

# Exploration and mining in the Southeast Region, British Columbia



Kirk Hancock<sup>1, a</sup>

<sup>1</sup> British Columbia Geological Survey, Ministry of Energy, Mines and Low Carbon Innovation, Victoria, BC, V8W 9N3

<sup>a</sup> corresponding author: Kirk.Hancock@gov.bc.ca

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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 with some recent extensions into Rare Earth Metals (REE) and related metals on Canada's critical minerals list. The region hosts several industrial mineral mines and quarries, and placer mining continues. The Trail smelter (Teck Resources Ltd.) produces refined lead, and zinc (which is on Canada's critical minerals list), silver and cadmium along with other metals on Canada's critical minerals list (germanium, indium), 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 \$29.4 million and exploration drilling is estimated at approximately 53,170 m (Clarke et al., 2023; EY LLP, 2023). Although the number of exploration projects remained similar to recent years, the amount of drilling decreased significantly to slightly more than half of what it was in 2021.

## 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 metal 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 12.21 billion for 2022, which accounts for approximately 67% 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 2022 is estimated to be 22-22.5 Mt of metallurgical coal. Teck reported that Q3 2022 production was 5% lower than in the same quarter of 2021. Q3 production was 5.7 Mt with nine-month

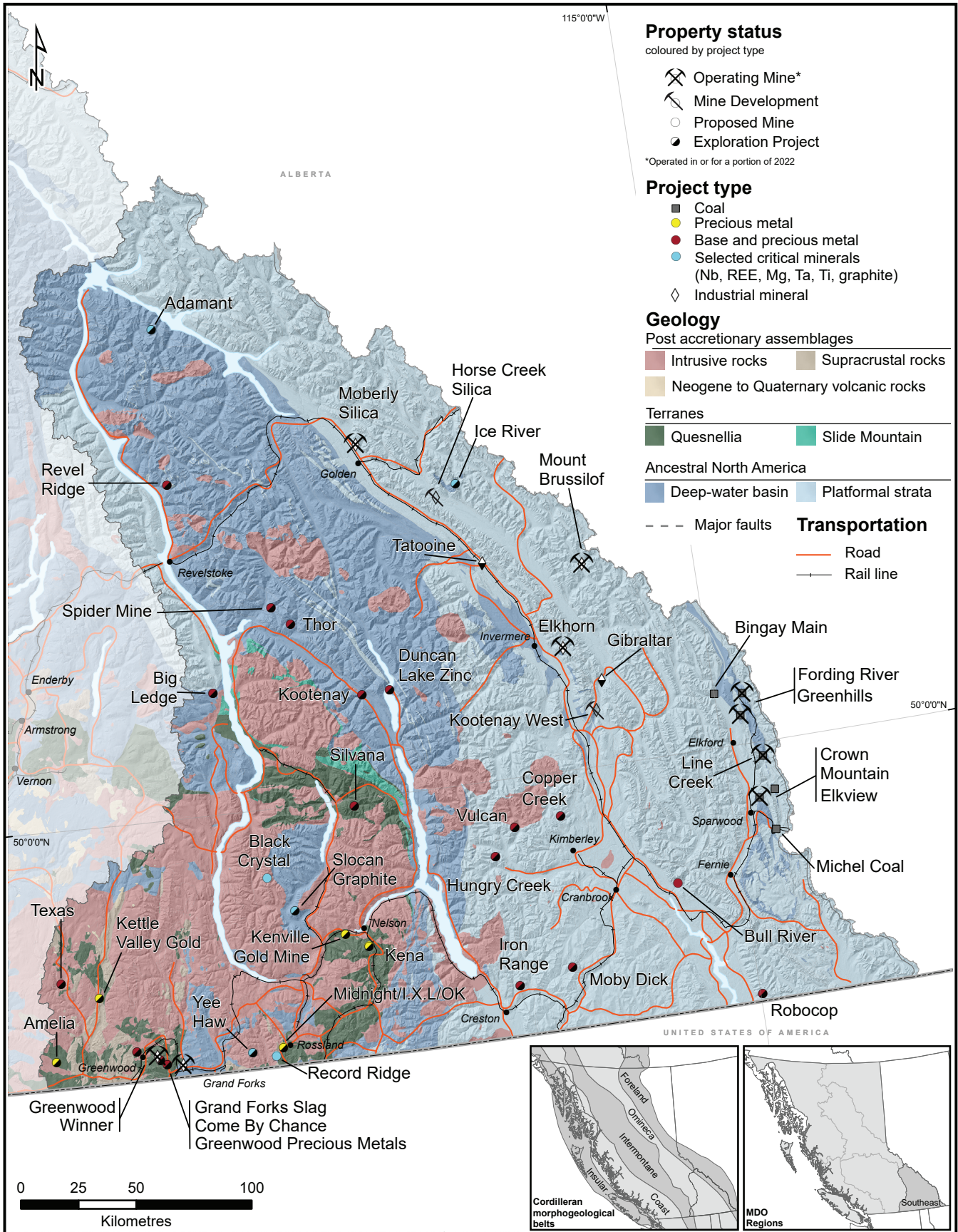


Fig. 1. Mines and selected exploration projects, Southeast Region, 2022. Terranes after Nelson et al. (2013).

