Bt 0.52 g/t Au, 0.21% Cu, 2.8 g/t Ag, 48 g/t Mo  Inf: 4.60 Bt 0.38 g/t Au, 0.32% Cu, 2.2 g/t Ag, 29 g/t Mo (Total for KSM deposits)	9450 m of drilling including 3484 m at Snowfield and Mitchell deposits. In late 2020, Snowfield acquired from Pretium Resources Inc. Results from Snowfield confirm prior drilling results; Snowfield might be incorporated in a new mining plan.
<b>Kutcho</b>	<b>Kutcho Copper Corp.</b>	Cu, Pb, Zn; Noranda/Kuroko VMS; 104I 060	Pr: 17.3 Mt 1.58% Cu, 2.31% Zn, 27.9 g/t Ag, 0.39 g/t Au	M+I: 22.8 Mt 1.52% Cu, 2.18% Zn, 0.39 g/t Au, 28.1 g/t Ag  Inf: 12.9 Mt 1.10% Cu, 1.58% Zn, 0.25 g/t Au, 20.0 g/t Ag	Favourable feasibility study released. The project would have an eleven-year open pit and underground mine life.
<b>Red Mountain</b>	<b>Ascot Resources Ltd.</b>	Au, Ag; Subvolcanic and precious metal veins; 103P 086	P+Pr: 2.54 Mt 6.52 g/t Au, 20.60 g/t Ag	M+I: 3.19 Mt 7.63 g/t Au, 21.02 g/t Ag  Inf: 0.41 Mt 5.32 g/t Au, 7.33 g/t Ag	Environmental baseline monitoring.
<b>Tenas</b>	<b>Allegiance Coal Ltd. 95%, Itochu Corp. 5%</b>	PCI; Bituminous coal; 093L 156	P+Pr: 62.9 Mt coal	na	Geotechnical drilling, continued finalizing Environmental Assessment Certificate application. Proposed production 775-825 kt of steelmaking coal annually with a mine-life of 22 years.

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

HCC = hard coking coal; PCI = pulverized coal injection; TC = thermal coal

(with a cut and fill method at 3.42 g/t Au cut-off). The company entered into a milling agreement with Nicola Mining Inc. in which ore will be trucked for processing at a mill west of Merritt.

Orogenic gold-silver mineralization is mainly in two zones (the Boulder vein and Argillite vein systems) in fragmental volcanic rocks of the Telkwa Formation and basalts and altered volcanic rocks of the Nilkitkwa Formation. In addition to the larger vein systems, more than a dozen other mineralized veins are on the property, mostly striking east-west and northwest-southeast. Veins (0.7 to 4.5 m wide) contain quartz±calcite±ankerite with lesser sulphide mineralization. Alteration, consisting of abundant carbonate-sericite-pyrite, envelopes veins and is positively correlated with gold.

Blue Lagoon carried out a 20,000 m diamond drilling program. The first phase tested deep targets and results included 3.0 m grading 24.07 g/t Au and 127.92 g/t Ag, and 4.13 m grading 11.08 g/t Au and 34.39 g/t Ag. The second phase targeted geophysical and geochemical anomalies. Results included 0.65 m grading 40 g/t Au, and 441 g/t Ag.

#### 6.1.2. Galore Creek (Galore Creek Mining Corporation)

The **Galore Creek** Cu-Au project is operated by the Galore Creek Mining Corporation and is jointly owned by Teck Resources Limited and Newmont Corporation. The project is 70 km west of the Bob Quinn airstrip adjacent to Highway 37, where a mine access road has been partially constructed.

The Galore Creek alkalic complex includes multiphase syenite, monzonite, and monzodiorite dikes and stocks that cut volcanic and sedimentary rocks of the Stuhini Group. Mineralization is thought to be at the endmember of the silica-undersaturated porphyry Cu-Au deposit type. At the Central zone (the principal economic resource) initial potassic alteration and gold-copper and sulphide mineralization formed from highly oxidized fluids. Hydrothermal processes during the second period generated calcic alteration and brecciation, followed by potassic alteration and mineralization of bornite and chalcopyrite (Micko et al., 2014).

The Galore Creek project contains a Proven and Probable reserve of 528 Mt grading 0.59% Cu, 0.32 g/t Au, and 6.02 g/t Ag and a Measured plus Indicated resource of 1.103 Bt grading 0.47% Cu, 0.26 g/t Au, and 4.2 g/t Ag, with an additional Inferred resource of 198 Mt grading 0.27% Cu, 0.21 g/t Au, and 2.7 g/t Ag. An 8000 m, 31-hole diamond drilling program was carried out in 2021.

#### 6.1.3. KSM (Seabridge Gold Inc.)

The **KSM** project consists of four porphyry Cu-Au deposits: Kerr, Sulphurets, Mitchell, and Iron Cap. It is the largest undeveloped gold project in the world by resources: Measured and Indicated resources 3.04 Bt grading 0.52 g/t Au, 0.21% Cu, 2.8 g/t Ag, and 0.0048% Mo and an Inferred resource of 4.59 Bt grading 0.38 g/t Au, 0.32% Cu, 2.4 g/t Ag, and 0.0029% Mo. The total KSM Proven and Probable reserves are 2.198 Bt grading 0.55 g/t Au, 0.21% Cu, 2.6 g/t Ag and 0.0043% Mo.

A Preliminary Economic Assessment (April, 2020) proposed a mine life of 44 years producing 27.6 Moz Au and 17.0 Blbs Cu. The initial capital for mine construction and development is \$5.2 billion, with a four-year payback period. In late 2020, Seabridge acquired the **Snowfield** property from Pretium Resources Inc. Seabridge has announced plans to integrate Snowfield into the KSM project. In 2021, Seabridge carried out 9450 m of drilling, including 3484 m at Snowfield and Mitchell. Drilling results at Snowfield matched grades previously reported by Pretium, suggesting that blending Snowfield ore with Mitchell production could lead to extension of open pit mining before underground block-cave mining is needed. A new KSM Preliminary Feasibility Study is scheduled for completion mid-2022.

KSM is part of the Sulphurets district, which contains abundant porphyry Cu-Au and related systems along a 200 km-long north-northwest trending corridor in northwestern Stikinia (Febbo et al., 2019). Four phases of calc-alkaline porphyry Cu-Au-Mo mineralization at KSM are genetically related to dioritic intrusions of the Sulphurets suite (Febbo et al., 2015), with the deposits distributed along a 12 km-long north-striking linear array. The intrusions cut volcanosedimentary rocks of the Stuhini Group (Upper Triassic) and sandstones, conglomerates, and andesitic rocks of the Jack Formation, a basal unit of the Hazelton Group (Upper Triassic to Lower Jurassic). Mineralization is disseminated in sheeted quartz veinlets and clustered quartz-vein stockworks and is open at depth.

#### 6.1.4. Kutcho (Kutcho Copper Corp.)

The **Kutcho** project is accessible by a 100 km-long seasonal gravel road and an airstrip 10 km from the deposit. Kutcho Copper Corp. entered the environmental assessment process late in 2019 and has received a Section 11 Order that defines the scope of the assessment and the Indigenous Nations that the company will engage with. The project is not required to undertake a federal environmental assessment.

The project includes three main zones: Main, Esso, and Sumac. Considered to be Kuroko-type volcanic massive sulphides, the Cu-Zn-Au-Ag deposits are in felsic and largely fragmental volcanic rocks in the upper part of the Kutcho Formation, a Permian-Triassic unit of bimodal volcanic rocks.

A 2021 Feasibility Study announced favourable economics using US\$3.50/lb Cu and US\$1.15/lb Zn. The project would have an eleven-year open pit and underground mine life. Reported Proven and Probable mineral reserves are 17.3 Mt grading 1.58% Cu, 2.31% Zn, 27.9 g/t Ag, 0.39 g/t Au. Mineral resources Measured and Indicated (inclusive of reserves) are reported as 22.8 Mt grading 1.52% Cu, 2.18% Zn, 28.1 g/t Ag, 0.39 g/t Au.

#### 6.1.5. Red Mountain (Ascot Resources Ltd.)

**Red Mountain** is a proposed underground mine 18 km east-northeast of Stewart. The deposit was first discovered in 1989 and has been extensively explored since, with 466 diamond-drill holes and more than 2000 m of underground

development. A provincial and federal Environmental Assessment Certificate was received in 2018. The project was purchased by Ascot Resources from IDM Mining in 2019 for \$45 million. A Feasibility Study was completed in 2020. Red Mountain is estimated to contain Measured and Indicated resources of 3.19 Mt grading 7.63 g/t Au and 21.02 g/t Ag and an additional Inferred resource of 405,000 t grading 5.32 g/t Au and 7.33 g/t Ag (reported at 3.0 g/t Au cut-off for long hole stoping).

The property is underlain by Upper Triassic-Lower Jurassic metasedimentary and volcanic rocks that were intruded by a multi-phased intermediate intrusive complex. Gold is in pyrite-rich brecciated bodies and stockworks along the margins of the intrusive rocks, with low-temperature quartz-sericite-pyrite (phyllic) alteration containing high-grade gold and high-temperature K-feldspar alteration.

Environmental baseline monitoring continued this year, although no exploration work was done as Ascot concentrated on developing their Premier Gold project.

## 6.2. Proposed coal mines

There is currently one proposed coal mine, Allegiance Coal Limited's **Tenas** project.

### 6.2.1. Tenas (Allegiance Coal Ltd. 90%, Itochu Corp. 10%)

Telkwa Coal Ltd., a subsidiary of Allegiance Coal Ltd., is proposing to develop the **Tenas** project, which is road accessible, approximately 17 km south of Smithers. The project entered the provincial environmental assessment process in 2018 and the project proposes to produce approximately 775,000-825,000 t of steelmaking coal annually with a mine-life of 22 years. In 2017, Allegiance Coal Ltd. released a reserve estimate of Proven plus Probable reserves of 62.9 Mt of coal.

At least 14 coal seams have been recognized in the Skeena Group (Lower-Upper Cretaceous) with individual seams up to 7.6 m thick. Currently there are four conceptual pits (from south to north: Tenas, Goathorn West, Goathorn East, and Telkwa North) on approximately 1050 ha. The current environmental assessment application is only for production of metallurgical coal from the Tenas pit. Proven plus Probable reserves for Tenas are 29.1 Mt. In 2021, Telkwa carried out geotechnical drilling to support the planned management ponds and continued finalizing their environmental assessment certificate application.

## 7. Selected exploration activities and highlights

Exploration projects are described on a continuum from early to advanced stages. The earliest stages are considered grassroots. Typically, where the collection of rock and soil samples are collected for geochemical analysis, commonly in conjunction with regional mapping and geophysical surveys. This preliminary work is predominantly benign and is used to generate targets to test, usually by drilling. At these early stages it is a common practice to establish base-line environmental testing and engage with communities and First Nations. As a

project progresses, drilling may delineate a mineral resource and establish baseline economics. Later stages of exploration generally coincide with mine evaluation, feasibility, and economic studies, which include environmental, social, engineering, and financial considerations.

## 7.1. Selected precious metal projects

The Northwest Region has numerous precious metal projects (Fig. 1; Table 5), many of which are in the area popularly known as the Golden Triangle.

### 7.1.1. Atsutla Gold (Trailbreaker Resources Ltd.)

The **Atsutla Gold** project is 70 km south of the British Columbia-Yukon border and 120 km northwest of Dease Lake. Sampling identified multiple high-grade gold zones and drilling is planned for 2022. Rock sample results include 222.05 g/t Au and 165.4 g/t Ag with 1894 g/t Ag.

### 7.1.2. BAM (Monarch Gold) (P2 Gold Inc.)

P2 Gold Inc. drilled six holes totalling 835.9 m at their **BAM** project about 150 km northwest of Stewart. Four of the six holes were drilled at the **Monarch Gold** zone. Results included 45.85 m grading 2.63 g/t gold, including 9.2 m grading 7.3 g/t Au. A 2022 exploration program is financed, and planned work includes a ZTEM airborne survey and 8000 to 10,000 m of diamond drilling.

### 7.1.3. Buck (Sun Summit Minerals Corp.)

Sun Summit Minerals Corp. is exploring the 15,000 ha **Buck** property, which lies on an all-season access road 12 km south of Houston. The property is underlain by andesitic to rhyolitic tuffs, flows, and breccias of the Hazelton Group (Upper Triassic to Lower Jurassic). Sulphides are in veinlets, disseminations, or coarse fracture fillings, mainly in rhyolitic breccias. Sun Summit carried out more than 10,000 m of drilling in 50 holes targeting high-grade and bulk tonnage gold mineralization across an area of more than 500 by 500 m. The drilling was to follow up on a 2020 discovery hole that intersected 17 m grading 5.86 g/t Au. Initial assay results indicated both high-grade and bulk tonnage mineralization. Results included 4.0 m grading 31.6 g/t Au and 109 m grading 1.07 g/t Au.

### 7.1.4. Casper (Garibaldi Resources Corp.)

Garibaldi Resources Corp.'s **Casper** target is a quartz vein gold system. Initial drilling results in 2020 included 0.72 m grading 9.1 g/t Au and 4.0 m grading 8.89 g/t Au. This year, Garibaldi followed up with a fall drilling program totalling 1152 m in five holes.

### 7.1.5. Cassiar Gold (Cassiar Gold Corp.)

Cassiar Gold Corp. expected to complete up to 14,000 m of diamond drilling at their **Cassiar Gold** project. At the Taurus deposit 4000 m of drilling was completed; at the Cassiar South target drilling was ongoing. Results from the Taurus deposit included 23.2 m grading 3.56 g/t Au, 13.1 m grading

**Table 5.** Selected Exploration projects, Northwest Region.

<b>Project</b>	<b>Operator (partner)</b>	<b>Commodity; Deposit type; MINFILE</b>	<b>Resources (NI 43- 101 compliant unless indicated otherwise)</b>	<b>Comments</b>
<b>American Creek</b>	<b>Mountain Boy Minerals Ltd.</b>	Ag, Pb, Zn, Au; Polymetallic veins; 104A 011	na	866 m of drilling at High-Grade zone. Results included 3.9 m grading 24.61 g/t Ag, 0.020 g/t Au, 0.085% Cu, 2.15% Pb, and 2.19% Zn.
<b>Atsutla Gold</b>	<b>Trailbreaker Resources Ltd.</b>	Au, Ag; Polymetallic veins; 104O 007	na	Sampling identified high-grade zones. Rock sample results include 222.05 g/t Au and 165.4 g/t Au with 1894 g/t Ag.
<b>BA</b>	<b>Mountain Boy Minerals Ltd.</b>	Ag, Cu, Pb, Zn; Subaqueous hot spring Ag-Au; 104A 180	na	650 m of drilling tested northern extension of Barbara zone. Results included 7.67 m grading 38.06 g/t Ag, 0.013% Cu, 0.86% Pb, 2.67% Zn, and 1.09 m grading 84.66 g/t Ag, 0.017% Cu, 3.76% Pb, 6.30% Zn.
<b>BAM (Jan Copper)</b>	<b>P2 Gold Inc.</b>	Cu, Au; Epithermal Au-Ag-Cu	na	Two holes drilled. Results included 39.25 m grading 0.01 g/t Au, 1.10% Cu including 9.15 m grading 0.04 g/t Au, and 3.23% Cu.
<b>BAM (Monarch Gold)</b>	<b>P2 Gold Inc.</b>	Au; Epithermal Au-Ag-Cu	na	Four holes drilled. Results included 45.85 m grading 2.63 g/t Au, including 9.2 m grading 7.3 g/t Au.
<b>Berg</b>	<b>Surge Copper Corp.</b>	Cu, Mo, Ag; Porphyry Cu±Mo±Au; 093E 046	M+I: 610 Mt 0.27% Cu, 0.03% Mo, 3.0 g/t Ag  Inf: 28.1 Mt 0.22% Cu, 0.02% Mo, 3.8 g/t Ag	Released an updated NI 43-101 resource estimate. Fall diamond drilling was expected to total 4500 m.
<b>Big Red</b>	<b>Libero Copper &amp; Gold Corp.</b>	Cu, Au; Alkalic porphyry; 104G 208	na	4571 m of drilling at Terry porphyry target. Results included 118.7 m grading 0.26% Cu, 0.06 g/t Au, and 1.83 g/t Ag within 510.0 m grading 0.18% Cu, 0.04 g/t Au, and 1.23 g/t Ag.
<b>Buck</b>	<b>Sun Summit Minerals Corp.</b>	Au, Ag, Zn, Pb, Cu; Polymetallic veins; 093L 009	na	17,464 m of drilling. Results included 4.0 m grading 31.6 g/t Au and 109 m grading 1.07 g/t Au.
<b>Cannonball</b>	<b>Goldrea Resources Corp.</b>	Cu, Au; Alkalic porphyry	na	IP survey and prospecting.
<b>Casper</b>	<b>Garibaldi Resources Corp.</b>	Au; Precious metal veins		1152 m of drilling.
<b>Cassiar Gold</b>	<b>Cassiar Gold Corp.</b>	Au; Precious metal veins; 104P 012, 19	Inf: 21.83 Mt 1.43 g/t Au (0.7 g/t Au cut-off)	14,000 m of drilling. Results from Taurus included 23.2 m grading 3.56 g/t Au, 13.1 m grading 3.53 g/t Au, and 37.8 m grading 1.8 g/t Au. Results from Cassiar South included 4.8 m grading 35.1 g/t Au and 6.4 m grading 12.6 g/t Au.



Table 5. Continued.

<b>Dardanelle</b>	<b>Decade Resources Ltd.</b>	Au, Ag, Pb; Polymetallic veins; 103I 107	na	Grab samples returned high-grade results including 695.6 g/t Au, 206 g/t Ag, 2.3% Pb and 102.9 g/t Au, 112.0 g/t Ag, 3.42% Pb.
<b>Del Norte</b>	<b>Decade Resources Corp.</b>	Au, Ag; Polymetallic veins; 103P 301	na	4147 m of drilling. Partial assay highlight results included 3.05 m grading 13.77 g/t Au, and 2661 g/t Ag within 9.91 m grading 4.28 g/t Au, and 1091.6 g/t Ag.
<b>DOC</b>	<b>Hanstone Gold Corp.</b>	Au, Ag; Intrusion-related, mesothermal; 104B 014	na	2700 m drilling. Two shallow small diameter backpack holes returned gold grades of 12 g/t Au in one hole and 10 g/t Au in the other along 1 m of core. Bulk sampling: 1 t from Q19 vein; 1 t sample from TRJC vein.
<b>Dolly Varden</b>	<b>Dolly Varden Silver Corporation</b>	Cu, Pb, Zn, Ag, Au; Kuroko VMS with polymetallic veins; 103P 188	I: 3.42 Mt 299.8 g/t Ag  Inf: 1.29 Mt 277.0 g/t Ag	10,506 m of drilling. Early results included 1532 g/t Ag, 0.44 g/t Au, 2.11% Pb, and 1.07% Zn along 1.22 m core length in a brecciated sulphide-rich quartz vein hosted in a broader pyrite stockwork breccia zone of 17.50 m grading 214 g/t Ag, and 0.47% Pb.
<b>Dungate</b>	<b>Edgemont Gold Corp.</b>	Cu, Au; Porphyry Cu±Mo±Au; 093L 010	na	3429 m of drilling. Six of the seven holes intersected sulphide-mineralized porphyry.
<b>Dunwell</b>	<b>Stinger Resources Inc.</b>	Au, Ag; Polymetallic veins; 103P 052	na	Diamond drilling, reported assays included 0.35 m grading 12.7 g/t Au, and 35.7 g/t Ag, 2.21 m grading 4.0 g/t Au, and 38.1 g/t Ag, and 1.64 m grading 2.3 g/t Au, and 60.3 g/t Ag.
<b>E&amp;L</b>	<b>Garibaldi Resources Corp.</b>	Ni, Cu, Co, Pt, Pd, Au; Tholeiitic intrusion hosted; 104B 006	na	Planned drilling cancelled because of weather.
<b>Emerson</b>	<b>Harvest Gold Corporation</b>	Cu, Au, Mo; Porphyry Cu±Mo±Au	na	Airborne magnetic survey, near surface Rotary Air Blast (RAB) drilling, and a ground 3D IP survey. The IP survey outlined a chargeability high anomaly 1000 by 1800 m in plan and 300 m thick, dipping gently to the south. The IP anomaly coincides with quartz-sericite pyrite alteration identified in the RAB drilling.
<b>Engineer</b>	<b>Engineer Gold Mines Ltd.</b>	Au, Ag; Epithermal; 104M 014	Inf: 41,000 t 19.0 g/t Au	Began drilling water monitoring wells to support an application to complete a 10,000 t bulk sample.

Table 5. Continued.

<b>Eskay Creek</b>	<b>Skeena Resources Limited</b>	Au, Ag, Cu, Pb, Zn; VMS and precious metal veins; 104B 008	<p>I: 12.7 Mt 4.3 g/t Au, 110 g/t Ag (pit constrained)</p> <p>Inf: 14.4 Mt 2.3 g/t Au, 47 g/t Ag (pit constrained)</p> <p>I: 819,000 t 6.4 g/t Au, 139 g/t Ag (underground)</p> <p>Inf: 295,000 t 7.1 g/t Au, 82 g/t Ag (underground)</p>	4375 m of drilling in the spring. Results included 8.20 m grading 3.99 g/t Au and 71 g/t Ag. 35,000 m drill program started in late summer. 116 km of soil sampling. Positive Prefeasibility Study released. Drilling of historic waste pile returned results including 22.80 m grading 4.16 g/t Au, and 204 g/t Ag and 16.77 m grading 5.90 g/t Au and 317 g/t Ag.
<b>Eskay-Corey</b>	<b>Eskay Mining Corp. (80%) and Kirkland Lake Gold Ltd. (20%)</b>	Au, Ag, Cu, Zn; Noranda/Kuroko massive sulphide; 104B 385	na	Property wide SkyTEM helicopter-borne electromagnetic survey and completed 23,500 m of diamond drilling. Highlight intersections included 92.29 m grading 1.1 g/t Au, and 124.0 g/t Ag including 24.09 m grading 2.2 g/t Au, and 374.0 g/t Ag, and 35.5 m grading 2.2 g/t Au, and 28.2 g/t Ag including 3.39 m grading 12.6 g/t Au, 50.8 g/t Ag.
<b>Foremore</b>	<b>Sassy Resources Corporation</b>	Au, Ag, Pb, Cu; Polymetallic veins	na	1684 line-km of VTEM, ground truthing of anomalies, diamond drilling (2691 m) began at the Westmore Discovery zone.
<b>Georgia</b>	<b>Scottie Resources Corp.</b>	Au, Ag, Pb, Zn, Cu; Intrusion-related Au pyrrhotite veins; 103O 013	na	Scottie Resources amalgamates with AUX Resources Corporation, assets include Georgia project. Diamond drilling carried out.
<b>Golddigger</b>	<b>Goliath Resources Limited</b>	Au, Cu, Pb, Zn; Polymetallic veins	na	6000 m of diamond drilling planned at Surebet target. Reported results included 35.7 m grading 4.46 g/t Au, and 122.13 g/t Ag, along with base metal mineralization.
<b>Hard Nickel Group</b>	<b>Nickel Rock Resources Inc.</b>	Ni, Fe; Podiform chromite; 093K 038	na	Rock sampling and soil geochemical surveys.
<b>Hat</b>	<b>Doubleview Gold Corp.</b>	Cu, Au; Alkalic porphyry; 104J 021	na	2476 m of diamond drilling. Drilling results included 907.8 m grading 0.31 g/t Ag, 0.12 g/t Au, 4.74 g/t Co, 0.15% Cu, 0.03 g/t Pd, and 28.64 g/t Sc.
<b>Hazelton (Netalzul Mountain)</b>	<b>Jaxon Mining Inc.</b>	Cu, Au; Sediment-hosted Cu; 094D 104	I: 5.0 Mt 0.5% Cu, 11.9 g/t Ag (non NI 43-101)	2483 m of diamond drilling. Volterra IP and MT surveys, lidar survey, petrological studies, rock dating studies, and structural mapping. Highlight drill results included 14.2 m in sulphide breccia grading 0.10 g/t Au, 50 g/t Ag, 0.1281% Cu, 0.01% Pb, 0.045% Sb, 0.05% Zn and 7.4 m in monzonite dikes grading 0.45% Cu, 12 g/t Ag, 0.019% Mo and 0.026% Zn.

Table 5. Continued.

<b>Homestake Ridge</b>	<b>Dolly Varden Silver Corporation</b>	Au, Ag, Cu, Pb, Zn; Epithermal; 103P 216	I: 0.736 Mt 7.02 g/t Au, 74.8 g/t Ag, 0.18% Cu, 0.077% Pb  Inf: 5.55 Mt 4.58 g/t Au, 100 g/t Ag, 0.13% Cu, 0.142% Pb.	Definitive agreement announced, Dolley Varden Silver Corporation would acquire the project from Fury Gold Mines Ltd.
<b>Iskut</b>	<b>Seabridge Gold Inc.</b>	Cu, Au; Porphyry; 104B 694	na	MT geophysical survey.
<b>Kinskuch (Hecla)</b>	<b>Hecla Mining Company</b>	Cu, Ag, Au; Porphyry; 103P 016	na	4311 m of diamond drilling.
<b>Kirkham</b>	<b>Metallis Resources Inc.</b>	Cu, Au; Porphyry; 104B 209	na	4785 m of diamond drilling, high-resolution IP survey. Drilling reported to have intersected stockwork and disseminated sulphide mineralization, including chalcopyrite.
<b>KSP (Inel)</b>	<b>QuestEx Gold&amp;Copper Exploration Ltd.</b>	Au, Ag; Au-quartz veins	na	4000 m of diamond drilling planned. IP survey.
<b>KSP (Sericate ridge)</b>	<b>QuestEx Gold&amp;Copper Exploration Ltd.</b>	Cu, Au; Porphyry	na	IP survey outlined a 1500 by 1000 m high chargeability and high resistivity anomaly with a signature consistent with a porphyry system. The anomaly is below part of an 8 by 3.5 km alteration zone (Sericate Ridge).
<b>LGM</b>	<b>Origen Resources Ltd.</b>	Au, Ag; Epithermal; 104G 447	na	Modelling of magnetic and VTEM data identified magnetic and electromagnetic anomalies coincident with a gold and silver geochemical anomaly known as the Hidden Gold zone.
<b>Midas</b>	<b>Juggernaut Exploration Ltd.</b>	Au, Ag, Cu, Zn; Skarn; 103I 131	na	New mineralized outcrop discovered. A 1 m chip sample assayed 9.34 g/t Au, 117 g/t Ag, 1.58% Cu, and 1.77% Zn.
<b>New Polaris</b>	<b>Canagold Resources Ltd.</b>	Au; Au-quartz veins; 104K 003	I: 1.69 Mt 10.8 g/t Au  Inf: 1.48 Mt 10.2 g/t Au	28,000 m of diamond drilling started. Results included 6.6 m grading 24.2 g/t Au, 3.9 m grading 30.8 g/t Au, 17.8 m grading 11.1 g/t Au, and 8.4 m grading 17.1 g/t Au.
<b>Newmont Lake</b>	<b>Enduro Metals Corporation</b>	Au, Cu, Ag; Intrusion-related Au pyrrhotite veins; 104B 126	na	10,000 m of diamond drilling planned. IP and MT surveys. Drill results from Burgundy ridge target included 331.43 m grading 0.35 g/t Au, 5.5 g/t Ag, 0.29% Cu, and 0.49% Zn.

Table 5. Continued.

<b>Ootsa</b>	<b>Surge Copper Corp.</b>	Cu, Au, Ag, Mo; Calc-alkaline porphyry; 093E 105	M+I: 224 Mt 0.22% Cu, 0.15g/t Au, 0.021% Mo, 2.8 g/t Ag  Inf: 5.2 Mt 0.18% Cu, 0.09 g/t Au, 0.019% Mo, 2.6 g/t Ag (2016 Prefeasibility Study)	26,556 m of diamond drilling at West Seel deposit. Highlights included 495 m grading 0.25% Cu, 0.21 g/t Au, 3.4 g/t Ag, and 0.021% Mo.
<b>Oweegee</b>	<b>Sanatana Resources Inc.</b>	Cu, Au; Subvolcanic Cu-Ag-Au (As-Sb); 104A 165	na	Property-wide sampling and IP survey over the Molly zone and Glacier, Delta, and Skowill prospects.
<b>Poplar</b>	<b>Universal Copper Ltd.</b>	Cu, Au, Ag, Mo; Porphyry Cu±Mo±Au	na	3000 m of diamond drilling.
<b>Porter</b>	<b>Strikepoint Gold Inc.</b>	Au, Ag, Zn, Pb; Polymetallic veins; 103P 089	na	Diamond drilling started in late summer.
<b>Ranch</b>	<b>Thesis Gold Inc.</b>	Au, Ag; Epithermal; 094E 267	na	16,139 m of diamond drilling. Initial drilling results included 34 m grading 19.56 g/t Au, including 7 m grading 82.48 g/t Au, and 25 m grading 9.53 g/t Au.
<b>Rock and Roll</b>	<b>Etruscus Resources Corp.</b>	Cu, Zn, Pb, Au; Besshi VMS and intrusion related precious metal veins; 104B 377	Inf: 2.02 Mt 0.71 g/t Au, 87.1 g/t Ag, 0.23% Cu, 0.23% Pb, 0.98% Zn	Geological mapping and sampling (64 silt, 385 soil, 297 rock). Results outlined two high-priority targets.
<b>Ruby Creek (Silver Surprise)</b>	<b>Stuhini Exploration Ltd.</b>	Ag; Unknown	na	Soil sampling, IP surveys, mapping, and prospecting.
<b>Schaft Creek</b>	<b>Teck Resources Ltd. (75%), Copper Fox Minerals Inc. (25%)</b>	Cu, Mo, Au, Ag; Porphyry Cu±Mo±Au; 104G 015	M+I: 1.346 Bt 0.26% Cu, 0.16 g/t Au, 0.017% Mo, 1.25 g/t Ag  Inf: 343.6 Mt 0.17% Cu, 0.11 g/t Au, 0.013% Mo, 0.84 g/t Ag	Updated Mineral Resource estimate released. Favourable Preliminary Economic Assessment released. Drilling of 835 m completed to collect samples for metallurgical testing. Environmental baseline studies carried out.
<b>Scottie Gold Mine</b>	<b>Scottie Resources Corp.</b>	Au, Ag, Cu; Intrusion-related and polymetallic veins; 104B 034	na	Diamond drilling at the Blueberry zone. Results included 10.0 m grading 16.5 g/t Au, 4.94 m grading 28.8 g/t Au, and 6.05 m grading 12.0 g/t Au. Drilling increased the zone's known strike length by 650 m.
<b>Silvertip</b>	<b>Coeur Mining Inc.</b>	Ag, Pb, Zn; Manto carbonate- replacement; 104O 038	M+I: 1.18 Mt at 222.73 g/t Ag, 4.09% Pb, 8.58% Zn  Inf: 0.53 Mt at 271.04 g/t Ag, 5.02% Pb, 9.31% Zn	Exploration included 100,000 m of drilling; discovered manto mineralization at the Southern Silver zone. Highlight results included 20.0 m grading 92.5 g/t Ag, 16.9% Zn, and 0.5% Pb, and 10.8 m grading 445.7 g/t Ag, 19.4% Zn, and 7.5% Pb.
<b>Silver Hope</b>	<b>Finlay Minerals Ltd.</b>	Cu, Ag, Au, Zn, Pb, Mo; Subvolcanic Cu-Ag-Au (As-Sb); 093L 056	na	IP survey outlined two chargeability and resistivity anomalies. A planned 2000 m of diamond drilling started in the fall.



Table 5. Continued.

