

# Exploration and mining in British Columbia, 2018:

## A summary



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### 1. Introduction

Reflecting its complex geological history, British Columbia is endowed with diverse minerals and deposit types. 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. An increase in commodity prices early in 2018 meant numerous mineral exploration projects remained active in 2018 (Fig. 1).

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.

This summary uses information from the British Columbia Coal Industry Overview (British Columbia Geological Survey Information Circular 2019-02) and incorporates the Regional Geologist reports 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.

### 2. Mine production

The Ministry of Energy, Mines and Petroleum Resources forecasts the total value of mine production for 2018 at \$10.93 billion (Fig. 3) including coal, copper, gold, industrial minerals, aggregate, molybdenum, and silver. This is an increase of \$2.09 billion over the 2017 preliminary NRCan estimate of \$8.84 billion (Fig. 4). The increase is mostly due to an increase in coal and copper production, and higher commodity prices, particularly for coal and copper and, to a lesser degree, gold. However, the price of copper dropped during the year, from a peak of more than \$3.20 per pound to \$2.71 per pound at years end. As in previous years, coal was the highest value mine

product (58%) followed by copper (25%).

In 2018, eleven metal mines operated during at least part of the year (Fig. 1; Table 2). Coal was produced at five large open-pit operations in the southeastern part of the province, three open-pit operations in the northeastern part of the province and one underground mine on Vancouver Island (Fig. 1; Table 3). About 30 industrial mineral mines and more than 1000 aggregate mines and quarries were in operation.

### 3. Mining highlights

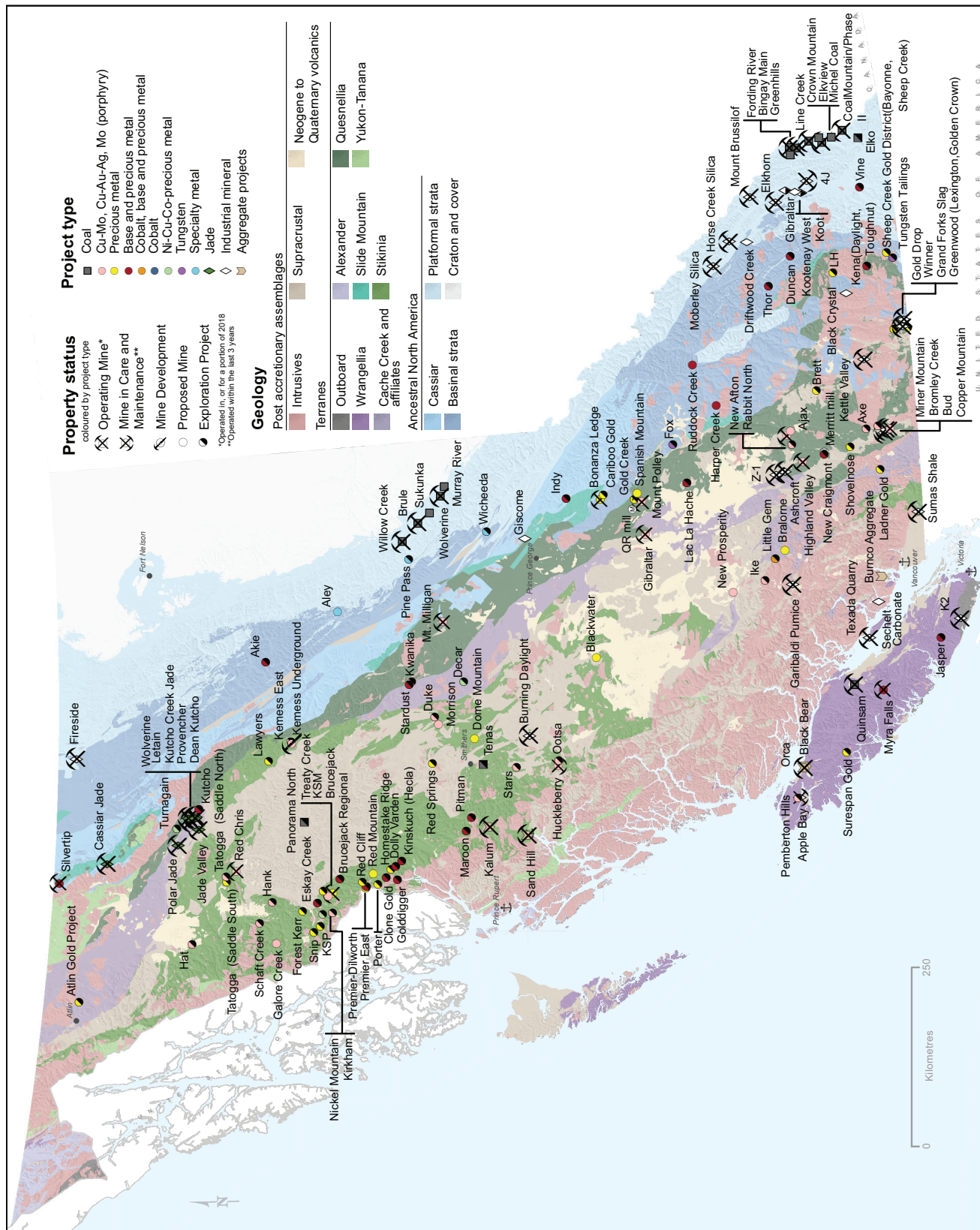
#### 3.1. Metal mines

Metal mines accounted for \$3.83 billion (forecast) of all mine production in 2018, representing about 35% of total output (Fig. 3). Eleven mines were producing in 2018.

In the Northwest Region, steady production was announced for the **Brucejack** mine. For the first three quarters ending September 30<sup>th</sup>, production totalled 279,670 oz Au and 308,676 oz Ag from 738,555 t of ore grading 12.0 g/t Au. Gold recoveries averaged 97.4%. In December 2018, Pretium Resources Inc. received approval from the British Columbia Ministry of Energy, Mines and Petroleum Resources and Ministry of Environment and Climate Change Strategy to increase production from 2700 tpd to 3800 tpd. Also in the Northwest Region, Imperial Metals Corporation reported that production from the **Red Chris** copper-gold mine to the end of the 3<sup>rd</sup> quarter totalled 44.78 Mlbs Cu and 29,569 oz Au from 7.93 Mt of ore grading 0.34% Cu and 0.25 g/t Au. Metal recoveries averaged 75.39% for Cu and 45.82% for Au.

In the North Central Region, the **Mt. Milligan** open-pit copper-gold mine was in its sixth year. Production to the end of the 3<sup>rd</sup> quarter totalled 35.3 Mlb of Cu and 134,722 oz Au from 9.80 Mt of ore grading 0.21% Cu and 0.69 g/t Au. Metal recoveries averaged 81.10% for Cu and 63.5% for Au.

In the South Central Region, operating mines included **Bonanza Ledge**, **Copper Mountain**, **Gibraltar**, **Highland Valley**, **Mount Polley** and **New Afton**. As of December 2018, Barkerville Gold Mines Ltd. mined 120,000 t at a diluted grade of 6.65 g/t Au from **Bonanza Ledge**. Initial life-of-mine is a planned 3.5 years at 150,000 tpy, but there is exploration



**Fig. 1.** Mines, mine development, selected proposed mines, and selected exploration projects in British Columbia, 2018. Based on Clarke et al., 2019, British Columbia Geological Survey Open File 2019-01.



Fig. 2. Geographic regions and Regional Geologist offices.

potential. Ore is trucked to Barkerville's QR mill, which is permitted for up to 875 tpd. They reported throughput up to 800 tpd and 91.6% recovery, which may improve with recommissioning of a gravity circuit.

Copper Mountain Mining Corporation reported that production at **Copper Mountain** to the end of the 3<sup>rd</sup> quarter totalled 58.2 Mlbs Cu, 20,100 oz Au and 211,200 oz Ag from 10.66 Mt of ore grading 0.31% Cu at 79.4% recovery. An exploration program at the mine site continued in 2018, with four holes in the east wall of Pit 3. Northwest of current mining at New Ingerbelle, a second phase of drilling included 10,616 m in 29 holes. The Measured and Indicated resource estimate for New Ingerbelle stands at 151.3 Mt 0.29% Cu and 0.18 g/t Au, applying a 0.16% Cu cut-off, or 195.6 Mt 0.26% Cu and 0.16 g/t Au applying a 0.12% Cu cut off. A base-case preliminary economic assessment indicated favorable economics using the existing mill.

The **Gibraltar** mine reported production to the end of the 3<sup>rd</sup> quarter totalled 99.4 Mlb of Cu and 1.64 Mlb Mo from 22.9 Mtons of ore. For the 3<sup>rd</sup> quarter a copper grade of 0.314% at a recovery of 85.9% was reported.

Table 1. Regional Geologists contact information.

Region	Community	Regional Geologist	Phone	email
Northwest	Smithers	vacant	-	-
Northeast and North Central	Prince George	John DeGrace	250-565-4316	John.Degrace@gov.bc.ca
South Central	Kamloops	vacant	-	-
Southeast	Cranbrook	Fiona Katay	250-417-6010	Fiona.Katay@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

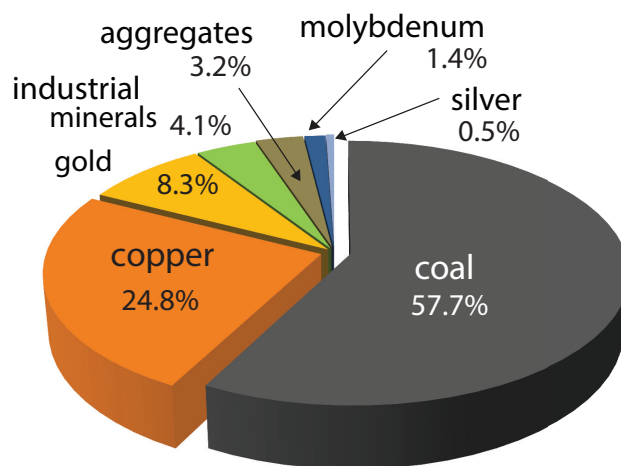


Fig. 3. 2018 forecast value of British Columbia mineral production by commodity; total is \$10.93 billion.

In the first nine months of 2018, Teck Resources Ltd.'s **Highland Valley** mine milled 36.964 Mt at a Cu grade of 0.23% and recovery of 78.9%. For the full 2018 year, the company projects 100 to 105 Mt Cu and 7.7 Mlb Mo in concentrate. Teck proposes to extend mining to the past-producing Bethlehem deposit, where it has defined about 100 Mt of ore that could feed the Highland Valley 140,000 tpd mill. An application for a first phase of development is under review with the Ministry of Energy, Mines and Petroleum Resources.

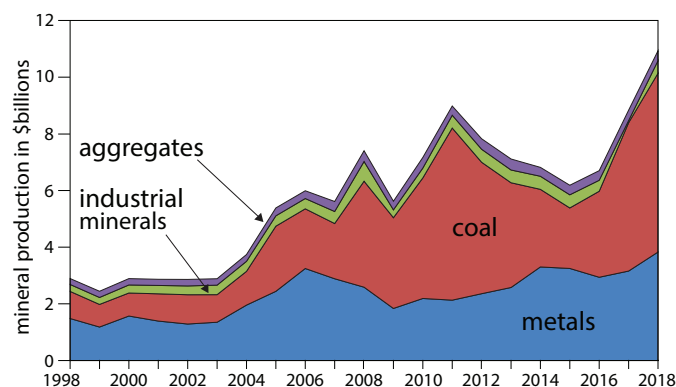


Fig. 4. Value of British Columbia mineral production by year, 1998-2018; value for 2017 is preliminary estimate, value for 2018 is forecast.