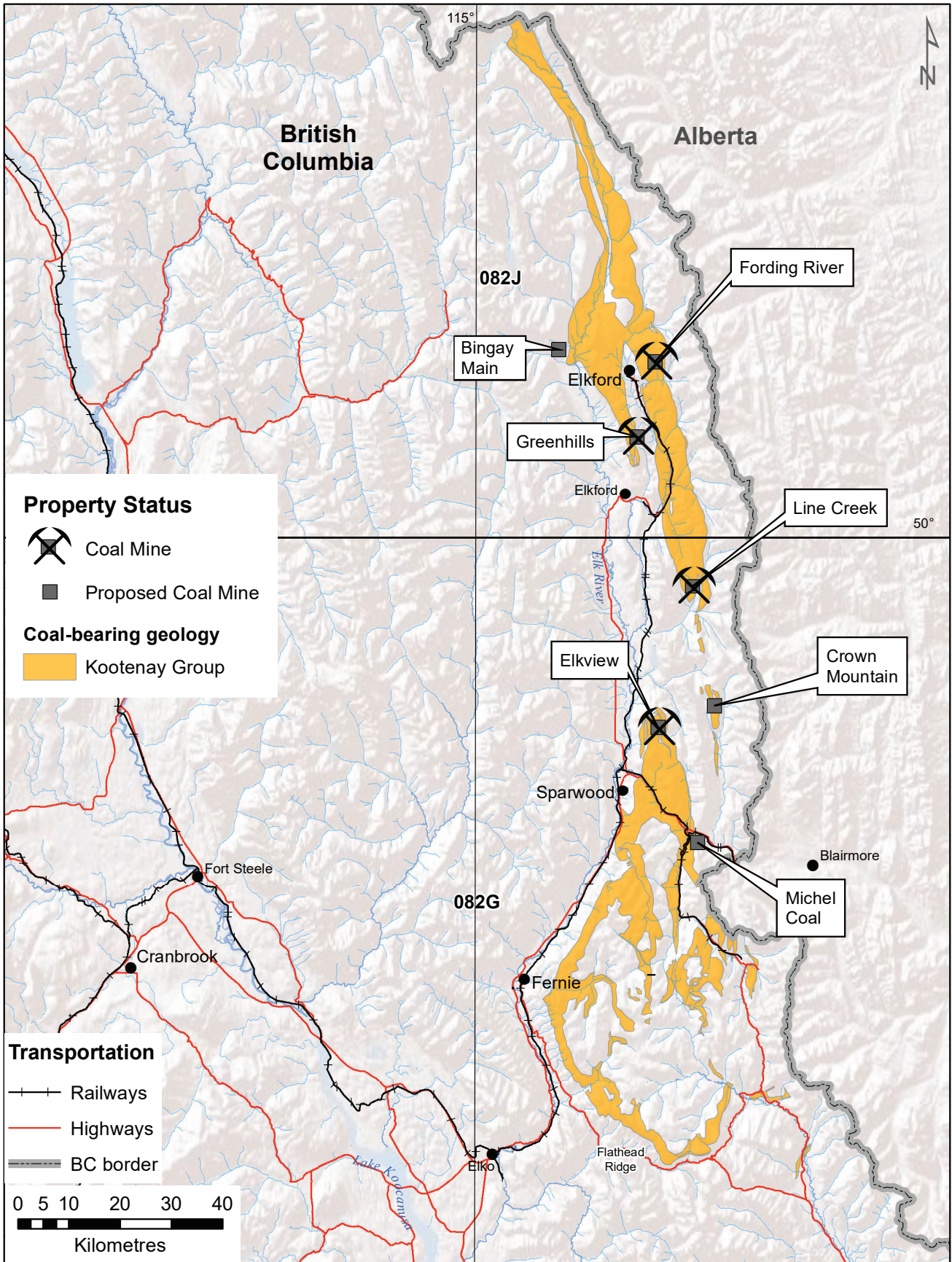


Fig. 2. Map of the Kootenay Group and East Kootenay coalfields, including the major coal mines and projects in southeastern British Columbia.

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

Mine	Operator (partner)	Commodity; Deposit type; MINFILE	Forecast 2022 Production (based on Q1-Q3)	Reserves	Resource	Comments
<b>Elkview</b>	<b>Teck Coal Limited 95%</b> ; Nippon Steel & Sumitomo Metal Corporation, 2.5%; POSCO, 2.5%	HCC; Bituminous coal; 082GNE016, 17	5.4 Mt	na	na	Teck estimates a remaining reserve life of approximately 29 years at the current production rate.
<b>Fording River</b>	<b>Teck Coal Limited</b>	HCC; Bituminous coal; 082JSE012	8.2 Mt	na	na	The focus for development in 2022 was the Fording River Extension project. Proven and Probable reserves sufficient for 27 years mine life; increase to 47 years including the Fording River Extension project.
<b>Greenhills</b>	<b>Teck Coal Limited, 80%</b> ; POSCO Canada Limited ('POSCAN'), 20%	HCC; Bituminous coal; 082JSE007, 10	6.3 Mt	na	na	Proven and Probable reserves are projected to support another 46 years of mining at planned production rates.
<b>Line Creek</b>	<b>Teck Coal Limited</b>	HCC, TC; Bituminous coal; 082GNE020	3.4 Mt	na	na	Proven and Probable reserves at Line Creek are projected to support planned production rates for a further 14 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