<b>Silver Queen</b>	<b>Equity Metals Corporation</b>	Ag, Pb, Zn, Au; Transitional porphyry- epithermal; 093L 002	I: 815,000 t 6.4% Zn, 3.2 g/t Au, 201.4 g/t Ag, 0.26% Cu, 1.0% Pb  Inf: 801,000 t 5.2% Zn, 2.5 g/t Au, 184 g/t Ag, 0.31% Cu, 0.9% Pb (resources at NSR cut-off of C\$100/t)	4991 m of diamond drilling in the winter-spring. Highlight results included 0.3 m grading 14,035 g/t Ag, 0.1 g/t Au, 0.5% Cu, 1.3% Pb, and 3.3% Zn within a 7.7 m interval grading 919 g/t Ag, 0.1 g/t Au, 0.1% Cu, 1.3% Pb, and 1.8% Zn. Drilling resumed in the fall with 4500 m planned. Initial results included 1.4 m grading 1097 g/t Ag, 0.1 g/t Au, 0.2% Cu, 0.5% Pb, 2.2% Zn, and 3.7 m grading 1143g/t Ag, 0.1% Zn.
<b>Silver Vista</b>	<b>Norseman Silver Inc.</b>	Cu, Ag; Cu±Ag quartz veins; 093M 195	na	1507 m of diamond drilling. Results included 47.82 m grading 37 g/t Ag and 0.21% Cu and 46 m grading 48 g/t Ag and 0.62% Cu.
<b>Skelly</b>	<b>Trailbreaker Resources Ltd.</b>	Au, Ag; Au-quartz veins	na	Soil sampling; 1.5 m chip sample returned 25.4 g/t Au and 882 g/t Ag. Grab samples assayed up to 3.43 g/t Au and 78.3 g/t Ag.
<b>Snip Gold</b>	<b>Hochschild Mining PLC</b>	Au, Ag; Intrusion-related Au pyrrhotite veins; 104B 250	I: 539,000 t 14.0 g/t Au  Inf: 942,000 t 13.3 g/t Au	High-grade intersections from drilling included 3.22 m grading 155.76 g/t Au, 4.41 m grading 110.22 g/t Au, and 12.5 m grading 27.04 g/t Au. In October, it was announced that Hochschild Mining PLC intended to take over as operator, earning a 60% interest from Skeena Resources Limited by spending approximately \$100 million during the option period.
<b>Snoball</b>	<b>Evergold Corp.</b>	Au, Ag; Intrusion-related Au pyrrhotite veins; 104G 143	na	400 m of diamond drilling. Assay results included 2.4 m grading 6.2 g/t Au, 11.9 g/t Ag.
<b>Snowfield</b>	<b>Seabridge Gold Inc.</b>	Cu, Au, Ag, Mo, Re; Porphyry Cu±Mo±Au; 104B 179	M+I: 1.37 Bt 0.59 g/t Au, 1.72 g/t Ag, 0.10% Cu, 85.5 ppm Mo, 0.57 ppm Re  Inf: 833 Mt 0.34 g/t Au, 1.90 g/t Ag, 0.06% Cu, 69.5 ppm Mo, 0.43 ppm Re (2011 Pretium Technical Report)	Diamond drilling. Results matched grades previously reported by Pretium Resources Inc. suggesting that blending Snowfield ore with Mitchell production could lead to extension of open pit mining before underground block-cave mining is needed.
<b>Stars</b>	<b>Aurwest Resources Corporation</b>	Cu, Au, Ag, Mo; Porphyry Cu±Mo±Au; 093L 367	na	Mapping, sampling, stream-sediment sampling, and a deep penetrating IP surveying.
<b>Stellar</b>	<b>Aurwest Resources Corporation</b>	Cu, Au, Ag, Mo; Porphyry Cu±Mo±Au	na	Mapping, sampling, stream-sediment sampling, and a deep penetrating IP surveying.

Table 5. Continued.

<b>Tatogga (Saddle North)</b>	<b>Newmont Corporation</b>	Cu, Au, Ag; Porphyry Cu-Au (alkalic); 104G 432	I: 298 Mt 0.28% Cu, 0.36 g/t Au, 0.8 g/t Ag  Inf: 543 Mt 0.25% Cu, 0.31 g/t Au, 0.7 g/t Ag	Asset included in purchase of GT Gold Corp. for estimated \$456 million. Newmont worked with the Tahltan Heritage Resources Environmental Assessment Team on a Tahltan land use study and with Tahltan Environmental Management to begin environmental studies.
<b>Telegraph</b>	<b>Mountain Boy Minerals Ltd.</b>	Cu; Porphyry Cu-Au (alkalic)	na	268 soil samples, and 141 rock samples. Many (30%) of the rock samples graded 0.5% Cu or higher, including 17.9% Cu. Three new zones of mineralization were discovered.
<b>Theia</b>	<b>Mountain Boy Minerals Ltd.</b>	Ag, Au, Pb, Cu, Zn; Polymetallic veins	na	Grab sampling. Results included 9676 g/t Ag, 1.59 g/t Au, 13.4% Pb, 0.64% Cu, and 2.75% Zn.
<b>Thorn (Camp Creek)</b>	<b>Brixton Metals Corporation</b>	Cu, Ag, Au; Porphyry Cu±Mo±Au	na	Diamond drilling. Results included 821.25 m grading 0.24% Cu, 0.10 g/t Au, 2.44 g/t Ag, and 174 ppm Mo, with a 318.25 m interval grading 0.42% Cu, 0.17 g/t Au, 3.87 g/t Ag, and 294 ppm Mo.
<b>Thorn (Trapper)</b>	<b>Brixton Metals Corporation</b>	Au; Epithermal	na	3107 m diamond drilling. Initial results: one hole 139 m grading 2.14 g/t Au, with 11.0 m interval grading 19.25 g/t Au; second hole 146 m grading 0.74 g/t Au with 31 m interval grading 2.0 g/t Au.
<b>Treaty Creek</b>	<b>Tudor Gold Corp. (60%), Teuton Resources Corp. (20%), American Creek Resources Ltd. (20%)</b>	Cu, Au; Porphyry; 104A 004	na	30,108 m of diamond drilling. Results included 556.5 grading 0.73 g/t Au, 6.27 g/t Ag, and 0.489% Cu and 1320 m grading 0.67 g/t Au, 3.70 g/t Ag, and 0.216% Cu.
<b>Trek</b>	<b>Romios Gold Resources Inc.</b>	Cu, Au; Porphyry Cu-Au (alkalic); 104G 022	na	Mapping and sampling. New zone called Trek South located. The zone contains porphyry-style epidote alteration with a coincident >800 m wide zone of quartz-pyrite ±chalcopyrite veinlets. Veinlets returned assay values from trace up to 1.83% Cu, 2.3 g/t Au, and 257 g/t Ag. Veinlets are 1-10 cm wide and locally form dense stockworks.
<b>Turnagain</b>	<b>Giga Metals Corporation</b>	Ni, Co, Pt, Cu, Mo; Alaskan-type, magmatic; 104I 014	M+I: 1.073 Bt 0.220% Ni and 0.013% Co  Inf: 1.142 Bt 0.217% Ni and 0.013% Co	Archaeological surveys, wildlife surveys, resource infill drilling (6295 m), geotechnical drilling, seismic refraction surveys, test pits excavated. Work was to collect exploration, geotechnical, and other data to advance project engineering to the Pre-Feasibility level.

Table 5. Continued.

<b>Williams</b>	<b>CopAur Minerals Inc.</b>	Au; Epithermal; 094E 028	na	3150 m of diamond drilling. Property-wide VTEM airborne survey. Soil sampling and rock sampling. Soil samples typically assayed up to 320 ppb Au; with one sample assaying up to 6.88 g/t Au. Rock samples assayed up to 79.7 g/t Au. Drilling results included 41.57 m grading 1.38 g/t Au and 0.70 m grading 22.00 g/t Au.
<b>Willoughby</b>	<b>Strikepoint Gold Inc.</b>	Au, Ag, Zn, Pb; Precious and polymetallic veins; 103P 006	na	4050 m of diamond drilling. Surface chip sampling, mapping. Drill results included 6.16 m grading 7.34 g/t Au, 202.84 g/t Ag.

M = Measured; I = Indicated; Inf = Inferred

3.53 g/t Au, and 37.8 m grading 1.8 g/t Au. Results from Cassiar South included 4.8 m grading 35.1 g/t Au and 6.4 m grading 12.6 g/t Au.

#### 7.1.6. DOC (Hanstone Gold Corp.)

The **DOC** project is underlain by deformed and metamorphosed Upper Triassic volcanic rocks of the Stuhini Group that are locally cut by coeval intrusions of the Bronson stock. The most significant gold and silver grades are in sulphide-bearing quartz veins. Hanstone completed 2700 m of diamond drilling. They also drilled two small diameter, shallow core holes on the Q19 vein with a portable backpack drill. These near-surface holes returned gold grades of 12 g/t Au in one hole and 10 g/t Au in the other along 1 m of core length. Hanstone collected a 1 t bulk sample from the Q19 vein and a 1 t bulk sample from the TRJC vein.

#### 7.1.7. Engineer Gold Mine (Engineer Gold Mines Ltd.)

Engineer Gold Mines Ltd.'s **Engineer Gold Mine** project is centered on the historic Engineer Gold mine 32 km southwest of Atlin. Engineer began drilling water monitoring wells to support an application to complete a 10,000 t bulk sample.

#### 7.1.8. Eskay Creek (Skeena Resources Ltd.)

Since 1932, **Eskay Creek** has been the focus of considerable exploration. In 1988, the news of drilling intersecting stratiform stibnite-realgar rich mineralization (Roth, 1989) in 21A zone sparked a staking rush throughout the region. An underground mine operated from 1994 to 2008 and produced 3.3 Moz of Au and 160 Moz of Ag (average grades of 45 g/t Au and 2224 g/t Ag).

In the spring, 4375 m of drilling was carried out and results included an 8.20 m intersection grading 3.99 g/t Au and 71 g/t Ag. In late summer, a planned 35,000 m of regional and near-mine drilling began. Soil sampling included 116 line-km on 100 m line spacing and 25 m sample intervals. In parallel with the soil sampling, regional mapping and lithogeochemical sampling was also completed. Skeena released a positive

Prefeasibility Study for the project.

Air rotary drilling was used to sample the historic “Albino Waste Facility”. Former operators deposited mineralized footwall rocks (estimated 2 Mt) considered uneconomic due to high cut-off grades required at the time. Highlight results included 22.80 m grading 4.16 g/t Au, and 204 g/t Ag and 16.77 m grading 5.90 g/t Au and 317 g/t Ag.

#### 7.1.9. Eskay-Corey (Eskay Mining Corp.)

At their **Eskay-Corey** property, Eskay Mining carried out a property wide SkyTEM helicopter-borne electromagnetic survey and completed 23,500 m of diamond drilling. Drilling was reported to have intersected massive sulphide mineralization at the TV and Jeff deposits. The deposits are interpreted as precious metal rich VMS systems. Highlight intersections included 92.29 m grading 1.1 g/t Au, and 124.0 g/t Ag including 24.09 m grading 2.2 g/t Au, and 374.0 g/t Ag, and 35.5 m grading 2.2 g/t Au, and 28.2 g/t Ag including 3.39 m grading 12.6 g/t Au, 50.8 g/t Ag.

#### 7.1.10. Foremore (Sassy Resources Corporation)

Sassy Resources Corporation carried out a 1684 line-km VTEM survey over their **Foremore** property and examined anomalies identified by the survey on the ground. In the fall, 2691 m of diamond drilling was completed at the Westmore Discovery zone.

#### 7.1.11. Georgia (Scottie Resources Corporation)

Scottie Resources Corporation's **Georgia** project is at tidewater, approximately 16 km south of Stewart. The property is prospective for intrusion-related gold deposits because several areas are close to rocks of the Texas Creek plutonic suite. Scottie acquired the project by amalgamating with AUX Resources Corporation. Scottie carried out diamond drilling.

#### 7.1.12. KSP (Inel) (QuestEx Gold & Copper Exploration Ltd.)

In late August, QuestEx Gold & Copper Exploration Ltd.

began 4000 m of diamond drilling at the Inel gold prospect on their **KSP** property to support an initial NI 43-101 mineral resource estimate. In addition, IP surveys were conducted over the Sericite Ridge and Tami showings.

#### **7.1.13. LGM (Origen Resources Ltd.)**

Origen's **LGM** property totals 26,771 ha and has multiple target areas. Modelling of magnetic and VTEM data identified magnetic and electromagnetic anomalies coincident with a gold and silver geochemical anomaly known as the Hidden Gold zone.

#### **7.1.14. New Polaris (Canagold Resources Ltd.)**

Canagold Resources Ltd. began 28,000 m of diamond drilling at their **New Polaris** gold project. Drilling was designed to upgrade Inferred resources to Indicated and target gold mineralization down plunge. Results included 6.6 m grading 24.2 g/t Au, 3.9 m grading 30.8 g/t Au, 17.8 m grading 11.1 g/t Au, and 8.4 m grading 17.1 g/t Au.

#### **7.1.15. Porter (Strikepoint Gold Inc.)**

Strikepoint Gold's **Porter** project hosts two past-producing silver-rich vein systems 2 km apart: Silverado and Prosperity/Porter Idaho. Strikepoint announced that drilling at the project started in late summer.

#### **7.1.16. Ranch (Thesis Gold Inc.)**

Thesis completed 16,139 m of diamond drilling in 106 holes, geochemical sampling, mapping, airborne VTEM, and ground magnetic and IP surveys at their **Ranch** project. Initial drilling results included 34 m grading 19.56 g/t Au, including 7 m grading 82.48 g/t Au, and 25 m grading 9.53 g/t Au.

#### **7.1.17. Ruby Creek (Silver Surprise) (Stuhini Exploration Ltd.)**

Stuhini Exploration Ltd. followed up on the 2020 discovery of new gold and silver zones with soil sampling, IP surveys, mapping, and prospecting at their **Ruby Creek** project.

#### **7.1.18. Scottie Gold Mine (Scottie Resources Corp.)**

The **Scottie Gold** Mine project, 35 km north of Stewart, is centred on the past-producing Scottie Gold mine, which operated from 1981 to 1985, producing 95,426 oz of Au at 16.2 g/t Au. The property is transected by north-striking and locally abundant east-striking faults. Stanley and Nelson (2022) recognized Stuhini Group and a Hazelton Group stratigraphy in the area that is comparable to that in the McTagg anticlinorium. Gold is in steeply dipping pyrrhotite-pyrite-quartz-calcite veins. Scottie Resources carried out drilling at the Blueberry zone. Results included 10.0 m grading 16.5 g/t Au, 4.94 m grading 28.8 g/t Au, and 6.05 m grading 12.0 g/t Au. Drilling increased the zone's known strike length by 650 m.

#### **7.1.19. Silver Hope (Finlay Minerals Ltd.)**

The **Silver Hope** mineral claims surround the past-

producing Equity Silver mine, which operated from 1980 to 1994, processing 33.8 Mt grading 0.4% Cu, 64.9 g/t Ag, and 0.46 g/t Au. Finlay completed an IP survey that outlined two chargeability and resistivity anomalies, Equity East (1.0 by 2.0 km) and Allin (2.0 by 1.5 km). In the fall the company started 2000 m of drilling.

#### **7.1.20. Skelly (Trailbreaker Resources Ltd.)**

At Trailbreaker's **Skelly** property in 2021, a 2500 by 800 m soil geochemical survey outlined a gold-in-soil anomaly immediately west of the main quartz-sulphide vein showings, suggesting potential for additional auriferous quartz veins. A 1.5 m chip sample across a quartz vein returned 25.4 g/t Au and 882 g/t Ag. Prospecting 200 m to the east of veins identified a new zone with grab samples assaying up to 3.43 g/t Au and 78.3 g/t Ag.

#### **7.1.21. Snip Gold (Hochschild Mining PLC)**

The **Snip** deposit is another past-producing mine with renewed interest. Between 1991 and 1999 the mine produced at an average grade of 27.5 g/t Au. The deposit is a southwest-dipping vein system in Upper Triassic metasedimentary rocks of the Stuhini Group that are cut by Early Jurassic stocks and plutons. High-grade intersections from drilling included 3.22 m grading 155.76 g/t Au, 4.41 m grading 110.22 g/t Au, and 12.5 m grading 27.04 g/t Au. In October, it was announced that Hochschild Mining PLC intended to take over as operator, earning a 60% interest from Skeena Resources Limited by spending approximately \$100 million during the option period.

#### **7.1.22. Snoball (Evergold Corp.)**

Evergold Corp. completed 400 m of diamond drilling at their **Snoball** project. Quartz veins with pyrrhotite, pyrite, arsenopyrite, and chalcopyrite was reported. Drill contractor crew shortages resulted in a late start to the program and only about a fifth of the planned drilling was completed. Assay results included 2.4 m grading 6.2 g/t Au, 11.9 g/t Au.

#### **7.1.23. Thorn (Trapper) (Brixton Metals Corporation)**

Brixton completed 3107 m of diamond drilling in 12 holes at the Trapper gold target of their **Thorn** project. Initial results from one hole included 139 m grading 2.14 g/t Au, with a 11.0 m interval grading 19.25 g/t Au that included 0.50 m of 160 g/t Au. Results from a second hole included 146 m grading 0.74 g/t Au within which a 31 m intersection graded 2.0 g/t Au.

#### **7.1.24. Treaty Creek (Tudor Gold Corp. 60%, Teuton Resources Corp. 20%, American Creek Resources Ltd. 20%)**

Tudor Gold Corp. released an initial mineral resource estimate for the **Treaty Creek** project of 815.7 Mt Measured and Indicated, grading 0.66 g/t Au, 3.6 g/t Ag, and 0.06% Cu, and 311.7 Mt Inferred, grading 0.72 g/t Au, 4.0 g/t Ag, and 0.05% Cu. The project is in Jurassic volcanic and intrusive rocks that also host the KSM deposits 5 km to the southwest.



The project is defined by its bulk tonnage resource. In 2021, 30,108 m of resource expansion and definition drilling was carried out. Results included 556.5 m grading 0.73 g/t Au, 6.27 g/t Ag, and 0.489% Cu and 1320 m grading 0.67 g/t Au, 3.70 g/t Ag, and 0.216% Cu.

#### 7.1.25. Williams (CopAur Minerals Inc.)

Previous exploration at CopAur's **Williams** copper-gold project identified the T-Bill Gold zone and the GIC copper gold zone. This year a property-wide VTEM airborne geophysical survey was completed. Soil sampling was done over the T-Bill Gold zone and reconnaissance soil and rock sampling was done in surrounding prospective areas. The reconnaissance sampling discovered a new north-trending zone of surface mineralization, 1.1 km west of historic gold-in-soil anomalies, that extends 1000 m along strike. Soil samples typically assayed up to 320 ppb Au; with one sample assaying up to 6.88 g/t gold. Rock samples southeast of the T-Bill Gold zone assayed up to 79.7 g/t Au. Diamond drilling totalled 3150 m in 7 holes and results included 41.57 m grading 1.38 g/t Au and 0.70 m grading 22.00 g/t Au.

#### 7.1.26. Willoughby (Strikepoint Gold Inc.)

The **Willoughby** project is 25 km northeast of Stewart. Between 1989 and 1996, more than 12,000 m of drilling was completed, and 110 m of underground workings excavated. Strikepoint completed 4050 m of drilling in 17 holes, surface chip-channel sampling, and mapping of well-exposed, gold-silver mineralization. Results included 6.16 m grading 7.34 g/t Au, 202.84 g/t Ag.

### 7.2. Selected porphyry projects

The Northwest Region hosts many significant porphyry deposits (Fig. 1; Table 5), and the region is highly prospective for Au-Cu-Mo bulk-tonnage mineralization related to Triassic-Jurassic island arc assembly and post accretionary intrusive complexes.

#### 7.2.1. Berg (Surge Copper Corp.)

Surge has an option to earn a 70% interest in the **Berg** project from Centerra Gold Inc. Surge released an updated NI 43-101 resource estimate of total Measured and Indicated 610 Mt grading 0.27% Cu, 0.03% Mo, and 3.0 g/t Ag, and Inferred 28.1 Mt grading 0.22% Cu, 0.02% Mo, and 3.8 g/t Ag. Fall diamond drilling was expected to total 4500 m.

#### 7.2.2. Big Red (Libero Copper & Gold Corporation)

At the **Big Red** project, porphyry Cu-Au-Mo, epithermal Au-Ag, and VMS-style mineralization have been recognized. Libero carried out a 4571 m, 10-hole drill program. The primary target was the Terry porphyry, which was discovered in 2020. Results included 118.7 m grading 0.26% Cu, 0.06 g/t Au, and 1.83 g/t Ag within 510.0 m grading 0.18% Cu, 0.04 g/t Au, and 1.23 g/t Ag.

#### 7.2.3. Cannonball (Goldrea Resources Corp.)

Goldrea carried out an IP survey at their **Cannonball** project and located visible surface mineralization. Glacial retreat revealed surface mineralization consisting of widespread narrow quartz- carbonate veins containing pyrite and chalcopyrite. The mineralized zone exposure is 300 by 300 m and is referred to as the Juice Box zone. The IP survey defined a chargeability anomaly coincident with the Juice Box zone.

#### 7.2.4. Dungate (Edgemont Gold Corp.)

Edgemont's **Dungate** project is 6 km southeast of Houston. Edgemont targeted IP and magnetic anomalies with seven diamond-drill holes totalling 3429 m. Six of the seven holes intersected sulphide-mineralized porphyry.

#### 7.2.5. Emerson (Harvest Gold Corporation)

Harvest Gold's **Emerson** project is 15 km west of Houston. The company completed an airborne magnetic survey, near surface Rotary Air Blast (RAB) drilling, and a ground 3D IP survey. The IP survey outlined a chargeability high anomaly 1000 by 1800 m in plan and 300 m thick, dipping gently to the south. The IP anomaly coincides with quartz-sericite pyrite alteration identified in the RAB drilling.

#### 7.2.6. Hat (Doubleview Gold Corp.)

Doubleview describes their **Hat** project as a gold-rich copper porphyry with additional critical metals including cobalt, silver, palladium, and scandium. This year, 2476 m total was drilled in four holes. Drilling results included 907.8 m grading 0.31 g/t Ag, 0.12 g/t Au, 4.74 g/t Co, 0.15% Cu, 0.03 g/t Pd, and 28.64 g/t Sc.

#### 7.2.7. Hazelton (Netalzul Mountain) (Jaxon Mining Inc.)

Jaxon drilled nine holes totalling 2483 m at the **Netalzul Mountain** project. Other work included a Volterra IP and MT survey, a high-resolution lidar survey, petrological studies, rock dating studies, and structural mapping. Drilling intersected multiple styles of mineralization interpreted to be related to a deeper porphyry system. Highlight drill results included 14.2 m in sulphide breccia grading 0.10 g/t Au, 50 g/t Ag, 0.1281% Cu, 0.01% Pb, 0.045% Sb, 0.05% Zn and 7.4 m in monzonite dikes grading 0.45% Cu, 12 g/t Ag, 0.019% Mo and 0.026% Zn.

#### 7.2.8. Iskut (Seabridge Gold Inc.)

The **Iskut** project includes the former Johnny Mountain mine and the Bronson Slope copper-gold deposit. Previous drilling below the Quartz Rise lithocap discovered a mineralized diatreme containing clasts of veined diorite porphyry with copper-gold mineralization. Drilling below and west of the lithocap returned intervals up to 158 m grading 0.16 g/t Au and 0.16% Cu. This year Seabridge carried out a MT geophysical survey.

### 7.2.9. Kinskuch (Hecla) (Hecla Mining Company)

At their **Kinskuch** project, Hecla drilled 4311 m total in 16 holes.

### 7.2.10. Kirkham (Metallis Resources Inc.)

The **Kirkham** property is on the western margin and adjacent to the Eskay rift. Metallis acquired the project in 2013 and has since conducted regional mapping and sampling, geophysics (IP, EM, Magnetics, Radiometric, VTEM), and greater than 10,000 m of drilling. Metallis completed 4785 m of diamond drilling in seven holes. Drilling was reported to have intersected stockwork and disseminated sulphide mineralization, including chalcopyrite. High-resolution IP surveys were also carried out.

### 7.2.11. KSP (Sericite Ridge) (QuestEx Gold & Copper Exploration Ltd.)

QuestEx's **KSP** project is 15 km southeast of the past-producing Snip mine. The project has both high-grade gold vein and bulk tonnage porphyry copper-gold targets. QuestEx reported that an IP survey outlined a 1500 by 1000 m high chargeability and high resistivity anomaly with a signature consistent with a porphyry system. The anomaly is below part of an 8 by 3.5 km alteration zone known as Sericite Ridge.

### 7.2.12. Newmont Lake (Enduro Metals Corporation)

Enduro Metals Corporation discovered new porphyry copper-gold at their **Newmont Lake** project. Results from the Burgundy ridge target area included 331.43 m grading 0.35 g/t Au, 5.5 g/t Ag, 0.29% Cu, and 0.49% Zn. A total of 10,000 m of diamond drilling was planned, along with deep penetrating IP and MT geophysical surveys.

### 7.2.13. Ootsa (Surge Copper Corp.)

The **Ootsa** project is at the southeast end of a southeast-trending belt of porphyry Cu-Au deposits and prospects including (from northwest-southeast) the Lucky Ship, Berg, Whiting Creek, Huckleberry, Ox, and Seel deposits. Similar to other deposits in the region, mineralization at Ootsa is temporally associated with the Bulkley suite intrusive rocks (Cretaceous). Calc-alkaline mineralization is reported as mineral resources for three separate deposits: Ox, East Seel, and West Seel. This year, Surge completed 41,088 m of diamond drilling. Results have the potential to expand the deposit and to improve grade within existing volumes. Drilling consistently intersected broad, continuous zones of mineralization within and outside of a 2016 resource-constraining pit. Highlights for West Seel included 495 m grading 0.25% Cu, 0.21 g/t Au, 3.4 g/t Ag, and 0.021% Mo.

### 7.2.14. Oweegee (Sanatana Resources Inc.)

Sanatana's **Oweegee** project is transected by Highway 37 and the NW transmission line. This year, Sanatana carried out property-wide sampling and IP surveying over the Molly zone and Glacier, Delta, and Skowill prospects.

### 7.2.15. Poplar (Universal Copper Ltd.)

In the fall, Universal Copper Ltd. completed 3000 m of diamond drilling in six holes at their **Poplar** project. The drilling was designed to expand known copper mineralization to depth and expand the limits of higher-grade mineralization within the current mineral resource.

### 7.2.16. Schaft Creek (Teck Resources Limited 75%, Copper Fox Metals Inc. 25%)

**Schaft Creek** is an advanced-stage exploration project. In March, an updated Mineral Resource estimate was released. Measured and Indicated resources are 1.346 Bt grading 0.26% Cu, 0.16 g/t Au, 0.017% Mo, and 1.25 g/t Ag. Inferred resources are 343.6 Mt grading 0.17% Cu, 0.11 g/t Au, 0.013% Mo, and 0.84 g/t Ag. In September a favourable Preliminary Economic Assessment was released. A drilling program of 835 m was completed to collect samples for metallurgical testing and environmental baseline studies were carried out.

### 7.2.17. Stars and Stellar (Aurwest Resources Corporation)

Aurwest Resources Corporation carried out mapping, sampling, stream-sediment sampling, and a deep penetrating IP survey at their **Stellar** project. Aurwest also acquired a 50% interest in the **Stars** property.

### 7.2.18. Tatogga (Newmont Corporation)

Newmont Corporation purchased GT Gold Corp. for an estimated \$456 million. Assets included the **Tatogga** project's Saddle North deposit. The deposit has an Indicated resource of 298 Mt grading 0.28% Cu, 0.36 g/t Au, and 0.8 g/t Ag and an Inferred Resource of 543 Mt grading 0.25% Cu, 0.31 g/t Au, and 0.7 g/t Ag. Newmont worked with the Tahltan Heritage Resources Environmental Assessment Team on a Tahltan land use study and with Tahltan Environmental Management to begin environmental studies.

### 7.2.19. Telegraph (Mountain Boy Minerals Ltd.)

Mountain Boy's **Telegraph** project consists of multiple properties. Mountain Boy has a 60% option on the DOK property, 100% interest in the DOKX-Yeti property, and 100% interest in ground that they staked. Mountain Boy collected 268 soil samples, and 141 rock samples. Many (30%) of the rock samples graded 0.5% Cu or higher, including 17.9% Cu. Three new zones of mineralization were discovered.

### 7.2.20. Thorn (Camp Creek) (Brixton Metals Corporation)

Brixton continued to drill the Camp Creek target of their **Thorn Project**. Results included 821.25 m grading 0.24% Cu, 0.10 g/t Au, 2.44 g/t Ag, and 174.27 ppm Mo, with a 318.25 m interval grading 0.42% Cu, 0.17 g/t Au, 3.87 g/t Ag, and 294.12 ppm Mo.

### 7.2.21. Trek (Romios Gold Resources Inc.)

Romios's **Trek** project consists of ten contiguous claims

approximately 10.0 km from the Galore Creek deposit. Romios carried out mapping and sampling and announced that they located a new zone called Trek South. The zone contains porphyry-style epidote alteration with a coincident >800 m wide zone of quartz-pyrite  $\pm$ chalcopyrite veinlets. Veinlets returned assay values from trace up to 1.83% Cu, 2.3 g/t Au, and 257 g/t Ag. Veinlets are 1-10 cm wide and locally form dense stockworks.

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

Many polymetallic base and precious metal projects are active throughout the Northwest Region (Fig. 1; Table 5). Base metals are explored for primarily as polymetallic vein and VMS deposits and, to lesser extent, SEDEX and manto replacement deposits.

#### 7.3.1. American Creek (Mountain Boy Minerals Ltd.)

The **American Creek** project is approximately 22 km north of Stewart, immediately adjacent to the past-producing Premier mine. Mountain Boy completed surface sampling and began diamond drilling in July to follow up on surface samples from an interpreted extension of the High-Grade zone. Surface sample results included 949 g/t Ag, 0.3% Cu, and 2.7% Pb. Drilling consisted of 866 m total in eight holes. Highlight results included 3.9 m grading 24.61 g/t Ag, 0.020 g/t Au, 0.085% Cu, 2.15% Pb, and 2.19% Zn.

#### 7.3.2. BA (Mountain Boy Minerals Ltd.)

Mountain Boy's **BA** project is located 18 km northeast of Stewart, and Highway 37A and the Northwest transmission line run through the property. This year, six diamond-drill holes totalling 650 m were completed. Holes tested the northern extension of the Barbara zone. Results included 7.67 m grading 38.06 g/t Ag, 0.013% Cu, 0.86% Pb, 2.67% Zn, and 1.09 m grading 84.66 g/t Ag, 0.017% Cu, 3.76% Pb, 6.30% Zn.

#### 7.3.3. BAM (Jan Copper) (P2 Gold Inc.)

P2 Gold drilled six holes totalling 835.9 m at their **BAM** project. Two of the six holes were drilled at the **Jan Copper** zone. Results included 39.25 m grading 0.01 g/t Au, 1.10% Cu including 9.15 m grading 0.04 g/t Au, and 3.23% Cu.

#### 7.3.4. Dardanelle (Decade Resources Ltd.)

The **Dardanelle** project is part of Decade's Terrace properties. The Dardanelle showing consists of two quartz veins 0.3 to 2.0 m wide that occur intermittently along both contacts of a rhyolite dike for 700 m and to a depth of 180 m. Sulphides in the veins include pyrite, sphalerite, chalcopyrite, argentite, galena, arsenopyrite, bornite, covellite, and gold. Grab samples returned high-grade results including 695.6 g/t Au, 206 g/t Ag, 2.3% Pb and 102.9 g/t Au, 112.0 g/t Ag, 3.42% Pb.

#### 7.3.5. Del Norte (Decade Resources Ltd.)

Decade has an option to earn up to a 55% interest in the **Del Norte** property and can earn an additional 20% interest

by carrying the property to commercial production. Decade carried out 4147 m of diamond drilling. Drilling targeted the Argo/LG zones. Decade reported visible gold, silver minerals, and strong base metal mineralization. Partial assay highlight results included 3.05 m grading 13.77 g/t Au, and 2661 g/t Ag within 9.91 m grading 4.28 g/t Au, and 1091.6 g/t Ag. Base metal assays were not reported.

#### 7.3.6. Dolly Varden (Dolly Varden Silver Corporation)

The immediate area of the Dolly Varden property has a long history of mining. The Dolly Varden mine produced more than 20 Moz of silver between 1910 and 1959. The property is underlain by Hazelton Group volcanic and volcanoclastic rocks and historic and recent exploration suggest the potential for epithermal precious metal and volcanogenic massive sulphide deposits. This year Dolly Varden completed 10,506 m of diamond drilling in 31 holes. Drilling is the start of a two-year goal to expand and upgrade the Torbrit Silver deposit and multiple silver-rich satellite zones and deposits including the Wolf. Early results included a hole testing 94 m down plunge from known resources at the Wolf deposit. The hole returned 1532 g/t Ag, 0.44 g/t Au, 2.11% Pb, and 1.07% Zn along 1.22 m in a brecciated sulphide-rich quartz vein hosted within a broader pyrite stockwork breccia zone of 17.50 m averaging 214 g/t Ag, and 0.47% Pb.