**Table 2.** Operating metal mines, 2018, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2018 Production (based on Q1- Q3)	Reserves	Resource	Comments
<b>Brucejack</b>	Northwest	<b>Pretium Resources Inc.</b>	Au, Ag; Au-quartz veins, quartz stockwork breccia, epithermal; 104B 193	372,900 oz Au, 411,600 oz Ag	P+Pr: Combined VOK zone and West zone 18.5 Mt at 14.6 g/t Au, 53.5 g/t Ag	M+I: VOK zone 16.4 Mt at 17.2 g/t Au and 15.0 g/t Ag M+I: West zone 4.9 Mt at 5.85 g/t Au and 267 g/t Ag. Resources are inclusive of reserves.	Announced steady production in 2 <sup>nd</sup> quarter. Received government approval to increase production rate to 3800 tpd from 2700 tpd.
<b>Red Chris</b>	Northwest	<b>Red Chris Development Company Ltd.</b>	Cu, Au, Ag; porphyry Cu-Au; 104H 005	59.71 Mlbs Cu, 39,425 oz Au and 102,733 oz Ag	P+Pr: 301.5 Mt at 0.36% Cu, 0.27 g/t Au	M+I: 1.035 Bt at 0.35% Cu, 0.35 g/t Au and 1.14 g/t Ag	First year of full production in 2016. Reserve and resource figures are for combined open-pit and planned underground operations and do not take into account mining since start-up.
<b>Silvertip</b>	Northwest	<b>Coeur Mining Inc.</b>	Ag, Pb, Zn, Au; polymetallic manto; 104O 038	na	na	I: 2.59 Mtons at 10.26 oz/ton Ag, 6.74% Zn, 9.41% Pb	Commercial production declared in September. Mine site drilling returned results including 11.4 m of 193.3 g/t Ag, 18.3% Zn and 3.2% Pb and located new mineralization.
<b>Mt. Milligan</b>	Northeast	<b>Centerra Gold Inc. (Centerra B.C. Holdings)</b>	Cu, Au, Ag; alkalic porphyry Cu-Au; 093N 194, 191	40-47 Mlbs Cu, 175- 195 Koz Au	P: 236.5 Mt at 0.187% Cu and 0.424 g/t Au Pr: 239.4 Mt at 0.188% Cu and 0.293 g/t Au	M+I: 243.9 Mt at 0.16% Cu and 0.2 g/t Au (additional to reserves)	Concentrator design capacity 62,500 tpd. Estimated mine life 22 years. More than 350 employees.
<b>Bonanza Ledge</b>	South Central	<b>Barkerville Gold Mines Ltd.</b>	Au; Au- quartz veins; 093H 140	120,000 t at 6.65 g/t Au diluted (as of December)	na	M: 264,000 t 7.3 g/t Au I: 508,300 t 6.2 g/t Au Inf: 173,400 t 4.6 g/t Au	Long hole and cemented rock fill.



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, alkaline; 092HSE001	80 Mlb Cu, 27,500 oz Au, 300,000 oz Ag (management's guidance)	P+Pr: 210,079 Kt 0.26% Cu, 0.08 g/t Au, 0.89 g/t Ag	M+I: 322,755 Kt 0.26% Cu, 0.08 g/t Au, 1.05 g/t Ag Inf: 111,855 Kt 0.21% Cu, 0.08 Au, 0.63 g/t Ag	Resources inclusive of reserves. Excludes New Ingerbelle: M+I: 195,647 Kt 0.26% Cu, 0.16 g/t Au, 0.50 g/t Ag Inf: 93,459 Kt 0.23% Cu, 0.14 g/t Au, 0.43 g/t Ag.
<b>Gibraltar</b>	South Central	<b>Taseko Mines Limited 75%, Sojitz Corp. 12.5%, Dowa Holdings Co. Ltd. 6.25%, Furukawa Co. Ltd. 6.25%</b>	Cu, Mo; porphyry Cu+/- Mo+/-Au; 093B 012	130 Mlb Cu+Mo (management's guidance)	P+Pr: 668 Mtons 0.26% Cu, 0.008% Mo	M+I: 1011 Mtons 0.25% Cu, 0.008% Mo	Resources inclusive of reserves.
<b>Highland Valley</b>	South Central	<b>Teck Resources Limited</b>	Cu, Mo; porphyry Cu+/- Mo+/-Au; 092ISW012, 45	102,500 t Cu, 3266 t Mo (management's guidance)	P+Pr: 589.5 Mt 0.300% Cu, 0.007% Mo	M: 488.4 Mt 0.31% Cu, 0.009% Mo I: 882.6 Mt 0.23% Cu, 0.009% Mo Inf: 382.4 Mt 0.23% Cu, 0.007% Mo	Resources exclusive of reserves.
<b>Mount Polley</b>	South Central	<b>Imperial Metals Corporation</b>	Cu, Au, Ag; porphyry Cu-Au, alkaline; 093A 008	15.6 Mlb Cu, 39,500 oz Au (management's guidance)	P+Pr: 58.272 Mt 0.33% Cu, 0.30 g/t Au, 0.86 g/t Ag	M+I: 206.22 Mt 0.285% Cu, 0.28 g/t Au, 0.67 g/t Ag Inf: 7.519 Mt 0.308% Cu, 0.24 g/t Au, 1.66 g/t Ag	Reserves in 5 zones. Resources inclusive of reserves. Shutdown of operations announced early 2019.
<b>New Afton</b>	South Central	<b>New Gold Inc.</b>	Au, Ag, Cu; porphyry Cu-Au, alkaline; 092INE023	55,000-65,000 oz Au, 75-85 Mlb Cu (guidance) 64.3 Mlb Cu, 58.551 Koz Au, 200 Koz Ag (Q3 actual)	P+Pr: 54.867 Mt 0.61 g/t Au, 2.0 g/t Ag, 0.78% Cu	M+I: 58.038 Mt 0.63 g/t Au, 2.1 g/t Ag, 0.76% Cu Inf: 15.253 Mt 0.39 g/t Au, 1.3 g/t Ag, 0.41% Cu	A, B and C zones + HW lens resources. Resources exclusive of reserves.
<b>Myra Falls</b>	Southwest	<b>Nyrstar Myra Falls Ltd.</b> (parent company Nyrstar N.V.)	Zn, Cu, Pb, Au, Ag; Noranda/Kuroko massive sulphide; 092F 072, 330, 71, 73	na	P+Pr: 4.89 Mt 6.84% Zn, 0.75% Pb, 0.91% Cu, 71.31 g/t Ag, 1.69 g/t Au	M+I: 7.29 Mt 6.59% Zn, 0.72% Pb, 1.01% Cu, 69.71 g/t Ag, 1.76 g/t Au Inf: 0.94 Mt 9.51% Zn, 1.05% Pb, 0.83% Cu, 136.78 g/t Ag, 2.90 g/t Au	Production ramp up in 2018. Resources inclusive of reserves Dec. 31, 2017.

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

**Table 3.** Operating coal mines, 2018, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2018 Production (based on Q1-Q3)	Reserves	Resource	Comments
<b>Brule</b>	Northeast	<b>Conuma Coal Resources Limited</b>	PCI; bituminous coal; 093P 007	2.47 Mt ROM	P: 14.8 Mt saleable	na	About 230 employees. November 2018, began on- lease exploration program to extend resource base.
<b>Willow Creek</b>	Northeast	<b>Conuma Coal Resources Limited</b>	HCC, PCI; bituminous coal; 093O 008	482,000 t ROM	P: 16.1 Mt saleable	na	About 220 employees, mine and plant. Restart began in July 2018. On- lease exploration program to extend resource base.
<b>Wolverine (Perry Creek)</b>	Northeast	<b>Conuma Coal Resources Limited</b>	HCC; bituminous coal; 093P 025	1.89 Mt ROM	P: 6.9 Mt saleable	na	About 300 employees, mine and plant. December 2018. Began on-lease drill program to help set the parameters for underground mining.
<b>Coal Mountain</b>	Southeast	<b>Teck Coal Limited</b>	PCI	615,000 t clean	na	na	Mineable resource at CMO depleted in Q3 2018; reclamation begun; facilities continue to process coal trucked from Elkview mine; facilities to be placed on care and maintenance; Coal Mountain Phase II (CMO2, Marten Wheeler) would use facilities from CMO, but project currently remains on hold.
<b>Elkview</b>	Southeast	<b>Teck Coal Limited (95%); Nippon Steel &amp; Sumitomo Metal Corp. (2.5%), POSCO (2.5%)</b>	HCC	6.7 Mt clean	HCC P: 7.4 Mt Pr: 286.1 Mt	HCC M: 379.5 Mt I: 164.2 Mt Inf: 245.3 Mt	Baldy Ridge Extension (BRE) approved (2016); exploration drilling in active pits and expansion areas; coal quality testwork; P+Pr reserves expected to support approximately 42 more years at the current production rate.

Table 3. Continued.

<b>Fording River</b>	Southeast	<b>Teck Coal Limited</b>	HCC	9.0 Mt clean	HCC P: 161 Mt Pr: 221.5 Mt	HCC M: 430.5 Mt I: 938.2 Mt Inf: 787.8 Mt	EA approval of Swift expansion (2015); exploration drilling in active pits and expansion areas; coal quality testing; geophysical work and exploration in future expansion areas; pilot water treatment construction; P+Pr reserves are projected to support a further 45 years of mining at current production rate.
<b>Greenhills</b>	Southeast	<b>Teck Coal Limited (80%); POSCAN (20%)</b>	HCC	6.1 Mt clean	HCC P: 10.6 Mt Pr: 154.6 Mt	HCC M: 176.6 Mt I: 247.1 Mt Inf: 181.6 Mt	Cougar Pit Expansion (CPX) approved (2016); exploration drilling in expansion areas; coal quality testing; P+Pr reserves are projected to support another 31 years of mining at the current planned production rates.
<b>Line Creek</b>	Southeast	<b>Teck Coal Limited</b>	HCC, TC	3.8 Mt clean	HCC P: 2.1 Mt Pr: 61.5 Mt  TC P: 0.5 Mt Pr: 9.4 Mt	HCC M: 312.1 Mt I: 410.5 Mt Inf: 397.1 Mt  TC M: 3.7 Mt I: 3.2 Mt Inf: 1.7 Mt	Burnt Ridge Extension (BRX) approved (2016); pre-stripping on Mount Michael (LCO2); exploration drilling and coal quality test work in expansion areas; Additional of treatment process to West Line Creek water treatment facility, with further design optimization underway; P+Pr reserves at Line Creek are projected to support another 18 years of mining at planned production rates.
<b>Quinsam</b>	Southwest	<b>Quinsam Coal Corporation (ERP Compliant Fuels LLC)</b>	Thermal coal; bituminous coal; 092F 319	Approx. 200,000 t clean coal	na	na	Resources and reserves are unpublished. Resumed operations Sept. 2017. Exploration 2017-2018.

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



At the **Mount Polley** mine, Imperial Metals Corporation suspended operations from May to August because of a labour disruption, and mill feed came from low-grade stockpiles. The 2018 production target is 15.6 Mlb Cu and 39,500 oz Au, about 87% of the target set earlier in the year. On January 7<sup>th</sup>, 2019 Imperial announced that operations would be suspended due to declining copper prices. Milling of low-grade stockpiles would continue until the end of May.

New Gold Inc. reported production to the end of the 3<sup>rd</sup> quarter for **New Afton** totalling 64.3 Mlb of Cu, 58,551 oz Au and 200,000 oz Ag from 3.973 Mt of ore grading 0.88% Cu and 0.54 g/t Au. Metal recoveries averaged 83.3% for Cu and 84.8% for Au.

### 3.2. Coal mines

Nine operating coal mines (Table 3) accounted for a forecast production of \$6.31 billion for 2018. This production represents about 58% of all total mineral output in the province. Coal was produced at five large open-pit operations of Teck Coal Limited in southeastern British Columbia, three open-pit operations of Conuma Coal Resources Limited in northeastern British Columbia, and one underground operation of Quinsam Coal Corporation on Vancouver Island. Conuma's **Willow Creek** mine restarted in July.

The average prices for the year (as of mid-November 2018) were US\$186 for hard coking coal and US\$149 for PCI coal, up slightly from 2017.

### 3.3. Industrial minerals, aggregates, and jade

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 \$443 million (4.0% of total mineral production) and for aggregates of \$349 million (3.0% of total mineral production), these operations are important to the economy of the province. British Columbia produces the world's best quality nephrite jade. The Northwest Region was the most active for jade producers.

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 2018, only Centerra Gold Inc.'s **Kemess Underground** project (Table 5) was considered under development, albeit at the earliest stages.