sales (2022) of 16.6 Mt. Mine operations at Teck's Elkview operation suffered a major failure of the in-pit conveyor system in September that resulted in a roughly one month modification of operations, with a 1.5 Mt projected loss of production. Additionally, labour issues at Westshore Terminals for two weeks also impacted coal sales, though this was partly mitigated with transfer of material through the Neptune port.

### 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 29 years.

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

The **Fording River** mine, which extends across 13,000 ha of coal lands, produces metallurgical coal and minor thermal coal. The current annual production capacity of the mine is 9 Mt; the preparation plant has a capacity of 9.5 Mt. In 2022, production continued from the Eagle Mountain and Swift pits. The focus for development and drilling in 2022 was the Fording River Extension project. Teck also did exploration drilling and large-diameter core drilling, in their producing pits. Proven and

Probable reserves at the mine are sufficient for a 27-year mine life and, if the Fording River Extension project is included, a 47-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. Mainly metallurgical coal is produced although some thermal coal is mined. The current 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 46 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 14 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 2022 Production (based on Q1-Q3)	Reserves	Resource	Comments
<b>Elkhorn</b>	<b>CertainTeed Gypsum Canada Inc.</b>	Gypsum; Bedded gypsum; 082JSW021	na	na	na	Elkhorn site nearing end of mine life. Operations will be transferred to the developing Kootenay West site.
<b>Grand Forks Slag</b>	<b>Pacific Abrasives and Supply Inc.</b>	Slag; Tailings; 082ESE264	na	na	na	Seasonal operation.
<b>Moberly Silica</b>	<b>Vitreo Minerals Ltd.</b>	Silica; Industrial silica; 082N 001	About 60 kt product on contract for sales through 2022	na	na	About 200 kt of stockpiled material on site from 2019 mining operations. No mining in 2022.
<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 operation.

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, allowing the mine to continue production until 2023. Production will be transferred to the developing Kootenay West mine in 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 was stockpiled. The company began contract sales of 60,000 t in the summer of 2021 and continued through 2022. 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 2022, 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

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

Project	Operator (partner)	Commodity; Deposit type; MINFILE	Reserves	Resource	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. 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)	Pre-stripping and Pre-production mining, mine road construction, environmental mitigation; planned 400,000 tpy; 43-year mine life.

seasonal quarry in Mount Wilson orthoquartzites. In 2022, 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.

## 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. Some pre-strip and pre-production extraction work was done as well. 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. Mining operations will begin in 2023 and 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 graphite 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 further refurbishment of all surface facilities. The company completed a ground management plan to advance the mine permit process. The mine permit and environmental permit process ongoing.

#### 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 intrusion syenites, quartz-poor monzonites, and granodiorite to the west and faulted against andesite and basalt of the Elise Formation to the east.

The company drilled one 35 m hole. The company amended its ongoing application for a Mines Act permit and completed a pre-feasibility study for the project.

### 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 proposed mine has a production capacity of 3.7 Mt per year for 16 years.

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

The **Michel Coal** project proposed by North Coal Limited 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. In December, the Tobacco Plains Indian Band, Pacific Road Capital and North Coal Limited signed a letter of intent centred around the principles of co-ownership, co-management, and co-governance for the project.

### 6.3. Selected proposed critical mineral (graphite) mine

#### 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 2022.

Table 4. Selected proposed mines, Southeast Region.

Project	Operator (partner)	Commodity; Deposit type; MINFILE	Reserves	Resource	Comments
<b>Bingay</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 1 Mty 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 1.35% fixed carbon  Inf: 23.92 Mt 1.3% fixed carbon (2018)	Active mine lease. No work reported for 2022.
<b>Bull River</b>	<b>Braveheart Resources Inc.</b>	Cu, Au, Ag; Cu±Ag quartz veins; 082GNW002	na	I: 2.26 Mt 1.80% Cu 0.42 g/t Au 15.3 g/t Ag  Inf: 1.36 Mt 1.60% Cu 0.42 g/t Au 13.6 g/t Ag	Further surface facilities refurbishment. Ground control plan provided to advance mine permit process.
<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 Mtpy operation (86% HCC and 14% PCI) with 15-year mine life.
<b>Michel Coal</b>	<b>North Coal Limited</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.
<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	35 m drill hole, pre-feasibility study.

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

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

## 7. Selected exploration activities and highlights

In 2022, 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. Amelia (Ximen Mining Corp.)