#### 7.3.7. Dunwell (Stinger Resources Inc.)

Stinger's **Dunwell** project includes about two dozen showings of high-grade gold, silver, lead, zinc and copper. Of these, more half have been historically explored underground and seven or eight have shipped ore, the most significant of which is the Dunwell Mine. Stinger carried out diamond drilling and reported assays including 0.35 m grading 12.7 g/t Au, and 35.7 g/t Ag, 2.21 m grading 4.0 g/t Au, and 38.1 g/t Ag, and 1.64 m grading 2.3 g/t Au, and 60.3 g/t Ag.

#### 7.3.8. Golddigger (Goliath Resources Ltd.)

The **Golddigger** property is 7 km west of the Dolly Varden mine access road. At the Sure Bet and Main zone, stratabound massive sulphide mineralization (galena-sphalerite-pyrite) and silica alteration are in highly folded Hazelton Group sedimentary rocks along northwest-trending faults. Goliath planned 6000 m of diamond drilling at the Surebet target. Reported results included 35.7 m grading 4.46 g/t Au, and 122.13 g/t Ag, along with base metal mineralization.

#### 7.3.9. Homestake Ridge (Dolly Varden Silver Corporation)

The **Homestake Ridge** project has a total Indicated resource of 0.736 Mt grading 7.02 g/t Au, 74.8 g/t Ag, 0.18% Cu and 0.077% Pb and a total Inferred resource of 5.55 Mt grading 4.58 g/t Au, 100 g/t Ag, 0.13% Cu and 0.142% Pb. The project is adjacent to Dolly Varden Silver Corporation's Dolly Varden project. In December, Fury Gold Mines Ltd. announced that it had entered into a definitive agreement with Dolly Varden whereby Dolly Varden would acquire a 100% interest in the



project from Fury's wholly-owned subsidiary, Homestake Resource Corporation. Terms include a \$5 million cash payment and the issuance of 76,504,590 common shares of Dolly Varden.

### 7.3.10. Midas (Juggernaut Exploration Ltd.)

Juggernaut reported discovering a new mineralized outcrop at their **Midas** project referred to as the Kokomo showing. Mineralization consists of pyrite, sphalerite, and chalcopyrite and coincides with a linear magnetic-high feature and a low-conductivity IP anomaly. A 1 m chip sample assayed 9.34 g/t Au, 117 g/t Ag, 1.58% Cu, and 1.77% Zn.

### 7.3.11. Rock and Roll (Etruscus Resources Corp.)

The **Rock and Roll** property is 7 km northwest of the past-producing Snip mine. The property includes the Black Dog VMS deposit and the SRV zone. Etruscus carried geological mapping and sampling (64 silt, 385 soil, 297 rock). Results outlined two high-priority targets.

### 7.3.12. Silver Queen (Equity Metals Corp.)

The **Silver Queen** project is on an all-season road 43 km south of Houston. Since its discovery in 1912, the property has seen more than 500 drill holes and 9 km of underground workings. Equity completed winter-spring diamond drilling of 4991 m. Highlight results included 0.3 m grading 14,035 g/t Ag, 0.1 g/t Au, 0.5% Cu, 1.3% Pb, and 3.3% Zn within a 7.7 m interval grading 919 g/t Ag, 0.1 g/t Au, 0.1% Cu, 1.3% Pb, and 1.8% Zn. Drilling renewed in the fall with 4500 m planned. Initial results included 1.4 m grading 1097 g/t Ag, 0.1 g/t Au, 0.2% Cu, 0.5% Pb, 2.2% Zn, and 3.7 m grading 1143 g/t Ag, 0.1% Zn.

### 7.3.13. Silver Vista (Norseman Silver Inc.)

At their **Silver Vista** property, Norseman completed 1507 m of diamond drilling to define the strike length and down-dip extensions of previously identified silver-copper mineralization. Results included 47.82 m grading 37 g/t Ag and 0.21% Cu and 46 m grading 48 g/t Ag and 0.62% Cu.

### 7.3.14. Silvertip (Coeur Mining Inc.)

Coeur announced that exploration diamond drilling (100,000 m) on their **Silvertip** mine property discovered manto mineralization at the Southern Silver zone. Highlight results included 20.0 m grading 92.5 g/t Ag, 16.9% Zn, and 0.5% Pb, and 10.8 m grading 445.7 g/t Ag, 19.4% Zn, and 7.5% Pb.

### 7.3.15. Theia (Mountain Boy Minerals Ltd.)

Mountain Boy reported high-grade silver from grab samples at the **Theia** project. Results included 9676 g/t Ag, 1.59 g/t Au, 13.4% Pb, 0.64% Cu, and 2.75% Zn.

## 7.4. Selected mafic- and ultramafic-hosted projects

The Northwest Region contains only a few mafic- and ultramafic-hosted prospects (Fig. 1; Table 5).

### 7.4.1. E&L (Garibaldi Resources Corp.)

The E&L property is one of only two known high-grade magmatic Ni-Cu-(PGE) massive sulphide projects in the Canadian Cordillera. The property is in the Eskay rift (Jurassic). The deposit contains pyrrhotite, pentlandite, and chalcopyrite in an olivine gabbro stock that intrudes Lower Jurassic sedimentary and volcanic rocks. Weather conditions resulted in cancelation of planned drilling.

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

Nickel Rock carried out rock sampling and soil geochemical surveys on the Nickel West and Nickel central blocks of their **Hard Nickel Group** project.

### 7.4.3. Turnagain (Giga Metals Corp.)

The **Turnagain** nickel-cobalt deposit is in an Alaskan- type Pt-(Os-Rh-Ir) ultramafic. The deposit has maximum dimensions of 3 by 8.2 km and displays a dunite core surrounded by peripheral peridotites, pyroxene- rich peridotite, wehrlite, and olivine pyroxene. Sulphide mineralization includes pyrrhotite, pentlandite, chalcopyrite, and trace bornite. Giga Metals carried out archaeological surveys, wildlife surveys, resource infill drilling (6295 m), geotechnical drilling, and seismic refraction surveys, and excavated test pits. Work was to collect exploration, geotechnical, and other data to advance project engineering to the Pre-Feasibility level.

## 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. George et al. (2021) used U-Pb zircon geochronology tied to Lu-Hf isotope analysis to consider the Triassic-Jurassic magmatic and accretionary history of Stikinia and evaluate the nature and origin of basement to Stikinia. Presenting field, U-Pb zircon, Lu-Hf, and whole rock and trace element geochemical data, Regan et al. (2001) established new piercing points for the Denali fault in Alaska, documenting significant along strike variations in rates of Eocene dextral strike-slip movement.

Nelson et al. (2021) provided raw U- Pb zircon datasets for 18 samples collected from between Dease Lake and Kitsault to constrain the age of intrusive and stratified protoliths, age and affinity of sedimentary sources, and timing of fault-related shearing. Hunter et al. (2022) continued a multi-year project in the Kitsault River area, south of Stewart, presenting a detailed facies analysis of the local Hazelton Group volcano-sedimentary depositional system, providing new U-Pb zircon geochronologic data, and evaluating the implications for mineralizing systems. Based on mapping, geochemistry, and U-Pb zircon geochronology, Stanley and Nelson (2022) recognized Stuhini Group rocks in the past-producing Scottie gold mine area and a Hazelton Group stratigraphy that is comparable to that in the McTagg anticlinorium. Bouzari et al. (2021) examined porphyry-related advanced argillic-



alteration in the Horn Mountain Formation (Hazelton Group) near Dease Lake.

Using ‘non-deposit’ training data, Lachaud et al. (2021) developed algorithm-based prospectivity maps for epithermal gold at the Iskut project. Schmidt et al. (2021) examined fluid inclusions in rocks from the Windy Craggy volcanogenic massive sulphide deposit (copper-cobalt-gold) using laser ablation ICP-MS and concluded that ore-forming fluids at Windy Craggy had a strong magmatic contribution. Roberts et al. (2021) conducted fluid inclusion, microthermometry, and cathodoluminescence imaging work to conclude that the Deer Horn gold-silver-tellurium deposit is genetically related to Eocene granodiorites of the Nanika suite. 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 in the northwest part of the region to develop models for geophysical mapping. Jiang et al. (2021) characterized the petrology, mineralogy, and geochemistry of green nephrite from Kutcho.

## 9. Summary

The Northwest Region has producing mines and an abundance of proposed and advanced-stage projects. In 2021, the region saw numerous early- to advanced-stage projects that focussed mainly on precious, base metal, and porphyry deposits. Exploration activity increased for the fifth consecutive year in the region and expenditures this year represent more than half of British Columbia’s total. Many companies reported positive exploration results, and many new targets were generated.

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# 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 of 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 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



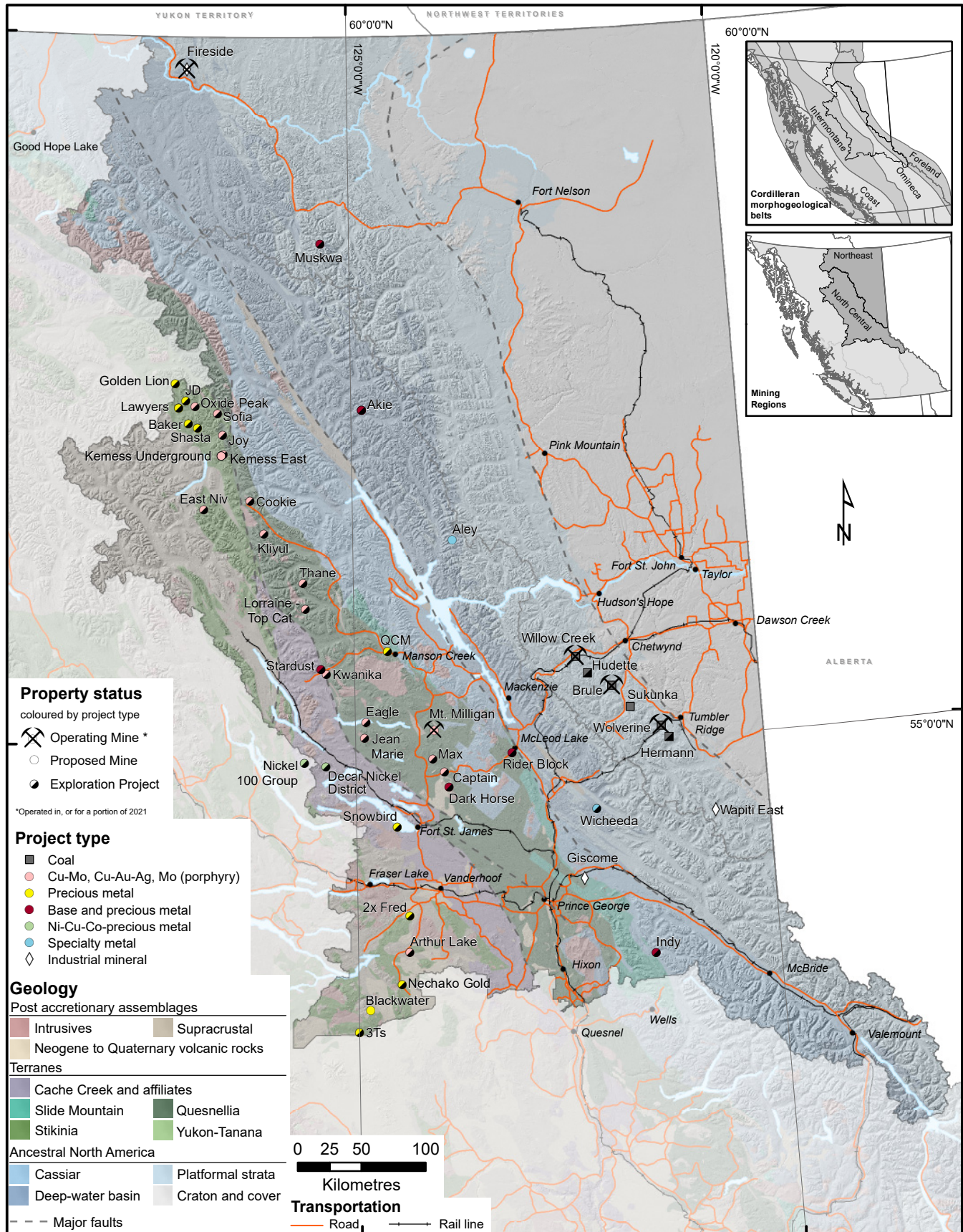


Fig. 1. Mines and selected projects, North Central and Northeast regions, 2021. Terranes after Nelson et al. (2013).

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
<b>Mt. Milligan</b>	<b>Centerra Gold Inc.</b>	Cu, Au, Ag; Alkaline 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
<b>Brule</b>	<b>Conuma Coal Resources Limited</b>	PCI; Bituminous coal; 093P 007	1.6 Mt	P+Pr: 3.58 Mt	na	About 230 employees.
<b>Willow Creek</b>	<b>Conuma Coal Resources Limited</b>	HCC, PCI; Bituminous coal; 093O 008	1.5 Mt	P+Pr: 11.07 Mt	na	About 220 employees, mine and plant.
<b>Wolverine</b>	<b>Conuma Coal Resources Limited</b>	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
<b>Fireside (Northeast Region)</b>	<b>Fireside Minerals Ltd.</b>	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<sub>4</sub>. 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

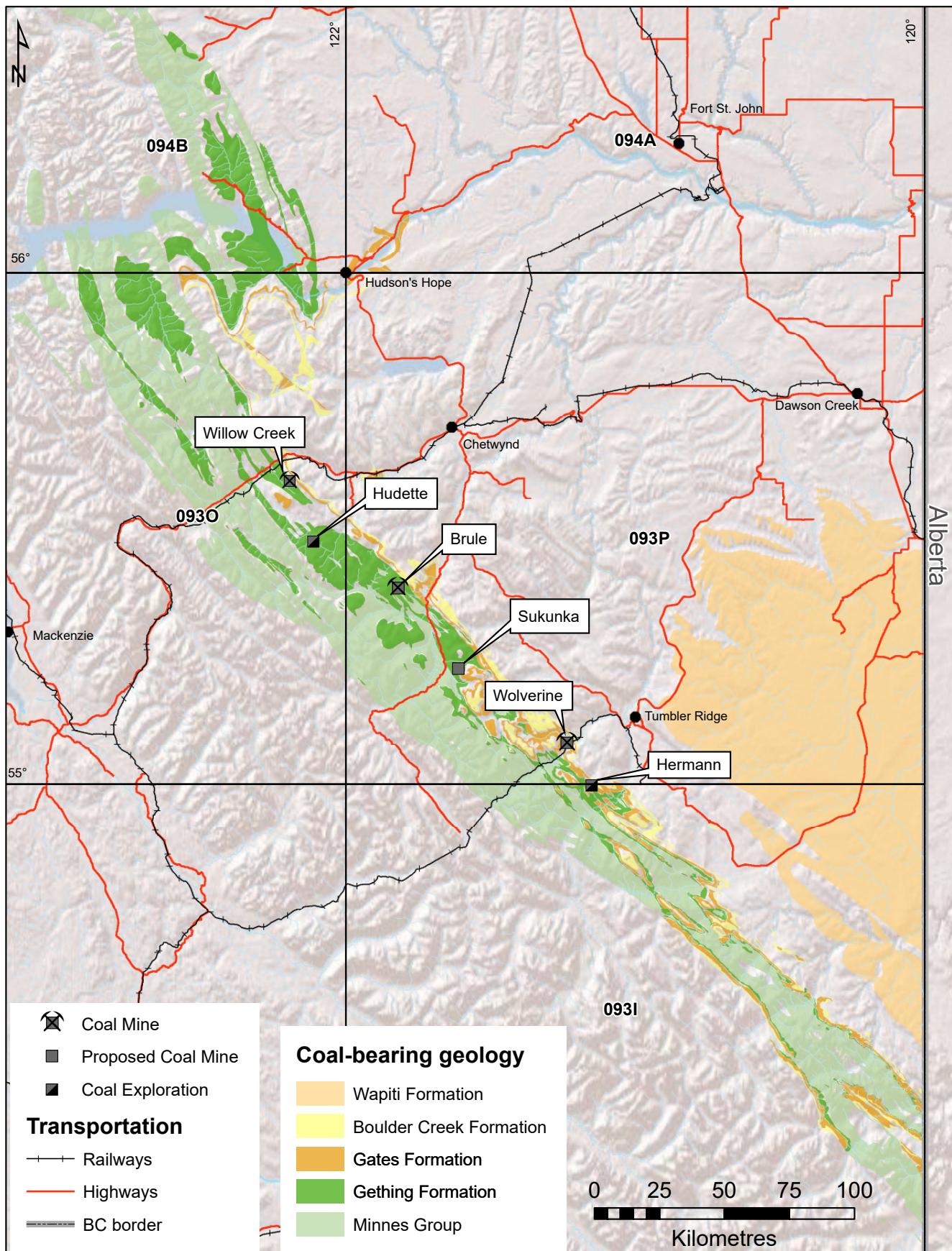


Fig. 2. Coal mines, proposed coal mines and coal exploration projects, northeastern British Columbia, 2021.





**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 platform 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<sub>2</sub>O<sub>5</sub>. 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
<b>Aley</b> (North Central Region)	<b>Taseko Mines Limited</b>	Nb; Carbonatite-hosted; 094B 027	P+Pr: 83.8 Mt 0.50% Nb <sub>2</sub> O <sub>5</sub> (at 0.30% Nb <sub>2</sub> O <sub>5</sub> cut-off)	M+I: 285.8 Mt 0.37% Nb <sub>2</sub> O <sub>5</sub> (at 0.20% Nb <sub>2</sub> O <sub>5</sub> 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.
<b>Blackwater</b> (North Central Region)	<b>Artemis Gold Inc.</b>	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.
<b>Giscome</b> (North Central Region)	<b>Graymont Western Canada Inc.</b>	CaCO <sub>3</sub> ; 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.

<b>Kemess Underground (KUG)</b> (North Central Region)	<b>Centerra Gold Inc.</b>	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.
<b>Sukunka</b> (Northeast Region)	<b>Glencore Canada Corporation</b>	Coal; Bituminous; 093P 014	na	145.0 Mt coal in situ	Permitting in progress.
<b>Wapiti East</b> (Northeast Region)	<b>Fertoz International Inc.</b>	P <sub>2</sub> O <sub>5</sub> ; Sedimentary phosphate deposits; 093I 008, 22, 15	na	I+Inf: 1.54 Mt 21.6% P <sub>2</sub> O <sub>5</sub>	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 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<sub>2</sub>O<sub>5</sub> (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.

<b>Project</b>	<b>Operator (partner)</b>	<b>Commodity; Deposit type; MINFILE</b>	<b>Resources (NI 43-101 compliant unless indicated otherwise)</b>	<b>Comments</b>
<b>2X Fred</b>	<b>Centerra Gold Inc.</b>	Au, Ag; Epithermal Au-Ag: low sulphidation; 093F 089	na	Drilling, 25 DDH, 6796 m. IP and CSAMT ground geophysical surveys, aeromagnetic survey, lidar survey.
<b>3Ts</b>	<b>Independence Gold Corp.</b>	Au, Ag; Epithermal Au-Ag: low sulphidation; 093F 055	Tommy and Ted-Mint veins Inf: 5.45 Mt 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.
<b>Akie</b>	<b>ZincX Resources Corp.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb-Ag; 094F 031	I: 22.7 Mt of 8.32% Zn, 1.81% Pb, 14.1 g/t Ag  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.
<b>Arthur Lake</b>	<b>Millbank Mining Corp.</b>	Cu, Au; Alkalic porphyry Cu-Au; 093F 102	na	Filed a NI 43-101 technical report, 16 line-km IP survey.
<b>Baker-Shasta</b>	<b>TDG Gold Corp.</b>	Au, Ag; Epithermal Au-Ag: low sulphidation; 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.
<b>Captain</b>	<b>Orestone Mining Corp.</b>	Cu, Au; Alkalic porphyry Cu-Au; 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.
<b>Cookie</b>	<b>Wedgemount Resources Corp.</b>	Cu, Au, Ag, Mo; Porphyry Cu±Mo±Au; 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.
<b>Dark Horse</b>	<b>IAMGOLD Corporation</b>	Au, Cu; Cu Skarn; 093K 083	na	Soil sampling, IP survey.

Table 5. Continued.

<b>Decar Nickel District</b>	<b>FPX Nickel Corp.</b>	Ni, Fe; Podiform chromite; 093K 116	Baptiste deposit I: 1996 Mt 0.122% Ni, DTR (Davis Tube Recoverable)  Inf: 593 Mt 0.114% Ni, DTR Ni (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.
<b>Eagle</b>	<b>Wedgemount Resources Corp.</b>	Cu, Au, Ag, Mo; Porphyry Cu±Mo±Au; 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.
<b>East Niv</b>	<b>NorthWest Copper Corp.</b>	Cu, Au; Alkalic porphyry Cu-Au; 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.
<b>Golden Lion</b>	<b>Evergold Corp.</b>	Au, Ag; Epithermal Au-Ag: low sulphidation; 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.
<b>Indy</b>	<b>InZinc Mining Ltd.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb-Ag; 093H 072	na	Soil sampling results outlined a 1.9 km long zinc-in-soil target.
<b>JD</b>	<b>Volatus Capital Corp.</b>	Au, Ag; Epithermal vein Au-Ag; 094E 171	na	Airborne and ground-based geophysical surveys, rock sampling and mapping.
<b>Jean Marie</b>	<b>Pacific Empire Minerals Corp.</b>	Cu, Au, Ag, Mo; Porphyry Cu±Mo±Au; na	na	Rock sampling, geological mapping, 128 km <sup>2</sup> magnetic gradient, radiometric, and VLF-EM airborne geophysics survey, core relogging.
<b>Joy</b>	<b>Amarc Resources Ltd.</b>	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, 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.

<b>Kliyul</b>	<b>Pacific Ridge Exploration Ltd.</b>	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	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.
<b>Kwanika</b>	<b>NorthWest Copper Corp.</b>	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, 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.
<b>Lawyers</b>	<b>Benchmark Metals Inc.</b>	Au, Ag; Epithermal Au-Ag: low sulphidation; 094E 066	Inf: Cliff Creek N zone, 550 Kt 4.51 g/t Au, 209.15 g/t Ag  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.
<b>Lorraine-Top Cat</b>	<b>NorthWest Copper Corp.</b>	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093N 002, 094C 069, 174	Lorraine I: historic non NI 43-101 compliant: 6.42 Mt 0.61% Cu, 0.23 g/t Au  Inf: 28.82 Mt 0.45% Cu, 0.19 g/t Au (Lorraine Copper Corp. 2012)	Mapping, soil and rock sampling, and ground and airborne geophysical surveys.
<b>Max</b>	<b>Centerra Gold Inc.</b>	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093K 020	na	Drilling, Backpack drill till sampling, 80 holes, 160 m.
<b>Mount. Milligan Brownfield</b>	<b>Centerra Gold Inc.</b>	Cu, Au, Ag; Alkalic porphyry Cu-Au; 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.

<b>Nechako Gold</b>	<b>Tower Resources Ltd.</b>	Au, Ag; Epithermal Au-Ag: low sulphidation; 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.
<b>Nickel 100 Block</b>	<b>Nickel Rock Resources Ltd.</b>	Ni, Fe; Podiform chromite; na	na	Soil sampling.
<b>Oxide Peak</b>	<b>TDG Gold Corp.</b>	Cu, Au, Ag; Porphyry Cu±Mo±Au; Epithermal Au-Ag-Cu: low sulphidation; 094E 181	na	Drilling, 2 DDH, 1029 m.
<b>QCM</b>	<b>Kestrel Gold Inc.</b>	Au, Cu; Au-quartz veins; 093N 200	na	Drilling, 7 RCD, 992 m.
<b>Rider Block</b>	<b>Golden Planet Mining Corp.</b>	Cu, Au, Ag; Porphyry Cu±Mo±Au; Epithermal Au-Ag-Cu: low sulphidation; na	na	Drilling, 7 DDH, 850 m.
<b>Stardust</b>	<b>NorthWest Copper Corp.</b>	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	Updated Mineral Resource Estimate filed.
<b>Snowbird</b>	<b>Element 79 Gold Corp.</b>	Au; Epithermal: in quartz veins; 093K 036	na	Drilling, DDH, 3000 m.
<b>Sofia</b>	<b>QuestEx Gold &amp; Copper Ltd.</b>	Cu, Au, Ag; Porphyry Cu±Mo±Au; Epithermal Au-Ag-Cu: low sulphidation; 094E 208	na	Drilling, 7 DDH, 1611 m. Rock and soil sampling and prospecting.
<b>Thane</b>	<b>Interra Copper Corp.</b>	Cu, Au, Ag; Alkalic porphyry Cu-Au; 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.
<b>Wicheeda</b>	<b>Defense Metals Corp.</b>	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	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
<b>Hermann</b>	<b>Conuma Coal Resources Ltd.</b>	Coal; Bituminous coal; 093I 031	P+Pr: 24.36 Mt	Environmental Assessment in-progress. Drilling, 5 RC holes, 592 m.
<b>Hudette</b>	<b>Conuma Coal Resources Ltd.</b>	Coal; Bituminous coal; 093O 060	P: 24.6Mt Pr: 465,000 t	Drilling, 16 RC holes, 2742 m. Working towards a PEA.
<b>Muskwa</b>	<b>Fabled Copper Corp.</b>	Cu, Ag, Pb, Co; Cu $\pm$ Ag quartz veins; 094K 012, 50	na	Rock sampling, mapping, drone surveys, and site reclamation.

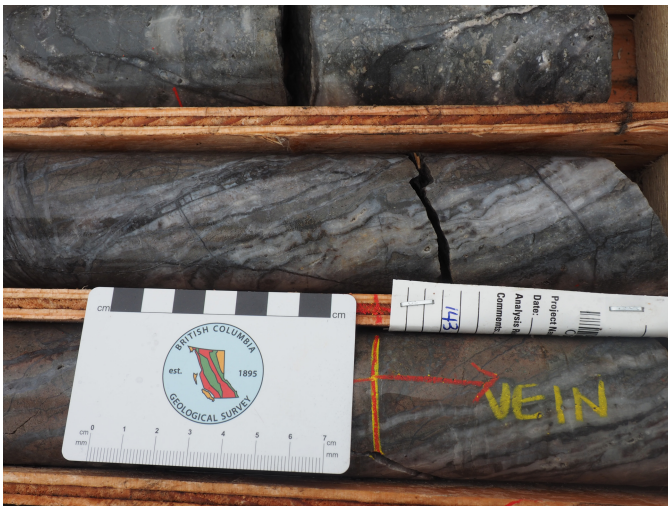
M = Measured; I = Indicated; P = Proven; Pr = Probable

### 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<sup>2</sup> 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



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

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.

#### 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 **Kliylul** 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<sup>2</sup> 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.)

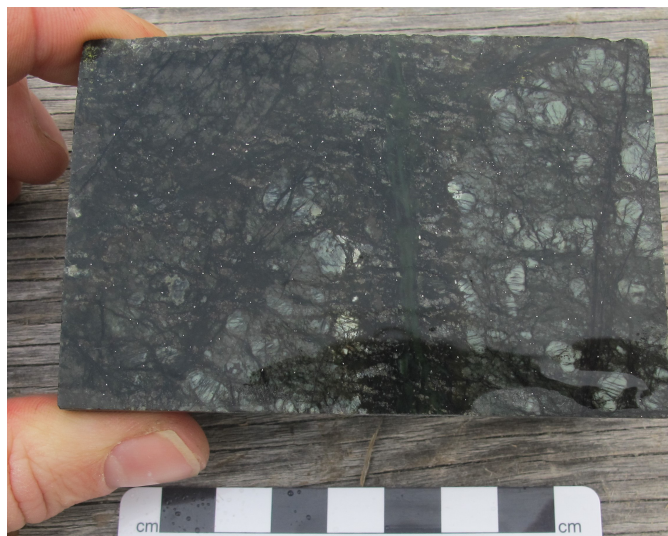
At the **Indy** SEDEX project, InZinc Mining Ltd. reported new soil geochemical results that outlined a 1.9 km long zinc-in-soil target and multi-element (Zn, Pb, Ba) along part of the 7 km Main trend. Silver-in-soil responses identified two new silver targets, one named Fox about 1.0 km long, another 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<sub>2</sub>.

#### 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.

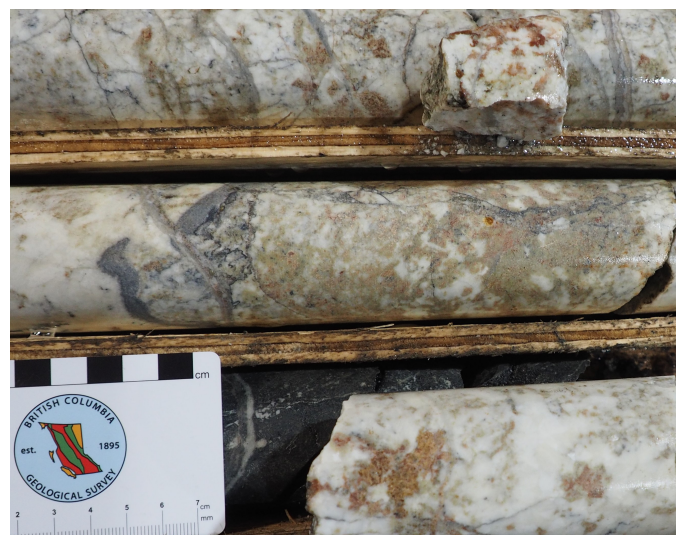
#### 7.5. Selected specialty metal projects

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 fluorocarbonates, 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



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

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.

#### 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 Hogen 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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# Exploration and mining in the South Central Region, British Columbia



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## 1. Introduction

With four major mines in operation, the South Central Region is currently the most productive copper mining district in Canada. The region's varied geology, well-established infrastructure, and access to markets also make it an important industrial minerals centre. The Cariboo area is the province's largest placer gold camp, with active permits numbering in the hundreds. Thermal coal resources in Cenozoic basins were last mined in 2013.

The region has four major proposed metal mines and a proposed small gold mine re-start. About 100 exploration projects were tracked in 2021, although this represents a minimum because not all exploration work is recorded.

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 South Central Region, exploration expenditures were estimated at \$147.6 million and exploration drilling 462,500 m (Clarke et al., 2022; EY LLP, 2022). These are significant increases from 2020, which saw \$69.3 million in expenditures and 212,000 m of drilling (Clarke et al., 2022; EY LLP, 2022).

The largest exploration programs focussed on orogenic and epithermal gold veins, but porphyry copper-gold exploration near mine sites and at some advanced exploration projects were also significant contributors to the totals.