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

The **Kemess Underground** project (KUG) is a calc-alkaline porphyry Cu-Au-Ag deposit in the North Central Region. In a technical report issued in July 2017, KUG was estimated to contain 246.4 Mt of Indicated resource containing 1.195 Mlbs of Cu, 3.3 Moz of Au, and 13.9 Moz of Ag. Within this resource are Probable reserves of 107.4 Mt containing 629.6 Mlbs of Cu, 1.9 Moz of Au and 6.7 Moz of Ag. In July 2018, a Mines Act permit for KUG was issued and, by the end of September, the North Tunnel portal was completed. Excavation was underway at the South Portal entrance and a nearby staging area was nearly complete, with the adit itself to be started in early 2019. Mine startup is anticipated in about 2022. During construction the project will provide about 575 jobs, dropping to about 475 with the start of mining operations.

## 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 at least 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 (Table 6) discussed below are grouped by region.

### 5.1. Northwest Region

#### 5.1.1. Proposed metal mines

Gavin Mines Inc. continues to work towards restarting the historic **Dome Mountain** gold and silver mine. The project has current Mines Act and Environmental Management Act permits in good standing and is allowed to mine up to 75,000 tpy. In early 2013, the project submitted applications to amend existing permits, which would allow for onsite milling and tailings storage. Due to various delays, including regulatory changes arising from the 2014 Mount Polley tailings breach, the permit amendments remain outstanding. Since 2016, stockpiled ore has been processed intermittently at the Nicola Mining Inc. custom mill near Merritt.

The **Galore Creek** gold-copper project is operated by the Galore Creek Mining Corporation (GCMC). Ownership of GCMC is equally split between Teck Resources Limited and Newmont Mining Corporation. Newmont purchased 50% interest from Novagold Resources Inc. in July. Newmont and Teck announced that they will complete prefeasibility studies over three to four years with an annual budget of \$10 to \$15 million (50 percent basis). The project consists of 13 known zones of gold-copper mineralization with Proven plus Probable reserves reported as 528 Mt at 0.59% Cu, 0.32 g/t Au and 65.02 g/t Ag.

**Table 4.** Selected operating industrial mineral mines and quarries, 2018, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2018 Production (based on Q1-Q3)	Reserves	Resource	Comments
<b>Burning Daylight</b>	Northwest	<b>Stone Ridge Quarries Ltd.</b>	Columnar basalt; dimension stone	unknown	na	na	Basalt quarrying.
<b>Cassiar Jade</b>	Northwest	<b>Dynasty Jade Ltd.</b>	Nephrite jade; gems and semi-precious stones; 104P 005	unknown	na	na	Trenching, quarrying, placer production.
<b>Dean Kutcho</b>	Northwest	<b>Cassiar Jade Contracting Inc.</b>	Nephrite jade; gems and semiprecious stones; 104I 078	unknown	na	na	Mining.
<b>Jade Valley</b>	Northwest	<b>United Oriental Mining Ltd.</b>	Nephrite jade; gems and semi-precious stones; 104I 048	unknown	na	na	Trenching, quarrying, placer production.
<b>Kalum</b>	Northwest	<b>Kalum Quarry Ltd. Partnership</b>	Industrial rock; crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN railway bed.
<b>Kutcho Creek Jade</b>	Northwest	<b>Continental Jade Ltd.</b>	Nephrite jade; gems and semi-precious stones; 104I 078	unknown	na	na	Mining, trenching.
<b>Letain</b>	Northwest	<b>Cassiar Jade Contracting Inc.</b>	Nephrite jade; gems and semi-precious stones; 104I 079	unknown	na	na	Mining, trenching.
<b>Polar Jade</b>	Northwest	<b>Glenpark Enterprises Ltd.</b>	Nephrite jade; gems and semi-precious stones; 104I 092	unknown	na	na	Mining, trenching.
<b>Provencher</b>	Northwest	<b>Glenpark Enterprises Ltd.</b>	Nephrite jade; gems and semi-precious stones; 104I 092	unknown	na	na	Mining, trenching.
<b>Wolverine</b>	Northwest	<b>Cassiar Jade Contracting Inc.</b>	Nephrite jade; gems and semi-precious stones	unknown	na	na	Mining, trenching.
<b>Fireside</b>	Northeast	<b>Fireside Minerals Ltd.</b>	Barite; vein barite; 094M 003, 19	30,000 t	P+Pr: 475,000 t (non-NI 43-101 compliant)	na	Mined from the Moose Pit. With possible extension to north.
<b>Ashcroft</b>	South Central	<b>IG Machine and Fibers Ltd. (IKO Industries Ltd.)</b>	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.

Table 4. Continued.

<b>Bromley Creek (Zeotech)</b>	South Central	<b>Canadian Zeolite Corp.</b>	Zeolite; open system zeolites; 092HSE243	na	na	M+I: (as of 2013-06-30) 550,000 t	Operating by Absorbent Products Ltd.
<b>Bud</b>	South Central	<b>Absorbent Products Ltd.</b>	Bentonite; 092HSE162	na	na	na	Operating, but volumes not published.
<b>Kettle Valley quarries</b>	South Central	<b>Kelowna Sand and Gravel Ltd./Kettle Valley Stone Company</b>	Ashlar, flagstone, thin veneer; 082ENW109, 111, 112	na	na	na	
<b>Z-1</b>	South Central	<b>ZMM Canada Minerals Corp.</b>	Zeolite; open system zeolites; 092INW095	9000 t	na	Approx. 800,000 t	Historical resource.
<b>4J</b>	Southeast	<b>Georgia-Pacific Canada Limited</b>	Gypsum; evaporitic bedded gypsum; 082JSW009	na; Processing stockpiled ore	na	Estimated 20 Mt	Processing stockpiles; updating mine expansion plans.
<b>Elkhorn</b>	Southeast	<b>CertainTeed Gypsum Canada Inc.</b>	Gypsum; evaporitic bedded gypsum; 082JSW021	Gypsum: 300,000 t; Anhydrite: 120,000 t	na	na	Mine expected to remain open until 2023; the company will replace production by developing the Kootenay West mine (EAO certificate granted in 2018).
<b>Grand Forks Slag</b>	Southeast	<b>Granby River Mining Company Inc.</b>	Slag/silica; tailings from Grand Forks smelter dumps; 082ESE264	Quarrying for abrasives and roofing granules	na	na	Crushing, screening, environmental monitoring.
<b>Horse Creek Silica</b>	Southeast	<b>HiTest Sand Inc. (PacWest Silicon)</b>	Silica, industrial use, aggregate; 082N 043	na	na	Estimated: 3 Mt at 99.5% Silica (1987)	Variety of aggregate and industrial use products; initial phases of public consultation for a silicon metal smelter in Newport, WA, USA.



Table 4. Continued.

<b>Moberly Silica</b>	Southeast	<b>HCA Mountain Minerals Limited</b> (Northern Silica Corp.)	Silica; industrial use silica, frac sand; 082N001	na	20 to 140 mesh frac sand (dry) P: 8.9 Mt of 64% frac sand Pr: 4.6 Mt of 64% frac sand (2014)	M+I: 30 to 140 mesh frac sand (dry): 37.5Mt at 70% frac sand + 11.3 Mt silica as frac sand residues (2016)	Updated mine design and haul roads; geological modelling to upgrade the resource; operation redeveloped for frac sand, and processing plant commissioned in 2017 (300,000 tpy capacity); Phase II expansion to 600,000 tpy will cost an additional USD \$15M.
<b>Mount Brussilof</b>	Southeast	<b>Baymag Inc.</b>	Magnesite; hydrothermal sparry magnesite; 082JNW001	230,000 t	P: 50 Mt	na	Exploration drilling at Struna Creek project (650 m, 6 DDH); MgO, and MgOH; sediment-hosted sparry magnesite.
<b>Winner</b>	Southeast	<b>Rockwool Inc.</b>	Gabbro/basalt; crushed rock for mineral wool; 082ESE265	Quarrying feed stock for mineral wool plant	na	na	Crushing, screening, stockpiling; environmental monitoring.
<b>Apple Bay (PEM 100)</b>	Southwest	<b>Linceo Media Group Inc.</b>	Silica+alumina; Volcanic glass-perlite; 092L 150	na	na	na	Care and maintenance 2018.
<b>Garibaldi Pumice</b>	Southwest	<b>Garibaldi Pumice Ltd.</b>	Pumice; volcanic ash; 092JW 039	Approx. 20,000 m <sup>3</sup> annually	na	11,396,000 m <sup>3</sup> pumice 4,990,000 m <sup>3</sup> pumicite (fines)	2014 resource. Additional exploration 2015, 2018.
<b>K2</b>	Southwest	<b>K2 Stone Quarries Inc.</b>	Dimension stone, flagstone; 092C 159	15,000-20,000 t annually	na	na	Number represents material extracted.
<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	na	na	100+ years	Mostly produces limestone for cement manufacture. High brightness carbonate and aggregates also produced.

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

**Table 5.** Mine development projects.

Project	Region	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resource	Comments
<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 at 0.27% Cu, 0.54 g/t Au, 1.99 g/t Ag; containing 285.6 Kt (629.6 Mlbs) Cu, 58.1 t (1.87 Moz) Au, 214 t (6.88 Moz) Ag	I: 246.4 Mt at 0.22% Cu, 0.42 g/t Au, 1.75 g/t Ag containing 542.2 Kt (1195 Mlbs) Cu, 103 t (3.33 Moz) Au, 431.3 t (13.87 Moz) Ag; inclusive of reserves	Mine permit approved July 2018. Mine start-up estimated for 2022. Proposed underground panel cave mine with 24,600 tpd ore processing rate and life-of-mine average annual production of 3.30 t (106,000 oz) Au and 21 Kt (47 Mlbs) Cu over a 12-year mine life.

Pr = Probable; I = Indicated

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

Project	Region	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resource	Comments
<b>Dome Mountain</b>	Northwest	<b>Dome Mountain Resources of Canada Inc.</b>	Au, Ag; vein breccia and stockwork; 093L 022	na	na	Permit amendments outstanding. Stockpiled ore intermittently processed at Nicola Mining Inc. mill near Merritt.
<b>Galore Creek</b>	Northwest	<b>Galore Creek Mining Corp. (50% Teck Resources Limited, 50% Newmont Mining Corporation)</b>	Au, Cu; alkalic porphyry; 104G 090	P+Pr: 528 Mt at 0.59% Cu, 0.32 g/t Au, 6.02 g/t Ag	M+I: 286.7 Mt at 0.33% Cu, 0.27 g/t Au, 3.64 g/t Ag. Resources exclusive of reserves	Baseline monitoring. Newmont purchased 50% interest from Novagold Resources Inc. in July. Multi-year prefeasibility study announced, with an annual budget of \$10 to \$15 million (50% basis).
<b>KSM</b>	Northwest	<b>Seabridge Gold Inc.</b>	Au, Cu, Ag, Mo; calc-alkalic porphyry; 104B 191	P+Pr: 2.198 Bt at 0.55 g/t Au, 0.21% Cu, 2.6 /t Ag, 0.00426% Mo	M+I: 2.925 Bt at 0.52 g/t Au, 0.21% Cu, 2.7 g/t Ag, 0.0055% Mo. Resources include mineral reserves	Results from 2018 drilling at the Iron Cap deposit extended its high-grade core down plunge and will be used for an upgraded resource estimate. Highlight results included 548 m of 0.63 g/t Au and 0.44% Cu.
<b>Morrison</b>	Northwest	<b>Pacific Booker Minerals Inc.</b>	Cu, Mo; calc-alkalic porphyry; 093M 007	P+Pr: 224.25 Mt at 0.33% Cu, 0.163 g/t Au, 0.004% Mo	na	Baseline monitoring, EA ongoing. Resource information from company website.
<b>Red Mountain</b>	Northwest	<b>IDM Mining Ltd.</b>	Au, Ag; porphyry related gold; 103P 086	na	M+I: 2.771 Mt at 7.91 g/t Au, 22.75 g/t Ag	Diamond drilling (40 hole, 10,000 m). Announced an updated M+I resource estimate. Granted a provincial environmental assessment certificate; federal certificate anticipated in early 2019.

Table 6. Continued.