Ximen Mining Corp. completed a helicopter-borne lidar and photographic survey at its **Amelia** property. A drone-mounted magnetic survey was also completed. The surveys covered an area of 8 km<sup>2</sup>. Mineralization at Amelia is in the Cariboo/McKinney vein, which contains white quartz and disseminated to massive pyrite with lesser sphalerite, galena, chalcopyrite, and rare tetrahedrite and pyrrotite. Visible native gold is locally prominent.

#### 7.1.2. Greenwood Precious Metals (CanXGold Mining Corp.)

In September, the company began drilling at the Phoenix targets of its **Greenwood Precious Metals**. The Phoenix targets were identified by helicopter-borne VTEM and magnetic geophysical surveys completed in 2021. Three holes were drilled for a total of 968 m. Bedrock includes Bonanza Group (Mesozoic) volcanic rocks and limestones that overlie Knob Hill complex (Paleozoic) metasedimentary rocks that include chert and graphitic argillite. Some trachyte dikes and/or sills are also present. Extensive and complex skarn alteration of Brooklyn Group carbonate and adjacent rocks are the main source of gold-silver-copper mineralization. The company's adjacent Lexington mine project is currently on care and maintenance.

#### 7.1.3. Kena (West Mining Corp.)

West Mining Corp. continued exploration at their **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 of the Silver King intrusion and well-foliated, pyritic intermediate volcanic rocks of the Elise Formation. In 2022, the company had composite drill core samples from the Kena Gold zone and the Gold Mountain zone drilled in 2021 examined for crushing, milling, and recovery characteristics. Results indicate the mineralization is amenable to whole-ore cyanidation and sulphide flotation processes. Additionally, property work comprised drilling of 9 DDH holes for a total of 2400 m at the Gold Mountain zone.

#### 7.1.4. Kenville Gold Mine (Ximen Mining Corp.)

Ximen Mining Corp. continued mine rehabilitation at its **Kenville Gold Mine** project. Site facility structures and portal support materials, plus many ancillary items are being acquired. Mine permitting is ongoing. The company preformed rock sampling and volume surveying of the dumps at the Protection

and Wilcox mines, southeast of Kenville mine. The Wilcox samples yielded 2.39 g/t Au and the Protection dump samples yielded an average grade of 9.5 g/t Au, 47.5 g/t Ag, 1.13% Pb, and 1.37% Zn. A small soil sampling survey was done in an area immediately southeast of the Kenville mine and 36.4 km<sup>2</sup> of lidar surveying was carried out over the historic mine site and surrounding area.

#### 7.1.5. Kettle Valley Gold (Goldcliff Resource Corporation)

Goldcliff Resource Corporation drilled 5 holes totalling 1500 m to test geochemical anomalies at their **Kettle Valley Gold** project. The best reported assay was 1.5 m grading 1.272 g/t Au and 11.42 g/t Ag. Other work included rock sampling and prospecting. One composite sample of galena-rich quartz yielded 170 g/t Ag, and 0.065 g/t Au along with elevated values of Pb, Bi, Te, and Mo. A second similar quartz-rich sample yielded 88.5 g/t Ag with elevated Pb, Bi, Te, and Mo. Mineralization is hosted in quartz-carbonate altered Eocene rhyolitic volcanic rocks of the Marron Formation and in dioritic rock.

#### 7.1.6. Midnight/I.X.L./OK (West High Yield Resources Ltd.)

The company drilled 41 holes for 6202 m on its **Midnight/I.X.L./OK** property near Rosslund. Drilling was divided into two sets of holes. The first set was focussed on near-surface targets (0- 200m depth) southeast and east of the historical high-grade Baker Vein, near a listwanite (quartz-carbonate-serpentine) zone that straddles an east-northeast trending fault juxtaposing an ultramafic intrusion and predominantly Jurassic andesites. The second set was focussed on targets of depths of 200-600 m, below the Baker vein. Multiple high-grade precious metals intersections were made, several with visible gold. Selected assay highlights from early results of typically 1.5 m sample intervals yielded grades of 38.4, 36.1, 22.6 and 20.7 g/t Au. Highlights from a later release included 1.5 m grading 15.7 g/t Au, 2.9 g/t Ag and 1.05 m grading 33.7 g/t Au, 3.5 g/t Ag.

## 7.2. Selected porphyry project

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

Belmont completed a six-hole, 2304 m drilling program that focussed on the Betts, Iron Chief and Lady M zones of their **Come-By-Chance** project where 2021 geophysical surveying identified anomalies coincident with high-grade copper-gold grab sampling results. Drilling intersected notable propylitic alteration zones and intervals with up to 20% pyrite. Belmont interprets results possibly indicating proximity to porphyry-style mineralization. Some molybdenum mineralization was identified. Further sampling and mapping were done in the fall. 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.