## 2. Geological overview

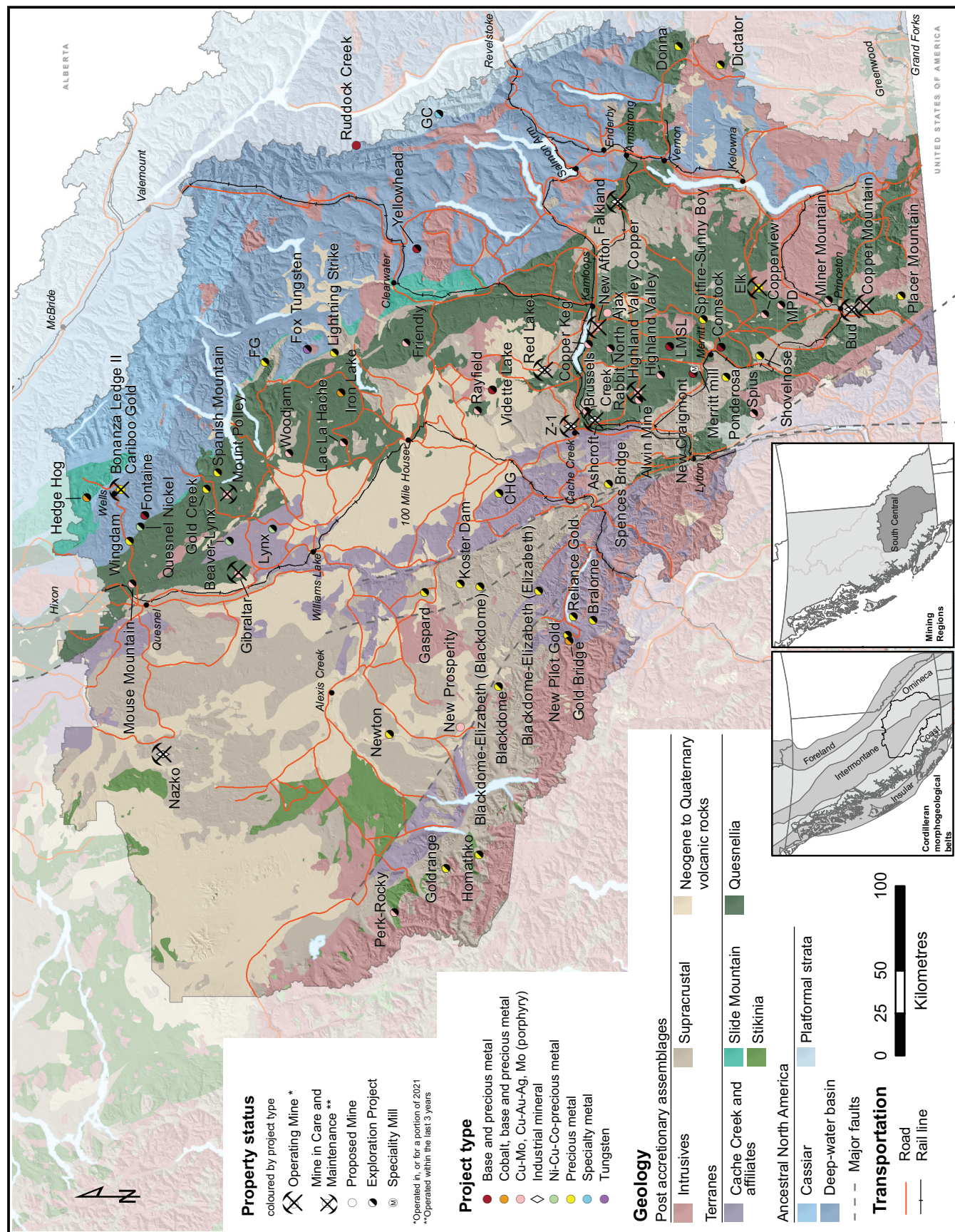
The tectonic and metallogenic evolution of the Canadian Cordillera are intimately linked (Fig. 1, e.g., Nelson et al., 2013). The South Central Region straddles three of British Columbia's five morphogeological belts (from west to east: Coast; Intermontane; Omineca). The mid-Mesozoic and older geological framework is represented by cratonic and pericratonic rocks in the east, and a series of Late Paleozoic through mid-Mesozoic arc and oceanic terranes to the west (Fig. 1). Younger rocks include Jura-Cretaceous siliciclastic and local volcanic rocks, Eocene volcanic rocks, Neogene

and Quaternary basalt, and Middle Jurassic to Eocene granitic intrusions.

The oldest rocks in the region are Paleoproterozoic basement gneiss complexes at the eastern boundary, such as in the Monashee complex. These are interpreted as parts of the North American craton (Armstrong et al., 1991), overlain by Neoproterozoic to Paleozoic cover deposited following rifting that formed the western margin of Ancestral North America (McDonough and Parrish, 1991; Murphy et al., 1991). To the northwest, the Cassiar terrane consists of Neoproterozoic to mid-Paleozoic siliciclastic and carbonate rocks interpreted as distal facies of the North American platform (Struik, 1988a). Also affiliated with Ancestral North America, the Kootenay terrane (deep-water basin strata on Figure 1) include Neoproterozoic to mid-Paleozoic deep-water facies equivalents deposited west of the North American platform. Lower Cambrian and older rocks are similar to North American strata to the east, but the overlying lower Paleozoic succession is characterized by units of coarse siliciclastic and mafic volcanic rocks that may reflect intermittent crustal extension (Colpron and Price, 1995). This belt also includes Devonian-Mississippian calc-alkaline to alkalic volcanic rocks and associated granitoid intrusions, found mainly in the Eagle Bay assemblage (Schiarrizza and Preto, 1987), which reflect the initiation of east-dipping subduction beneath the North American plate margin. These rocks host polymetallic volcanogenic massive sulphide (VMS) occurrences, and the **Yellowhead** bulk tonnage copper deposit. Slide Mountain terrane is the easternmost tract of oceanic rocks in the Canadian Cordillera. These rocks may be the remnant of a Late Paleozoic marginal basin that formed behind a westward-retreating volcanic arc in Quesnel terrane. The Fennell Formation hosts copper-zinc-silver massive sulphide mineralization at the **Chu Chua** occurrence.

Quesnel terrane is a Late Triassic to Early Jurassic island arc complex (e.g., Mortimer, 1987; Struik, 1988a, b; Unterschutz et al., 2002). It also includes a Late Paleozoic arc sequence, represented by the Harper Ranch Group (Beatty et al., 2006) and, in the south, assemblages of oceanic rocks (Tempelman-Kluit, 1989). The Mesozoic rocks are represented mainly by Middle to Upper Triassic volcanic and sedimentary rocks of the







Nicola Group, together with abundant Upper Triassic to Lower Jurassic calc-alkaline to alkaline intrusions (Preto, 1977, 1979; Mortimer, 1987; Panteleyev et al., 1996; Schiarizza et al., 2013). The Nicola Group consists mainly of volcanic and volcanic-derived sedimentary rocks, but also includes siltstone and slate intercalated with quartzite and limestone (Bloodgood, 1990; Schiarizza et al., 2013; Mihalynuk et al., 2015; Schiarizza, 2019; Mihalynuk and Diakow, 2020). The volcanic rocks are mainly augite-phyric shoshonitic basalts, but the western part of the group locally includes a belt of calc-alkaline volcanic rocks with substantial amounts of rhyolite and dacite (Preto, 1977, 1979; Mortimer, 1987). A younger stratigraphic component of Quesnel terrane consists of Lower to Middle Jurassic sedimentary rocks that unconformably overlie the western parts of the Nicola Group (Travers, 1978; Logan and Moynihan, 2009; Schiarizza et al., 2013).

Quesnel terrane is important for its porphyry copper deposits (e.g., Logan, 2013; Logan and Mihalynuk, 2014). The plutons that host these deposits conform, in part, to a pattern defined by parallel belts of calc-alkaline and alkalic plutons that become progressively younger from west to east (Schiarizza, 2014). The western (Late Triassic) calc-alkaline belt includes the Guichon Creek batholith, host to the **Highland Valley Copper** copper-molybdenum mines, and the Granite Mountain batholith, host to the **Gibraltar** copper-molybdenum mine. A well-defined belt farther east comprises younger, latest Triassic alkalic plutons, which host alkalic porphyry copper-gold deposits, including producing mines at **Copper Mountain** and **New Afton** and the **Mount Polley** mine, which is currently on care and maintenance. A third belt, younger and farther to the east, is defined by several large, Lower Jurassic calc-alkaline plutons.

Cache Creek terrane, consisting of Carboniferous to Early Jurassic chert, argillite, basalt, limestone, sandstone, gabbro, and serpentinized ultramafic rocks of the Cache Creek complex, forms a belt to the west of Quesnel terrane in the central and northern parts of the region. It is interpreted, at least in part, as a subduction complex responsible for generating the Quesnel magmatic arc (Travers, 1978; Struik et al., 2001).

Cadwallader terrane, as interpreted by Schiarizza (2013), underlies parts of the Intermontane and eastern Coast belts, west of Cache Creek and Quesnel terranes. It includes a Late Permian-Early Triassic primitive oceanic arc complex, and an overlying Late Triassic-Middle Jurassic arc complex and associated siliciclastic apron.

Bridge River terrane is in the eastern Coast belt, west of Lytton and Lillooet, where it is partially enveloped by Cadwallader terrane. It is represented mainly by the Bridge River complex, comprising structurally interleaved slivers of chert, argillite, basalt, blueschist, gabbro, serpentinite, limestone, and sandstone (Schiarizza et al., 1997). Both Cadwallader and Bridge River terranes are shown as 'Cache Creek and affiliates' on Figure 1.

Stikine terrane is a mid-Paleozoic to Middle Jurassic arc terrane that is markedly similar to Quesnel terrane, and forms a predominant component of the Cordillera in central and

northern British Columbia. It is represented in the northwestern part of the South Central Region by a few scattered exposures of volcanic and sedimentary rocks correlated with the Hazelton Group (Upper Triassic to Middle Jurassic; Tipper, 1959, 1969). Younger stratigraphic units overlap older terranes and cover large parts of the region. These units include: Upper Jurassic to Upper Cretaceous siliciclastic rocks of the Tyaughton-Methow basin, which overlap Cadwallader and Bridge River terranes in the eastern Coast belt (Schiarizza et al., 1997); and mid-Cretaceous arc volcanic rocks of the Spences Bridge Group, which form a northwest-trending belt that overlaps Quesnel and Cache Creek terranes in the Merritt-Lillooet area (Monger and McMillan, 1989), and continues westward across the Fraser River where it overlaps Cadwallader and possibly Stikine terranes (Mahoney et al., 2013). Eocene volcanic and subordinate sedimentary rocks (e.g., Kamloops Group, Penticton Group, Princeton Group) are prominent in some locations. Neogene basalt of the Chilcotin Group overlaps Quesnel, Cache Creek, Cadwallader, and Stikine terranes throughout much of the central part of the region (Dohane et al., 2010). Granitic plutons, ranging from late Middle Jurassic to Eocene, occur throughout the region and, in some cases, are responsible for significant mineralization (e.g., **IKE**, **New Prosperity**).

### 3. Mines and quarries

The region produces copper, molybdenum, gold, and silver from four large mines, and a variety of industrial minerals (bentonite, zeolite, diatomaceous earth, gypsum, pumice, opal, and dimension stone) from about ten quarries. Almost 1000 placer mines and gravel pits have active permits, but not all produce in any given year.

#### 3.1. Metal mines

The South Central Region hosts six of the province's metal mines (Fig. 1; Table 1). These include the province's two largest copper-molybdenum producers (**Gibraltar** and **Highland Valley Copper**) and two major copper-gold mines (**New Afton** and **Copper Mountain**). A third copper-gold producer, **Mount Polley**, has been on care and maintenance since 2019, awaiting a sustained improvement in copper prices. The region hosts two precious metal mines, **Bonanza Ledge II**, which resumed mining mid-2021 and **Elk**, which began mining ore in November.

##### 3.1.1. Bonanza Ledge II (Osisko Development Corp.)

Barkerville Gold Mines Ltd. (now under Osisko Development Corp.) restarted the **Bonanza Ledge** mine (Fig. 1; Table 1) in 2017 as an underground long-hole and cemented fill operation below the existing pit. Osisko Development Corp. began a second phase of underground mining at Bonanza Ledge in 2021. Phase II will exploit the BC vein at a targeted rate of 650 tpd. Bonanza Ledge is part of the larger Cariboo Gold project, a proposal for a larger 15-year mining operation to the north. A permit amendment allows for production of up to



Table 1. Metal mines, South Central Region.

Mine	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1-Q3)	Reserves	Resources	Comments
<b>Bonanza Ledge II</b>	<b>Osisko Development Corp.</b>	Au; Au-quartz veins; 093H 140	na	na	Bonanza Ledge II M: 240,000 t 5.1 g/t Au I: 1,671,000 t 4.3 g/t Au Inf: 2,398,000 t 3.1 g/t Au	Production at Bonanza Ledge resumed in March 2021. Target rate of 650 tpd.
<b>Copper Mountain</b>	<b>Copper Mountain Mining Corporation 75%, Mitsubishi Materials Corporation 25%</b>	Cu, Au, Ag; Porphyry Cu-Au, Alkalic; 092HSE001	90-100 Mlb Cu+Au, Ag (management's guidance)	P+Pr: 403.433 Mt 0.24% Cu, 0.11 g/t Au, 0.76 g/t Ag	M+I: 597,124 Mt 0.23% Cu, 0.10 g/t Au, 0.70 g/t Ag Inf: 311.010 Mt 0.20% Cu, 0.10 g/t Au, 0.50 g/t Ag	Third ball mill commissioned for 45 ktpd throughput. Exploration drilling ongoing. Resources inclusive of reserves.
<b>Elk</b>	<b>Gold Mountain Mining Corp.</b>	Au, Ag; Au quartz veins; 092HNE009, 295, 41, 261	na	na	Combined Elk property M+I: 4.359 Mt 5.6 g/t Au, 11.0 g/t Ag Inf.: 1.497 Mt 5.3 g/t Au, 14.4 g/t Ag	Began mining ore in November. Ore is to be trucked to New Afton. Exploration drilling and updated resource estimates.
<b>Gibraltar</b>	<b>Taseko Mines Limited 75%, Cariboo Copper Corp. 25%</b>	Cu, Mo; Porphyry Cu±Mo±Au; 093B 012	120 Mlb Cu+Mo (management's guidance)	P+Pr: 538 M short tons 0.25% Cu, 0.008% Mo	M+I: 1048 M short tons 0.25% Cu, 0.007% Mo	Resources inclusive of reserves.
<b>Highland Valley</b>	<b>Teck Resources Limited</b>	Cu, Mo; Porphyry Cu±Mo±Au; 092ISW012, 45	128,000-133,000 t Cu and 1.2-1.8 Mlbs Mo (management's guidance)	P+Pr: 401.6 Mt 0.30% Cu, 0.007% Mo	M: 724.1 Mt 0.28% Cu, 0.008% Mo I: 999.7 Mt 0.24% Cu, 0.009% Mo Inf: 406 Mt 0.23% Cu, 0.007% Mo	2040 extension plan under consideration which would yield 4.3 Blbs Cu and extend mine life.
<b>Mount Polley</b>	<b>Imperial Metals Corporation</b>	Cu, Au, Ag; Porphyry Cu-Au, Alkalic; 093A 008	nil	P+Pr: 53.772 Mt 0.34% Cu, 0.90 g/t Ag	Open pit M+I: 186.9 Mt 0.27% Cu, 0.28 g/t Au, 0.49 g/t Ag Inf: 4.6 Mt 0.18% Cu, 0.21 g/t Au, 0.39 g/t Ag Underground M+I: 7.42 Mt 0.94% Cu, 0.35 g/t Au, 6.57 g/t Ag Inf: 1.019 Mt 1.25% Cu, 0.58 g/t Au, 10.29 g/t Ag	Estimates were effective 2016. On care and maintenance since May 2019. Restart under consideration. Current reserves would support about 6 years operation.
<b>New Afton</b>	<b>New Gold Inc.</b>	Au, Ag, Cu; Porphyry Cu-Au, Alkalic; 092INE023	165-195 AuEq oz or approx. 57,000 oz Au, 28 kt Cu, 260,000 oz Ag (management's guidance)	P+Pr: 46.624 Mt 0.64 g/t Au, 1.8 g/t Ag, 0.74% Cu	M+I: 66.498 Mt 0.55 g/t Au, 2.0 g/t Ag, 0.68% Cu Inf: 18.313 Mt 0.36 g/t Au, 1.1 g/t Ag, 0.36% Cu	M+I resources are exclusive of reserves. Exploration is ongoing at Cherry Creek 3 km west of mine and regionally.

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

215,000 tpy of ore. The mine life of phase II is an anticipated 18 months. Ore is trucked to the Quesnel River Mill.

Two types of mineralization are of interest at Bonanza Ledge: pyrite replacement and vein, which consists of native gold in quartz veins cutting pyrite-bearing, carbonaceous and chloritic phyllite of the Snowshoe Group (Proterozoic-Paleozoic).

### 3.1.2. Copper Mountain (Copper Mountain Mining Corporation 75%; Mitsubishi Materials Corporation 25%)

The **Copper Mountain** copper-gold open-pit mine (Fig. 1; Table 1), has produced since August 2011 and mills at a rate of 40,000 tpd. Copper Mountain commissioned a third ball mill to increase milling capacity to 45,000 tpd. In the first nine months of 2021, the mine produced 73.4 Mlbs Cu, 23,263 oz Au and 443,444 oz Ag, more than the same period in 2020. Guidance for 2021 is 90-100 million pounds Cu. Mill expansion to 65,000 tpd is to be commissioned in 2024. In 2022, the mine will conduct trial use of electric trolley assist haul trucks to reduce diesel use.

Copper Mountain Mining Corporation reported exploration drilling at Copper Mountain. At the New Ingerbelle deposit, results extended mineralization below the current projected reserve pit shell to twice its previously known vertical extent. Drilling was also designed to expand resources and reserves at Copper Mountain North. Drilling continued into late 2021 at the Copper Mountain Main pit, North pit and New Ingerbelle deposit. Based on current reserves, the mine life is another 21 years; longer if resources are included.

The Copper Mountain ore bodies are Late Triassic alkalic porphyry Cu-Au deposits, mainly in Nicola Group rocks (Triassic) intruded by the high-level Copper Mountain intrusions (Upper Triassic). Holbek et al. (2015, 2020) described the deposit as an alkalic porphyry Cu-Au system with strong vertical continuity.

### 3.1.3. Elk (Gold Mountain Mining Corp.)

Gold Mountain Mining began mining operations at the **Elk** project in November. A 2021 updated Preliminary Economic Assessment considers a 70,000 tpy open pit-only operation expanding to 324,000 tpy open pit and underground after three years, which they anticipate would require an environmental assessment. The total mine life would be 11 years. The open pit schedule plans for 2.5 Mt ore at an approximate grade of 7 g/t Au and 11 g/t Ag. Ore is trucked to New Afton for processing under an agreement with New Gold Inc.

An 8700 m and subsequent 13,900 m drilling program included potential open pit and underground targets. Most of the second phase (10,500 m) targeted the Siwash North zone, the location of the largest current resource estimate. The remainder was on satellite targets. Highlights included 2.4 m of 20.20 g/t Au, 1.3 m of 10.59 g/t Au, and 1.1 m of 17.54 g/t Au at the Siwash North zone. Following drilling and as of December, the combined pit-constrained and underground resources were estimated at 4.359 Mt grading 5.6 g/t Au and 11.0 g/t Ag, Measured+Indicated and 1.497 Mt grading 5.3 g/t Au and

14.4 g/t Ag, Inferred (Table 1).

### 3.1.4. Gibraltar (Taseko Mines Limited 75%; Cariboo Copper Corp. 25%)

Taseko Mines Limited expects to produce approximately 120 million pounds of copper at **Gibraltar** in 2021, similar to 2020 (123 million pounds). As of December, transport infrastructure disruptions resulting from unusually intense rainstorms had affected shipments but not production. Current Proven and Probable reserves can support mining until 2038. The Polyanna pit provided the primary mill feed during 2021.

The calc-alkaline porphyry Cu-Mo deposit is in the Granite Mountain batholith (Upper Triassic; van Straaten et al., 2013; Schiarizza and Friedman, 2021) in a fault-bounded section of Nicola Group and Dragon Mountain succession volcanic and sedimentary rocks (Quesnel terrane; Schiarizza 2014, 2015, van Straaten et al., 2020) bounded by Cache Creek terrane rocks to the east and west.

### 3.1.5. Highland Valley Copper (Teck Resources Limited)

Management's guidance for the year is 128-133,000 t Cu and 1.2-1.8 million pounds Mo (Table 1). Copper production 2022-24 is projected at 135,000-165,000 tpy. Tonnes mined and milled in the first nine months of 2021 were lower than in 2020, but grades, recoveries, production, and sales were higher. Operations were suspended briefly due to a wildfire evacuation. Heavy November rains and resulting floods and landslides did not immediately affect production although Teck announced disruption of logistics between all its British Columbia operations and coastal terminals. Teck has scaled up electrification and automation of equipment since a pilot project started in 2018, increasing the number of autonomous haul trucks from six to an anticipated 35, close to 70% of their total fleet.

Teck is proposing an extension to the mine's projected life from about 2028 to at least 2040. The project is in the pre-application stage of environmental assessment. Teck submitted an update to the project description as engineering and design advanced. The submission includes plans for: extending the Highmont and Valley open pits; extending waste rock dumps; increasing tailings storage capacity; and upgrading pit infrastructure, processing facilities, and water and tailings infrastructure. In addition, the possibility of relocating part of Highway 97C and BC Hydro power lines is being examined. The company envisages increasing average mine production from 136,000 up to 178,000 tonnes tpd.

All mineralization at **Highland Valley Copper** is calc-alkaline Cu-Mo type in the Guichon Creek batholith (Upper Triassic), which has been divided into several pre-, syn- and post-mineral phases (see Byrne et al., 2013, 2020; Ryan et al., 2020).

### 3.1.6. Mount Polley (Imperial Metals Corporation)

Imperial suspended production at **Mount Polley** in 2019 in response to low copper prices. It is an open-pit operation with

an underground component. The mine has remained on care and maintenance, although management indicated an intention to restart mining and a plan was updated to account for current metal prices and late 2020 exploration results. The company is seeking financing to implement the restart. Remediation and monitoring are ongoing following the 2014 tailings dam breach.

The deposits at Mount Polley are alkalic porphyry Cu-Au in the syenitic to monzodioritic Polley stock (Upper Triassic-Lower Jurassic), which intrudes Nicola Group volcanic rocks. At least eight discrete mineralized zones have contributed to production or host resources (see Rees, 2013, Brown et al., 2016; Rees et al., 2020).

### 3.1.7. New Afton (New Gold Inc.)

The **New Afton** gold-copper mine (Fig. 1; Table 1) is a block cave operation that opened in mid-2012 (Hall and May, 2013). The New Afton deposits form a high-grade keel beneath the past-producing (1978-1997) Afton open-pit mine, an alkalic porphyry in the Iron Mask batholith (Upper Triassic). In the first 3 quarters of 2021 the mine produced 39,735 oz Au and 47.5 Mlb Cu or 134,898 AuEq oz. The mining rate was expected to increase and meet guidance for 2021 of 165-195 AuEq oz. Floods, landslides, and transport infrastructure collapse across British Columbia due to heavy rains in November did not immediately affect operations although disruptions to transportation routes may have a long-term impact.

The company reported both underground exploration drilling at the mine site and surface drilling within the mine footprint and on the Cherry Creek trend 3 km to the west. Work in the Cherry Creek trend area included drilling for deep porphyry style and shear-hosted gold mineralization. An early highlight of the surface drilling was 1 m of 21 g/t Au. The main targets are alkalic porphyry Cu-Au hosted by the Iron Mask batholith and volcanosedimentary rocks of the Nicola Group (Upper Triassic; Lipske et al., 2020).

### 3.1.8. Merritt Mill (Nicola Mining Inc.)

Nicola Mining's 200 tpd custom mill and tailings facility at the Craigmont mine site resumed operation in 2021, processing stockpiled ore from Blue Lagoon Resources Inc.'s Dome Mountain gold project in the Northwest Region. They expect to process more than 6000 t gold-mineralized quartz vein material (see Clarke, 2022).

## 3.2. Selected industrial mineral mines

More than a dozen industrial mineral quarries and processing plants are in the region (Fig. 1; Table 2). In addition, nearly 300 sand and gravel pits and 45 quarries have active Mines Act permits, although many are intermittently active. Industrial minerals producers and explorers compete in local markets and information is commonly not made public. Operations are listed here to highlight the local availability of selected products.

### 3.2.1. Ashcroft (IG Machine and Fibers Ltd.)

IG Machine and Fiber Ltd, a subsidiary of IKO Industries Ltd., operates the **Ashcroft** basalt quarry and roofing granule plant. They began production in 2001 and now typically produce 300,000 tpy of granules. The quarry is permitted to mine 500,000 tpy, 60% of which is processed into granule products. It has reserves of about 13 Mt or 30 years of production.

### 3.2.2. Falkland (Lafarge Canada Inc.)

Gypsum and anhydrite mined at the **Falkland** quarry, which no longer supplies Lafarge's cement plant in Kamloops, still supplies gypsum for other uses including agriculture. After operating intermittently for many years supplying cement to western Canada, the Kamloops cement plant and Harper Ranch limestone quarry of Lafarge Canada Inc. are now mainly on care and maintenance, although it produces some construction aggregate.

### 3.2.3. Kettle Valley quarries (Kelowna Sand and Gravel Ltd.)

Decorative rock and dimension stone are produced from small quarries throughout the region. Kelowna Sand and Gravel Ltd. mines gneiss, dacite tuff, and basalt at the Nipple Mountain, Kettle Valley, Canyon, and Gemini quarries and has been issued permits to explore other sites. Kettle Valley Stone Company of Kelowna produces flagstone, ashlar, facing stone, and landscape rock.

### 3.2.4. Nazko (Canlava Mining Corp.)

Canlava Mining produces red and black scoria from the **Nazko** quarry for geotechnical and other applications requiring lightweight fill. It is also sold for landscaping.

### 3.2.5. Red Lake and Bud (Absorbent Products Ltd.)

Absorbent Products Ltd. produces diatomaceous earth from the **Red Lake** quarry, and bentonite from the **Bud** quarry to manufacture cat litter, barn deodorizer, industrial absorbents, and carriers for agricultural products at their plant in Kamloops.

### 3.2.6. Bromley Creek (International Zeolite Corp.)

In 2014, Canadian Mining Company Inc. a subsidiary of International Zeolite, concluded its option agreement with Heemskirk Canada Ltd., and regained control of the **Bromley Creek** zeolite quarry. Absorbent Products Ltd. mines zeolite with agricultural and absorbent applications from the quarry.

### 3.2.7. Z-1 (Progressive Planet Solutions Inc.)

The **Z-1** mine is now owned by Progressive Planet Solutions, formerly Ashburton Ventures Inc. ZMM Canada Minerals Corp. is the operator. Their product is currently used as an agricultural feed additive, a growth medium, a filtration medium, a component of lightweight concrete, and for soil remediation.

**Table 2.** Selected industrial mineral mines and quarries, South Central Region.

Mine	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1-Q3)	Reserves	Resources	Comments
Ashcroft	IG Machine and Fibers Ltd. (IKO Industries Ltd.)	Basalt (roofing granules); 092INW104	300,000 t	na	Approx. 13.3 Mt in 2002	Typically mines 500,000 t with 60% processed into granule products.
Bromley Creek (Zeotech)	Absorbent Products Ltd. (owner International Zeolite Corp.)	Zeolite; Open system zeolites; 092HSE243	na	na	M+I (as of 2013-06-30): 550,000 t	
Bud	Absorbent Products Ltd.	Bentonite; 092HSE162	na	na	na	
Falkland	Lafarge Canada Inc.	Gypsum; 082LNW001	na	na	Approx. 1.8 Mt	Found alternate uses since closure of Lafarge's Kamloops cement plant.
Kettle Valley Quarries	Kelowna Sand and Gravel Ltd./Kettle Valley Stone Company	Ashlar, flagstone, thin veneer; 082ENW109, 111, 112	na	na	na	
Klinker	Opal Resources Canada Inc.	Opal; 082LSW125	Intermittent operation	na	na	
Nazko	CanLava Mining Corporation	Lava rock; Cinder cone; 093B 060	na	na	Historical: 45 Mt	
Red Lake	Absorbent Products Ltd.	Diatomaceous earth; Lacustrine diatomite; 092INE081	na	na	na	
Z-1	Progressive Planet Solutions Inc.	Zeolite; Open system zeolites; 092INW095	na	na	Approx. 800,000 t	Historical resource.

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

#### 4. Placer mines

The region has several hundred placer mines. Most of these operations are small, intermittent, or seasonal, and production data and details of exploration are generally unavailable.

##### 4.1. Wingdam (Omineca Mining and Metals Inc.)

Preparations were underway for an underground bulk sample, including dewatering and rehabilitation of the decline to the mining face. Once active mining is underway, third parties may earn a 50% interest in the project. The project uses a freeze technology to gain access to a placer channel below Lightning Creek.

#### 5. Mine development

Mine development projects are those that have a positive production decision and key government approvals, and on-site construction has begun. No major projects meet these criteria in the South Central Region.

#### 6. Proposed mines

Proposed mines are defined as feasibility-stage projects for which the process of formal socioeconomic and environmental review has begun. For projects that exceed thresholds set by the British Columbia Environmental Assessment Act (or its federal equivalent), reviews are coordinated by the British Columbia



Environmental Assessment Office and Canadian Environmental Assessment Agency. Smaller projects are reviewed by an interagency Mine Development Review Committee (MDRC) chaired by the Ministry of Energy, Mines and Low Carbon Innovation. Four projects are in this category: **Ajax**, **Cariboo Gold**, **New Prosperity**, **Ruddock Creek** (Fig. 1; Table 3). Two projects, Taseko Mines Limited's **Yellowhead** and Spanish Mountain Gold Ltd.'s **Spanish Mountain** are active but have terminated or withdrawn environmental assessments. Ajax was rejected by both provincial and federal levels of government, and New Prosperity's provincial certification may expire in early 2022, having been extended 12 months. In none of these cases has the operator abandoned their project.

## 6.1. Proposed metal mines

### 6.1.1. Ajax (KGHM Ajax Mining Inc.)

The **Ajax** porphyry copper-gold project, owned by KGHM Ajax Mining Inc., is an 80:20 joint venture between KGHM Polska Miedź S.A. and Abacus Mining and Exploration Corporation. Mineralization is in the Iron Mask batholith, a multi-phase Triassic alkalic intrusive complex. A revised Feasibility Study released in 2016 modelled Ajax as a 65,000 tpd

open-pit mine with a projected 18-year life. In December 2017, the project was denied certification by the British Columbia Ministries of Environment and Climate Change Strategy and Energy, Mines and Petroleum Resources. In June 2018, Natural Resources Canada, Fisheries and Oceans Canada, and the Canadian Coast Guard denied federal certification. Although KGHM Ajax has not announced plans for the site, Abacus issued an update stating that the project remains a priority and that they have begun re-engaging those potentially affected by it and considering whether to reapply for environmental certification. With a Kamloops office that opened in 2020, KGHM is considering resubmitting an application.

### 6.1.2. Cariboo Gold (Osisko Development Corp.)

Osisko Development Corp. acquired the **Cariboo Gold** project in 2019 through a purchase of Barkerville Gold Mines. The property consolidates several historic gold mines. The company project engaged in the British Columbia environmental assessment process in 2019, and the application is now in the development and review phase. The current project description is for a 4750 tpd underground mine with a 16-year life. Ore crushing, sorting, and a flotation circuit on site would produce

**Table 3.** Selected proposed mines or quarries, South Central Region.

Project	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resources	Comments
<b>Ajax</b>	<b>KGHM Ajax Mining Inc. (KGHM Polska Miedź SA 80%, Abacus Mining and Exploration Corporation 20%)</b>	Cu, Au; Alkalic porphyry; 092INE012, 13	P+Pr (NSR cut-off US\$7.10/t): 426 Mt 0.29% Cu, 0.19 g/t Au, 0.39 g/t Ag	M+I (NSR cut-off US\$7.10/t): 568 Mt 0.26% Cu, 0.18 g/t Au, 0.35 g/t Ag	Environmental certification denied by provincial (2017) and federal ministers (2018). Proponents are investigating a possible resubmission.
<b>Cariboo Gold Project</b>	<b>Osisko Development Corp.</b>	Au; Au-quartz veins; 093H 140, 139, 19, 6	na	M+I: 21.441 Mt 4.6 g/t Au Inf: 21.649 Mt 3.9 g/t Au	Updated project description has average production rate of 4750 tpd and mine life up to 16 years. Ongoing exploration drilling.
<b>New Prosperity</b>	<b>Taseko Mines Limited</b>	Cu, Au; Porphyry; 092O 041	P+Pr (NSR cut-off \$5.50/t): 831 Mt 0.23% Cu, 0.41 g/t Au containing (recoverable) 3.6 Blb Cu, 7.7 Moz Au	M+I (cut-off 0.14% Cu): 1010 Mt 0.24% Cu, 0.41 g/t Au	Granted provincial environmental certificate and time extensions but denied federal approval. Taseko and Tsilhqot'in Nation in discussion.
<b>Ruddock Creek</b>	<b>Ruddock Creek Mining Corporation (Imperial Metals 100%)</b>	Pb, Zn, Ag; Broken Hill-type; 082M 082	na	M+I (cut-off 4.0% Pb+Zn): 6.2 Mt 6.50% Zn, 1.33% Pb Inf: 6.678 Mt 6.33% Zn, 1.20% Pb	Project at environmental assessment pre-application stage. Feb 2013 resource before 2018-19 drilling. Imperial Metals now owns 100%.

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

a flotation concentrate to be trucked to the Quesnel River mill. Tailings would be disposed of as paste backfill on site and at the QR with a filtered stack tailings storage facility. A feasibility study is to be completed in 2022. Measured and Indicated resources stood at approximately 3 Moz with a similar amount in the Inferred category before 2020-21 drilling.