<b>Murray River</b>	Northeast	<b>HD Mining International Ltd.</b>	Coal; bituminous; 093I 035	P: 261.6 Mt mineable	M+I: 314.2 Mt in situ Inf: 373.9 Mt coal in situ	Provincial and Federal EA certificates in place. Mine plan and reclamation program approved April 2018. Would produce 6 Mtpy from two longwall faces over 25-year mine life with 764 direct jobs.
<b>Sukunka</b>	Northeast	<b>Glencore Canada Corporation</b>	Coal; bituminous 093P 014	na	145.0 Mt coal in situ	20+ year mine life at 1.5-2.5 Mt saleable coal per year, 250 permanent jobs once operational.
<b>Aley</b>	North Central	<b>Taseko Mines Ltd.</b>	Nb; carbonatite-hosted; 094B 027	P+Pr: 83.8 Mt at 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 at 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 niobium over a 24-year mine life. In 2018, completed 24 boreholes, 2700 m total for metallurgical testing.
<b>Blackwater</b>	North Central	<b>New Gold Inc.</b>	Au, Ag; epithermal Au-Ag-Cu (intermediate sulphidation); 093F 037	P: 124.5 Mt at 0.95 g/t Au, 5.5 g/t Ag, containing 3.79 Moz Au, 22.1 Moz Ag Pr: 169.7 Mt at 0.68 g/t Au, 4.1 g/t Ag, containing 3.73 Moz Au, 22.3 Moz Ag	M: 117 Mt at 1.04 g/t Au, 5.6 g/t Ag containing 3.90 Moz Au, 21.06 Moz Ag I: 189 Mt at 0.78 g/t Au, 6.0 g/t Ag, containing 4.73 Moz Au, 36.47 Moz Ag, additional to reserves	Environmental Assessment (under review), engineering and environmental studies. Proposed open-pit mine with 60,000 tpd ore processing rate and life-of-mine average annual production of 12.8 t (413 Koz) Au and 54.2 t (1.74 Moz) Ag over a 17-year mine life.
<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 under review. 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>Ajax</b>	South Central	<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 grading 0.29% Cu, 0.19 g/t Au, 0.39 g/t Ag	M+I: (NSR cut-off US\$7.10/t) 568 Mt grading 0.26% Cu, 0.18 g/t Au, 0.35 g/t Ag	Environmental certification denied by provincial (2017) and federal ministers (2018).
<b>Bralorne</b>	South Central	<b>Avino Silver and Gold Mines Ltd.</b>	Au; Au-quartz veins; 092JNE001	na	M+I+Inf: 577,559 t grading 9.6 g/t Au	Past producer 1900-1971. Operated on a trial basis 2010-2014. New 100 tpd permit in 2017. Exploration in 2018 included drilling, airborne and ground geophysics, mapping, and geochemical sampling.



Table 6. Continued.

<b>Harper Creek</b>	South Central	<b>Yellowhead Mining Inc.</b>	Cu, Au, Ag; Noranda/Kuroko; 082M 008, 9	P+Pr: (cut-off 0.14% Cu) 716 Mt grading 0.26% Cu, 0.029 g/t Au, 1.18 g/t Ag	M+I: (cut-off 0.2% Cu) 815 Mt 0.28% Cu, 0.030 g/t Au, 1.3 g/t Ag	BC Environmental Assessment Office terminated EA process 2018. Taseko Mines Limited offer to buy Yellowhead Mining late 2018.
<b>New Prosperity</b>	South Central	<b>Taseko Mines Ltd.</b>	Cu, Au; porphyry; 092O 041	P+Pr: (NSR cut-off \$5.50/t) 831 Mt grading 0.23% Cu and 0.41 g/t Au; containing (recoverable) 3.6 Blb Cu, 7.7 Moz Au	M+I: (cut-off 0.14% Cu) 1010 Mt grading 0.24% Cu, 0.41 g/t Au	Project at post-decision stage. Granted provincial environmental certificate but denied federal approval. Exploration and site evaluation proposed 2018 but a BC Supreme court decision declaring a work permit valid, was appealed. Pending the appeal, an injunction preventing work is in place.
<b>Ruddock Creek</b>	South Central	<b>Ruddock Creek Mining Corporation (Imperial Metals 50%, Mitsui Mining and Smelting Co. 30%, ITOCHU Corp. 20%)</b>	Pb, Zn, Ag; Broken Hill-type; 082M 082	na	M+I: (cut-off 4.0% Pb+Zn) 6.2 Mt grading 6.50% Zn, 1.33% Pb	Project at environmental assessment pre-application stage. Exploration drilling 2018. Japan Oil, Gas and Metals National Corporation earning an interest.
<b>Spanish Mountain</b>	South Central	<b>Spanish Mountain Gold Ltd.</b>	Au, Ag; Au-quartz veins; 093A 043	na	M+I: (cut-off 0.15 g/t Au) 306.5 Mt grading 0.39 g/t Au, 0.64 g/t Ag Inf: 450.64 Mt 0.28 g/t Au, 0.61 g/t Ag	Project at environmental assessment pre-application stage. Exploration in 2018 included drilling.
<b>Bingay Main</b>	Southeast	<b>Centermount Coal Ltd.</b>	Coal (HCC); open pit and underground; 082JSE011	na	M: 42.43 Mt I: 52.9 Mt (2012)	Pre-application of EA (2012); resubmitted project description (2017); 13 Mt; 15-year mine life; 1 Mt/y.
<b>Black Crystal</b>	Southeast	<b>Eagle Graphite Corp.</b>	Graphite; metamorphic hosted 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 batteries; updated resources; working on Preliminary Economic Assessment.
<b>Coal Mountain Phase II (Marten Wheeler)</b>	Southeast	<b>Teck Coal Limited</b>	Coal (PCI and TC); open pit and underground; 082GNE006	na	HCC: M+I: 173.9 Mt Inf: 7.9 Mt PCI: M+I: 6.5 Mt Inf: 0.9 Mt (2015)	Pre-application of EA (2014); potential of 76.5 Mt; 34-year mine life; 2.25 Mtpy; EA withdrawn in late 2015; project on hold.

Table 6. Continued.

<b>Crown Mountain</b>	Southeast	<b>NWP Coal Canada Ltd. (Jameson Resources Limited 92%, Bathurst Resources Limited 8%)</b>	Coal (HCC and PCI); open pit; 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)	Option agreement with Bathurst Resources Limited for 8% with ability to earn 50% with investment of \$121.5 M; drilling (4200 m, 23 holes); pre-application of EA (2014); Application Information Requirements (AIR) received in April (2018); coal quality testwork; water quality and treatment studies involving passive biological treatment; engineering studies and mine design; 16-year mine life; 1.7 Mtpy.
<b>Driftwood Creek</b>	Southeast	<b>MGX Minerals Inc.</b>	Magnesite; hydrothermal sparry magnesite; quarry; 082KNE068	na	M+I: 7.847 Mt grading 43.27% MgO Inf: 55.8 Mt (2016; using cut-off grade of 42.5% MgO)	Preliminary Economic Assessment: 169,700 t of MgO, average grade of 43.27% MgO, 19-year mine life, 2.4:1 strip ratio; scoping study underway; environmental baseline studies; 100 t bulk sample; Preliminary test work indicates recovery rates of 93.4% reverse flotation and removal of up to 70% silica and 30% calcium oxides; bulk of resource is within 100 m of surface; 2016 drilling extended the zone; 20-year mine lease acquired.
<b>Kootenay West</b>	Southeast	<b>CertainTeed Gypsum Canada Inc.</b>	Gypsum; evaporitic bedded gypsum; quarry; 082JSW005, 20	na	North and South Quarries: Total 16.9 Mt (at average quality of 83-85%)	Granted a conditional EA certificate in January, 2018; environmental baseline work, permitting, and modifications to mine design; 400,000 tpy; 43-year mine life; blended product to market specifications.
<b>Michel Coal</b>	Southeast	<b>North Coal Limited</b>	Coal (HCC and PCI); open pit and underground; 082GSE050	na	HCC: M: 44.6 Mt I: 42.5 Mt open-pit and underground (2015)	Drilling (5000 m, 23 holes); environmental and baseline work; drilling of 23 groundwater monitoring wells; entered pre-application of EA in 2015, re-submission of their project description in September (2018) to include all 3 mining areas; geotechnical studies and updates to mine design; coal quality testing indicates coal has similar characteristics to Elk Valley hard coking coal; drilling identified 20 coal seams with cumulative thickness of 70 m (14% of a 504 m section in the Mist Mountain Formation).
<b>Black Bear</b>	Southwest	<b>Polaris Materials Corporation (Parent company US Concrete, Inc.)</b>	Aggregate; crushed rock; na	na	na	Orca environmental certificate amendment Application Information Requirements approved for proposed 250,000 tpy near the Orca quarry.

Table 6. Continued.

<b>BURNCO Aggregate</b>	Southwest	<b>BURNCO Rock Products Ltd.</b>	Aggregate; sand and gravel; na	na	Approx. 20 Mt	Has environmental certification.
<b>Sechelt Carbonate</b>	Southwest	<b>Ballinteer Management Inc.</b>	Limestone, dolostone, aggregate; dolomite, crushed rock; 093GNW031	na	Carbonate rock: 76.1 Mt Gabbro: >700 Mt	Proponent requests project remain in environmental assessment pre-application stage.

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

Seabridge Gold Inc. continued work on their **KSM** porphyry copper-gold project. The project consists of four porphyry Cu-Au deposits: Kerr, Sulphurets, Mitchell, and Iron Cap. Seabridge received federal and provincial approval of its environmental assessment in 2014 and is seeking partnership to enter construction. In 2018, Seabridge continued to drill the Iron Cap deposit. Results extended its high-grade core down plunge and will be used to produce an upgraded resource estimate. KSM economics might be improved if the Iron Cap deposit is mined before the Kerr deposit. The deposits represent what may be the largest undeveloped copper-gold camp in the world (by reserves). Proven plus Probable reserves are reported as 2.198 Bt grading 0.55 g/t Au, 0.21% Cu, 2.6 g/t Ag and 42.6 g/t Mo. Measured plus Indicted resource estimate totals 2.924 Bt grading 0.52 g/t Au, 0.21% Cu, 2.7 g/t Ag and 55 ppm Mo.

Pacific Booker Minerals Inc.'s **Morrison** porphyry Cu-Au-Mo-Ag project has Measured plus Indicated resources reported as 208.3 Mt at 0.39% Cu, 0.19 g/t Au, 0.005% Mo (at a 0.30% Cu Eq cut-off). After the Mount Polly tailings breach in 2014, the Morrison environmental assessment review was suspended, but it resumed in June 2015. In July 2015, a letter from the British Columbia Minister of Environment and Minister of Energy and Mines stated that project design concerns remained. In 2018, Pacific Booker continued to lobby for the project.

The **Red Mountain** project is a proposed high-grade underground gold mine. In 2018, IDM Mining Ltd., carried out a 40-hole, 10,000 m diamond drilling program and announced an updated Measured plus Indicated resource estimate of 2.77 Mt of 7.91 g/t Au and 22.75 g/t Ag. As well, they were granted their provincial environmental assessment certificate. A federal certificate is anticipated in early 2019.

## 5.2. Northeast Region

### 5.2.1. Proposed coal mines

HD Mining International Limited's **Murray River** project is a proposed underground mine with Proven mineable reserves of 261.6 Mt, and Measured plus Indicated resources of 314.2 Mt. In 2018 the company received its Mines Act permit that would allow operations to begin. The company plans to construct its

own wash plant and use existing rail facilities. The project is expected to provide about 764 jobs in direct employment for a 25-year mine life. Chinese miners experienced in longwall methods would start production, but would be replaced within 10 years once Canadian miners are trained. Murray River awaits a final investment decision by HD Mining's parent company, China Huiyong Holdings.

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 environmental assessment process was suspended in January 2016, and remains so pending further study on the effects on caribou and water quality.

## 5.3. North Central Region

### 5.3.1. Proposed metal mines

Taseko Mine Ltd.'s **Aley** niobium-bearing carbonatite project is a proposed open-pit mine that would process 10,000 tpd to produce ferroniobium. Reserves stand at 84 Mt grading 0.5% Nb<sub>2</sub>O<sub>5</sub>. The projected mine life is 24 years and environmental assessment is underway. In 2018, Taseko completed 25 drill holes at **Aley**, sited within the perimeter of previous exploration drilling and totalling 2700 m, to collect material for further metallurgical testing.