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

<b>Project</b>	<b>Operator (partner)</b>	<b>Commodity; Deposit type; MINFILE</b>	<b>Resource (NI 43- 101 compliant unless indicated otherwise)</b>	<b>Comments</b>
<b>Adamant</b>	<b>Eagle Plains Resources Ltd.</b>	REE; Nepheline Syenite; 082M 173	na	Silt sampling, geological mapping, channel samples, metallurgical studies.
<b>Amelia</b>	<b>Ximen Mining Corp.</b>	Au; Polymetallic veins Ag-Pb-Zn±Au; 082ESW020	na	LIDAR, airborne photogrammetry, airborne magnetic survey.
<b>Big Ledge</b>	<b>Stuhini Exploration Ltd.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb- Ag; 082LSE012	Inf: 100 Mt 4% Zn (1980, non- compliant)	Airborne TDEM, magnetic.
<b>Come-By-Chance (CBC)</b>	<b>Belmont Resources Inc.</b>	Cu, Au; Porphyry, Skarn; 082ESE261	na	6 DDH 2304 m, mapping, sampling. Belmont interprets results possibly indicating proximity to porphyry-style mineralization.
<b>Copper Creek</b>	<b>DLP Resources Inc.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb- Ag	na	1 DDH 386 m.
<b>Duncan Lake Zinc</b>	<b>Rokmaster Resources Corp.</b>	Zn, Pb, Ag; Mississippi Valley- type Pb-Zn; 082KSE023	na	3 DDH 681 m.
<b>Greenwood</b>	<b>Grizzly Discoveries Inc.</b>	Cu; Cu skarn; 082ESE034	na	15 DDH 3123 m total: 4 DDH 1014 m (Dayton), 9 DDH (Motherlode), 2 DDH 387 m (Marguerite), rock and soil sampling.
<b>Greenwood Precious Metals</b>	<b>CanXGold Mining Corp.</b>	Au, Cu; Au-quartz veins, Porphyry Cu±Mo±Au; 082ESE032, 41	na	3 DDH 698 m (Phoenix).
<b>Hungry Creek</b>	<b>DLP Resources Inc.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb- Ag; 082FSE110	na	5 DDH 1442 m (711), 1 DDH 3786 m (Copper Creek).
<b>Ice River</b>	<b>Eagle Plains Resources Ltd.</b>	REE; Nepheline syenite; 082N 028	na	Mapping, rock & soil sampling.
<b>Iron Range</b>	<b>Private company</b>	Pb, Zn, Ag; Iron oxide breccias & veins±P±Cu±Au± Ag±U, Polymetallic veins Ag-Pb- Zn±Au; 082FSE014	na	4 DDH 2618 m
<b>Kena</b>	<b>West Mining Corp.</b>	Au; Alkalic, Porphyry Cu-Au; 082FSW237	na	9 DDH 2400 m; metallurgical testing.

Table 5. Continued.

<b>Kenville Gold Mine</b>	<b>Ximen Mining Corp.</b>	Au; Au-quartz veins; 082FSW086	na	Ongoing mine rehabilitation, material acquisition, rock sampling, dump volume surveys. Samples from dump at former Protection mine returned an average grade of 9.5 g/t Au, 47.5 g/t Ag, 1.13% Pb, and 1.37% Zn; sample from former Wilcox mine dump with 2.39 g/t Au.
<b>Kettle Valley Gold</b>	<b>Goldcliff Resources Corporation</b>	Au; Au-quartz veins	na	5 DDH 1500 m; rock sampling, prospecting. One composite sample of galena-rich quartz assayed 170 g/t Ag and 0.065 g/t Au, another 88.5 g/t Ag.
<b>Kootenay</b>	<b>Wealth Minerals Ltd.</b>	Au; Polymetallic veins Ag-Pb-Zn±Au; 082KSW088	na	Prospecting, rock sampling.
<b>Midnight/I.X.L./OK</b>	<b>West High Yield Resources Ltd.</b>	Au; Polymetallic veins Ag-Pb-Zn±Au; 082FSW119	na	41 DDH 6202 m. Selected early results: 1.5 m with 15.7 g/t Au and 2.9 g/t Ag, and 1.05m with 33.7 g/t Au and 3.5 g/t Ag.
<b>Moby Dick</b>	<b>DLP Resources Inc.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb-Ag	na	1 DDH 1305 m, hole abandoned.
<b>Regional Project 2 (Spider Mine)</b>	<b>New Gold Inc.</b>	Polymetallic veins Ag-Pb-Zn±Au; 082KNW045	na	Soil geochemistry, rock sampling, mapping, structural analysis.
<b>Revel Ridge</b>	<b>Rokmaster Resources Corp.</b>	Pb, Zn, Ag; Irish-type carbonate-hosted Zn-Pb; 082M 003	M+I: 6.7 Mt 50 g/t Ag, 3.69 g/t Au, 1.93% Pb, 3.68% Zn  Inf: 6 Mt 37 g/t Ag, 4.7 g/t Au, 1.19% Pb, 2.2% Zn (2021)	14 DDH (10 underground, 4 surface); rock and soil sampling, stream sampling. Selected highlights: Main zone 4.35 m grading 2.57 g/t Au, 17.11 g/t Ag, 0.66% Pb, and 1.94% Zn; Yellowjacket zone 4.45 m grading 0.01 g/t Au, 5.32 g/t Ag, 0.06% Pb, and 0.87% Zn.
<b>Robocop</b>	<b>Grizzly Discoveries Inc.</b>	Co; Polymetallic veins Ag-Pb-Zn±Au; 082GSW019	na	Mapping; rock sampling.
<b>Silvana Mine</b>	<b>Klondike Silver Corp.</b>	Polymetallic veins Ag-Pb-Zn±Au; 082FNW050	na	Underground drilling.
<b>Slocan Graphite</b>	<b>Aben Resources Ltd.</b>	Graphite; Crystalline flake graphite; 082FNW285	na	Mapping; rock and soil sampling.
<b>Tatooine Silica</b>	<b>Homerun Resources Inc.</b>	Silica; Silica sandstone; 082KNE012	na	Acquisition. High purity silica (SiO <sub>2</sub> ) quarry development. Historical (1964) sample: 98.66% SiO <sub>2</sub> , 0.47% Al <sub>2</sub> O <sub>3</sub> , 0.06% Fe <sub>2</sub> O <sub>3</sub> , and 0.08% CaO.
<b>Texas</b>	<b>Troubadour Resources Inc.</b>	Au, Ag; Polymetallic veins Ag-Pb-Zn±Au; 082ESW235	na	Mapping, rock and soil sampling, soil geochemistry, magnetic survey. Former Inyo-Ackworth mine dump selected grab sample: 6.72 g/t Au, 509 g/t Ag, 292 ppm Cu, 73,800 ppm Pb, and 2210 ppm Zn.