The company is permitted to begin underground development at Cow Mountain, separate from the **Bonanza Ledge Mine** which is on the property and produced in 2021 (see Metal mines section 3.1.1.). This underground development will serve as access for a bulk sample and underground drilling. The company completed 152,000 m of resource conversion and exploration drilling at Cariboo Gold in 2021.

#### 6.1.3. New Prosperity (Taseko Mines Limited)

Taseko Mines Limited's **New Prosperity** project received a 12 month extension of its provincial environmental certificate for a 70,000 tpd open pit copper-gold mine. New Prosperity received provincial certification in 2010 but in 2014 the Government of Canada refused to authorize the project. Taseko has a standstill agreement with the T̓silhqot'in Nation pending a dialogue between the parties to arrive at a long-term resolution of differences about the project.

#### 6.1.4. Ruddock Creek (Imperial Metals Corporation 100%)

Imperial Metals Corporation increased its ownership of the **Ruddock Creek** project to 100% by purchasing the interest held by Japanese partners in Ruddock Creek Mining Corporation. Although they reported no 2021 exploration, the project remains in the British Columbia Environmental Assessment process. A 2014 revised project description referred to a 3000 tpd underground lead-zinc mine with an 8-year life. A mineral resource estimate, released in February 2013, reported 6.246 Mt grading 6.5% Zn and 1.33% Pb (Indicated) and 6.678 Mt grading 6.33% Zn and 1.20% Pb (Inferred), using a 4.0% combined Pb+Zn cut-off. This estimate does not incorporate 2018-19 drilling. The deposit is described as sedimentary exhalative, Monashee or Broken Hill-type, in marble, gneiss, and calc-silicate rocks.

### 6.2. Proposed industrial mineral and aggregate quarries

The proposed quarries in the region are below environmental assessment thresholds, and not treated herein because details are not widely reported.

## 7. Selected exploration activities and highlights

Exploration spending in 2021 was predominantly for gold, although exploration for porphyry copper remained significant.

### 7.1. Selected precious metal projects

The South Central Region has many precious metal deposit types including: orogenic veins; transitional veins; epithermal veins; hot spring systems; replacement deposits; skarns; sediment-hosted deposits; and intrusion-related breccias.

#### 7.1.1. Blackdome-Elizabeth (Tempus Resources Ltd.)

Tempus Resources Ltd. drilled at their **Elizabeth** property (7740 m, 28 holes) and reported early highlights of 3.4 m (true thickness) grading 34.4 g/t Au and 1.28 m grading 68.30 g/t Au. A newly discovered vein, which returned 1.0 m grading 33.7 g/t Au and 0.5 m grading 26.4 g/t Au, has been traced along a 380 m strike length. At their **Blackdome** property Tempus conducted an alteration study and identified new target areas. The linked Blackdome and Elizabeth properties were the subject of a 2010 Preliminary Economic Assessment in which mining would occur at both sites, with processing at an existing mill at Blackdome. Tempus is focussed on verifying and expanding the existing resource (Table 4).

Blackdome is a low-sulphidation epithermal deposit in Cenozoic intermediate to felsic volcanic rocks. Elizabeth, 30 km south, is a series of veins in a Paleocene quartz diorite intrusion in the Shulaps ultramafic complex. Historically they have been compared to the Bralorne-Pioneer orogenic deposits.

#### 7.1.2. Blackdome (ArcPacific Resources Corp.)

ArcPacific Resources Corp. reported results of hand trenching at their **Blackdome** epithermal precious metals project (separate from Tempus Resources property of the same name). High values along 1 m intervals of two separate trenches were reported at 5.67 g/t Au and 8.77 g/t Ag, and 7.35 g/t Au and 12.9 g/t Ag.

#### 7.1.3. Bralorne (Talisker Resources Ltd.)

Talisker Resources Ltd. is targeting 100,000 m of drilling at the **Bralorne** mine with plans to prepare a resource estimate in 2022. Drilling for an underground resource is from surface to a depth of about 700 m. They are also developing a near-surface (<350 m deep) bulk-tonnage resource. The company reported numerous narrow high-grade vein intersections, but also notable were longer, lower grade near-surface intersections to be incorporated in a surface resource. They also reported significant intersections of 2.25 m grading 90.71 g/t Au at the BRX target, 5.5 km north of the Bralorne mine and 1.25 m grading 81.09 g/t Au between the Bralorne and Pioneer mines.

Talisker acquired the Bralorne project in 2019 and subsequently assembled a larger contiguous land position in the Bridge River Camp which comprises the Congress and Royale properties. The camp produced more than 4 million oz of gold between 1900 and 1971 at average grades of about 15 g/t Au. Veins have characteristics typical of orogenic gold deposits; the age of mineralization is estimated at ca. 68-64 Ma ( $^{40}\text{Ar}/^{39}\text{Ar}$  muscovite; Hart and Goldfarb, 2017). Historical development traced veins to a depth of 1900 m (Church and Jones, 1999).

#### 7.1.4. CHG (Basin Uranium Corp.)

Basin Uranium Corp. (formerly Black Shield Metals Corp.) flew an airborne VTEM geophysical survey at the **CHG** (carbonate hosted gold) project under an option agreement with vendor Cariboo Rose Resources Ltd.

**Table 4.** Selected exploration projects, South Central Region.

<b>Project</b>	<b>Operator (partner)</b>	<b>Commodity; deposit type; MINFILE</b>	<b>Resources (NI 43-101 compliant unless indicated otherwise)</b>	<b>Comments</b>
<b>Alwin Mine</b>	<b>GSP Resource Corp.</b>	Cu, Ag; Cu±Ag quartz veins; Porphyry Cu±Mo±Au; 092ISW010, 21	Historical: 390,000 t 11.7 g/t Ag, 0.69 g/t Au, 2.5% Cu	Drilling, 8 holes, 2334.5 m; highlight 164.6 m grading 0.61% CuEq (0.5% Cu).
<b>Beaver-Lynx</b>	<b>Inomin Mines Inc.</b>	Ni, Co; Ultramafic-mafic; 093B 073, 285	na	Ground magnetic survey. Drilling 5 holes, 715 m.
<b>Blackdome</b>	<b>ArcPacific Resources Corp.</b>	Au, Ag; Epithermal Au-Ag; 092O 002, 169, 164	I: 144,500 t 11.29 g/t Au, 50.01 g/t Ag Inf: 90,600 t 8.79 g/t Au, 18.61 g/t Ag	Trenching, initial result 36 m 1.03 g/t Au.
<b>Blackdome- Elizabeth</b>	<b>Tempus Resources Ltd.</b>	Au, Ag; Au quartz veins, Epithermal Au-Ag-Cu low sulphidation; 092O 053, 12	Inf: 522,843 t 12.26 g/t Au	Drilling, 7740 m in 28 holes at Elizabeth. New vein discovery. Alteration study at Blackdome.
<b>Bralorne</b>	<b>Talisker Resources Ltd.</b>	Au; Au-quartz veins; 092JNE001	M+I: 260,000 tons 0.351 oz/ ton Au Inf: 317,000 tons 0.231 oz/ton Au	Drilling, 100,000 m planned by year end. Objectives include new surface and underground resource estimates.
<b>Brussels Creek</b>	<b>Recharge Resources Ltd.</b>	Cu, Au, Pd; Porphyry Cu-Au (alkalic); 092INE089	na	TITAN IP survey (announced start).
<b>CHG</b>	<b>Basin Uranium Corp. (Cariboo Rose Resources Ltd.)</b>	Au, Ag; Carbonate-hosted Au; 092P 083	na	Airborne (VTEM) survey, 335 km.
<b>Comstock</b>	<b>North Valley Resources Ltd.</b>	Au, Zn, Pb, Cu, Ag; Polymetallic veins Ag-Pb- Zn±Au; 092ISE052, 156	na	Ground magnetic, soil and rock geochemical surveys. Known base metal, also targeting epithermal mineralization.
<b>Copper Keg</b>	<b>District Copper Corp.</b>	Cu, Au, Ag; Porphyry Cu±Mo±Au; 092INW031	na	Mapping, TITAN IP survey.
<b>Copperview</b>	<b>Golden Lake Exploration Inc.</b>	Cu, Au; Porphyry Cu-Au (alkalic); 092HNE296, 320	na	Prospecting, geological mapping, rock and soil sampling. Airborne VLF EM and magnetic survey. Grab sample returned 9920 g/t Ag.
<b>Dictator</b>	<b>Eagle Plains Resources Ltd.</b>	Au, Ag; Polymetallic veins Ag-Pb- Zn±Au; 082ENE022, 23, 73, 72	na	2020-21 airborne magnetic survey completed. Prospecting, rock and soil geochemistry.
<b>Donna</b>	<b>Eagle Plains Resources Ltd.</b>	Au, Ag; Polymetallic veins; 082LSE022, 10, 20, 16	na	Airborne radiometric and magnetic survey, soil and silt stream geochemistry, drilling 12 holes, 1152 m.

Table 4. Continued.

<b>FG</b>	<b>Karus Gold Corp.</b>	Au, Ag; Au-quartz veins; 093A 061	(2015 estimate considered historical by Karus) M: 5,600,000 t 0.812 g/t Au I: 9,570,000 t 0.755 g/t Au Inf: 27,493,000 t 0.718 g/t Au	Drilling, 7142 m in 19 holes. Technical report.
<b>Fox Tungsten</b>	<b>Happy Creek Minerals Ltd.</b>	W; W skarns; 093A 259, 260, 261, 211	I: 582,000 t 0.826% WO <sub>3</sub> Inf: 565,400 t 1.231% WO <sub>3</sub>	Drilling, 12 holes, 2052.7 m.
<b>Friendly</b>	<b>Wedgemount Resources Corp.</b>	Cu, Ag, Pt, Pd; Porphyry Cu±Mo±Au; 092P 007, 9, 10, 212	na	Mapping, rock and soil geochemistry, IP (planned).
<b>Gold Bridge</b>	<b>Blackstone Minerals Ltd.</b>	Cu, Ni, Co, Au; 5 element veins?; 092JNE068, 108	na	Drilling commenced at the Jewel target in December. First hole encountered visible Cu-Ni-Co mineralization.
<b>Gold Creek</b>	<b>Karus Gold Corp.</b>	Au, Ag; Au-quartz veins; 093A 127	na	Drilling, 5 holes, 1375 m.
<b>GC</b>	<b>MGX Minerals Inc.</b>	Li, Cs, Ta, Rb; LCT pegmatite	na	Announced field work late in the year.
<b>Goldrange</b>	<b>Kingfisher Metals Corp.</b>	Au, Ag; Au and Cu±Ag quartz veins; 092N 058, 59, 47, 57, 48	na	14 holes, 4925.3 m drill program. Highlight 9 m of 6.88 g/t Au, 13.6 g/t Ag, 0.28% Cu.
<b>Highland Valley project (West Valley-Rateria)</b>	<b>Happy Creek Minerals Ltd.</b>	Cu, Mo, Au, Ag, Re; Porphyry Cu±Mo±Au; 092ISE199	na	Airborne magnetic survey, surface mapping and sampling.
<b>Hedge Hog</b>	<b>West Oak Gold Corp.</b>		na	Soil survey. Targeting gold mineralization.
<b>Homathko</b>	<b>Homerun Resources Inc.</b>	Au, Ag; Au quartz veins, Cu±Ag quartz veins; 092N 049, 67, 68	na	Increased property size, airborne magnetic survey.
<b>Iron Lake</b>	<b>Tech-X Resources Inc.</b>	Pt, Pd, Co, Cu, Au; Alkalic porphyry Cu-Au and ultramafic hosted; 092P 132, 113, 182, 222	na	Private company does not release details of work.
<b>Koster Dam</b>	<b>Cariboo Rose Resources Ltd.</b> (Ameriwest Lithium Inc.)	Au, Ag; Au and Cu±Ag quartz veins; 092O 031	na	Airborne magnetic and lidar survey.



Table 4. Continued.

<b>Lac La Hache</b>	<b>Engold Mines Ltd.</b>	Cu, Au, Ag, Fe; Alkalic porphyry Cu-Au, Cu skarn; 092P 120, 108, 2, 153	Aurizon Inf: 1.99 Mt 2.32 g/t Au, 0.6% Cu, 5.37 g/t Ag  Spout zone open pit I: 6.5 Mt 0.33% Cu, 1.34 g/t Ag, 0.05 g/t Au, 11.62% magnetite  Spout zone open pit Inf: 7.66 Mt 0.27% Cu, 0.99 g/t Ag, 0.04 g/t Au, 9.5% magnetite  Spout zone u/g Inf: 0.39 Mt 1.0% Cu, 2.58 g/t Ag, 0.13 g/t Ag, 10.33% magnetite  G1 u/g Inf: 1.71 Mt 1.25% Cu, 6.45 g/t Ag, 0.19 g/t Au, 30.94% magnetite	Drilling (5277.4 m) at Ann North, G1, G1 south and Road Gold zone. Updated resource estimates, maiden resource for G1.
<b>Lightning Strike</b>	<b>Cariboo Rose Resources Ltd.</b>	Au, Ag; Au-quartz veins; 093A 250	na	Drilling 1463 m, 11 holes. Targets are sediment-hosted gold veins.
<b>LMSL</b>	<b>ArcPacific Resources Corp.</b>	Cu, Au, Mo, W; Porphyry Cu±Mo±Au, W skarn; 092ISE027, 94, 128, 129	na	Data review, drill targets selected, permitting, expanded property.
<b>Miner Mountain</b>	<b>Sego Resources Inc.</b>	Cu, Au; Alkalic porphyry Cu-Au; 092HSE203, 78	na	Drilling, 2200 m in 11 holes. Highlights include 59 m 1.03 g/t Au, 88 m 1.08 g/t Au, and 94.2 m of 0.86 g/t Au.
<b>Mouse Mountain</b>	<b>Omineca Mining and Metals Ltd.</b>	Cu, Au, Ag; Alkalic porphyry Cu-Au; 093G 003	na	Completed 2000 m drilling, earned 50% interest in the project.
<b>MPD</b>	<b>Kodiak Copper Corp.</b>	Cu, Au; Alkalic porphyry Cu-Au; 092HNE243, 55, 191, 244	na	Drilled 21,675 m of a planned approx. 30,000 m before weather related suspension. Highlights include 504 m 0.37% Cu, 0.15 g/t Au, 1.11 g/t Ag at Gate zone.
<b>New Craigmont</b>	<b>Nicola Mining Inc.</b>	Cu, Au; Cu skarn; 092ISE035	Inf: 18.669 Mt 0.13% Cu (waste rock)	1460 m drilling in 5 holes. Highlights 11.5 m 2.19% Cu and 71.35 m 0.29 % Cu.
<b>New Pilot</b>	<b>Nexus Gold Corp.</b>	Au, Ag, Cu Zn, Pb; Au quartz veins, Cu±Ag quartz veins; 092JNE076, 197	na	Airborne magnetic and radiometric survey.
<b>Newton</b>	<b>Carlyle Commodities Corp.</b>	Au, Ag; Epithermal Au-Ag-Cu (high sulphidation)	Inf: 111.46 Mt 0.44 g/t Au, 2.1 g/t Ag	New owner Carlyle to update the 2012 resource estimate.

Table 4. Continued.

<b>Perk-Rocky</b>	<b>Ethos Gold Corp.</b>	Cu, Au, Ag; Porphyry Cu, Au quartz veins; 092N 011, 12, 53	na	Wide spaced reconnaissance drilling (2050 m, 6 holes) intersected anomalous Cu and alteration.
<b>Placer Mountain</b>	<b>Damara Gold Corp.</b>	Au, Ag; Au quartz veins; 092HSE262, 263	na	Soil geochemical survey, trenching, rock sampling drilling (2000 m planned).
<b>Ponderosa</b>	<b>Au Gold Corp.</b>	Au, Ag; Au-quartz veins; 092ISE192	na	Rock and soil geochemistry, airborne magnetic survey.
<b>Quesnel Nickel</b>	<b>Green River Gold Corp.</b>	Ni, Co, talc; Mafic-ultramafic; 093A 130, 093H 061, 139	na	Packsack drilling to average depth approx. 1.5 m.
<b>Rabbit North</b>	<b>Tower Resources Ltd.</b>	Cu, Au; Alkalic porphyry Cu-Au; 092INE045, 147	na	Infill till sampling identified drill target. Drilling commenced in December.
<b>Rayfield</b>	<b>Golden Sky Minerals Corp.</b>	Cu,Au; Alkalic porphyry Cu-Au; 092P 005	na	Soil (1337) and rock (29) geochemistry.
<b>Reliance</b>	<b>Endurance Gold Corporation</b>	Au, Sb, Ag; Au quartz veins, Stibnite veins and disseminations; 092JNE033, 136, 191	Historical: 410,916 t grading 5.96 g/t Au	Reverse circulation drilling (35 holes, highlight 15.24 m 14.08 g/t Au), IP and 4329 m (22 holes) diamond drilling. Initial results 5.4 m 10.94 g/t Au, 9 m 7.49 g/t Au.
<b>Shovelnose</b>	<b>Westhaven Gold Corp.</b>	Au, Ag; Epithermal Au-Ag-Cu low sulphidation; 092HNE309, 308	na	Drilling, approximately 41,000 m before drilling suspended. Metallurgical testing.
<b>Spanish Mountain</b>	<b>Spanish Mountain Gold Ltd.</b>	Au, Ag; Au-quartz veins; 093A 043	M+I: 294 Mt 0.50 g/t Au, 0.72 g/t Ag Inf: 18 Mt 0.63 g/t Au, 0.76 g/t Ag	Prefeasibility study, sonic drilling (1226 m, 21 holes). P+Pr: 95.9 Mt 0.76 g/t Au, 0.71 g/t Ag.
<b>Spences Bridge and Regional</b>	<b>Talisker Resources Ltd.</b>	Au, Ag; Epithermal Au-Ag-Cu low sulphidation; 092O 054, 60, 143, 092INW092, 110, 092ISW118, 124, 84	na	Regional prospecting mapping and sampling program continued in 2021 over multiple targets.
<b>Spitfire-Sunny Boy</b>	<b>Falcon Gold Corp.</b>	Au, Ag, Cu; Polymetallic veins, epithermal?; 092ISE049, 48, 118, 119, 117	na	Packsack drilling highlights 0.86 m of 29.7 g/t Au, 0.47 m 68.7 g/t Au. Grab samples up to 168 g/t Au.
<b>Spilus</b>	<b>Arctic Fox Ventures Inc. (Pacific Ridge Exploration Ltd.)</b>	Cu, Mo; Porphyry Cu±Mo±Au; 092HNW027, 85	na	Drilling 550 m.
<b>Vidette Lake</b>	<b>Kermode Resources Ltd.</b>	Au, Ag, Cu; epithermal; no MINFILE	na	Soil geochemistry and ground magnetic survey.

Table 4. Continued.

<b>Wingdam</b>	<b>Omineca Mining and Metals Ltd.</b>	Au; Au-quartz veins; 093H 012	na	Drilling, targeting approximately 8000 m, 27 holes (continuation of 2020 program).
<b>Woodjam</b>	<b>Consolidated Woodjam Copper Corp.</b>	Cu, Au; Alkalic porphyry Cu-Au; 093A 269, 78	Inf: 227.5 Mt 0.31% Cu (Woodjam South)  Inf: 32.8 Mt 0.22% Cu, 0.49 g/t Au (Deerhorn)  Inf: 8.3 Mt 0.22% Cu, 0.26 g/t Au (Takom)	Drilling 4000 m (planned) at Deerhorn. Early released highlight 142.4 m 0.56% Cu, 0.23 g/t Au.
<b>Yellowhead</b>	<b>Taseko Mines Limited</b>	Cu, Au, Ag; Noranda/Kuroko; 082M 008, 9	M+I: 1292 Mt 0.25% Cu, 0.028 g/t Au, 1.2 g/t Ag Inf: 109 Mt 0.21% Cu, 0.024 g/t Au, 1.2 g/t Ag	Engineering and baseline environmental work. Community engagement. Proven+Probable reserves are 817 Mt grading 0.28% Cu.

M = Measured; I = Indicated; Inf = Inferred

#### 7.1.5. Comstock (North Valley Resources Ltd.)

North Valley Resources Ltd. announced ground magnetic and soil and rock geochemical surveys at the **Comstock** property, where targets include volcanogenic massive sulphide and vein-hosted polymetallic and epithermal precious metals mineralization.

#### 7.1.6. Dictator (Eagle Plains Resources Ltd.)

Eagle Plains Resources completed a 2020-21 airborne magnetic survey and subsequently carried out rock and soil geochemistry and prospecting at **Dictator**. Targets include intrusion-related precious and base metals.

#### 7.1.7. Donna (Eagle Plains Resources Ltd.)

Eagle Plains Resources Ltd. completed 1152 m of drilling in 12 holes at **Donna**. A highlight intersection was reported at 1.5 m grading 9.41 g/t Au. Surface work included soil and silt geochemistry following up 2020-21 airborne radiometric and magnetic surveys. Targets include intrusive-related gold mineralization.

#### 7.1.8. FG (Karus Gold Corp.)

The **FG** project targeted orogenic gold mineralized quartz veins in sedimentary rocks with 7142 m drilling in 19 holes. Karus was a spin-off company of Kore Mining Ltd. created to hold and operate the company's Cariboo gold projects and is targeting higher-grade mineralization than previous exploration. The Main zone lies in metasedimentary rocks on the northeast limb of a syncline. They propose other targets in equivalent rocks on this structure.

#### 7.1.9. Gold Creek (Karus Gold Corp.)

Karus Gold Corp. carried out drilling at the **Gold Creek**

(1375 m in 5 holes) project. They are targeting high-grade mineralization in gold-bearing quartz-carbonate sheeted veins northwest of the Spanish Mountain project.

#### 7.1.10. Goldrange (Kingfisher Metals Corp.)

Kingfisher Metals Corp. drilled 4925 m in 14 holes at the **Goldrange** project, which had hitherto seen little modern exploration. Highlight results include a 9 m intersection grading 6.88 g/t Au, 13.6 g/t Ag, and 0.28% Cu in a hydrothermal breccia. One vein returned 1 m of 14.8 g/t Au. Work also included geochemical and IP surveys.

#### 7.1.11. Hedge Hog (West Oak Gold Corp.)

West Oak Gold Corp. optioned the **Hedge Hog** property and began exploration for gold mineralization. Work included soil geochemistry. Hedge Hog has been explored previously as a VMS target.

#### 7.1.12. Homathko (Homerun Resources Inc.)

Homerun Resources Inc. expanded their **Homathko** property land package and flew an airborne magnetic survey (521 line-km) across the expanded property.

#### 7.1.13. Koster Dam (Cariboo Rose Resources Ltd.)

Cariboo Rose reported an airborne survey (magnetic and lidar) at the **Koster Dam** property. Ameriwest Lithium Inc. has a 45% interest under an option agreement.

#### 7.1.14. Lac La Hache (Engold Mines Ltd.)

Engold Mines Ltd. drilled their Road Gold zone, reporting an intersection of 1.5 m grading 7.6 g/t Au. They also reported work on skarn and porphyry targets on their **Lac La Hache** property (see below).

#### 7.1.15. Lightning Strike (Cariboo Rose Resources Ltd.)

Cariboo Rose Resources Ltd. reported trenching and 1463 m of drilling at their **Lightning Strike** project. The target is shale-hosted gold similar to Spanish Mountain and FG.

#### 7.1.16. New Pilot (Nexus Gold Corp.)

Nexus Gold Corp. completed an airborne magnetic and radiometric survey at the **New Pilot** project, outlining a magnetic low.

#### 7.1.17. Newton (Carlyle Commodities Corp.)

Carlyle Commodities Corp. acquired the **Newton** gold property from Amarc Resources Ltd. and plan to update the property's 2012 resource estimate. They applied for a permit to allow drilling.

#### 7.1.18. Placer Mountain (Damara Gold Corp.)

Damara reported soil geochemistry surveys, trenching, and drilling at its **Placer Mountain** project (formerly Princeton Gold). The planned 2000 m program commenced late in the fall. Grab samples returned up to 70.6 g/t Au and 244 g/t Ag. A 400 by 1200 m gold-in-soil anomaly had individual samples grading up to 18,067 ppb Au and 52.1 g/t Ag.

#### 7.1.19. Ponderosa (Au Gold Corp.)

Au Gold Corp. conducted rock and soil sampling and airborne magnetic and photogrammetry surveys at their **Ponderosa** project in the Spences Bridge belt. They have applied for a permit to allow drilling and trenching. The targets are epithermal precious metals occurrences.

#### 7.1.20. Reliance (Endurance Gold Corporation)

Endurance Gold Corporation conducted an IP geophysical survey, reverse circulation drilling, and diamond drilling at the **Reliance** project, focussing on the Eagle zone, where 2020 and 2021 returned several high-grade intersections, including 15.24 m grading 14.08 g/t Au.

Endurance Gold Corporation reported 4329 m diamond drilling (22 holes) in addition to reverse circulation drilling (35 holes), and surface exploration. Initial diamond drilling results included 5.4 m grading 10.94 g/t Au and 9.0 m grading 7.49 g/t Au at the Eagle zone.

The Reliance targets are orogenic gold veins in shear zones in volcanic rocks and cherts of the Bridge River complex. The property has an historical resource of 410,916 t grading 5.96 g/t Au.

#### 7.1.21. Shovelnose (Westhaven Gold Corp.)

Westhaven Gold Corp. focussed on its **Shovelnose** project in the Spences Bridge gold belt with 41,000 m of drilling completed. The planned drilling was substantially completed before being suspended in November due to flooding in Merritt. In addition to step out and infill drilling at the South zone, they tested more recently discovered zones along the mineralized trend. One objective is an initial resource estimate for the

South zone early in 2022. Preliminary metallurgical testing demonstrated 95% recovery of gold and 96% recovery of silver in South zone quartz veins. Drilling highlights at the South zone include: 85.45 m grading 1.09 g/t Au and 2.43 g/t Ag including 3.14 m grading 10.8 g/t Au, and 24.8 g/t Ag; 76.33 m grading 2.93 g/t Au and 11.3 g/t Ag including 2 m grading 26.6 g/t Au and 98.37 g/t Ag; 41.55 m grading 8.17 g/t Au and 34.64 g/t Ag including 0.45 m grading 614 g/t Au and 2070 g/t Ag.

#### 7.1.22. Spanish Mountain (Spanish Mountain Gold Ltd.)

Spanish Mountain Gold Ltd. completed a Prefeasibility study on its **Spanish Mountain** sediment-hosted vein gold project and continued with project optimization, environmental assessment, and sonic drilling (1226 m in 21 holes). The company withdrew the project from the environmental assessment process in 2019. The study, with an effective date of May 10, estimated Proven and Probable reserves of 95.9 Mt grading 0.76 g/t Au and 0.71 g/t Ag for 2.34 Moz Au. The main zone reserves would supply a 20,000 tpd open-pit operation with a 14-year life.

The deposit consists of disseminated gold in graphitic argillite and gold-bearing quartz veins in siltstone, greywacke, and tuff. Host rocks are Upper Triassic and mineralization is Late Jurassic, older than that at the **Cariboo Gold** project (Allan et al., 2017).

#### 7.1.23. Spences Bridge and Regional (Talisker Resources Ltd.)

Talisker reported ongoing work at its **Spences Bridge** and **Remington** greenfields projects. A team of 20 geologists undertook mapping and geochemical sampling across multiple targets, including Nova and Cyclone, at which they report epithermal-style quartz veins. Remington, Dora, and Lola are among other active properties in the area. The company received a permit to drill at Dora.

#### 7.1.24. Spitfire-Sunny Boy (Falcon Gold Corp.)

Falcon Gold Corp. following up 2020 sampling at the **Spitfire-Sunny Boy** project with packsack drilling. Highlights included 0.47 m grading 68.7 g/t Au, and 11.8 g/t Ag, and 0.86 m grading 29.7 g/t Au and 2.1 g/t Ag. A grab sample returned 168 g/t Au, 17.5 g/t Ag, and 0.7% Cu. Falcon Gold also acquired the Gaspard gold project and reported reconnaissance mapping and geochemical sampling.

#### 7.1.25. Vidette Lake (Kermode Resources Ltd.)

Kermode Resources Ltd. expanded their **Vidette Lake** gold property and conducted soil sampling and ground magnetic surveys before work was interrupted by a wildfire.

#### 7.1.26. Wingdam (Omineca Mining and Metals Ltd.)

Omineca Mining and Metals Ltd.'s **Wingdam** project saw 8000 m of surface drilling in 2020-21, exploring for bedrock sources from which placer gold was derived. In addition to drilling, work included rock, soil and stream sediment sampling



and magnetic surveys. The underground placer bulk sampling program also proceeded with dewatering and rehabilitation ahead of underground development.

## 7.2. Selected porphyry projects

Although the focus of financing and exploration in 2021 largely centred on gold, porphyry copper projects also saw advances. Kodiak Copper continued a major drill program at **MPD**, and work continued at **Miner Mountain**, **Woodjam**, and the **Highland Valley** project, and near mine sites described above.

### 7.2.1. Alwin Mine (GSP Resource Corp.)

GSP Resource Corp. drilled at the **Alwin Mine** project. Highlights of the first phase of 2021 drilling (1439 m) included 164.6 m grading 0.61% CuEq (0.5% Cu, + Ag, Au, Mo, Re). They remobilized in the fall for an additional 896 m.

Between 1916 and 1981, exploration targeted high-grade mineralization described as replacement type and of limited extent. However, the 2021 program encountered potentially larger zones of lower grade material.

### 7.2.2. Brussels Creek (Recharge Resources Ltd.)

Recharge Resources Ltd. (formerly Le Mare Gold Corp.) reported a Titan IP survey at **Brussels Creek**. The target is alkalic porphyry mineralization similar to New Afton.

### 7.2.3. Copper Keg (District Copper Corp.)

District Copper Corp. conducted mapping at **Copper Keg** in April. An IP survey was planned for later in the year. Porphyry mineralization is the target.

### 7.2.4. Copperview (Golden Lake Exploration Inc.)

Golden Lake Exploration conducted mapping, prospecting, soil and rock geochemistry, and an airborne electromagnetic (VLF EM) and magnetic survey at **Copperview**. Grab samples from historical trenches returned up to 9920 g/t Ag and 5900 g/t Ag.

### 7.2.5. Friendly (Wedgemount Resources Corp.)

Wedgemount Resources Corp. reported geological and geochemical work at **Friendly**, an early-stage project with porphyry, skarn, and other target types.

### 7.2.6. Highland Valley (Happy Creek Minerals Ltd.)

Happy Creek Minerals Ltd. flew an airborne magnetic survey at its **Highland Valley** (Rateria and West Valley properties) project and followed up with surface mapping and sampling.

### 7.2.7. Lac La Hache (Engold Mines Ltd.)

Engold Mines Ltd. drilled deep holes at the Ann North and G-1 south porphyry targets on their **Lac La Hache** project, encountering visible mineralization and alteration, including potassic alteration. Two holes had been completed at Ann North as of December. While G-1 is a skarn target, drilling

encountered disseminated mineralization to the southeast which they continue to explore.

### 7.2.8. LMSL (ArcPac Resources Corp.)

ArcPac Resources Corp.'s **LMSL** project is an amalgamation of the Lucky Mike and Silver Lode properties. Targets include silver-lead zinc mineralization in veins and skarns. Data compilation revealed porphyry-style alteration and geochemical signatures and identified drill targets.

### 7.2.9. Miner Mountain (Sego Resources Inc.)

**Miner Mountain** has several alkalic porphyry Cu-Au and Au targets in a roughly 2 by 3 km area, much of which is buried by drift (see Britten et al., 2020). The Southern gold zone is a gold rich target at the southern end of the property.

Sego drilled its Southern gold zone, with highlights including 59 m grading 1.03 g/t Au, 88 m grading 1.08 g/t Au, and 94.2 m grading 0.86 g/t Au. Drilling was continuing at the end of November, interrupted briefly by weather. Total drilling was approximately 2200 m.

### 7.2.10. Mouse Mountain (Omineca Mining and Metals Inc.)

Omineca Mining and Metals drilled 2000 m at the **Mouse Mountain** project, an alkalic porphyry Cu-Au prospect which has been explored intermittently since a 20 t bulk sample was taken in 1956. The drilling satisfied terms of an option agreement which gives Omineca a 50% interest in the project.