In 2018, New Gold Inc. continued with the environmental assessment process for its **Blackwater** project. Permitting is coordinated with both federal and provincial governments, with the aim of meeting the requirements for an Environmental Assessment Certificate (EAC) from the Province of British Columbia, and a Decision Statement from the federal Minister of the Environment. In November 2018, the Canadian Environmental Assessment Agency began a 30-day public and indigenous comment period on its draft Environmental Assessment report. New Gold continued collecting baseline data, completed additional soil and till sampling, and undertook geotechnical work related to mine design. Proven and Probable reserves stand at 8.2 Moz of Au, and 60.8 Moz Ag. As proposed, Blackwater would be a 60,000 tpd operation with a 17-year mine life.



### 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 British Columbia Environmental Certificate for the project is in place, and the Mines Act Permit process is underway. The company anticipates starting construction in about 2020, with up to 600 Kt of limestone quarried annually.

## 5.4. South Central Region

### 5.4.1. Proposed metal mines

The **Ajax** copper-gold porphyry project is owned by KGHM Ajax Mining Inc., which is an 80:20 joint venture between KGHM Polska Miedź S.A. (KGHM SA) and Abacus Mining and Exploration Corporation. A revised feasibility study, released at the start of 2016, modelled the project 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, the Ministers of Natural Resources and Fisheries, Oceans and the Canadian Coast Guard denied federal certification. The company has not announced plans for the site.

Avino Silver & Gold Mines Ltd. acquired the **Bralorne** gold mine in 2014 and suspended mining shortly thereafter because the tailings storage facility reached capacity. The mine had been operating at a 100 tpd trial basis between 2010 and 2014. Avino anticipates operating the mine at more than 100 tpd. However, they report that much of their existing infrastructure is inadequate for higher throughput and they are proceeding with upgrades and planning to meet permitting requirements.

The **Harper Creek** copper-gold-silver project has Proven and Probable mineral reserves of 716 Mt grading 0.26% Cu, 0.029 g/t Au and 1.2 g/t Ag. A 2104 feasibility study proposed a 70,000 tpd operation with a mine life of 28 years. Initial capital costs would exceed \$1 billion. In December 2018, Taseko Mines Limited announced an agreement whereby it would acquire all of the outstanding common shares of Yellowhead Mining Inc. and acquire the asset. The agreement was expected to close in early 2019.

The **New Prosperity** gold-copper porphyry project of Taseko Mines Limited has defined Proven and Probable reserves of 830 Mt grading 0.42 g/t Au and 0.23% Cu. Taseko continues to seek a judicial review of the February 2014 federal decision to deny the project. British Columbia granted Taseko a project certificate in November 2013 and has extended its expiry date by five years. In 2017, the British Columbia Ministry of Energy, Mines and Petroleum Resources issued a permit for a detailed site investigation of proposed mine infrastructure. Although a 2018 British Columbia Supreme Court decision would have allowed this work to proceed, opponents of the project have appealed and obtained an injunction preventing

the work pending the appeal.

Ruddock Creek Mining Corporation (Imperial Metals Corporation (50%) and joint venture partners Mitsui Mining and Smelting Co. Ltd. (30%) and Itochu Corporation (20%)) own the **Ruddock Creek** zinc-lead project. A mineral resource estimate, released in March 2012, reported 4.65 Mt grading 6.77% Zn and 1.38% Pb (Indicated) and 5.38 mt grading 6.69% Zn and 1.31% Pb (Inferred), using a 4.0% combined Pb+Zn cut-off. In 2018, Japan Oil, Gas and Metals National Corporation (JOGMEC) funded Imperial's share of a drill program designed to test for mineralized extensions. By funding the program, JOGMEC earns a right to participate in the project. The project remains in the pre-application phase of environmental assessment.

Spanish Mountain Gold Ltd.'s **Spanish Mountain** gold project has been in the pre-application phase of environmental assessment since 2011. A 2017 updated preliminary economic assessment was based on a 20,000 tpd, 24-year operation focussed on a pit at the First zone. Initial capital expenditure was estimated at \$507 million, pre-tax net present value \$597 million (at 5% discount rate) and initial rate of return 22%. Average gold production would be 92,000 ozpy.

## 5.5. Southeast Region

### 5.5.1. Proposed coal mines

Centermount Coal Ltd. proposes an open-pit coal mine for its **Bingay Creek** project. The mine would produce approximately 1 Mtpy during an estimated 15-year lifespan, with a total resource of approximately 13 Mt of clean coal. The project entered pre-application of environmental assessment in 2013; the company resubmitted the project description in 2017. Environmental baseline studies are ongoing.

In 2015, Teck Coal Limited withdrew from the pre-application phase of environmental assessment for their **Coal Mountain Phase II** (Marten Wheeler) project, and the project remains on hold. The project was designed to replace production at the **Coal Mountain** mine, which suspended mining in Q3 of 2018.

The **Crown Mountain** property is owned by NWP Coal Canada Ltd. (92% Jameson Resources Limited and 8% Bathurst Resources Limited). In April of 2018, application information requirements were issued by the environmental assessment office. The proposed project is an open-pit mine with an estimated production capacity of 1.7 Mtpy of clean coal and a 16-year mine life. In 2014, the company completed a resource estimate of 74.9 Mt (Measured+Indicated) and a preliminary prefeasibility study. Bathurst could become a 50/50 joint venture partner after exercising all tranches in the terms of an agreement, with an investment totalling \$121.5 million.

The **Michel Coal** project of North Coal Limited, a wholly owned subsidiary of CoalMont Pty Ltd., is in the pre-application stage of environmental assessment. The project includes the Loop Ridge, Loop South, Tent Mountain, and Michel Head areas. In September of 2018, a revised project description was submitted. The expanded plan will give them more flexibility in blending product from different areas to client specifications.

The project is expected to produce between 2.3 and 4 Mt annually, with a 30-year mine life.

### 5.5.2. Proposed industrial mineral mines or quarries

Eagle Graphite Corp. operates the **Black Crystal** flake graphite project. In 2018, the company updated the resource estimate with results obtained in their 2016 drilling, and focussed efforts on research and development to upgrade the purity of their product for use in the energy storage industry.

The **Driftwood Creek** project is owned by MGX Minerals Inc. In 2016, a resource estimate reported Measured and Indicated resources of 8.028 Mt grading 43.3% MgO (using a cut-off grade of 42.5% MgO). In 2018, the company continued with environmental baseline studies, carried out drilling and released a Preliminary Economic Assessment for a 1200 tpd quarry. The mine would produce 169,700 t of MgO at an average grade of 43.27% MgO, with a 19-year mine life.

CertainTeed Gypsum Canada Inc. continued to advance their **Kootenay West** project. The project was approved through the Environmental Assessment Office in January 2018, and is currently working to fulfill conditions outlined in the approval. The total mineral reserve is estimated at 18.7 Mt, and the mine would have an average production rate of 400,000 tpy, during a 42-year mine life.

## 5.6. Southwest Region

### 5.6.1. Proposed industrial mineral mines or quarries

Polaris Materials Corporation is including the **Black Bear** aggregate 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 250,000 tpy of crushed basalt.

The **BURNCO Aggregate** Project now has environmental certification and may proceed with British Columbia Mines Act and other permitting. 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. owns the property comprising the **Sechelt Carbonate** project. They filed engineering, archeological, and baseline environmental studies for assessment in 2016; no activity was reported for 2017 or 2018. The property contains resources of calcite- and dolomite-bearing carbonate rock and gabbroic rock for potential use as aggregate.

## 6. Exploration expenditures

In 2018, 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 Petroleum Resources, the Association for Mineral Exploration, and Ernst & Young LLP.

A full report will be available in March. The new survey does not capture exploration expenditures for aggregates, which had previously been done for the Southwest Region only.

Total metal, industrial mineral and coal exploration expenditures are estimated at \$331.4 million for 2018, up \$84.8 million from the 2017 survey total of \$246.6 million. Of this, \$50.2 million was contributed by coal projects and \$281.2 million by metal and industrial mineral projects (Fig. 5). Exploration expenditures by region for 2018 are illustrated in Figure 6. Exploration expenditures can be further divided into five categories: grassroots, early stage, advanced stage, mine evaluation, and mine lease (Figs. 7-13). The provincial combined total result for grassroots and early stage exploration in the 2018 survey is 44.4% up from the 2017 total of 34.7%. The total reported metres drilled for the province was 730,500 up from the 2017 total of 626,897 (see Fig. 14 for regional breakdown).

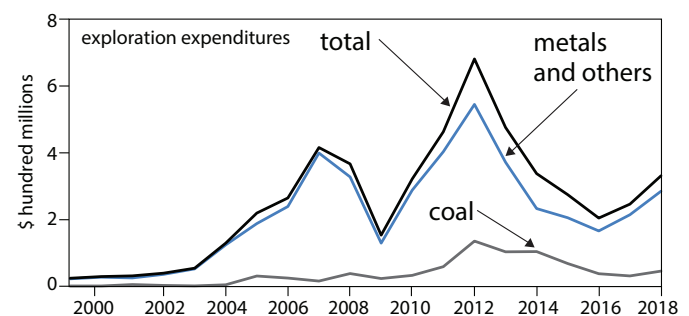


Fig. 5. Exploration expenditures per year, by type.

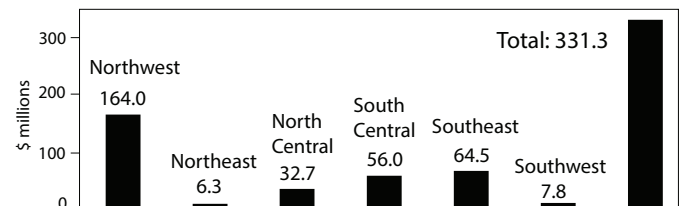


Fig. 6. 2018 exploration expenditures by region.

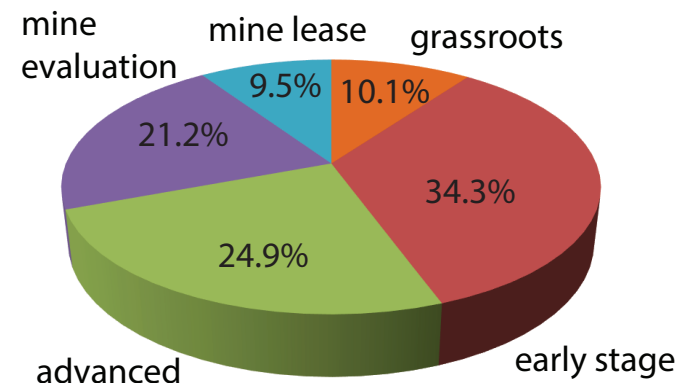
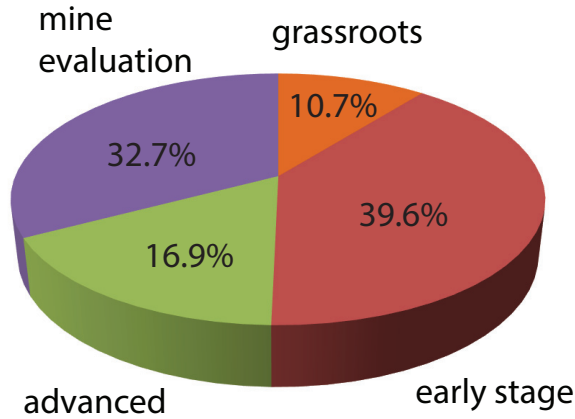
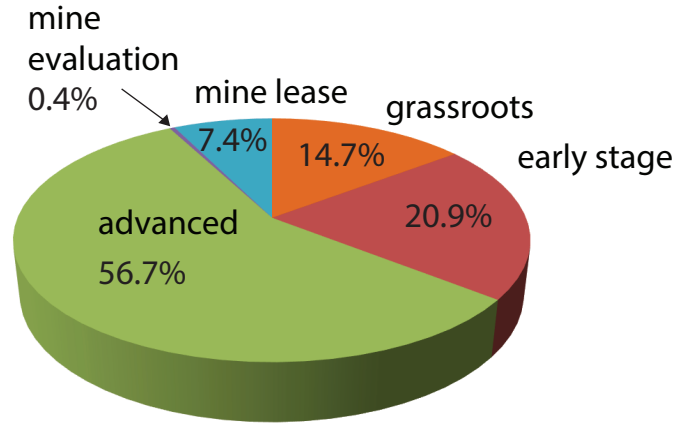


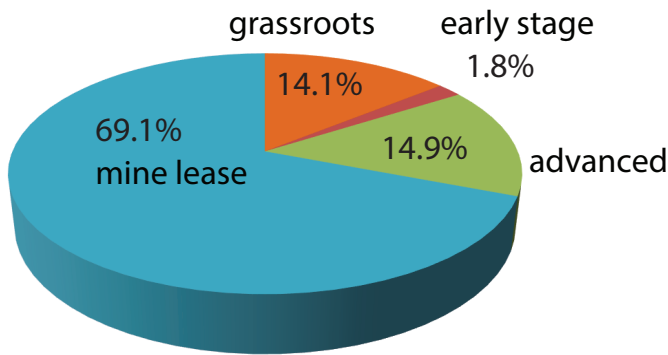
Fig. 7. Province-wide 2018 exploration expenditures by category.