Table 5. Continued.

<b>Thor</b>	<b>Taranis Resources Inc.</b>	Base metals, Polymetallic manto Ag-Pb-Zn; 082KNW030	na	Mapping, rock and soil sampling, soil geochemistry, aeromagnetic survey, ground VLF survey. Ripper zone channel: 0.33 m grading 12.5 g/t Au, 1100 g/t Ag, 0.03% Cu, 14.9% Pb, and 0.10% Zn.
<b>Vulcan</b>	<b>Eagle Plains Resources Ltd.</b>	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb-Ag; 082FNE093	na	3 DDH 1700 m; aeromagnetic survey.
<b>Yee Haw</b>	<b>Lithium Corporation</b>	Ti-REE; Lamprophyric dike	na	Prospecting, hand trenching.

M = Measured; I = Indicated; Inf = Inferred

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

#### 7.3.1. Big Ledge (Stuhini Exploration Ltd.)

Stuhini Exploration Ltd. completed an airborne electromagnetic (TDEM) and magnetic survey over its Big Ledge property, covering 51 km<sup>2</sup>. Known mineralization consists of sphalerite, pyrite, pyrrhotite, galena, hosted in highly folded marble and quartzite within the Shuswap metamorphic complex of the Monashee Group (Proterozoic). Cominco previously explored the property and released a historical resource of 100 Mt grading 4% Zn in 1980.

#### 7.3.2. Copper Creek (DLP Resources Inc.)

DLP Resources drilled one 386 m hole on their **Copper Creek** property. Drilling targeted sediment hosted-stratiform copper-silver-cobalt mineralization in the middle to upper parts of the Creston Formation (Belt-Purcell basin).

#### 7.3.3. Duncan Lake (Rokmaster Resources Corp.)

Assessment work was completed on the company's **Duncan Lake** property. Three holes were wedged off former Cominco hole 97-12, for a total of 681 m drilled. Hole D22-02 intersected 34.75 m of semi-massive pyrite-sphalerite-galena mineralization that graded 7.03 g/t Ag, 1.56% Pb and 1.76% Zn, including an interval of 3.66 m grading 17.28 g/t Ag, 7.29% Pb and 4.94% Zn. The holes intersected similar intervals of lead-zinc-silver mineralization that were seen in hole 97-12.

#### 7.3.4. Hungry Creek (DLP Resources Inc.)

Following up on 2021 drilling, five holes totalling 1442 m were drilled at the '711' target on the **Hungry Creek** property. Chalcopyrite, intense sericite alteration, and carbonate alteration were observed in upper Creston Formation quartzites.

#### 7.3.5. Greenwood (Grizzly Discoveries Inc.)

Geological mapping, rock and soil sampling programs at its **Greenwood** holdings, focussed at the Motherlode and Dayton targets and the Midway and Sappho occurrences. The company completed 15 holes for a total of 3123 m. This includes 4 holes (1014 m) at the Dayton copper-gold skarn

target, 9 holes (1722 m) at the Motherlode North copper-gold-silver ±lead-zinc target, and 2 holes (387 m) at the Marguerite target. The company performed extensive grab sampling plus some soil sampling from locations across its Greenwood area holdings totalling several hundred samples. Selected rock samples from old Midway mine pits yielded results of 12.05 to 70.8 g/t Au. Selected rock samples from the Sappho occurrence yielded copper values between 1% and 9% with anomalous Au, Ag, Pt, and Pd.

#### 7.3.6. Iron Range (private company)

A private company optioned the **Iron Range** project from Eagle Plains Resources Ltd. Four holes totalling 2618 m were drilled at the project where massive to disseminated hematite with local magnetite are in the Aldridge Formation (Purcell Supergroup, Mesoproterozoic) along the north trending, subvertical Iron Range fault zone. The company targeted both iron-oxide copper-gold ('IOCG') and Sullivan-style lead-zinc-silver sedimentary-exhalative ('sedex') mineralization.