### 7.2.11. MPD (Kodiak Copper Corp.)

Kodiak undertook a 30,000 m (planned) drill program at its **MPD** project. They completed 21,675 m before suspending work in response to flooding in nearby Merritt. Positive results included 504 m grading 0.37% Cu, 0.15 g/t Au, 1.11 g/t Ag at Gate zone and a step out (242 m grading 0.38% Cu, 0.22 g/t Au, 0.63 g/t Ag), which extended the zone by several hundred metres. The Gate zone was a 2019-20 discovery. Drilling was scheduled to move to the Dillard target before the interruption. MPD is a consolidation of the Man, Prime, and Dillard alkalic porphyry Cu-Au targets, which had historically been explored to about 200 m depth.

### 7.2.12. Perk-Rocky (Ethos Gold Corp.)

Ethos Gold Corp. reported a 2050 m, wide-spaced reconnaissance drill program at the **Perk-Rocky** porphyry copper-gold project. Five of six holes intersected advanced argillic alteration and anomalous copper values consistent with a porphyry system.

### 7.2.13. Rabbit North (Tower Resources Ltd.)

An infill till geochemical survey identified a gold dispersal train and a drill target, under cover at **Rabbit North**. Drilling of a planned seven-site program began in December. They expect to complete 3 holes in 2021. The known targets at Rabbit North are porphyry Cu-Au type.

### 7.2.14. Rayfield (Golden Sky Minerals Corp.)

Golden Sky acquired the **Rayfield** Property in 2021 and conducted an initial soil and rock geochemical survey (1337 soil and 29 rock). The target is porphyry Cu-Au mineralization. The Rayfield River pluton (Late Triassic) underlies the property.

### 7.2.15. Spius (Arctic Fox Ventures Inc.)

Pacific Ridge Exploration Ltd. reported 550 m of drilling at the **Spius** porphyry copper project, funded by optionee Arctic Fox Ventures Inc.

### 7.2.16. Woodjam (Consolidated Woodjam Copper Corp.)

**Woodjam** comprises six zones in a cluster approximately 5 km in diameter. Early results from a planned 4000 m of drilling included 142.4 m grading 0.56% Cu and 0.23 g/t Au at the Southeast zone. Consolidated Woodjam Copper Corp. also drilled at the Deerhorn zone and an IP target at the Megaton. The Deerhorn zone has an Inferred resource of 32.8 Mt at 0.49 g/t Au and 0.22% Cu (Table 4). Mineralization exhibits both alkaline and calc-alkaline characteristics (del Real et al., 2020).

## 7.3. Selected polymetallic base and precious metal projects

The region has numerous polymetallic massive sulphide prospects, including those hosted by the Eagle Bay assemblage (e.g., Samatosum, Rea, Yellowhead) and other Paleozoic strata.

### 7.3.1. Yellowhead (Taseko Mines Limited)

In an effort to restart environmental assessment for **Yellowhead**, a feasibility-stage bulk-tonnage copper project, Taseko Mines is focussing on advancing into the environmental assessment process through engineering work and engagement with local communities including First Nations. The company is also collecting baseline data and developing models that will be used to support environmental assessment and permitting. Taseko announced results of an updated Feasibility Study in 2020, including a new development plan and resource estimate (Table 4). Proven and Probable reserves now stand at 817 Mt grading 0.28% Cu at a 0.17% cut-off.

Although porphyry-like in tonnage and grade, Yellowhead is generally considered a marine volcanogenic and syngenetic deposit. It is hosted by metavolcanic and metasedimentary rocks of the Eagle Bay assemblage (Lower Cambrian to Mississippian).

## 7.4. Selected skarn projects (tungsten, copper, gold)

Historically, copper skarns have been important sources of high-grade ore. One, the Craigmont mine, has been reactivated as the **New Craigmont** exploration project. One tungsten skarn project, **Fox Tungsten**, has recently been active.

### 7.4.1. Fox Tungsten (Happy Creek Mineral Ltd.)

Happy Creek Minerals Ltd. completed 12 holes (2052 m) at the **Fox Tungsten** skarn project. Drilling stepped out from known mineralization and infilled at the Nightcrawler-Creek

zone. Eleven holes intersected tungsten-bearing skarn, with scheelite identified in core. Prospecting identified new areas.

### 7.4.2. Lac La Hache (Engold Mines Ltd.)

Among other porphyry and gold targets, Engold Mines Ltd. drilled the G-1 target at **Lac La Hache**. Earlier in the year, Engold announced an Inferred resource at G-1 of 1.71 Mt grading 1.25% Cu, 6.45 g/t Ag, 0.19 g/t Au, and 30.94% magnetite.

### 7.4.3. New Craigmont (Nicola Mining Inc.)

Nicola Mining Inc. reported results from 1460 m of drilling (5 holes) at their **New Craigmont** project. Highlights included 11.5 m grading 2.19% Cu and 71.35 m grading 0.29% Cu, both within longer mineralized intervals. The company is conducting surface work while awaiting a permit for further drilling.

## 7.5. Selected mafic- and ultramafic-hosted projects

The South Central Region saw several early-stage Ni-Co projects hosted by, or spatially related to, mafic and ultramafic rocks.

### 7.5.1. Beaver-Lynx (Inomin Mines Inc.)

Inomin Mines Inc. carried out a ground magnetic survey and drilled 715 m in five holes at the **Beaver-Lynx** nickel-cobalt project. The target is disseminated sulphide nickel and cobalt mineralization. They reported visible mineralization.

### 7.5.2. Gold Bridge (Blackstone Minerals Limited)

Blackstone announced the start of drilling at the Jewel prospect on their **Gold Bridge** project at the end of November. The first hole intersected visible Cu-Ni-Co sulpharsenide mineralization. Jewel is a Au-Cu-Ni-Co target the company believes may be analogous to deposits of the Bou Azzer district in Morocco, which hosts primary cobalt producers exploiting lenses and veins of Ni-Co-Fe arsenide minerals.

### 7.5.3. Iron Lake (Tech-X Resources Inc.)

Tech-X Resources Inc. optioned **Iron Lake**, a Cu-Au-Pd and Cu-Co-Ni project. Mafic-ultramafic magmatic sulphide deposits are targets as is gold mineralization at the southeastern extent of the property. A private company, Tech-X have not reported details of their work.

### 7.5.4. Quesnel Nickel (Green River Gold Corp.)

Green River Gold reported exploration at their Fontaine gold property and the adjacent **Quesnel Nickel** project. The company reported packsack drilling at Quesnel Nickel targeting nickel cobalt and talc mineralization.

## 7.6. Specialty metals

Significant new work on pegmatite, carbonatite or alkaline intrusion related specialty metals targets was not reported. However, MGX Minerals Inc. announced renewed investigation of its properties.

### 7.6.1. GC (MGX Minerals Inc.)

MGX Minerals Inc. announced it would be conducting exploration at its **GC** property and reviewing data for the **REN** property. **GC** hosts lithium-caesium-tantalum (-rubidium) bearing pegmatites. Drilling at **REN** returned niobium tantalum-titanium-rubidium results in 2018.

### 7.7. Industrial minerals

Although work on industrial minerals projects was permitted and reported to regulators, information is not generally made public.

## 8. Geological research

Lett and Paulen (2021a, b) published a compilation of soil and till geochemical data for two mineral properties in the South Central region, the **Ace**, a massive sulphide and quartz vein showing, and **Getty South** a porphyry copper prospect. Schiarizza et al. (2022) conducted a conodont and detrital zircon geochronologic study across the **Salmon River** unconformity southeast of Kamloops. Van Wagoner and Ootes (2022) examined the geology and geochemistry of the **Kamloops Group** (Eocene) in its type area; the full geochemical dataset for this study was provided by Van Wagoner et al. (2021). Rubino et al. (2021) integrated detrital zircon and Hf isotopic data to establish the provenance and paleogeographic evolution of Eocene intermontane basin deposits and consider the nature of the crust from which magmatic source rocks were derived. Spence et al. (2022) combined field mapping and remotely piloted aircraft-derived imagery to better understand the magmatic and structural relationships of rocks in the **Tulameen ultramafic-mafic Alaskan-type intrusion**. Arnold (2021) compiled a depth-to-bedrock dataset for the **Interior Plateau** from **Williams Lake** to **MacKenzie**. Ledoux and Hart (2021) started to investigate the porphyry fertility of the southern **Quesnel arc** with a literature review and descriptions of samples collected for analytical work. Lee et al. (2021) provided a new **U-Pb zircon** age for the **Guichon Creek batholith** and used trace element compositions of zircons to identify changes in magma composition coincident with copper mineralization. Jackaman et al. (2021) published reanalyses of archived till samples in parts of the **NTS 93** map sheet, a study area that overlaps the **South Central** and **North Central** regions.

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# Exploration and mining in the Southeast Region, British Columbia



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## 1. Introduction

Four metallurgical coal mines operate in the Elk Valley of the Southeast Region, accounting for most of Canada's coal production and exports, and mine expansion and exploration continued at these mines. Dating back to the mid-1800s, the region has a long history of metals mining, including lead, zinc, and silver from the past-producing Sullivan mine and gold and silver from the Rossland, Greenwood, Sheep Creek, and Slocan camps. Today, exploration in the region focusses on base and precious metals. The region hosts several industrial mineral mines and quarries, and placer mining continues. The Trail smelter (Teck Resources Ltd.) produces refined zinc and lead, silver, critical metals (including germanium, indium, and cadmium), and fertilizer products.

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 Southeast Region, exploration expenditures are forecasted at \$55.4 million and exploration drilling is estimated at approximately 96,700 m (Clarke et al., 2022; EY LLP, 2022). Although the number of exploration projects remained similar to that of recent years, the amount of drilling decreased. During the summer fire season, many programs had to be temporarily suspended, but exploration continued into the fall and some programs remained active in December.

## 2. Geological overview

The mineral endowment of British Columbia, including the Southeast Region, is intimately tied to the tectonic evolution of the Canadian Cordillera, which records a protracted history of supercontinent breakup followed by accretion of allochthonous terranes to the western flank of Ancestral North America and post-accretion deformation and magmatism (e.g., Nelson et al., 2013). From east to west, the Southeast Region provides a cross-section through several components of the Canadian Cordillera (Fig. 1). On the east are Archean to Mesoproterozoic basement rocks of Ancestral North America, Proterozoic rift and intracratonic basin successions (Belt-

Purcell and Windermere supergroups), Paleozoic to Jurassic passive margin and deep-water basin deposits, and Jurassic to Cretaceous foreland basin deposits. To the west are the Slide Mountain terrane, which records Devonian subduction beneath the western flank of Ancestral North America and back-arc extension that led to the creation of the 1000 km-wide Slide Mountain ocean, and the Quesnel volcanosedimentary arc terrane and its basement (Nelson and Colpron, 2007; Nelson et al., 2013). The Southeast Region contains two of the major physiographic belts commonly used to describe the Canadian Cordillera (Fig. 1). In the Rocky Mountain foreland belt, mainly unmetamorphosed sedimentary rocks are deformed by northeast-vergent, thin-skinned thrusts and folds. The Omineca belt contains greenschist- to amphibolite-grade siliciclastic and volcanic rocks and basement-cored gneiss domes (Monger, 1999).

## 3. Mines and quarries

### 3.1. Metal mines

There are no metals mines operating in the Southeast Region of British Columbia.

### 3.2. Coal mines

Coal remains British Columbia's most valuable mined commodity with sales forecasted at CDN \$6.26 billion for 2021, which accounts for approximately 49.7% of the mining revenue for the province. In the Southeast Region, Teck Coal Limited mines coal from structurally thickened seams of the Kootenay Group (upper Jurassic to lower Cretaceous; Fig. 2; Table 1) at four open-pit operations along the Elk River valley: Fording River, Greenhills, Line Creek, and Elkview. More than 95% is metallurgical, high-quality hard coking coal. Coal is shipped via rail to three main shipping terminals on the west coast (Westshore, Neptune, and Ridley). Total annual production from the mines in the Southeast Region for 2021 is forecast to be 26 Mt of metallurgical coal. Teck reported that Q3 2021 production was 17.6% higher than the same quarter in 2020. Q3 production was 6 Mt with nine-month sales (2021) of 18.3 Mt. Unusually intense rainstorms in November caused transport infrastructure collapse from floods and slope failures. Although production was unaffected, rail links from Elk Valley



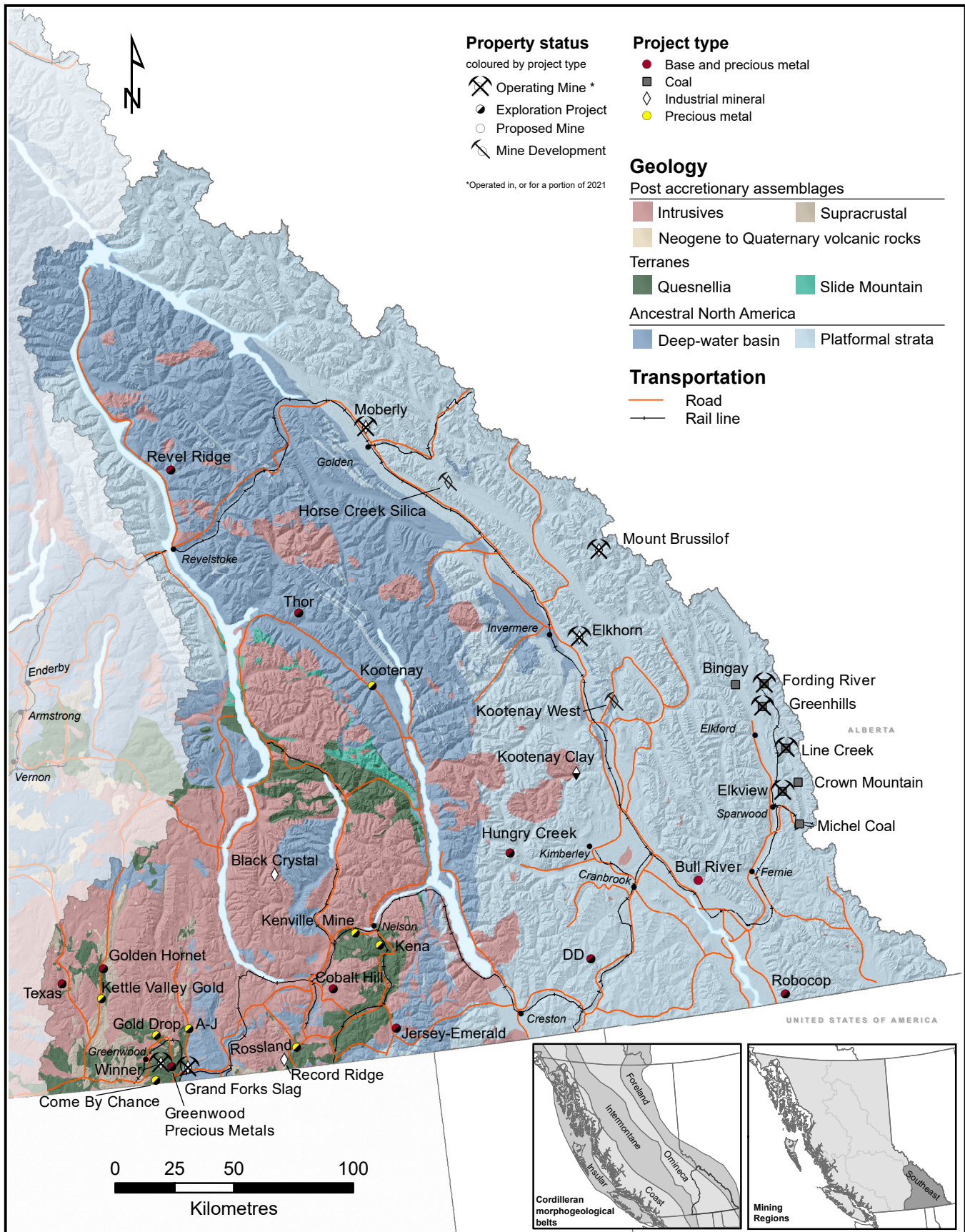
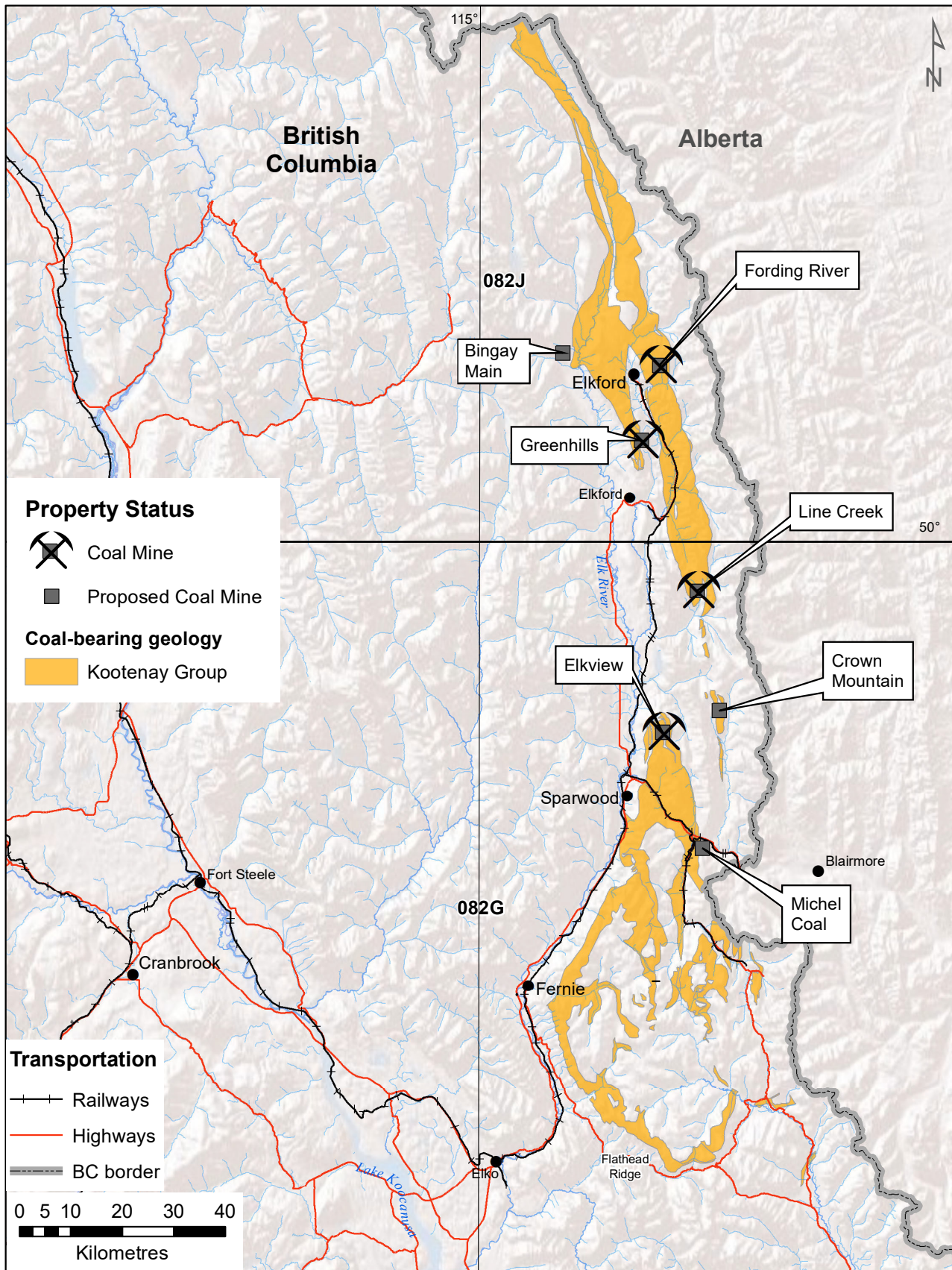


Fig. 1. Mines and selected exploration projects, Southeast Region, 2021. Terranes after Nelson et al. (2013).





**Fig. 2.** Map of the Kootenay Group and East Kootenay coalfields, including the major coal mines and projects in southeastern British Columbia. From British Columbia Geological Survey (2022).



**Table 1.** Coal mines, Southeast Region.

Mine	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1- Q3)	Reserves	Resources	Comments
<b>Elkview</b>	<b>Teck Coal Limited</b> , 95%; Nippon Steel & Sumitomo Metal Corporation, 2.5%; POSCO, 2.5%	HCC; Bituminous coal; 082GNE016, 17	9.0 Mt clean	na	na	Teck estimates a remaining reserve life of approximately 30 years at the current production rate.
<b>Fording River</b>	<b>Teck Coal Limited</b>	HCC; Bituminous coal; 082JSE012	9.5 Mt clean	na	na	The focus for development drilling in 2021 was the Fording River Extension project. Proven and Probable reserves sufficient for 28 years mine life; increase to 48 years including the Fording River Extension project.
<b>Greenhills</b>	<b>Teck Coal Limited</b> , 80%; POSCO Canada Limited (‘POSCAN’), 20%	HCC; Bituminous coal; 082JSE007, 10	5.4 Mt clean	na	na	Proven and Probable reserves are projected to support another 47 years of mining at planned production rates.
<b>Line Creek</b>	<b>Teck Coal Limited</b>	HCC, TC; Bituminous coal; 082GNE020	4.0 Mt clean	na	na	Proven and Probable reserves at Line Creek are projected to support planned production rates for a further 15 years.

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

to Neptune and Westshore terminals in the Lower Mainland were cut. Some coal was rerouted north to Ridley Terminals in Prince Rupert, some south through the United States.

### 3.2.1. Elkview (Teck Coal Limited, 95%; Nippon Steel & Sumitomo Metal Corporation, 2.5%; POSCO, 2.5%)

The **Elkview** mine, which extends across 27,100 ha of coal lands, produces metallurgical coal. Upgraded in 2020, the annual production capacity of the mine and preparation plant is 9.0 Mt and Teck estimates a remaining mine life of 30 years.

### 3.2.2. Fording River (Teck Coal Limited)

The **Fording River** mine, which extends across 13,000 ha of coal lands, produces primarily metallurgical coal, with lesser amounts of lower grade hard coking coal. The current annual production capacity of the mine is 9 Mt; the preparation plant has a capacity of 9.5 Mt. In 2021, production was mainly from the Eagle Mountain and Swift pits. The focus for development drilling in 2021 was the Fording River Extension project. Teck also did exploration drilling and large-diameter core drilling, in their producing pits and carried out bulk sampling on seams in the Castle Mountain area for coal quality testing. Proven and Probable reserves at the mine are sufficient for a 28-year mine

life and, if the Fording River Extension project is included, a 48-year life.

### 3.2.3. Greenhills ((Teck Coal Limited, 80%; POSCO Canada Limited (‘POSCAN’), 20%)

The **Greenhills** mine, consists of 11,800 ha of coal lands from which mainly metallurgical coal and minor thermal coal is mined. Currently, the annual production capacity is 5.9 Mt from the mine and 5.4 Mt from the preparation plant. Some coal from Greenhills is processed at Fording River. Proven and Probable reserves are projected to support 47 years of mining.

### 3.2.4. Line Creek (Teck Coal Limited)

The **Line Creek** mine consists of 8200 ha of coal lands and produces mainly metallurgical coal and minor thermal coal. The annual production capacity of the mine and preparation plant is 4.0 Mt. Proven and Probable reserves are projected to support mining for a further 15 years.

## 3.3. Industrial minerals mines and quarries

The Southeast Region has several industrial mineral mines and quarries (Fig. 1; Table 2). The operators range from local companies through to large international corporations.

**Table 2.** Selected industrial mineral mines, Southeast Region.

Mine	Operator	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1-Q3)	Reserves	Resources	Comments
<b>Elkhorn</b>	<b>CertainTeed Gypsum Canada Inc.</b>	Gypsum; Bedded gypsum; 082JSW021	na	na	na	Elkhorn site nearing end of mine life.
<b>Grand Forks Slag</b>	<b>Pacific Abrasives and Supply Inc.</b>	Slag; Tailings; 082ESE264	na	na	na	Seasonal.
<b>Moberly Silica</b>	<b>Vitreo Minerals Ltd.</b>	Silica; Industrial silica; 082N 001	About 60 kt product on contract for sales through to 2022	na	na	About 200 kt of stockpiled material on site from 2019 mining operations. No mining in 2021.
<b>Mount Brussilof</b>	<b>Baymag Inc.</b>	Magnesite; Sparry magnesite; 082JNW001	230 kt	na	na	Material is coarse crushed on site and trucked to processing facility in Exshaw, AB.
<b>Winner</b>	<b>Rockwool Inc.</b>	Gabbro/basalt; Crushed rock, for mineral wool; 082ESE265	na	na	na	Seasonal.

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

### 3.3.1. Elkhorn (CertainTeed Gypsum Canada Inc.)

The **Elkhorn** mine produces gypsum from Middle Devonian evaporites of the Burnais Formation. Because the reserve life for gypsum is ending, the mine is blending a product with the anhydrite that was once left behind as waste, which will allow the mine to continue production until 2023.

### 3.3.2. Grand Forks Slag (Pacific Abrasives and Supply Inc.)

The company supplies slag material from the former Granby Consolidated Mining, Smelting and Power Company smelter site for sand blasting abrasive material.

### 3.3.3. Moberly Silica (Vitreo Minerals Ltd.)

The last production at the **Moberly Silica** mine, owned by Vitreo Minerals Ltd., was in 2019 and 200,000 t of material is currently stockpiled. The company began contract sales of 60,000 t in the summer of 2021. The silica deposit (99% SiO<sub>2</sub>) is in regionally extensive orthoquartzites, 300 m thick at the mine site, of the Mount Wilson Formation (Middle to Upper Ordovician).

### 3.3.4. Mount Brussilof (Baymag Inc.)

In production since 1981, Baymag Inc. produces magnesite at the **Mount Brussilof** mine from Cambrian limestones in which magnesium has replaced calcium. Quarried ore is crushed

then trucked to the company's processing facilities in Exshaw, Alberta. Annual magnesite production is approximately 230 kt.

### 3.3.5. Winner (Rockwool Inc.)

Rockwool Inc. extracts gabbro and basalt from its seasonal **Winner** quarry.

## 4. Placer operations

Placer mines have operated in southeastern British Columbia since the gold rush of the 1860s. Although activities were not tracked in 2021, several placer areas have operations under Mines Act permits. Active locations include, Goldstream River, Quartz Creek, Lardeau Creek, Perry Creek, Moyie River, Wild Horse River, and the Nelson-Salmo-Trail region. The placer creeks are generally linked to areas with known bedrock gold mineralization.

## 5. Mine or quarry development

Two industrial mineral projects in the Southeast Region are at the mine development stage, **Horse Creek Silica**, and **Kootenay West** (Table 3).

### 5.1. Horse Creek Silica (Sinova Global)

At the **Horse Creek Silica** mine, Sinova Global operates a seasonal quarry in Mount Wilson orthoquartzites. In 2021, the

**Table 3.** Selected mine development projects, Southeast Region.

Project	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resources	Comments
<b>Horse Creek Silica</b>	<b>Sinova Global</b>	Silica; Silica sandstone; 082N 043	na	1.4 Mt est.	High purity silica >99.9% SiO <sub>2</sub> , permit updates, road and rail construction, mine site preparation. Drilling; 3 DDH (2272 m), 29 RC (2275 m). Planned up to 400,000 tpy.
<b>Kootenay West</b>	<b>CertainTeed Gypsum Inc.</b>	Gypsum; Evaporitic bedded gypsum; 082JSW005, 20	na	North and South quarries: Total 17 Mt (blended quality of 83% gypsum)	Mine road construction, environmental mitigation; planned 400,000 tpy; 43-year mine life.

company continued with permit updates, road construction, rail siding development, and mine site preparation. The mine is expected to produce up to 400,000 tpy of >99% SiO<sub>2</sub> with an estimated resource of 1.4 Mt.

## 5.2. Kootenay West (CertainTeed Gypsum Canada Inc.)

The company continued development work on its **Kootenay West** mine. Most work was on developing and improving road access to the mine site and environmental mitigation. The mine reported a resource of 17 Mt gypsum at a blended quality of 83%, with annual production of 400,000 tpy. The deposit is in evaporites of the Burnais Formation (Devonian) in a section 20-25 m thick grading 75-95% gypsum. With expected transition to active mining in 2022, the projected mine life is 43 years.

## 6. Proposed mines and quarries

The Southeast Region has two proposed metal mines (**Bull River, Record Ridge**), three proposed coal mines, (**Bingay Main, Crown Mountain, Michel Coal**), and one proposed industrial mineral mine **Black Crystal** (Fig. 1; Table 4).

### 6.1. Proposed metal mines

#### 6.1.1. Bull River (Braveheart Resources Inc.)

Braveheart Resources is continuing development of its **Bull River** mine. Work included full dewatering of all mine levels and assessment and refurbishment of all surface facilities. Underground drilling in six holes (1050 m), below known mineralization, identified extensions to the mineralization. Best results reported are from hole BRU-21-05 with 1.71% Cu, 17.6 g/t Au, and 11.6 g/t Ag along 4.9 m within which was a 0.5 m high-grade intersection of 3.09% Cu, 127 g/t Au, and 40.60 g/t Ag. In early December the company updated the mineral resource, reporting Indicated at 2,261,000 t with 2.132% Cu, and 0.442 g/t Au, and Inferred at 1,356,000 t with 1.598% Cu and 0.417 g/t Au. Relative to a resource estimate reported in 2018, the new copper resource increased by 57%.

The company also began assessing the economic potential of cobalt mineralization.

#### 6.1.2. Record Ridge (West High Yield Resources Ltd.)

The **Record Ridge** magnesium project is in a variably serpentinized and locally carbonatized ultramafic cumulate body. The body is cut by Coryell intrusions to the west and faulted against andesite and basalt of the Elise Formation to the east. The company restarted its application for a Mines Act permit and continued metallurgical studies to develop high-purity MgO and Mg(OH)<sub>2</sub> products and possible nickel chloride, nickel oxide, iron oxide and pure silica byproducts. Reported mineral resources as of 2013 include 28.4 Mt at 24.82% Mg Measured, 14.6 Mt at 24.21% Mg Indicated, and 1.07 Mt at 24.37% Mg Inferred.

### 6.2. Proposed coal mines

Three coal mine proposals are currently in the Environmental Review process.

#### 6.2.1. Bingay Main (Centerpoint Resources Inc.)

The **Bingay Main** project proposed by Centerpoint Resources Inc. remains in the Pre-Application process at the Environmental Review Office. The company has proposed a mine with a production capacity of 1 Mt per year and a mine life of 12 to 14 years.

#### 6.2.2. Crown Mountain (NWP Coal Canada Ltd.)

The **Crown Mountain** mine proposed by NWP Coal Canada Ltd. is in the Pre-Application process at the Environmental Review Office. The company was granted an extension to the expiry of the Application Information Requirements (AIR) for the project from October 26, 2021 to April 26, 2022 to accommodate First Nations concerns. The company has proposed a mine with production capacity for 3.7 Mt per year and a mine life of 16 years.

**Table 4.** Selected proposed mines, Southeast Region.

<b>Project</b>	<b>Operator (partner)</b>	<b>Commodity; deposit type; MINFILE</b>	<b>Reserves</b>	<b>Resources</b>	<b>Comments</b>
<b>Bingay Main</b>	<b>Centermount Coal Ltd.</b>	Coal; Bituminous coal; 082JSE011	na	na	Pre-application stages of EA; letter submitted in 2020 for project to remain in EA. Proposed 1Mt per year operation with 12 to 14 year mine life.
<b>Black Crystal</b>	<b>Eagle Graphite Inc.</b>	Graphite; Crystalline flake graphite; 082FNW260, 283	na	Regolith + calc-silicate M + I: 19.23 Mt at 1.35% fixed carbon Inf: 23.92 Mt at 1.3% fixed carbon (2018)	Research and development; possible application for Li-ion battery anodes.
<b>Bull River</b>	<b>Braveheart Resources Inc.</b>	Cu, Au, Ag; Cu±Ag quartz veins; 082GNW002	na	I: 2.26 Mt at 2.13% Cu, 0.44 g/t Au  Inf: 1.36 Mt at 1.60% Cu, 0.42 g/t Au	Six underground drill holes. Best intersection with 1.71% Cu, 17.6 g/t Au and 11.6 g/t Ag along 4.9 m.
<b>Crown Mountain</b>	<b>NWP Coal Canada Limited</b> (Jameson Resources Limited (80%), Bathurst Resources Limited (20%))	HCC and PCI; Bituminous coal; 082GNE018	HCC P: 42.60 Mt Pr: 4.91 Mt  PCI P: 7.13 Mt Pr: 1.19 Mt (2014)	HCC + PCI M: 68.9 Mt I: 6.0 Mt (2014)	Pre-Application EA stage, 2021 extended FN consultation to 2022. Proposed 2 Mt per year operation (86% HCC and 14% PCI) with 15 year mine life.
<b>Michel Coal</b>	<b>North Coal Ltd.</b>	HCC and PCI; Bituminous coal; 082GSE050	na	HCC M: 44.6 Mt I: 42.5 Mt open-pit and underground (2015)	Entered pre-application of EA in 2015; received AIR requirements in September 2020; geotechnical studies and updates to mine design; coal quality testing indicates coal has similar characteristics to Elk Valley hard coking coal; environmental baseline and mine design.
<b>Record Ridge</b>	<b>West High Yield (W.H.Y.) Resources Ltd.</b>	Mg; Alaskan-type Pt±Os±Rh±Ir; 082FSW398	na	M: 28.4 Mt 24.82% Mg  I: 14.6 Mt 24.12% Mg  Inf: 1.07 Mt 24.37% Mg	Restarted Mines Act permit application, metallurgical testing.