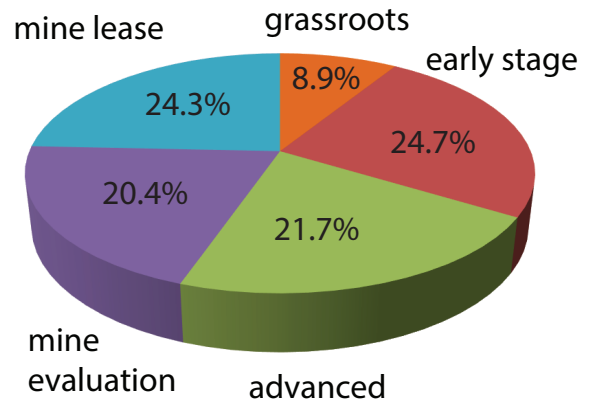
**Fig. 8.** Northwest Region 2018 exploration expenditures by category.



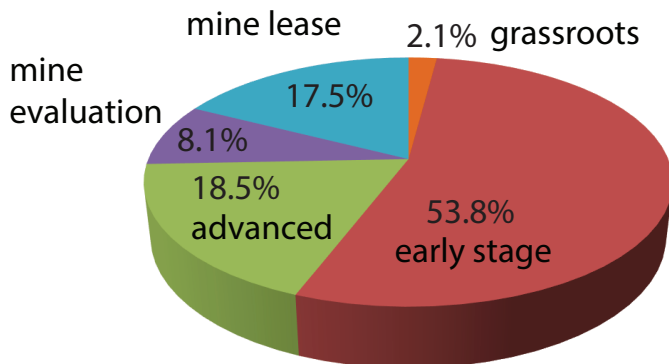
**Fig. 11.** South Central Region 2018 exploration expenditures by category.



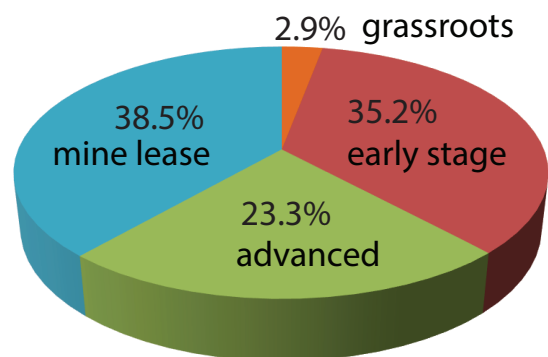
**Fig. 9.** Northeast Region 2018 exploration expenditures by category.



**Fig. 12.** Southeast Region 2018 exploration expenditures by category.



**Fig. 10.** North Central Region 2018 exploration expenditures by category.



**Fig. 13.** Southwest Region 2018 exploration expenditures by category.

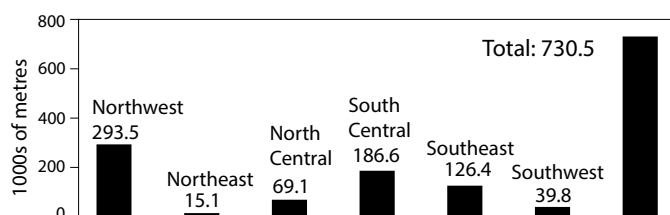


Fig. 14. 2018 exploration drilling by region.

## 7. Exploration land tenure

Acquisition of new mineral claims in 2018 was up compared to 2017 (Fig. 15). The total for 2018 was 1,961,719 hectares vs. 1,613,486 hectares for the previous year. New coal licenses issued in 2018 totalled 8852 hectares, down from the 2017 total of 48,118 hectares (Fig. 16).

## 8. Selected exploration project highlights

For the second year in a row, the province saw an increase in recorded exploration expenditures. Explorationists 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. Data from the British Columbia Mineral and Coal Exploration Survey show an

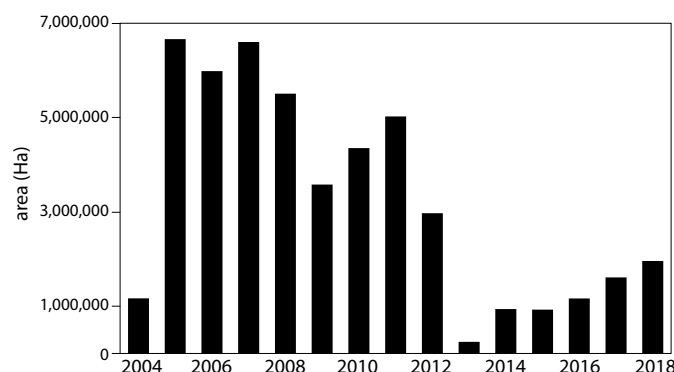


Fig. 15. New mineral claims by year.

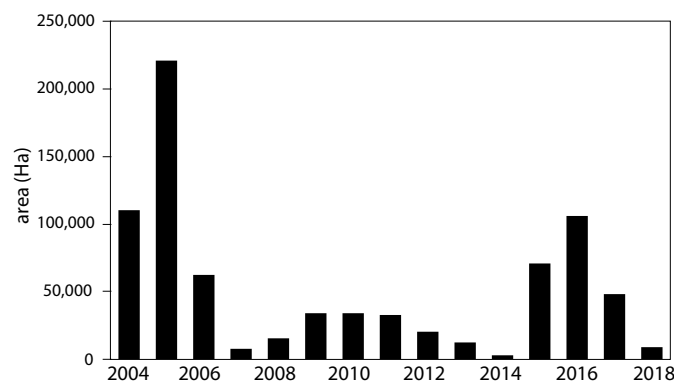


Fig. 16. New coal license issuances by year.

increase in grassroots and early stage projects. 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

In 2018, the price of gold sustained interest in gold exploration in the Northwest Region. Since 2016, Brixton has staked claims and completed transactions to secure approximately 1000 km<sup>2</sup> of mineral rights for the **Atlin Gold** project. In 2018, Brixton conducted geological mapping, rock and chip sampling, and biogeochemical studies, and collected 2500 soil samples across selected areas. Several gold-in-soil anomalies were defined.

The first drill hole of 2018 at the North Boundary zone (NBZ), part of Aben Resources Ltd.'s **Forest Kerr** project, intersected multiple high-grade zones including 38.7 g/t Au over 10.0 m. Subsequent holes also returned high-grade gold assays. The company also discovered a new mineralized zone (South Boundary zone), about 1.5 km south of the NBZ. Drilling intersected quartz veins with abundant pyrite and chalcopyrite and returned anomalous Au, Ag and Cu assays.

In 2018, Metallis Resources Inc. carried out the first ever drill programs at the Cole and Nina targets of the **Kirkham** project. Although these were porphyry Cu-Au targets, drilling at Cole intersected an intrusion-related massive sulphide pyrite-pyrrhotite vein that assayed 11.18 g/t Au over 7.7 m.

At their **Premier/Dilworth** project, Ascot Resources Ltd. drilled an additional 45,800 m in 2018, following up on 140,000 m of drilling in 2017. Reported results included 20.0 m of 8.04 g/t Au and 21.4 g/t Ag at the western extension of Premier, 7.2 m of 20.67 g/t Au and 24.92 g/t Ag at the Big Missouri zone, and 12.38 m of 8.91 g/t Au and 22.9 g/t Ag at the North Star prospect. In December, the company released an updated resources estimate. For the Premier/Northern Lights, Big Missouri, Silver Coin and Martha Ellen deposits, total Indicated resources are 2.78 Mt grading 7.46 g/t Au and 26.2 g/t Ag. For the Premier/Northern Lights, Big Missouri, Silver Coin, Martha Ellen and Dilworth deposits, Inferred resources are 6.03 Mt grading 7.18 g/t Au and 24.0 g/t Ag.

Decade Resources Ltd. (65%) and Mountain Boy Minerals Ltd. (35%) carried out a 53-hole 11,000 m diamond drilling program on their **Red Cliff** project. Drilling results for the Waterpump zone included 4.54 m of 12.11 g/t Au and 7.26 m of 10.6 g/t Au.

Skeena Resources Ltd. continued with underground and surface drilling at their past-producing **Snip** gold mine project, completing 7732 m in 46 holes. Results included 13.8 g/t Au over 18.0 m. In October, it was announced that Skeena granted Hochschild Mining Holdings Limited (a wholly owned subsidiary of Hochschild Mining plc) an option to acquire 60% of the project.

In 2018, GT Gold Corp. extended Saddle South gold-silver mineralized zones along strike and identified additional high-grade gold mineralization at depth for their **Tatogga** project.

Table 7. Selected exploration projects.

Project	Region	Operator (partner)	Commodity; deposit type; MINFILE	Resource (NI 43- 101 compliant unless indicated otherwise)	Comments
<b>Atlin Gold Project</b>	Northwest	<b>Brixton Metals Corporation</b>	Au; precious metal veins	na	Geological mapping, rock and chip sampling, biogeochemical studies, and 2500 soil samples. Several gold-in-soil anomalies.
<b>Brucejack Regional</b>	Northwest	<b>Pretium Resources Inc.</b>	Au, Ag; epithermal vein	na	Evaluation of 1250 km <sup>2</sup> of mineral claims surrounding the mine area. Diamond drilling (8000 m), mapping and prospecting. At the American Creek zone, drilling highlight results included 1.5 m grading 10.15 g/t Au and 25.5 m grading 41.54 g/t Ag, 2.12% Zn and 0.56% Pb. Prospecting sample results located the new Upper Kirkham zone. Samples assayed as high as 3.55 g/t Au, greater than 10,000 g/t Ag, 4.7% Cu, greater than 20% Pb and 3.8% Zn.
<b>Clone</b>	Northwest	<b>Sunvest Minerals Corp.</b>	Au, Ag, Cu, Co; Au, precious metal veins; 103P 251	na	Geochemical rock, silt and soil sampling, detailed geological mapping and packsack drilling. A number of samples returned anomalous Cu, Ag and Au assays. A newly discovered mineralized vein returned a 1 m chip sample result of 4.11% Cu, 160 g/t Ag, 0.52 g/t Au.
<b>Dolly Varden</b>	Northwest	<b>Dolly Varden Silver Corporation</b>	Ag, Zn; Noranda/Kuroko massive sulphide; 103P 188	I: 3.073 Mt at 321.6 g/t Ag Inf: 898,500 t at 373.3 g/t Ag	Drilling, 29,108 m in 84 holes. A new zone, (Bonus) discovered. Results included 15.50 m grading 161.4 g/t Ag, 0.25% Pb and 0.20% Zn. Drilling on known zones included 24.00 m grading 287.5 g/t Ag, 0.29% Pb, and 0.11% Zn at Torbrit East and 29.15 m grading 226.0 g/t Ag, 0.09% Pb, and 0.13% Zn at the Moose-Lamb zone.
<b>Duke</b>	Northwest	<b>Amarc Resources Ltd.</b>	Cu, Mo, Au; porphyry Cu-Au; 093M 009, 121, 163	Historic non NI 43-101 compliant I: 41 Mt at 0.25% Cu, 0.01% Mo	Property straddles the Northwest and North Central regions. Six diamond drill holes totalling 3600 m completed. Highlight results included 348 m grading 0.23 % Cu, 0.013% Mo, 1.1 g/t Ag, 0.05 g/t Au.
<b>Eskay Creek</b>	Northwest	<b>Skeena Resources Limited</b>	Au, Ag, Zn, Cu, Pb; VMS; 104B 008	I: 1.08 Mt at 4.9 g/t Au, 72 g/t Ag (pit constrained) Inf: 4.26 Mt at 3.3 g/t Au, 72 g/t Ag (pit constrained) I: 2.51 Mt at 7.2 g/t Au, 215 g/t Ag (underground) Inf: 0.81 Mt at 7.2 g/t Au, 214 g/t Ag (underground)	Diamond drilling, compiled and reviewed 20 years of exploration and production information and completed a geologic model and resource estimate. Drilling highlights include 14.55 m grading 7.36 g/t Au, 1189 g/t Ag and 31.50 m grading 10.16 g/t Au, 331 g/t Ag and 42.65 m grading 9.49 g/t Au, 111 g/t Ag.