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

The company completed a helicopter-borne VTEM and magnetic survey across 5456 hectares (12,014 line-km) of its **Kootenay** project, which comprises the Goldsmith, Lardeau and Ledgend claim blocks. At Goldsmith, gold mineralization is in listwanite-altered ultramafic rocks and the area also has nickel-cobalt mineralization associated with ultramafic bodies. Ground follow up on targets identified in the geophysical survey led to the discovery of a 6 m-wide zone of massive sulphide mineralization in the Ledgend claim block. Sphalerite, hydrozincite, chalcopyrite, bornite and pyrite were visually identified in outcrop. In addition, two outcrops of sulphide mineralization, containing pyrite-pyrrhotite with minor chalcopyrite and sphalerite, were located on the Goldsmith block. The showings coincide with geophysical anomalies and previous geochemical soil sampling anomalies.

#### 7.3.8. Moby Dick (DLP Resources Inc.)

The company drilled one hole at its **Moby Dick** property.

Ground problems at 1200 m depth led to a re-drill off a downhole wedge placed at 1150 m, which also had to be abandoned. The hole was in Middle Aldridge Formation sedimentary rocks with weak pyrrhotite mineralization and intense sericite alteration with trace tourmaline.

### 7.3.9. Regional Project 2 (Spider Mine) (New Gold Inc.)

New Gold Inc. conducted a regional exploration program on its mineral holdings in the Incomappleux River area, along Poole Creek, that includes the historical mines **Spider**, **Meridian**, **Cholla**, **Eva**, and **Criterion-Oyster**. New Gold completed a reconnaissance program of soil geochemistry, rock sampling, geological mapping and detailed structural analysis, and petrography, and completed an airborne lidar survey. Lardeau Group (Cambrian-Devonian) metasedimentary rocks, consisting mostly of thinly laminated phyllites and argillites of the Broadview Formation, underlie the property.

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

At the **Revel Ridge** project, 14 holes (10 underground and 4 surface) totalling 4803 m were completed, primarily testing extension of mineralization at the Main and Yellowjacket zones. Highlights from the Main zone include 4.35 m grading 2.57 g/t Au, 17.11 g/t Ag, 0.66% Pb, and 1.94% Zn and the Yellowjacket zone 4.45 m grading 0.01 g/t Au, 5.32 g/t Ag, 0.06% Pb, and 0.87% Zn.

The company also completed mapping, prospecting, and geochemical sampling across the property. A total of 62 channel samples, 91 rock samples, 562 soil samples, and 70 stream sediment samples were taken. In January 2022, the company released an updated mineral resource estimate that included 2021 drilling results. Current to November 2021 the company reported a Measured and Indicated resource of 6.734 Mt grading 50 g/t Ag, 3.69 g/t Au, 1.93% Pb, and 3.68% Zn, an Inferred resource of 5.996 Mt grading 37 g/t Ag, 4.7 g/t Au, 1.19% Pb, and 2.2% Zn.

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).

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

Grizzly Discoveries Inc. completed geological mapping, rock sampling, and geophysical surveys at its **Robocop** property. The company is waiting on permits for drilling.

### 7.3.12. Silvana mine (Klondike Silver Corp.)

The company recommenced exploration at its **Silvana mine** project near Sandon. The company did underground drifting for a drill station and completed one hole that intersected the 'Main lode'. The mine formerly produced from the Main lode,

an extensive structure that yielded silver, zinc, and lead. The Silvana mine is hosted by predominantly interbedded black argillite and medium to dark grey quartzite and argillaceous quartzite of the Slocan Group. Silver-lead-zinc mineralization is hosted in a structurally bound carbonate-quartz breccia.

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

The company completed property-wide exploration with detailed work at the Golden Bug, Golden Eagle, Midnight and Doorn showings at its **Texas** property. This work included geological mapping, rock and soil geochemical sampling and magnetic surveys. Packsack drilling was done at the Golden Bug for representative core samples. A selected core sample yielded 5.5 g/t Au along 70 cm, which corroborates a chip sample from 2020 that returned 8.19 g/t Au along 1.0 m. The past-producing Inyo-Ackworth mine on the claims recovered silver, gold, lead, and zinc from vuggy quartz-calcite veins that carried galena, native silver, sphalerite, tetrahedrite, and pyrite. A selected grab sample from the old dump yielded 6.72 g/t Au, 509 g/t Ag, 292 ppm Cu, 73,800 ppm Pb, and 2210 ppm Zn. 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.