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



### 6.2.3. Michel Coal (North Coal Ltd.)

The **Michel Coal** project proposed by North Coal Ltd. is in the Pre-Application process at the Environmental Review Office. The company has proposed a mine with production capacity of 2.3-4 Mt per year and a mine life of 30 years.

## 6.3. Proposed industrial mineral mines

### 6.3.1. Black Crystal (Eagle Graphite Inc.)

The Black Crystal project has an active mining lease. No work was reported for the site in 2021.

## 7. Selected exploration activities and highlights

In 2021, numerous precious metal, polymetallic base and precious metal, and industrial mineral projects were active in the Southeast Region (Table 5).

### 7.1. Selected precious metal projects

#### 7.1.1. A-J (Belmont Resources Inc.)

Belmont Resources Inc. completed 2061 m of drilling in nine holes at its **A-J** property adjacent to former workings of the Athelstan and Jackpot mines. Several holes intersected gold mineralization. Highlights results included: 14.66 m of 1.78 g/t Au in hole AJ21-009 and 0.43 m of 9.35 g/t Au in hole AJ21-008. The area is underlain by variably altered ultramafic rocks of the Mount Roberts Formation (Carboniferous to Permian). Mineralization is generally restricted to talc-carbonate listwanite and serpentinite alteration zones. Gold mineralization occurs with massive to semi-massive sulphides, mainly pyrite and arsenopyrite.

#### 7.1.2. Gold Drop (GGX Gold Corp.)

The company drilled 25 holes for a total of 1617 m on its **Gold Drop** property. Targets included the Perky (12 holes, 445 m), Lively (12 holes, 1061 m) and C.O.D. (1 hole, 111 m) veins. The company applied for a permit to allow bulk sampling of the C.O.D. vein. The property is underlain by chert and siliceous argillite of the Knob Hill Group (Devonian to Permian). Mineralization consists of disseminated pyrite, galena, chalcopyrite, and sphalerite in north-trending steeply dipping quartz veins 10 cm to 2 m wide with gold and silver values.

#### 7.1.3. Greenwood Precious Metals (Golden Dawn Minerals Inc.)

Golden Dawn Minerals Inc. completed helicopter-borne VTEM and magnetic geophysical surveys at its **Greenwood Precious Metals** project, which identified several targets and included both the Lexington mine and Golden Crown targets. The company mobilized equipment in late September to begin drilling at the Lexington mine where mineralization consists of low-grade copper associated with a quartz porphyry intrusion. Pyrite and chalcopyrite form fracture fills and disseminations.

#### 7.1.4. Kena project (West Mining Corp.)

West Mining Corp. completed the first phase of an exploration

program on its **Kena** project. The project includes three adjacent properties (Kena, Daylight, and Athabasca) that extend along a 20 km trend. The properties cover known mineralized zones and historical mine sites. Mineralization comprises quartz-pyrite stockwork and veinlet zones in bleached and silicified Jurassic plagioclase porphyry and well-foliated, pyritic intermediate volcanic rocks (Silver King intrusive and the Elise Formation). Field work included geological mapping, prospecting, and rock sampling focussed on veins at old workings and following gold and copper soil geochemistry anomalies and airborne magnetic low features. Additionally, a 300 line-km, 100-m line spacing helicopter magnetic survey was flown over 27 km<sup>2</sup>.

At the Kena property, 4000 m of diamond drilling (26 holes) was completed and on the Daylight property, eight holes were completed at the Great West Zone. Highlights included: hole DL21-01 averaged 0.25 g/t Au for its entire 100.37 m depth; hole DL21-05 averaged 0.23 g/t Au for its entire 318.72 m depth; and hole DL21-08 averaged 0.32 g/t Au for its entire 146.5 m depth. The company released an updated, 43-101 compliant combined resource estimate for the Kena project in March of 2021, with an Indicated resource of 32 Mt of 0.54 g/t Au at a 0.25 g/t Au cut-off and an Inferred resource of 177 Mt of 0.49 g/t at a 0.25 g/t Au cut-off.

#### 7.1.5. Kenville Gold Mine, Amelia, and Providence (Ximen Mining Corp.)

Ximen Mining Corp. continued its mine rehabilitation planning with hydrogeological and engineering studies at its **Kenville Gold Mine** project. The company received permits in the fall for drilling on both its **Amelia** Gold Mine and **Providence** properties in the Greenwood area.

#### 7.1.6. Kettle Valley Gold (Goldcliff Resources Corporation)

Goldcliff Resource Corporation excavated nine trenches for a total of 600 m at their **Kettle Valley Gold** project. Other work included soil sampling, rock sampling, prospecting and mapping. Sampling discovered a new mineralized zone ("Cliff") in quartz-carbonate altered Eocene rhyolitic volcanic rocks of the Marron Formation. Samples of mineralized float and sub-crop similar to adjacent bedrock yielded results ranging from 162 to 736 ppb Au and 14.0 to 41.7 ppm Ag.

#### 7.1.7. Kootenay (Wealth Minerals Ltd.)

The company planned a helicopter-borne VTEM and magnetic geophysical survey covering 5456 hectares (12,014 line-km) over its **Kootenay** project that comprises the Goldsmith, Lardeau and Legend claim blocks. The targets are known gold mineralization in listwanite-altered ultramafic rocks at Goldsmith and possible nickel-cobalt mineralization associated with ultramafic bodies.

#### 7.1.8. Rossland (Currie Rose Resources Inc.)

The company drilled the Mascot (3 holes, 687 m) and Gertrude (1 hole, 61 m) targets of its **Rossland** project and completed a surface VLF-EM survey at Gertrude. Drilling

**Table 5.** Selected exploration projects, Southeast Region.

<b>Project</b>	<b>Operator (partner)</b>	<b>Commodity; Deposit type; MINFILE</b>	<b>Resources (NI 43-101 compliant unless indicated otherwise)</b>	<b>Comments</b>
<b>A-J</b>	<b>Belmont Resources Inc.</b>	Au; Polymetallic veins Ag-Pb-Zn+/-Au; 082ESE047		9 DDH, 2061 m.
<b>Cobalt Hill</b>	<b>Megawatt Lithium and Battery Metals Corp.</b>	Co; Polymetallic veins Ag-Pb-Zn±Au; 082FSW325		Ground IP, 28 line-km.
<b>Come-By- Chance (CBC)</b>	<b>Belmont Resources Inc.</b>	Cu, Au; Cu skarns; 082ESE261		IP and lidar surveys. 42 DDH begun.
<b>DD-Hungry Creek</b>	<b>DLP Resources Inc.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb- Ag; 082FSE110		4 DDH, DD (2 holes, 3630 m), Hungry Creek (2 holes), 306 line-km airborne MT survey.
<b>Gold Drop</b>	<b>GGX Gold Corp.</b>	Au; Epithermal Au- Ag-Cu, low sulphidation; 082ESE153		25 DDH, 1617 m (Perky 11 DDH, 445 m; Lively 12 DDH, 1061 m; C.O.D. 1 DDH, 111 m).
<b>Golden Hornet</b>	<b>Talisker Resources Ltd.</b>	Au, Zn, Cu, Pb; Au-quartz veins; 082ESE168		DDH 14 holes, 4583 m.
<b>Greenwood Precious Metals</b>	<b>Golden Dawn Minerals Inc.</b>	Au, Cu; Au-quartz veins; Porphyry Cu±Mo±Au; 082ESE032, 41		Helicopter-borne VTEM and magnetic surveys over Golden Crown and Lexington mine.
<b>Jersey- Emerald</b>	<b>Apex Resources Inc.</b>	W; Irish-type carbonate-hosted Zn-Pb; 082FSW009	I: 1.4 Mt 0.173% WO <sub>3</sub> , 0.021% Mo, 0.05 g/t Au  Inf: 5.1 Mt 0.227% WO <sub>3</sub> , 0.026% Mo, 0.08 g/t Au	New resource estimate released in September. Combined best case open pit & underground.
<b>Kena</b>	<b>West Mining Corp.</b>	Au; Alkalic porphyry Cu-Au; 082FSW237		Kena: 9 DDH, 3253 m; Athabasca/Daylight: 14 DDH, 2011 m.
<b>Kenville Gold Mine, Amelia, Providence</b>	<b>Ximen Mining Corp.</b>	Au; Au-quartz veins; 082FSW086		Ongoing mine rehabilitation.
<b>Kettle Valley Gold</b>	<b>Goldcliff Resources Corporation</b>	Au; Au-quartz veins		Nine trenches, 600 m, new “Cliff” zone.

Table 5. Continued.

<b>Kootenay</b>	<b>Wealth Minerals Ltd.</b>	Au; Polymetallic veins Ag-Pb-Zn±Au; 082KSW088	Helicopter-borne VTEM and magnetic geophysical survey, 12,014 line-km.
<b>Kootenay Clay</b>	<b>Hi Ho Silver Resources Inc.</b>	Clay; Sedimentary kaolin	A 7000 kg bulk sample was shipped to China for evaluation.
<b>Revel Ridge</b>	<b>Rokmaster Resources Corp.</b>	Pb, Zn, Ag; Irish-type carbonate-hosted Zn-Pb; 082M 003	Drilling, (28,000 m); 44 holes underground, 39 surface. Rock and soil sampling; new resource calculation in progress.
<b>Robocop</b>	<b>Grizzly Discoveries Inc.</b>	Co; Polymetallic veins Ag-Pb-Zn±Au; 082GSW019	400 line-km VTEM and magnetic surveys; rock and soil sampling.
<b>Rossland</b>	<b>Currie Rose Resources Inc.</b>	Au; Intrusion-related Au pyrrhotite veins; 082FSW093	4 DDH, 748 m, 11 line-km VLF-EM.
<b>Texas</b>	<b>Troubadour Resources Inc.</b>	Au, Ag; Polymetallic veins Ag-Pb-Zn±Au; 082ESW235	2093 m DD in 25 holes; new vein found, best assay: 0.8 m with 8.79 g/t Au.
<b>Thor</b>	<b>Taranis Resources Inc.</b>	Base metals; Polymetallic manto Ag-Pb-Zn; 082KNW030	10 DDH, 1500 m, line cutting, VLF and resistivity; permit for 10,000 t bulk sample in 2022.

M = Measured; I = Indicated; Inf = Inferred

at Mascot provided a best result of 0.2 m of 7.41 g/t Au and 2.19 g/t Ag with no other notable results. A single hole at Gertrude yielded three high-grade intersections with the best being 1.87 m of 17.68 g/t Au. An 11 line-km ground VLF-EM survey was done over the Gertrude target. The company has dropped its option on the targets.

## 7.2. Selected polymetallic base and precious metal projects

### 7.2.1. Cobalt Hill (Megawatt Lithium and Battery Metals Corp.)

Megawatt Lithium and Battery Metals Corp. completed a 22.8 line-km ground induced polarization survey at its **Cobalt Hill** cobalt property. The survey examined three target areas: the Meister zone, the Cobalt zone, and the Gold Soil anomaly zone. Results released define geophysical features that support known geological and geochemical responses in the three areas. The property is underlain by the Bonnington granodioritic pluton (mid-Jurassic). Copper-cobalt mineralization is in pendants interpreted to have been derived from either metasedimentary rocks of the Hall Formation (Lower Jurassic) or the Castlegar gneiss (Paleozoic).

### 7.2.2. Come-By-Chance (Belmont Resources Inc.)

Belmont resumed a IP and lidar surveys at its **Come-By-Chance** property this fall, after being suspended due fires in the summer. In mid-November the company began a planned 42-hole drill program. The property is largely underlain by tuffaceous sedimentary rocks, limestone, conglomerate, and greenstone of the Brooklyn Formation (Triassic). Mineralization includes mesothermal veins, possible epithermal veins, and replacement mineralization with copper and gold values.

### 7.2.3. DD and Hungry Creek (DLP Resources Inc.)

The company used the results of a ground MT survey on the **DD** and **Hungry Creek** properties completed in December 2020 to target drilling in 2021. The company drilled several holes, mapped, and prospected. On the DD property, two holes DD21-01 (1728 m) and DD21-02 (1902 m) were drilled. In DD21-01, strongly hydrothermally altered and sheared Sullivan horizon siltstone and argillite was intersected from 1452.46 to 1550 m. Weak pyrrhotite, chalcopyrite, and trace pyrite occur through this alteration zone along with a late gabbro sill from 1498 m to 1503.57 m. In DD21-02, a 7.6 m interval of the Sullivan siltstones and argillites with fine

grained disseminated sphalerite (Zn, Fe)S and wispy bands of pyrrhotite was intersected. This section included a 2.92 m interval with 0.16% Zn and 0.06% Pb.

The company drilled two holes on the Hungry Creek property, neither of which intersected copper-cobalt mineralization identified previously in boulders along Hungry Creek. However, the drill hole information helped better understand of the middle part of the Creston Formation (Belt-Purcell basin) and further prospecting west and south of the area drilled identified a section of middle Creston quartzites with visible copper.

#### 7.2.4. Golden Hornet (Talisker Resources Ltd.)

The company completed an airborne VTEM and magnetic survey at the end of 2020 for a total of 1093 line-km. Sampling from late 2020 extended known historic mineralization, including the new polymetallic Montana Zone which returned up to 14.05 g/t Au, 7.84% Zn, 1.8% Cu and 4.4% Pb. In 2021, the company drilled 4850 m in 14 holes, of which 10 were placed to test mineralized structures of the Hornet zone and 4 holes were placed 700 m to the northeast to test the extension of a geochemical anomaly identified in 2020. Mineralization occurs in both quartz veins and breccias within feldspathic tuff and diorite dikes of the Anarchist Group (Carboniferous to Permian).

#### 7.2.5. Jersey-Emerald (Apex Resources Inc.)

The **Jersey-Emerald** mine is a sedimentary exhalative carbonate hosted lead-zinc deposit. The former mine is in lower Cambrian limestones of the Laib Formation. Skarn-hosted tungsten mineralization is also present. In September, the company released a resource estimate for its Jersey Emerald tungsten project that includes open pit and underground operations, with an Indicated resource of 1.4 Mt with 0.173% WO<sub>3</sub>, 0.021% Mo, and 0.05 g/t Au and an Inferred resource of 5.1 Mt with 0.227% WO<sub>3</sub>, 0.026% Mo, and 0.08 g/t Au.

#### 7.2.6. Revel Ridge (Rokmaster Resources Corp.)

The company completed underground drilling at its **Revel Ridge** project. Results from the Main zone indicated continuity of zinc-silver mineralization along a 1200 m length and a vertical extent of the same amount. Drilling highlights included RR21-28 with 26.2 m grading 1.73 g/t Au, 14.38 g/t Ag, 0.75% Pb, and 4.95% Zn, and RR21-23 with 1.0 m grading 7.22 g/t Au, 4.00 g/t Ag, 0.32% Pb, and 0.41% Zn. Surface drilling of 10,747 m was completed in the fall and results extended the limits of known mineralization. Highlights included 3.60 m grading 0.19 g/t Au, 244.28 g/t Ag, 6.25% Pb, and 18.09% Zn at the Main zone, and 2.70 m grading 0.03 g/t Au, 83.69 g/t Ag, 4.20% Pb, and 8.64% Zn at the Yellowjacket zone. Underground drilling resumed in November. A resource update is in progress using information from 39 NQ surface holes completed this summer. Rock and soil sampling identified mineralized float and outcrops well beyond the known mineralized zones.

The Revel Ridge property is underlain by north- to northwest-striking, moderate to steeply east dipping metasedimentary and metavolcanic rocks of the Hamill and Lardeau groups; mineralization is in the Hamill Group (Badshot and Mohican formations). The Main zone is a structurally controlled stratiform massive sulphide zinc-lead-silver-gold-iron-arsenic deposit overprinting a pre-existing silver-lead-zinc deposit (the Yellowjacket zone).

#### 7.2.7. Robocop (Grizzly Discoveries Inc.)

Grizzly Discoveries Inc. completed a 400 line-km with 100 m line spacing of VTEM and magnetic geophysical surveys over its **Robocop** property. Surface work included soil and rock sampling. The highest-grade rock sample taken on the property yielded 3.35% Cu and 196 ppm Co and is from a newly discovered outcrop 340 m west of the 'Discovery' showing area. A permit application has been submitted for follow-up drilling.

#### 7.2.8. Texas (Troubadour Resources Inc.)

The company completed 2093 m of drilling in a total of 25 holes at its **Texas** project. Drilling intersected several polymetallic veins near the Cabin target. Results included 5.9 m grading 1.78 g/t Au. A newly discovered vein yielded a highlight of 0.8 m with 8.79 g/t Au. The property is underlain by a Nelson suite granodiorite pluton (Middle Jurassic) that is cut by quartz and lesser carbonate veins with strong chlorite-carbonate-clay-silica alteration envelopes.

#### 7.2.9. Thor (Taranis Resources Inc.)

The company planned a 1200 m drill program on its **Thor** property. A total of ten holes were drilled on the Ridge target, now named the Thunder zone. Drilling intersected Jowett Formation volcanic rocks containing abundant quartz veins with tetrahedrite, sphalerite, galena, and pyrite mineralization. The best assays reported from the first three holes drilled include 10.30 m with 0.07% Cu, 1.07% Pb, 2.13% Zn, 103.42 g/t Ag, and 0.35 g/t Au. Within the interval was a 3.96 m with 0.15% Cu, 2.63% Pb, 3.63% Zn, 253.8 g/t Ag and 0.61 g/t Au. The company received permits for a 10,000 t bulk sample. The property is underlain mostly by Cambrian to Devonian carbonate and fine-grained sedimentary rock of the Lardeau Group.

### 7.3. Selected industrial mineral projects

#### 7.3.1. Kootenay Clay (Hi Ho Silver Resources Inc.)

An outcrop of illite-rich lacustrine clay is exposed on a road cut of the Skookumchuk Creek forest service road, near Buhl Creek. The clay extends for at least 110 m along the road cut and about 28 m back from it. Grab samples yielded about 78 wt.% illite. The company shipped a 7000 kg bulk sample to China to be evaluated for use in cosmetics.

## 8. Geological research

Höy et al. (2021) reported on mapping and U-Pb zircon



and  $^{40}\text{Ar}/^{39}\text{Ar}$  geochronology of the Penticton Group in the Boundary area, and Kuppusamy and Holuszko (2021) developed a rare earth element database based on samples from the East Kootenay coal fields. Perelló et al. (2021) investigated the timing of sediment-hosted stratiform copper-silver mineralization in the Creston Formation (Belt-Purcell Supergroup) using U-Pb zircon detrital zircon geochronology to establish a maximum depositional age (ca. 1470 Ma) and Re-Os molybdenite geochronology to determine the age of mineralization (ca. 1043 Ma).

## 9. Summary

Companies have been able to establish financing for fieldwork and company development. Exploration has been varied across a spectrum of commodities, including precious and base metals, specialty metals, industrial minerals and coal. Industrial minerals production has remained steady. Coal prices and sales increased during the year and demand for metallurgical coal remains strong.

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# Exploration and mining in the Southwest Region, British Columbia



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## 1. Introduction

The Southwest Region (Fig. 1) has a long history of mining. This history includes: the use of native copper by First Nations; silver, gold, and coal mining by the mid-19th century; mining of iron in the mid-20th century; and substantial copper production throughout the 20th century. Although mining and exploration for metals continues in the region, most mining is for construction materials, mainly aggregates for local markets with some exports from the largest coastal quarries.

The area has one major polymetallic metal mine, **Myra Falls** (Trafigura Mining Group, Trafigura Group Pte. Ltd.), one coal mine on care and maintenance, **Quinsam** (Quinsam Coal Corporation), and numerous industrial minerals and aggregate operations. Having been on care and maintenance since 2015, Nyrstar prepared to return **Myra Falls** to production in 2017 and produced some concentrate in 2018. Operations were suspended in 2018 for compliance reasons but restarted in April 2019 and continued through 2021. The **Quinsam** mine, on care and maintenance since 2016, had returned to production in 2017, after being purchased by ERP Compliant Fuels LLC, and produced about 200,000 t in 2018. However, the mine was placed on care and maintenance again in May 2019 and remained so through 2021.

Mine site exploration at **Myra Falls**, which began late in 2017, continued in 2018 through 2021. Privateer Gold Ltd. continued a significant exploration program at Zeballos, as did Northisle Copper and Gold Inc. on northern Vancouver Island. More than 30 other exploration projects were tracked, mainly grass roots or early stage and small scale.

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 Southwest Region, exploration expenditures were estimated at \$8.0 million and exploration drilling was estimated at approximately 40,400 m (Clarke et al., 2022; EY LLP, 2022).

## 2. Geological overview

Metallogeny in British Columbia is closely linked to the tectonic evolution of the Canadian Cordillera, first as an accretionary orogen consisting of allochthonous terranes that were welded to and deformed with the western margin of ancestral North America, primarily during the Jurassic, and then as the site of post-accretionary tectonism and magmatism (e.g., Nelson et al., 2013).

The Southwest Region includes parts of the Insular, Coast, and Intermontane physiographic regions. Most of the area is underlain by rocks of the Wrangell terrane and the Coast Plutonic complex (Fig. 1). Wrangellia is a Devonian to Jurassic island arc terrane that underlies most of Vancouver Island and Haida Gwaii. The oldest rocks on Vancouver Island are Devonian volcanic arc andesites, basalts, breccias, tuffs, and tuffaceous sediments of the Sicker Group and allied intrusive rocks, which are overlain by Mississippian-Permian limestones, argillites, and minor conglomerate of the Buttle Lake Group. This Paleozoic basement is exposed in two major uplifts on southern and central Vancouver Island. The Cowichan anticlinorium and the Buttle Lake anticlinorium host the past volcanogenic massive sulphide polymetallic producer at Mount Sicker and the current mine at **Myra Falls**.

Unconformably overlying the Paleozoic rocks are Middle to Upper Triassic oceanic flood basalts and related sedimentary rocks of the Vancouver Group. The upper part of the Vancouver Group contains numerous skarn occurrences adjacent to Jurassic intrusions (Island Plutonic suite). The Tasu past producer on Haida Gwaii is one of the larger examples of numerous iron and iron-copper skarns. Between 1914 and 1983, it produced 12 Mt of iron concentrate as well as copper, gold, and silver.

The Vancouver Group is overlain by arc rocks of Bonanza Group (Upper Triassic-Middle Jurassic), which consist of a volcano-sedimentary succession and subaerial basalt to rhyolitic flows and tuffs (Nixon and Orr, 2007). The Bonanza Group north of Holberg Inlet host the past-producing Island Copper Cu-Mo-Au porphyry deposit and other undeveloped porphyry and epithermal prospects where they are intruded by Island Plutonic suite granodiorite and quartz diorite.

On the east coast of Vancouver Island, in the Strait of Georgia



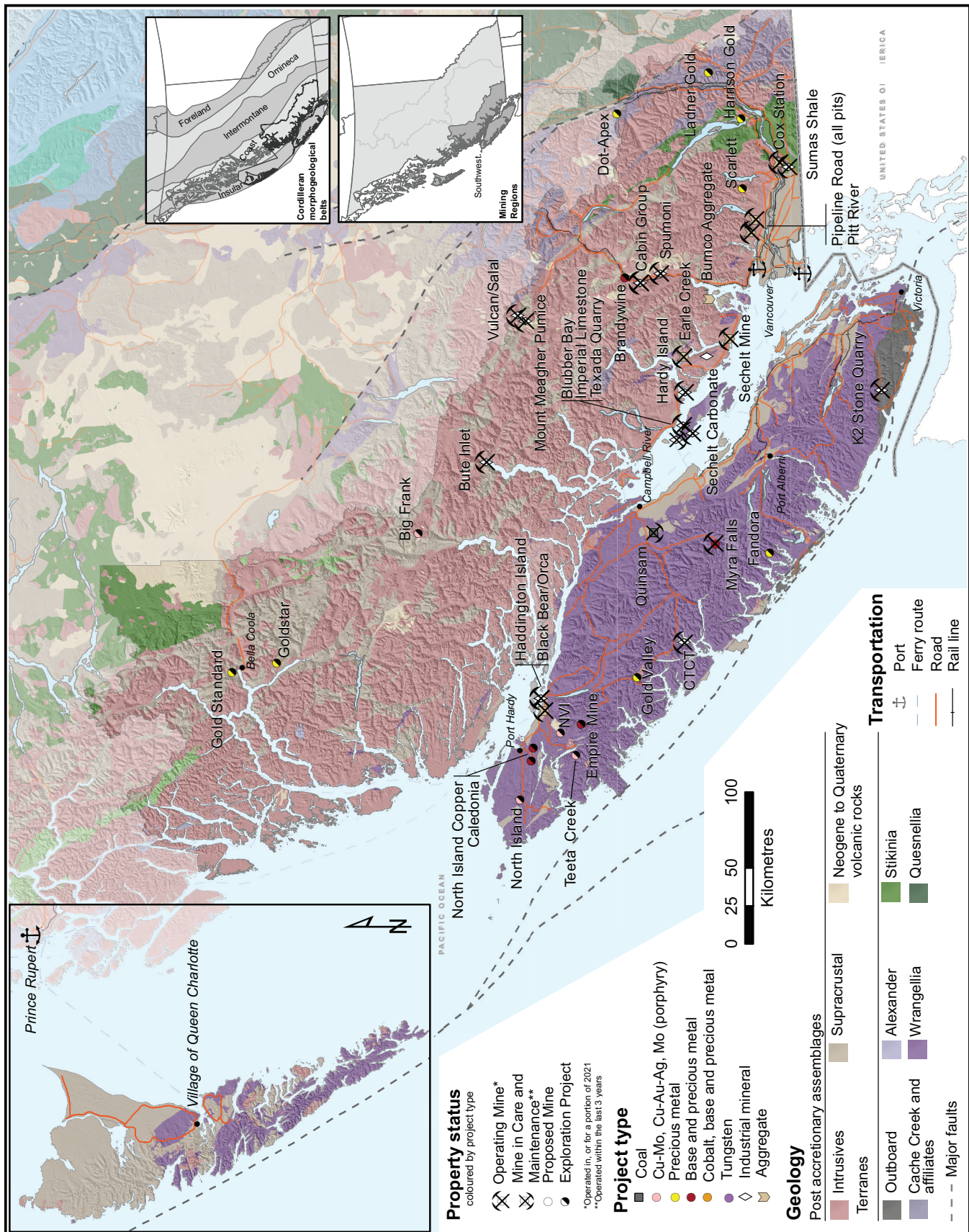


Fig. 1. Mines, proposed mines, and selected exploration projects, Southwest Region, 2021. Terranes from Nelson et al. (2013).

and on the western mainland, Wrangellia is buried by rocks of the Nanaimo Group, an Upper Cretaceous continental to marine molassoid succession containing debris derived from unroofing of the Coast Belt and northern Cascades (Mustard, 1994). The Comox Formation, the basal unit of the Nanaimo Group, hosts economically important coal deposits that were mined historically in the Nanaimo area.

The Coast Mountain range is underlain by the Coast Plutonic complex, a large northwest-trending batholith consisting largely of diorite, quartz diorite, tonalite, and granodiorite calcalkaline rocks with less abundant high-grade metamorphic rocks. For the most part, uplift and erosion have removed the levels at which epithermal and porphyry-style mineralization form, with some exceptions. At the southern end of the Coast Plutonic complex, economically important deposits occur in pendants of the Gambier Group, overlapping Late Jurassic to Mid-Cretaceous arc-related volcanic and sedimentary rocks. The most productive of these deposits was the Britannia mine, a Kuroko-type polymetallic volcanogenic massive sulphide deposit that produced 517,000 t of copper along with zinc, silver, gold, lead, and cadmium between 1905 and 1974. At the southeastern edge of the Coast ranges, the Giant Mascot ultramafic-mafic intrusive suite (Late Cretaceous, Manor et al., 2014, 2015, 2016, 2017) hosts the province's only past-producing nickel mine, Giant Mascot Nickel, which operated between 1958 and 1974.

Eocene to Miocene ancestral Cascades arc magmatism extended as far northward as southwestern British Columbia, as does present day Cascades magmatism. Evidence of forearc Paleocene to Miocene magmatism can be traced from southern Oregon through Alaska (Madsen et al., 2006). Mount Washington Copper (Eocene) produced 3548 t of copper, 131 kg gold and 7235 kg silver. Catface Copper (Eocene) has a significant undeveloped resource. Other presumably Cenozoic targets include **Giant Copper** and **Okeover Harmony**, on Graham Island, Haida Gwaii (Fig. 1) is a Miocene epithermal deposit with a significant undeveloped gold resource. Some recent exploration targets Neogene mineralization along a magmatic belt between the Brooks Peninsula and Alert Bay on northern Vancouver Island (Nixon et al., 2011a, b; 2020).

Quaternary Cascades magmatism has produced pumice and other volcanic rocks quarried for construction, landscaping, and other applications. The Mount Meager area has also been investigated as a possible source of geothermal energy.

On Vancouver Island, the western and southern margins of Wrangellia are structurally juxtaposed with the Pacific Rim terrane, which consists of possible mélange deposits (Rusmore and Cowan, 1985; Brandon, 1989) and the Leech River complex, an assemblage of greenschist- to amphibolite-grade mudstones, sandstones, and mafic volcanic rocks cut by granitic bodies (Groome et al., 2003). Slate and siltstone are quarried for building stone in the Leech River complex. The Leech River has been an active placer gold camp since 1864. Gold quartz veins have been the subject of recent exploration

near the Leech River fault, along the southern margin of the terrane (Fig. 1).

The Crescent terrane represents Eocene accretion of Late Cretaceous or Paleocene to Early Eocene seamounts. The Leech River fault marks the boundary of Pacific Rim and Crescent terranes. The Metchosin Igneous complex, a partial ophiolite and northernmost extent of the Coast Range basalt province (Massey, 1986), contains three tholeiitic intrusion-hosted past producers of copper and precious metals, the most significant of which was the Sunro mine.

The southeastern Coast Belt, north of the international border is underlain by the Nooksack-Harrison and Chilliwack terranes (equivalent to Stikinia; Monger and Struik, 2006), and the Bridge River, Cadwallader, and Methow terranes, allied with the main Cache Creek terrane (Fig. 1). These represent slices of oceanic and arc-related rocks enclosed between Intermontane and Insular terranes during Middle Jurassic to Middle Cretaceous regional sinistral faulting (Bustin et al., 2013; Monger and Brown, 2016). Gambier Group-equivalent overlap deposits and parts of the Nooksack-Harrison terrane are prospective for VMS mineralization. The Coquihalla Serpentine belt, along the Hozomeen fault between the Bridge River terrane to the west and the Methow terrane to the east, hosts several gold prospects and five past producers including the Carolin mine, which operated between 1981 and 1984.

Tectonic uplift, erosion, and glaciation produced sand and gravel deposits important to the construction and transportation industries of the Lower Mainland. Most are products of the most recent retreat of the Cordilleran Ice Sheet in the Pleistocene (e.g., Howes, 1983; Clague and Ward, 2011).

### 3. Mines

The Southwest Region has one metal mine, one coal mine placed on care and maintenance in 2019 and numerous industrial minerals and aggregate operations (Fig. 1; Tables 1-3). Of eight large-scale industrial minerals operations in the region, two entered care and maintenance in 2016 and remained so in 2021. Aggregate operations in the region number in the 100s and only the most prominent (e.g., those producing at least 1 Mtpy) are reported here.