Table 7. Continued.

<b>Forest Kerr</b>	Northwest	<b>Aben Resources Ltd.</b>	Au, Ag, Cu; precious metal veins	na	Diamond drilling, 36 holes totalling 9900 m. Drilling intersected multiple high-grade zones including 38.7 g/t Au over 10.0 m.
<b>Golddigger</b>	Northwest	<b>Goliath Resources Limited</b>	Au, Ag, Pb, Cu; polymetallic veins	na	A 0.55 m channel sample graded 29.70 g/t Au and 14.30 g/t Ag, a 0.50 m chip sample graded 47.50 g/t Au and 272.00 g/t Ag and grab samples graded up to 113.50 g/t Au and 249.00 g/t Ag.
<b>Hank</b>	Northwest	<b>Golden Ridge Resources Ltd.</b>	Au, Cu; calc-alkalic porphyry	na	Drilling discovered new porphyry Cu-Au at the Williams zone. Discovery hole returned 327 m grading 0.31% Cu, 0.35 g/t Au and 1.94 g/t Ag.
<b>Hat</b>	Northwest	<b>Doubleview Capital Corp.</b>	Au, Cu; calc-alkalic porphyry; 104J 015	na	Project optioned to Hudbay Minerals Inc. by Doubleview Capital Corp. In the summer, a 40 line-km, deep-penetrating induced polarization survey was carried out to delineate drilling targets.
<b>Kinskuch (Hecla)</b>	Northwest	<b>Hecla Quebec Inc.</b>	Ag, Cu, Pb, Zn; polymetallic veins	na	Diamond drilling defined silver-enriched base metal mineralization over a strike length of 4.8 km.
<b>Kirkham</b>	Northwest	<b>Metallis Resources Inc.</b>	Au, Cu; calc-alkalic porphyry and Au, Ag; intrusion related; 104B 079	na	Although a porphyry Cu-Au target, drilling at Cole intersected an intrusion-related massive sulphide pyrite-pyrrhotite vein that assayed 11.18 g/t Au over 7.7 m.
<b>KSP</b>	Northwest	<b>Colorado Resources Ltd.</b>	Au, Cu; calc-alkalic porphyry and Au, Ag; intrusion related; 104B 111 and 104B 013	na	Diamond drilling, 7847 m in 35 holes. Results included 32 m grading 0.32 g/t Au and 1.64% Zn and 50 m grading 2.28 g/t Au, including 6 m grading 7.36 g/t Au.
<b>Kutcho</b>	Northwest	<b>Kutcho Copper Corp.</b>	Cu, Pb, Zn, Au, Ag; VMS; 104I 060	M+I: at 16.853 Mt of 1.89% Cu, 2.87% Zn, 0.36 g/t Au and 32.8 g/t Ag (at a 1.0% Cu cut-off)	Results from 2018 drilling included 28 m of 2.09% Cu, 6.1% Zn, 65.8 g/t Ag, 0.82 g/t Au and 5.4 m of 2.48% Cu, 1.0% Zn, 114.0 g/t Ag, 0.24 g/t Au. A bench scale metallurgical study is underway and a feasibility study is scheduled for 2019.
<b>Maroon</b>	Northwest	<b>Gitennes Exploration Inc.</b>	Au, Pb, Zn; polymetallic veins; 103I 029	na	Reconnaissance prospecting found several polymetallic quartz-sulphide veins. Sampling focussed on historical workings and returned results up to 50 g/t Au, 11.5% Zn and 13.9% Pb.

Table 7. Continued.

<b>Nickel Mountain</b>	Northwest	<b>Garibaldi Resources Corp.</b>	Ni, Cu, Co, Pt, Pd, Au, Ag; tholeiitic intrusion; 104B 006	na	Diamond drilling (32 holes, 11,573 m). Highlight results for 10 holes include 30.5 m of 3.10% Ni, 1.86% Cu, 0.081% Co, 0.863 g/t Pt, 1.776 g/t Pd, 0.739 g/t Au, 7.3 g/t Ag and 5.6 m of 7.60% Ni, 3.36% Cu, 0.198% Co, 0.668 g/t Pt, 0.814 g/t Pd, 0.466 g/t Au, 9.0 g/t Ag.
<b>Ootsa</b>	Northwest	<b>Surge Copper Corp.</b>	Cu, Au, Ag, Mo; porphyry; 093E 105	I: 67.76 Mt 0.21% Cu, 0.17 g/t Au, 0.015% Mo, 2.01 g/t Ag Inf: 410.88 Mt 0.16% Cu, 0.11 g/t Au, 0.018% Mo, 1.95 g/t Ag	A new copper zone discovered 500 m northeast of the East Seel deposit. Continuous mineralization (202 m) assayed 0.26% Cu, 0.31 g/t Au and 1.32 g/t Ag. A later hole intersected 22 m of 0.5% Cu, 0.10 g/t Au, 17.6 g/t Ag, 0.65% Zn and 0.14% Pb. Drilling between the East Seel and Damascus deposits intersected a new gold zone returning 2 m grading 9.4 g/t Au.
<b>Pitman</b>	Northwest	<b>Casa Minerals Inc.</b>	Au, Ag, Cu, Pb, Zn; polymetallic veins	na	New showings, Golden Dragon and Dragon Tale, discovered in 2018. Rock chip sampling at Golden Dragon returned 0.6 m assaying 574.42 g/t Au, 109 g/t Ag, 0.1% Cu, 1.56% Pb, 0.23% Zn and 0.9 m assaying 268.86 g/t Au, 127 g/t Ag, 0.2% Cu, 2.95% Pb, 0.04% Zn. The Dragon Tale showing returned rock sample assays as high as 231 g/t Ag and 6.15% Zn.
<b>Porter</b>	Northwest	<b>StrikePoint Gold Inc.</b>	Ag, Au, Cu, Zn; polymetallic veins	na	StrikePoint Gold acquired the property from Skeena Resources Limited in July and carried out diamond drilling (4800 m), prospecting, and sampling. Thirty-two samples with assays ranging from trace to 43.6 oz/t Ag, trace to 0.54 oz/t Au and trace Zn to 28.8%. A new mineralized vein was discovered with a 205 m strike length and widths of up to 2 m. Samples graded up to 876 g/t Ag and 10.8 g/t Au.
<b>Premier East</b>	Northwest	<b>Decade Resources Ltd.</b>	Au, Ag, Cu; polymetallic veins	na	Rock sampling returned anomalous values for precious and base metals including one sample that graded 5.72 g/t Au, 716 g/t Ag and 11.60% Cu.
<b>Premier/Dilworth</b>	Northwest	<b>Ascot Resources Ltd.</b>	Au, Ag; Au in quartz veins; 104B 044	I: 2.78 Mt grading 7.46 g/t Au and 26.2 g/t Ag (Premier/Northern Lights, Big Missouri, Silver Coin and Martha Ellen deposits) Inf: 6.03 Mt grading 7.18 g/t Au and 24.0 g/t Ag (Premier/Northern Lights, Big Missouri, Silver Coin, Martha Ellen and Dilworth deposits)	Diamond drilling 45,800 m. Results included 20.0 m of 8.04 g/t Au and 21.4 g/t Ag at the western extension of Premier, 7.2 m of 20.67 g/t Au and 24.92 g/t Ag at the Big Missouri zone, and 12.38 m of 8.91 g/t Au and 22.9 g/t Ag at the North Star prospect. In December, an updated resource estimate was released.

Table 7. Continued.

<b>Red Cliff</b>	Northwest	<b>Decade Resources Ltd. (65%),</b> (Mountain Boy Minerals Ltd. (35%))	Cu, Au, Ag, Zn; polymetallic veins; 104A 037	na	A 53 hole 11,000 m diamond drilling program carried out. Drilling results for the Waterpump zone included 4.54 m of 12.11 g/t Au and 7.26 m of 10.6 g/t Au.
<b>Schaft Creek</b>	Northwest	<b>Teck Resources Limited (75%),</b> (Copper Fox Metals Inc. (25%))	Cu, Au; calc-alkalic porphyry; 104G 015	1.229 Bt at 0.26% Cu, 0.017% Mo, 0.19 g/t Au, 1.69 g/t Ag	Collection of environmental base line data, ongoing First Nations consultation.
<b>Snip</b>	Northwest	<b>Skeena Resources Limited</b>	Au, Ag; mineralized quartz veins; 104B 250	na	Underground and surface drilling (46 holes, 7732 m). Results included 13.8 g/t Au over 18.00 m. In October, Skeena granted Hochschild Mining Holdings Limited an option to acquire 60% of the project.
<b>Stars</b>	Northwest	<b>ML Gold Corp.</b>	Cu, Au, Ag, Mo; porphyry	na	Reported that drilling at two new targets intersected mineralized porphyry. In February, they announced 204 m assayed 0.45% Cu, 0.045 g/t Au, 1.64 g/t Ag, 0.0048% Mo. In August, they announced 405 m assayed 0.20% Cu, 0.0082% Mo, 0.754 g/t Ag and 24 ppb Au.
<b>Tatogga (Saddle North)</b>	Northwest	<b>GT Gold Corp.</b>	Au, Ag, Cu; porphyry; 104G 432	na	New porphyry Cu-Au-Ag discovery. Initial drilling highlights included 430 m of 0.67 g/t Au, 0.41% Cu and 0.89 g/t Ag. A later hole, approximately 200 m to the northwest, returned 363 m of 1.02 g/t Au, 0.51% Cu and 1.72 g/t Ag in 904 m of 0.51 g/t Au, 0.30% Cu and 0.93 g/t Ag.
<b>Tatogga (Saddle South)</b>	Northwest	<b>GT Gold Corp.</b>	Au, Ag, Cu; epithermal Au-Ag, low sulphidation; 104G 433	na	Gold-silver mineralized zones were extended along strike. Additional high-grade Au mineralization at depth. Drilling highlights included 40.89 m of 9.55 g/t Au.
<b>Tenas</b>	Northwest	<b>Allegiance Coal Limited (80%)</b> (Itochu (20%))	bituminous coal; 093L 156	M: 89.113 Mt I: 42.037 Mt Inf: 33.412 Mt	Drilling program for geotechnical information, installing water monitoring wells and collecting samples for geochemical and coal testing studies. 1400 kg of coal sent for sizing, washability, and comprehensive coal quality analyses and to generate samples for coke oven tests. In November, it was announced that Itochu Corporation of Japan (Itochu) was investing in the project. A definitive feasibility study was expected in early 2019.
<b>Treaty Creek</b>	Northwest	<b>Tudor Gold Corp. (80%),</b> (Teuton Resources Corp. (20%), American Creek Resources Ltd. (20%))	Au, Ag; epithermal high sulphidation; 104B 078	na	Diamond drilling (nine holes, 7200 m) targeting the Copper Belle zone. Highlight results included 121.8 m of 1.04 g/t Au with a high-grade interval of 26.6 g/t Au over 1.5 m.

Table 7. Continued.