### 7.3.14. Thor (Taranis Resources Inc.)

The company completed geological mapping, rock and soil sampling, helicopter-borne magnetic and electromagnetic surveys, a ground VLF survey, and drilling on its **Thor** project. Seven drill holes totaling 844 m were completed at the Thunder zone. A new showing near the Thunder zone, referred to as the 'Ripper fault', exposed bonanza-type mineralization. The structure appears to connect several known mineral showings on the property. Selected channel samples from Ripper included 0.33 m grading 0.26 g/t Au, 52.7 g/t Ag, 0.03% Cu, 0.291% Pb, 0.12% Zn and 0.33 m grading 12.5 g/t Au, 1100 g/t Ag, 0.03% Cu, 14.9% Pb, and 0.10% Zn. The property is underlain mostly by Cambrian to Devonian carbonate and fine-grained sedimentary rocks of the Lardeau Group. From stratigraphic bottom to top, the section includes black siliceous of the Sharon Creek Formation, mafic volcanic rocks of the Jowett Formation, and coarse siliciclastic sedimentary rocks of the Broadview Formation. Mineralization generally appears spatially related to the Jowett Formation system at depth.

### 7.3.15. Vulcan (Eagle Plains Resources Ltd.)

Early in the year, the company completed a 537 line-km high-resolution aeromagnetic survey at **Vulcan**. Subsequently, a three-hole, 1700 m drill program was completed. Disseminated sulphides and thin massive sulphide layers were intersected in the Alldridge Formation. Down-hole electromagnetic surveys were done upon completion of each hole. Drilling targeted sedex silver-lead-zinc mineralization at the transition between the lower and middle parts of Alldridge Formation such as found at the historical Sullivan mine.

## 7.4. Selected REE, Ti, Nb and graphite projects

### 7.4.1. Adamant (Eagle Plains Resources Ltd.)

The company completed silt sampling, geological mapping, channel sampling, and mineralogical studies. REE mineralization at **Adamant** (previously known as Trident Mountain) is in a nepheline syenite and carbonatite dike system. The Late Devonian dikes intrude psammatic and kyanite-bearing pelitic schists of the Horsethief Creek Group (Neoproterozoic).

### 7.4.2. Ice River (Eagle Plains Resources Ltd.)

The company completed mapping and rock and soil sampling in both areas of known REE mineralization and at previously identified exploration targets. Limestone of the Ottertail Formation (Cambrian) is cut by nepheline syenite of the **Ice River** complex (Devonian or Carboniferous).

### 7.4.3. Slocan Graphite (Aben Resources Ltd.)

A property-wide field reconnaissance, geological mapping, soil and rock sampling program was done on the **Slocan Graphite** property. Graphite mineralization is hosted primarily in carbonate and calc-silicate rocks in the Passmore dome of the Valhalla metamorphic complex. Based on field observations, the company staked additional claims to expand the property. The project is near Eagle Graphite Corporation's flake graphite processing facility.

### 7.4.4. Yee Haw (Lithium Corporation)

Lithium Corporation completed a small program of hand trenching and prospecting at the **Yee Haw** titanium-REE showings related to lamprophyric dikes previously examined in 2017. The property appears to be underlain by Eocene rocks of the Coryell intrusion, including syenites, quartz-poor monzonites, and granodiorites.

## 7.5. Selected industrial mineral projects

### 7.5.1. Tatoonie Silica (Homerun Resources Inc.)

Homerun purchased an option to acquire 100% of the Brisco silica property and adjacent claims and have renamed it the **Tatoonie Silica** project. The company intends to develop the property as a high-purity silica operation. The silica is in a 60-90 m thick quartzite bed in the Mount Wilson Formation (Ordovician). Previous work yielded a typical sample grading 98.66% SiO<sub>2</sub>, 0.47% Al<sub>2</sub>O<sub>3</sub>, 0.06% Fe<sub>2</sub>O<sub>3</sub>, and 0.08% CaO (1964).

## 8. Geological research

Taerum (2022) interpreted that regionally developed normal faults in the eastern Main Ranges, hitherto considered to have formed from transtension during Cenozoic contraction, to be reactivated structures that originated during Paleozoic rifting and opening of the Slide Mountain ocean. Working in the British Columbia alkaline province, Burgess et al. (2022) obtained ultra-precise perovskite dates from the Ice River alkaline intrusive complex province and evaluated the

suitability of the Ice River perovskite as a U-Pb age reference material, and Piilonen et al. (2022) described a sodalite-bearing carbohydrothermal breccia that hosts a suite of rare and unique Ba-Sr-REE minerals at Mount Mather Creek. Paradis et al. (2022a, b) reviewed carbonate-hosted deposits in the southeastern Cordillera, Simandl et al. (2022) examined rare-earth elements of carbonate minerals in sediment-hosted Pb-Zn deposits, and Araoka et al. (2022) considered the origin of carbonate-hosted REE-F-Ba at the Rock Canyon Creek deposit, using Mg-Sr isotopes in dolomite, calcite, and fluorite. Kuppasamy and Holuszko (2022) presented geochemical analyses of coal samples as a step in developing a rare-earth element database for the East Kootenay coalfield.

## 9. Summary

Companies have been able to obtain financing for fieldwork. Exploration has been varied across a spectrum of commodities, including precious and base metals, critical minerals, industrial minerals, and coal. Industrial minerals production has remained steady. Coal prices were high during the year and demand for metallurgical coal remains strong.

## Acknowledgments

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