#### 3.1. Metal mines

##### 3.1.1. Myra Falls Operations (Trafigura Mining Group)

Trafigura Mining Group, part of Trafigura Group Pte. Ltd. acquired the **Myra Falls** underground Zn-Cu-Pb-Ag-Au mine in 2020 from Nyrstar N.V. Trafigura is a private multinational commodity trading company and is not required to publish compliant production or reserves figures. However, they reported continuing to ramp up to a target throughput of 800,000 tpy of ore and estimate the operation has 10 years of reserves (Table 1). After re-starting following infrastructure upgrades and closing again for compliance reasons in 2018, the mine reopened in April 2019 and continued operation through 2021. The mine has a history of replacing reserves through



**Table 1.** Metal mines, Southwest Region.

Mine	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1- Q3)	Reserves (December 31, 2018)	Resources (December 31, 2018)	Comments
<b>Myra Falls</b>	<b>Trafigura Group Pte. Ltd. (Trafigura Mining Group)</b>	Zn, Cu, Pb, Ag, Au; Noranda/Kuroko massive sulphide; 092F 330, 71, 72, 73	Not reported. Mill capacity 2000 tpd. Long term target 800,000 tpy of ore	P+Pr: 4.7 Mt 7.11% Zn, 0.78% Pb, 0.92% Cu, 76.55 g/t Ag, 1.78 g/t Au	M+I: 7.64 Mt 6.59% Zn, 0.72% Pb, 0.99% Cu, 72.52 g/t Ag, 1.79 g/t Au	Resumed production in April 2019, continued to ramp up 2020-21. Continuing multi-year underground drilling.

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

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

Mine	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1- Q3)	Reserves	Resources	Comments
<b>Quinsam</b>	<b>Quinsam Coal Corporation (receiver Bowra Group Inc.)</b>	TC; Bituminous coal; 092F 319	nil	Not reported	Unofficial, non-compliant resources estimated at 40 Mt in 2013 by mine staff.	Placed on care and maintenance May 2019. Property and assets offered for sale. No sale reported with exception of stockpiled coal.

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 and aggregate mines and quarries, Southwest Region.

Mine	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2021 Production (based on Q1- Q3)	Reserves	Resources	Comments
<b>Blubber Bay</b>	<b>CRH Canada Group Inc.</b>	Limestone, dolostone; Limestone; 092F 479		na	100+ years	Opens for contracts.
<b>Bute Inlet</b>	<b>Ironwood Clay Company Inc.</b>	Clay; Sedimentary kaolin? (or illite)	na	na	na	Intermittent mining as needed.
<b>Cabin Group</b>	<b>Northwest Landscape and Stone Supply Ltd.</b>	Landscaping stone	na	na	na	
<b>Cox Station</b>	<b>Mainland Construction Materials ULC</b>	Aggregate; Crushed rock; 092GSE103	Approx. 3-4 Mtpy	na	na	
<b>CTCT</b>	<b>Vancouver Island Marble Quarries Ltd.</b>	Marble; Limestone; 092E 020	Typically, about 400 t annually	na	na	Supplies Matrix Marble and Stone Inc.
<b>Earle Creek</b>	<b>Lafarge Canada Inc.</b>	Sand and Gravel	Typically, >1 Mtpy	na	na	

Table 3. Continued.

<b>Garibaldi Pumice (Vulcan/Salal)</b>	<b>Garibaldi Pumice Ltd.</b>	Pumice; Volcanic ash; 092JW 039	Typically 10,000-20,000 m <sup>3</sup>	na	11,396,000 m <sup>3</sup> pumice 4,990,000 m <sup>3</sup> pumicite (fines)	2014 resource. Additional exploration 2015, 2018, 2019.
<b>Haddington Island</b>	<b>Adera Natural Stone Supply Ltd.</b>	Dimension stone, Building stone; 092L 146	na	na	na	Not active every year.
<b>Hardy Island</b>	<b>Hardy Island Granite Quarries Ltd.</b>	Dimension stone, Building stone; Dimension stone-granite; 092F 425	3000-5000 tpy	na	Approx. 100,000 t	
<b>Imperial Limestone</b>	<b>Imperial Limestone Co. Ltd.</b>	Limestone; Limestone; 092F 394	Approx. 600,000 tpy	na	75 years	250,000 to 275,000 t high purity product + cement feedstock.
<b>K2</b>	<b>K2 Stone Quarries Inc.</b>	Dimension stone, flagstone; Flagstone; 092C 159	15,000-20,000 t annually	na	na	Production number represents material extracted.
<b>Mount Meager Pumice</b>	<b>Great Pacific Pumice Inc.</b>	Pumice; Volcanic ash; 092JW 039	na	na	na	
<b>Orca</b>	<b>Polaris Minerals Corporation</b> (US Concrete Inc. and 'Namgis First Nation)	Sand and Gravel	Up to 6 Mtpy	na	na	Planning increased production, targeting up to 8.5 Mtpy.
<b>Pipeline Road (2)</b>	<b>Lehigh Hanson Materials Ltd., Allard Contractors Ltd.</b>	Sand and Gravel	na	na	na	Two adjacent operating sites.
<b>Pitt River</b>	<b>Lafarge Canada Inc.</b>	Aggregate; Crushed rock; 092GSE007	Typically, >1 Mtpy	na	na	
<b>Sechelt</b>	<b>Lehigh Hanson Materials Limited</b>	Sand and Gravel	Typically, 5-6 Mtpy	na	Several decades	
<b>Spumoni</b>	<b>Northwest Landscape and Stone Supply Ltd.</b>	Flagstone; Flagstone; 092GNW100	na	na	na	Seasonal quarry.
<b>Sumas Shale</b>	<b>Sumas Shale Ltd.</b> (Lafarge Canada Inc., Clayburn Industrial Group)	Shale, clay, sandstone; Residual kaolin; 092GSE024	About 500,000 t annually	na	50+ years	Approximately 55% shale, 45% sandstone for cement production.
<b>Texada Quarry</b>	<b>Texada Quarrying Ltd.</b> (Lafarge Canada Inc.)	Limestone, aggregate; Limestone; 092F 395	Typically, approx. 3.5 to 4.5 Mtpy	na	100+ years	Mostly produces limestone for cement manufacture.

Table 3. Continued.

<b>Treat Creek</b>	<b>Lehigh Hanson Materials Limited</b>	Aggregate; Crushed rock	Approx. 500 ktpy	na	na
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P = Proven; Pr = Probable; M = Measured; I = Indicated; Inf = Inferred

exploration, which continued in 2021 with significant drilling. The Myra Falls camp hosts Kuroko-type, or bimodal felsic type Zn-Cu- Pb-Ag-Au VMS deposits from which more than 30 Mt of ore have been mined since 1966.

### 3.2. Coal mines

#### 3.2.1. Quinsam (Quinsam Coal Corporation, Bowra Group Inc.)

**Quinsam** is an underground mine that began commercial production of thermal coal in 1988 (Table 2). At its peak, it produced approximately 1 Mt clean coal annually. It ceased operation and entered care and maintenance in early 2016. It was then purchased by ERP Compliant Fuels LLC in 2017 and operated by Quinsam Coal Corporation until 2019. In 2018, its last full year of operation, it produced about 200,000 t and employed 50 people.

Quinsam placed the mine on care and maintenance at the end of May 2019. The company subsequently made an assignment into bankruptcy. The receiver and manager Bowra Group Inc. offered the property and assets for sale in 2020. As of the end of 2021 they had not reported a sale, except that of the existing mined coal inventory. One conditional offer for the mine was ultimately rejected. Neither the receiver nor the Province of British Columbia support further marketing efforts. Reclamation is a long-term option for the property. Reclamation liability is estimated at \$12.4 million.

### 3.3. Industrial minerals and aggregates

Large quarries on the coast (Table 3) serve the Lower Mainland, Vancouver Island, and U.S. Pacific northwest markets by barge. Those with access to freighter loadout facilities can also supply eastern Pacific international markets and Hawaii. Aggregates are an important part of the mining industry on the south coast, generating many more jobs in the region than metal and coal mining. The area hosts some of the largest aggregate pits and quarries in Canada. Most quarries serve local markets. General sales and production trends follow those of the construction industry. Lafarge North America Inc., Lehigh Hanson Materials Ltd., U.S. Concrete, Inc. and a local company, Mainland Sand and Gravel Ltd., are the largest participants in the coast area, although hundreds of pits and quarries produce in the region.

One of the largest aggregate-only mines is the **Sechelt mine**, operated by Lehigh Hanson. The company no longer makes production figures public, but volumes have been in the 5-6 Mt range in recent years. It is permitted for up to 7.5 Mtpy. They expect reserves to last several more decades. A loading facility

capable of accommodating Panamax-class freighters handles most of the shipments.

In addition to the **Texada Quarry**, Lafarge North America operates two of the largest aggregate quarries in the region (**Earle Creek** and **Pitt River**) each of which typically produces more than 1 Mtpy.

**Pipeline Road** is the site of large operations by Lehigh Hanson Materials Ltd. and Allard Contractors Ltd. Together they produce more than 1 Mtpy. Lehigh Hanson also has a large crushed aggregate operation at **Treat Creek** on Jervis Inlet.

Polaris Minerals Corporation, a subsidiary of U.S. Concrete Inc. operates the **Orca** quarry near Port McNeill, in partnership with the 'Namgis First Nation, which holds a 12% interest. The owner-operator partnership is Orca Sand and Gravel LP. The quarry produces sand and gravel mainly for export to California. The operation was originally permitted for up to 6 Mtpy, but Polaris plans to increase production to 8.5 Mtpy in 2021-23. In 2017, Polaris applied to the British Columbia Environmental Assessment Office for an amendment to its Orca project certificate to allow for producing aggregate at a site approximately 4 km from current operations. The new site was previously known as the **Black Bear** project. This site was to supply 250,000 tpy of a crushed basalt product, but in 2020 Polaris revised the proposal to 3-4 Mtpy.

The **Cox Station** quarry, on the north side of Sumas Mountain, is operated by Mainland Sand and Gravel Ltd. More than 95% of the crushed quartz diorite product goes to the Lower Mainland market via barge on the Fraser River. The quarry also has two CN Rail spur lines, which allow shipment by rail. Production and shipments have recently been on about 3-4 Mtpy.

Small operations produce building stone on Vancouver Island. Island Stone Landscape Supply is a producer and supplier of flagstone, as is San Juan Quarries. Vancouver Island Marble Quarries Ltd. continues to quarry marble on Vancouver Island and fabricate a line of products including countertops, sinks, and tiles at Matrix Marble and Stone Inc. They quarry marbles referred to as 'Tlupana Blue Grey' and 'Vancouver Island White' near Hisnit Inlet (**CTCT** quarry). Pacific West Stone Inc. also has a quarry permit near Tahsis and a quarry at the Leo D'Or site at Bonanza Lake.

Landscaping stone and dimension stone is quarried in the Squamish-Whistler corridor. The largest operator is Northwest Landscape and Stone Supply Ltd., with the **Spumoni** quarry and their Cabin Group property, which now has a Mines Act quarry permit. Others active in the area include Bedrock Granite Sales Ltd., Citadel Stone Ltd., and Alpine Natural Stone Ltd.

**Haddington Island** and **Hardy Island** have been two regular sources of dimension stone. The Haddington Island product (typically referred to as Haddington Island andesite) is a durable, resistant dacitic volcanic rock, part of the Alert Bay volcanic belt (Neogene). Adera Natural Stone Supply Ltd. supplies the Haddington Island andesite as needed. Most of the product is used for restoration work on historic buildings, but it has also been used in modern monuments and buildings.

Hardy Island Granite Quarries Ltd. produces up to 5000 tpy from a Coast Plutonic complex granodiorite unit. Like Haddington Island, it is an historic quarry that mainly serves the local market. Hardy Island has opened another quarry on Valdes Island that supplies sandstone from the Nanaimo Group, another rock type common to many older buildings in Vancouver and Victoria.

### 3.3.1. Blubber Bay Quarry (CRH Canada Group Inc.)

The **Blubber Bay** limestone quarry on Texada Island has remained mostly on care and maintenance since 2010, after more than 100 years of operation. It reopens for sufficiently large contracts. It can still supply limestone aggregate and continues to supply dolostone periodically at an average annual rate of about 50,000 tpy.

### 3.3.2. Bute Inlet (Ironwood Clay Company Inc.)

Ironwood Clay Company Inc. mines glacial marine clay on the central coast. Until 2015, production was from the De Cosmos Lagoon south of Bella Bella (Fig. 1). The company has a site at the head of **Bute Inlet**, which is active and likely to supply future raw material. Mining is intermittent. Ironwood produces cosmetic products using the clay at its Richmond plant, a business that has continued for 30 years. Glacial Bay Organic Clay Inc. also extracts material by hand near the head of Bute Inlet. Other individuals and companies supply the growing cosmetic clay market at smaller scales from locations on the central coast and Vancouver Island. Generally, Mines Act permits are not required where material is collected by hand, and these glacial marine clay operations are unreported.

### 3.3.3. Garibaldi Pumice and Mount Meager Pumice (Garibaldi Pumice Ltd.; Great Pacific Pumice Inc.)

In the Mount Meager area, Garibaldi Pumice Ltd. produces 15,000-20,000 m<sup>3</sup> of pumice annually from their quarry (**Vulcan/Salal**). Neighbouring Great Pacific Pumice Inc. has been producing smaller quantities but have stockpiles in Squamish from which they can ship year-round.

### 3.3.4. Imperial Limestone (Imperial Limestone Co.)

In recent years, the **Imperial Limestone** quarry near Van Anda on Texada Island (Fig. 1) has produced approximately 250,000 to 275,000 tpy of high-purity product, most of which is shipped to their parent company in Seattle. Imperial Limestone Co. also mine and stockpile a larger quantity of lower quality limestone that goes to local cement plants. Quarrying at the

Imperial site dates to the 1930s. The company anticipate reserves will last about 75 years.

### 3.3.5. K2 (K2 Stone Quarries Inc.)

K2 Stone is a natural stone product supplier with a quarry near Port Renfrew on Vancouver Island (**K2**). They extract about 15,000-20,000 t annually. The rock is trucked to Nanaimo for processing into masonry and landscaping products.

### 3.3.6. Sumas Shale (Sumas Shale Ltd.)

The **Sumas Shale** quarry of Sumas Shale Ltd., operated by contractor Fraser Pacific Enterprises Inc., delivers sandstone and shale product to the Lafarge and Lehigh cement plants in Richmond and Ash Grove in Seattle. Sumas Shale Ltd is 50% owned by Lafarge Canada Inc. and 50% by Clayburn Industrial Group. Production and shipments have been approximately 500,000 tpy in recent years. Mining plans include an average 475,000 tpy of approximately 55% shale and 45% sandstone. Because Clayburn's brick and refractory products plant in Abbotsford closed, fire clay is no longer produced separately.

### 3.3.7. Texada (Texada Quarrying Ltd.)

The largest limestone quarry on the coast is the **Texada Quarry** operation near Gillies Bay. Texada Quarrying Ltd. is a subsidiary of Lafarge Canada Inc. The quarry also produces aggregate, mainly from quartz monzonite to gabbro dikes and sills, which would otherwise be waste rock. The site also hosts a white carbonate quarry, one of only a few sources on the coast. The quarry, which has operated for more than 60 years, has extensive reserves and, at current rates, could produce for more than 100 years. They produce about 3.5 to 4.5 Mt annually.

## 4. Placer gold

Historic placer camps include the Lower Fraser River, Leech River, and China Creek. Although short lived, a gold rush in the Fraser Canyon, beginning in 1858 at Hills Bar, led miners farther up the Fraser River into the Chilcotin and Cariboo. In 1864, reports of gold in the Leech River on southern Vancouver Island led to another brief gold rush. Both camps are worked by placer miners to the present day. The Lillooet River was also on a historic route to the Cariboo. It also remains an active placer camp.

## 5. Mine development

Mine development projects are those for which a decision to produce has been made, key government approvals are in place, and on-site construction has begun. The Southwest Region has no such large-scale projects.

## 6. Proposed mines

Proposed mines are feasibility-stage projects for which proponents have begun the environmental certification process (in the case of large projects) or have submitted applications for Mines Act permits (in the case of projects below British Columbia Environmental Assessment Act thresholds). The



Southwest Region has three such projects (Table 4); several small-scale and inactive larger projects are not covered in this report.

### 6.1. Proposed metal mines

The Southwest Region had no proposed major metal mine projects active in 2021.

### 6.2. Proposed coal mines

The region has no active proposed coal mine projects.

### 6.3. Selected proposed industrial minerals mines

Proposed mines include the **BURNCO Aggregate** Project and the **Sechelt Carbonate** project, which has been inactive apart from a request by the owner to remain in the provincial environmental assessment process. The **Black Bear** aggregate project near Port McNeill was the subject of an application to amend the **Orca** Environmental Certificate. This was withdrawn with a request for review under new legislation.

#### 6.3.1. Black Bear and Orca (Polaris Materials Corporation)

As noted above, Polaris Materials Corporation included the **Black Bear** project near its **Orca** sand and gravel quarry in an Environmental Certificate amendment for Orca. If the project proceeds, it will be a source of up to 3-4 Mtpy of crushed basalt, an increase over the 250,000 tpy proposed in a 2017 project description. Mine life would be extended from 10 to 20 years. This application was withdrawn with a request by the proponent to re-apply under the 2018 Environmental Assessment Act.

#### 6.3.2. BURNCO Aggregate (BURNCO Rock Products Ltd.)

The **BURNCO Aggregate** project in the McNab Creek Valley (Fig. 1) received environmental certification in 2018 and may proceed with British Columbia Mines Act and other

permitting. Certifications are valid for 5 years. Fisheries and Oceans Canada concluded that the project is unlikely to cause significant environmental harm. The proposed sand and gravel mine would ramp up to a 1.6 Mtpy operation, initially barging product to BURNCO Rock Products Ltd.'s ready-mix concrete plants in South Burnaby and Port Kells. BURNCO submitted revisions to the project in 2014, changing production rate, relocating some facilities, and specifying a mine life of 16 years.

#### 6.3.3. Sechelt Carbonate (Ballinteer Management Inc.)

Ballinteer Management Inc. now holds the property comprising the **Sechelt Carbonate** project. They filed engineering, archeological, and baseline environmental studies for assessment in 2016; activity was not reported for 2017-2021. The property contains resources of calcite- and dolomite bearing carbonate rock and gabbroic rock for potential use as aggregate. The original proposal was for a 4-6 tpy carbonate quarry producing both limestone and dolostone. Product was to be shipped from a barge load out on Sechelt Inlet.

## 7. Exploration activities and highlights

Exploration projects are categorized as grassroots, early stage, advanced, and mine evaluation, depending upon the nature of recent work. Work directed at discovering new resources away from ore bodies in an existing mine plan can be considered mine-lease or on-site exploration. The Southwest Region had few large exploration programs in 2021 (Table 5).

### 7.1. Selected precious metal projects

Precious metal prospects are found in a variety of settings in the region. There was one major exploration project in 2021, in addition to several smaller projects.

**Table 4.** Selected proposed mines or quarries, Southwest Region.

Project	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resources	Comments
<b>Black Bear and Orca</b>	<b>Polaris Materials Corporation</b> (US Concrete, Inc. and 'Namgis First Nation)	Aggregate; na	na	20 years (proposed life)	Orca environmental certificate amendment application withdrawn. Proposed 250,000 tpy near the Orca quarry revised to 3-4 Mtpy. Indicate intention to re-apply under 2018 Act.
<b>BURNCO Aggregate</b>	<b>BURNCO Rock Products Ltd.</b>	Aggregate; Sand and Gravel; na	na	Approx. 20 Mt	Has environmental certification, would require Mines Act and other permits.
<b>Sechelt Carbonate</b>	<b>Ballinteer Management Inc.</b>	Limestone, dolostone, aggregate; Limestone, dolomite, crushed rock; 093GNW031	na	Carbonate Rock: 76.1 Mt Gabbro: >700 Mt	Proponent requests project remain in environmental assessment pre- application stage.

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

**Table 5.** Selected exploration projects, Southwest Region.

<b>Project</b>	<b>Operator (partner)</b>	<b>Commodity; deposit type; MINFILE</b>	<b>Resources (NI 43- 101 compliant unless indicated otherwise)</b>	<b>Comments</b>
<b>Big Frank</b>	<b>Goldplay Mining Inc.</b>	Cu, Au, Mo, Ag; Porphyry Cu±Mo±Au; 092N 051, 29, 28	na	Reconnaissance soil (165) and rock (114) sampling.
<b>Brandywine</b>	<b>Bayhorse Silver Inc., Turnagain Resources Inc.</b>	Ag, Au, Pb, Zn; Polymetallic veins; 092JW 001, 21, 22	na	Permitting, technical report.
<b>Caledonia</b>	<b>Surge Battery Metals Inc.</b>	Cu, Ag, Zn, Pb; Pb-Zn skarn, Polymetallic manto; 092L 061, 209	na	Geochemistry, technical report.
<b>Dot-Apex</b>	<b>Mineral Hill Industries Ltd.</b>	Au, Ag; Au-quartz veins; 092ISW064, 90, 79	na	Geology, rock and soil geochemistry, VLF-EM.
<b>Empire Mine</b>	<b>Coast Copper Corp.</b>	Au, Ag, Cu, Fe, Co; Fe skarn, Cu skarn; 092L 044, 45, 46	M+I: 960,000 t 2 g/t Au, 5.6 g/t Ag, 0.34% Cu, 0.013% Co Inf: 120,000 t 1.2 g/t Au, 2.8 g/t Ag, 0.13% Cu, 0.008% Co	Rock, soil and silt geochemistry, IP surveys, drilling (2346 m, 19 holes).
<b>Fandora</b>	<b>Imperial Metals Corporation</b>	Au, Ag; Au quartz veins; 092F 041	na	Magnetometer, VLF and lidar surveys.
<b>Gold Standard</b>	<b>Juggernaut Exploration Ltd.</b>	Au, Ag; Au quartz veins	na	Drilling 11 holes, 1203 m. Grab sample 34.6 g/t Au, 149 g/t Ag.
<b>Goldstar</b>	<b>Juggernaut Exploration Ltd.</b>	Au, Ag; Au quartz veins	na	Drilling 5 holes, 285 m. Highlight 5.5 m grading 10.8 g/t Au, 260.8 g/t Ag.
<b>Gold Valley</b>	<b>Privateer Gold Ltd.</b>	Au, Ag; Au-quartz veins; 092L 008, 311, 155	na	Drilling 4474 m in 14 holes.
<b>Harrison Gold</b>	<b>Bear Mountain Gold Mines Ltd.</b>	Au, Ag; Au quartz veins; 092HSW092	Historical I: 1.845 Mt 2.79 g/t Au Inf: 0.6 Mt 2.8 g/t Au	Geology, surveying, access, drilling 8 holes, 460 m.
<b>Ladner Gold</b>	<b>Talisker Resources Ltd.</b>	Au, Ag; Au quartz veins; 092HNW003, 7, 18, 092HSW034	Carolin Inf: 12,352,124 t 1.53 g/t Au  McMaster Inf: 3,575,000 t 0.69 g/t Au  Tailings I: 445,378 t 1.83 g/t Au Inf: 93,304 t 1.85 g/t Au	Late 2020 metallurgical testing of tailings. Project acquired by Talisker Resources in 2021.

Table 5. Continued.

<b>North Island</b>	<b>Northisle Copper and Gold Inc.</b>	Cu, Au, Mo, Re; Porphyry Cu±Mo±Au; 092L 185, 240, 200	I: 527,344,000 t 0.20% Cu, 0.24 g/t Au, 0.008% Mo, 0.31 ppm Re  Inf: 417,272,000 t 0.15% Cu, 0.18 g/t Au, 0.006% Mo, 0.29 ppm Re	Drilling at 4 sites (18 holes, 9293 m as of mid December.), IP and ground magnetic surveys, geological and clay analysis mapping, soil surveys.
<b>North Island Copper</b>	<b>Questcorp Mining Inc.</b>	Cu, Ag, Au, magnetite; Cu and Fe skarn; 092L 318, 315, 159, 113	na	Geology, geochemistry, drone magnetic survey.
<b>Scarlett</b>	<b>New Target Mining Corp.</b>	Au; Au, polymetallic veins	na	Rock and soil geochemistry, portable drilling, drone magnetic survey.
<b>Teeta Creek</b>	<b>Teck Resources Limited, ArcWest Exploration Inc.</b>	Cu, Mo, Au; Porphyry Cu±Mo±Au; 092L 454, 235	na	Drilling, 2 holes, 1116 m. Reconnaissance mapping and rock sampling on neighbouring NVI property.

M = Measured; I = Indicated; Inf = Inferred

#### 7.1.1. Dot-Apex (Mineral Hill Industries Ltd.)

Mineral Hill Industries has an option to acquire an interest in the **Dot-Apex** and **Master-ACE** properties. Initial work at Dot-Apex included geological, rock and soil geochemical, and VLF-EM surveys. They reported elevated gold in initial samples and commissioned a technical report that recommended additional work conditional on results. Targets include orogenic gold veins and possible intrusion-related gold.

#### 7.1.2. Fandora (Imperial Metals Corporation)

Imperial Metals reported magnetometer, VLF and lidar surveys at the **Fandora** property in 2021. The property had minor (972 t) production in the 1960s and has a historical resource of about 180,000 t grading 10.3 g/t in quartz calcite veins.

#### 7.1.3. Gold Standard (Juggernaut Exploration Ltd.)

Juggernaut drilled 1203 m in 11 shallow holes to test the Goldzilla Hinge zone at the **Gold Standard** project, a section of the Goldzilla vein. Drilling highlights included 6.5 m grading 2.1 g/t Au and 7.6 g/t Ag. Surface grab samples ranged up to 34.6 g/t Au and 149 g/t Ag.

#### 7.1.4. Goldstar (Juggernaut Exploration Ltd.)

Juggernaut drilled 285 m in 5 shallow holes testing the Goldilocks zone at the **Goldstar** project. All five holes intersected gold mineralization; a highlight included 5.5 m grading 10.8 g/t Au and 260.8 g/t Ag.

#### 7.1.5. Gold Valley (Privateer Gold Ltd.)

Privateer Gold continued to drill its Zeballos area project, formerly the New Privateer project, now called **Gold Valley**. As a private company operating on Crown granted claims, they have no obligation to make public details of their work

or results, but the company maintains a web page with contact information. The target is vein mineralization like that mined historically. Privateer Gold holds a land position including Crown grants covering the Privateer mine and other past producers in the historic Zeballos gold camp.

#### 7.1.6. Harrison Gold (Bear Mountain Gold Mines Ltd.)

Bear Mountain reported geological work, surface and underground surveying, and drilling (460 m, 8 holes) at **Harrison Gold**. An historical (1989) resource estimate has 1.845 Mt grading 2.79 g/t Au in the indicated category and 0.6 Mt grading 2.8 g/t Au in the inferred category.

#### 7.1.7. Ladner Gold (Talisker Resources Ltd.)

Talisker Resources acquired New Carolin Gold Corp., owner and operator of the **Ladner Gold** project, which includes the past-producing Carolin mine. Late 2020 metallurgical tests on Carolin mine tailings indicated that a gold concentrate could be produced using conventional flotation by regrinding. Apart from plans for 2022, the company reported no new work on the project in 2021.

#### 7.1.8. Scarlett (New Target Mining Corp.)

New Target Mining conducted rock and soil geochemical sampling, including portable drilling, and a drone-supported magnetic survey on the **Scarlett** property. Targets on this grassroots-stage property include porphyry and vein mineralization.

#### 7.2. Selected porphyry projects

Jurassic porphyry mineralization is a target on Vancouver Island. Southwestern British Columbia also has several advanced Eocene to Miocene porphyry copper targets.

### 7.2.1. Big Frank (Goldplay Mining Inc.)

Goldplay reported initial rock and soil sampling at its recently acquired **Big Frank** property. The property covers several porphyry Cu-Mo and vein occurrences that have seen little recent exploration. They carried out similar initial work on their Goldstorm South property to the east.

### 7.2.2. North Island (NorthIsle Copper and Gold Inc.)

NorthIsle Copper and Gold's **North Island** property covers an approximately 50 by 8 km block extending west-northwest from the past-producing Island Copper porphyry deposit. Within this area are several porphyry Cu-Au-Mo targets, four of which were drilled in 2021. The most developed targets are the Hushamu and Red Dog deposits, for which there are resource estimates (Table 5) and a Preliminary Economic Assessment. The North West Expo and Pemberton Hills areas were also drilled. In addition, the company reported work at Goodspeed and South Mackintosh targets. Surface work included geologic mapping, mapping of clays using TerraSpec infrared spectroscopy, soil geochemistry, and IP and ground magnetic surveys. Work was continuing as of mid December 2021. An update to the PEA prepared before the 2021 exploration considers a 75,000 tpd, 22-year, two open-pit operation with life of mine average yearly production of 95.9 million lbs Cu and 99.9 koz Au.

### 7.2.3. Teeta Creek (Teck Resources Limited)

Teck Resources drilled two holes for a total of 1116 m at the **Teeta Creek** project, a Neogene porphyry occurrence. Highlights included 2.4 m grading 1.27 g/t Au, 3.35 m grading 47.2 g/t Ag, and 1.09 m grading 1.047% Cu. The holes intersected quartz-sericite-pyrite alteration. Teck also carried out reconnaissance mapping and sampling on the adjacent NVI project. Teck relinquished its option and its interest returned to ArcWest Exploration Inc.

## 7.3. Selected polymetallic base and precious metal projects

### 7.3.1. Brandywine (Bayhorse Silver Inc. 80%; Turnagain Resources Inc. 20%)

Bayhorse Silver Inc. continues to await final permitting for a planned drilling and geophysical program at the **Brandywine** project. In 2021 they commissioned a technical report on the property which recommended a VTEM survey and drilling. Brandywine has vein targets and precious metals-enriched massive sulphide targets.

## 7.4. Selected skarn projects

### 7.4.1. Caledonia (Surge Battery Metals Inc.)

Surge Battery Metals carried out soil, silt, moss mat, and rock sampling and commissioned a technical report on the **Caledonia** property. They reported a 3 km Cu skarn trend. Cu-Zn-Pb-Ag skarn mineralization occurs at contacts between Vancouver Group rocks (Quatsino Formation and Karmutsen Formation) with granodiorites of the Island Plutonic suite.

### 7.4.2. Empire Mine (Coast Copper Corp.)

Coast Copper Corp. completed rock, soil, and silt geochemistry, and extended IP surveys at the **Empire Mine** Cu-Au-Fe skarn property. Drilling (2346 m, 19 holes) late in the year tested targets at the Merry Widow pit, Copper Knob, Raven pit, North Notch and the Benson Lake Mine-Old Sport horizon. The property hosts iron-copper-gold-cobalt skarn mineralization where mafic Island Plutonic suite rocks intrude Vancouver Group Quatsino Formation limestone. Several of these skarns were mined for iron, copper, silver and gold from the late 1950s to early 1970s.

### 7.4.3. North Island Copper (Questcorp Mining Inc.)

Questcorp Mining, a new, currently private company, conducted geological mapping sampling and a drone magnetic survey on the **North Island Copper** property, which hosts several Cu-Fe skarn occurrences in Vancouver Group rocks intruded by Island Plutonic suite quartz diorite to granodiorite.

## 8. Geological research

Rukhlov et al. (2021, 2022) continued to test measurement of gaseous elemental mercury as an exploration tool with new surveys at the Lara-Coronation polymetallic volcanogenic massive sulphide occurrence on southern Vancouver Island. They confirmed that direct and continuous measurements in near-surface air using a portable device can map sediment-covered mineralization in real time and that gaseous elemental mercury sampling is a simple and effective technique for mineral exploration in overburden-covered areas. Alberts et al. (2021) used U-Pb and Hf analyses of detrital zircons to investigate the early evolution of southern Wrangellia, documenting a previously unrecognized Mississippian magmatic event, and Isava et al. (2021) conducted an  $^{40}\text{Ar}/^{39}\text{Ar}$  geochronologic study of detrital K-feldspar from Nanaimo Group rocks (Cretaceous) on Vancouver Island and the Gulf Islands to establish provenance and constrain the denudation history of the Coast Mountain batholith. Cecil et al. (2021) used zircon Hf and O isotopes together with whole rock and mineral geochemistry to model spatial and temporal flare ups of Coast Plutonic complex magmatism. Morris and Canil (2021) used whole rock geochemistry and oxygen isotope analyses to examine the extent of magmatic skarn, which resulted from assimilation of Ca-rich wallrock in magma, at the Merry Widow deposit on northern Vancouver Island. Grasby et al. (2021) reported on the geothermal resource potential of the Garibaldi volcanic belt, an area of Quaternary volcanism in southwestern British Columbia.

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