<b>Turnagain</b>	Northwest	<b>Giga Metals Corp.</b>	Ni, Co; Alaskan-type; 104I 014	M+I: 865 Mt at 0.21% Ni, 0.013% Co Inf: 976 Mt at 0.2% Ni, 0.013% Co	Diamond drilling (40 holes, 10,835 m) to test new targets, infill, collect metallurgical samples and geotechnical information for pre-feasibility study.
<b>Akie</b>	North Central	<b>Canada Zinc Metals Corp.</b>	Zn, Pb, Ag; sedimentary exhalative Zn-Pb-Ag; 094F 031	Updated 43-101: I: 22.7 Mt at 8.32% Zn, 1.81% Pb, 14.1 g/t Ag Inf: 7.5 Mt at 7.04% Zn, 1.24% Pb, 12.9 g/t Ag, all at 5% Zn cut-off	5 holes on Sitka extension of Cardiac Creek zone, 2013 m total, 567 samples taken. All holes intersected mineralization. June PEA proposed 18-year mine life, mine production rate 4000 tpd, 25.8 Mt total mined, initial capital cost \$302.3 million.
<b>Decar</b>	North Central	<b>FPX Nickel Corp.</b>	Ni; ultramafic-hosted; 093K 039, 72, 89	2018 I: 1843 Mt at 0.143% DTR (Davis tube recoverable) Ni Inf: 391 Mt at 0.115% DTR Ni, at 0.06% cut-off	Metallurgical study to improve on 2013 results. Announced an updated mineral resource estimate.
<b>Indy</b>	North Central	<b>InZinc Mining Ltd.</b>	Zn, Pb, Ag; sedimentary exhalative Pb-Zn-Ag; 093N 240	na	11 holes total 1271 m. Significant Zn, Pb, Ag intersected.
<b>Kemess East</b>	North Central	<b>Centerra Gold Inc.</b>	Cu, Mo, Au; porphyry Cu±Mo±Au; 094E 315	I: 113.12 Mt at 0.38% Cu, 0.46 g/t Au, 1.94 g/t Ag, containing 954 Mlb Cu, 1680 Koz Au, 7066 Koz Ag	27 line-km IP on Nugget, Hilda South, Oriobn, Kemess South extension targets. Relogged historic core, revised deposit model.
<b>Kwanika</b>	North Central	<b>Kwanika Copper Corp.</b> (65% Serengeti Resources Inc., 35% Daewoo Minerals Canada Corp.)	Cu, Au, Ag; porphyry Cu±Mo±Au; 093N 073	I: Central zone pit, 11.8 Mt at 0.37% Cu, 0.39 g/t Au, 1.07 g/t Ag. Central zone underground, 41.4 Mt at 0.46% Cu, 0.52 g/t Au, 1.36 g/t Ag	21 holes, 7411 m.
<b>Lawyers</b>	North Central	<b>Benchmark Metals Inc.</b>	Au, Ag, Cu, Zn; epithermal low sulphidation Au-Ag-Cu; 094E 066	Inf: Cliff Creek N zone, 550 Kt at 4.51 g/t Au, 209.15 g/t Ag Duke's Ridge Zone, 58 Kt at 4.30 g/t Au, 139.13 g/t Ag	30 holes, 4116 m, soil and rock samples, airborne VTEM. Discovered two new zones, Marmot and Phoenix East.
<b>Panorama North</b>	North Central	<b>Atrum Coal Panorama Inc.</b> , JOGMEC (Japan Oil, Gas, and Metals National Corporation)	Coal; anthracite; 104A 085, 89	na	8 holes, 1979 m targeting low-S PCI coal.

Table 7. Continued.

<b>Pine Pass</b>	North Central	<b>Ethos Gold Corp.</b>	V; sediment-hosted; 093O 009	na	Trenching, sampling. Best result 0.45% V <sub>2</sub> O <sub>5</sub> over 20 m.
<b>Stardust</b>	North Central	<b>Sun Metals Corp.</b>	Ag, Pb, Zn; skarn Ag-Pb-Zn; 093N 009	na	22 holes, 6838 m, downhole EM survey. Mapping, prospecting, soil sampling, lidar survey, VTEM/magnetic survey.
<b>Wicheeda</b>	North Central	<b>Spectrum Mining Corporation</b>	Carbonatite-hosted deposits Nb, REE; 093J 014	Inf: non NI 43-101 compliant 11.26 Mt, 2.3% LREE (Ce+La+Nd)	Beginning bulk sample, drilling program.
<b>Axe</b>	South Central	<b>Evrmin Exploration Canada Corp.</b> (Antofagasta PLC)	Cu; 092HNE040, 142, 143	I: 39 Mt 0.38% Cu Inf: 32 Mt 0.38% Cu (gold not included)	Mapping, diamond (2113.6 m) and RC (695.3 m) drilling.
<b>Brett</b>	South Central	<b>Ximen Mining Corp.</b>	Au, Ag; epithermal Au-Ag-Cu; low sulphidation; 082LSW084, 131	na	Metallurgy. A gold recovery batch test of stockpiled material (34 kg) returned a weighted average grade of 4.20 g/t Au.
<b>Cariboo Gold</b>	South Central	<b>Barkerville Gold Mines Ltd.</b>	Au; Au-quartz veins; 093H 140, 139, 19, 6	M+I: 8.1099 Mt 6.1 g/t Au Inf: 12.73 Mt 5.2 g/t Au	Diamond drilling 123,021 m in 439 holes. Updated resource estimate.
<b>Fox</b>	South Central	<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>	Geology, geochemistry, updated resource estimate.
<b>Gold Creek</b>	South Central	<b>Kore Mining Ltd.</b>	Au, Ag; Au-quartz veins; 093A 127	na	Diamond drilling 940 m in 4 holes. Highlights included 9.0 m grading 5.8 g/t Au including 1.5 m grading 32.2 g/t Au.
<b>Ike</b>	South Central	<b>Amarc Resources Ltd.</b> (Hudbay Minerals Inc.)	Cu, Mo; porphyry Cu±Mo±Au; 092O 025, 67	na	Diamond drilling 3000 m in 5 holes. Results included 138 m grading 0.28% Cu, 0.024% Mo, 2.1 g/t Ag; 222 m grading 0.35% Cu, 0.022% Mo, 2.4 g/t Ag and 147 m grading 0.26% Cu, 0.042% Mo, 1.9 g/t Ag.
<b>Lac La Hache</b>	South Central	<b>Engold Mines Ltd.</b>	Cu, Au, Ag, Fe; 092P 120, 108, 2	I: 7.60 Mt 0.28% Cu, 0.05 g/t, 1.26 g/t Ag, 11.4% magnetite Inf: 15.8 Mt 0.21% Cu, 0.04 g/t Au, 0.93 g/t Ag, 8.32% magnetite Inf: 1.073 Mt 2.48 g/t Au, 0.64% Cu, 5.98 g/t Ag (Aurizon)	Diamond drilling (5000 m, 10 holes), geophysics, geochemistry. Highlight intersections include 8.8 m grading 3.26% Cu, 0.88 g/t Au, 16.88 g/t Ag, 26.7% Fe at Spout North; 31 m grading 1.14% Cu 0.28 g/t Au, 6.89 g/t Ag, 24.31% Fe at G1 and 58.5 m grading 0.47% Cu, 0.06 g/t Au, 2.18 g/t Ag, 6.07% Fe at Gap.



Table 7. Continued.

<b>Little Gem</b>	South Central	<b>Blackstone Minerals Ltd.</b>	Co, Au; five-element veins Ni-Co-As-Ag+/- (Bi, U); 092JNE068, 108	na	Diamond drilling (2918 m, 10 holes), geophysics, geochemistry, geology. Initial drill results included 4.3 m grading 1.0% Co and 15 g/t Au and 3.2 m grading 0.8% Co and 4 g/t Au.
<b>Miner Mountain</b>	South Central	<b>Sego Resources Inc.</b>	Cu, Au; alkalic porphyry Cu-Au; 092HSE203, 78	na	Diamond drilling (3000 m, 9 holes), mapping. Drilling highlights include 57 m grading 0.26% Cu and 18 m grading 0.56% Cu.
<b>New Craigmont</b>	South Central	<b>Nicola Mining Inc.</b>	Cu, Au; Cu skarns; 092ISE035	na	Drilling (RC 1250 m, 66 holes, DD 5000 m 18 holes). Drilling results included 73.6 m grading 1.05% Cu and 100.6 m grading 1.33% Cu.
<b>Rabbit North</b>	South Central	<b>Tower Resources Ltd.</b>	Cu, Au; alkalic porphyry Cu-Au; 092INE147, 45		Diamond drilling: 790 m in 2 holes. Highlights include 53 m grading 0.32% Cu and 0.22 g/t Au within a larger interval of 288 m grading 0.18% Cu and 0.12 g/t Au.
<b>Shovelnose</b>	South Central	<b>Westhaven Ventures Inc.</b>	Au; epithermal Au-Ag-Cu, low sulphidation; 092HNE309, 308	na	Diamond drilling (5721 m in 16 holes), airborne and ground geophysics. A new discovery was made with results including 17.77 m grading 24.50 g/t Au.
<b>Duncan</b>	Southeast	<b>Rokmaster Resources Ltd.</b>	Zn-Pb-Ag; carbonate-hosted; 082KSE023, 22	na	Mapping; sampling; soil geochemistry; grab sample results up to 23 g/t Ag, 12.5% Pb, and 21.4% Zn; drill permits received late in 2018.
<b>Elko</b>	Southeast	<b>Pacific American Coal Limited</b>	Coal (HCC, PCI); 082GSE029	M: 19.2 Mt I: 57 Mt Inf: 181.3 Mt (JORC 2015)	Drilling (8 RC, 1 large-diameter core; 3451 m); environmental baseline studies and permitting; mapping of five coal seams; 3 seams have hard coking coal quality, 2 seams have PCI coal.
<b>Gibraltar</b>	Southeast	<b>MGX Minerals Inc.</b>	Si; silica sandstone; 082JSW001	na	One tonne sample sent for metallurgical test work; results indicated suitability for medium quality feedstock for metallurgical-grade silicon; sampled 97.8 to 99.9% SiO <sub>2</sub> ; began drilling late in the year (8 DDH).
<b>Gold Drop</b>	Southeast	<b>GGX Gold Corp.</b>	Au; alkalic intrusion-associated Au; 082ESE055, 150, 152, 153, 285, 286, 287	na	Rock sampling; trenching; channel sampling; drilling at the C.O.D. (71 DDH, 14,500 m); drill results include: 2.05 m grading 50.1 g/t Au; 1.47 m grading 54.9 g/t Au; and 16.03 m grading 4.59 g/t Au; trenching at the Everest, Gold Drop, Silent Friend, and Ken veins.

Table 7. Continued.

<b>Greenwood (Lexington/ Golden Crown)</b>	Southeast	<b>Golden Dawn Minerals Inc.</b>	Au-Ag-Pb- Zn+/-Cu; Cu- Au-Ag skarns, polymetallic veins, epithermal Au- veins, porphyry; 082ESE041, 42, 32, 45, 20, 130, 116	Golden Crown: M+I: 163,000 t grading 11.09 g/t Au, 0.56% Cu (2016)  Lexington: M+I: 372,000 t grading 6.4 g/t Au, 1.05% Cu (2016)	<b>Golden Crown</b> drilling (33 DDH, 3121 m); drill intersections include 1.74 m grading 11.11 g/t Au, 0.23% Cu, 7 g/t Ag; 1.66 m grading 15.20 g/t Au, 1.37% Cu, and 20.1 g/t Ag; 12.3 m grading 3.53 g/t Au, 0.11% Cu; and 6.95 m grading 6.77 g/t Au, 1.18% Cu; surface mapping and sampling. <b>Lexington</b> dewatering and rehabilitation of underground; mapping; rock sampling; results included: 3.9 m grading 13.41 g/t Au, 2.08% Cu; 2.3 m grading 26.67 g/t Au, 1.77% Cu; 1.8 m grading 30.18 g/t Au, 4.93% Cu; 1.4 m grading 22.2 g/t Au, 4.32% Cu; and 2.6 m grading 17.04 g/t Au, 3.42% Cu; surface mapping and sampling.
<b>Kena</b>	Southeast	<b>Prize Mining Corp. (Apex Resources Inc.)</b>	Au-Cu+/- Pb-Zn-Ag; porphyry, Au-veins, polymetallic veins; 082FSW379, 173, 174, 175, 294	Kena: I: 24.89 Mt grading 0.6 g/t Au; Inf: 85.79 Mt grading 0.48 g/t Au	Released results of 2017 drilling (3425 m, 29 DDH); results include <b>Daylight</b> : 0.9 m grading 62.7 g/t Au, 0.5 m grading 20.9 g/t Au, 0.5 m grading 7.36 g/t Au; <b>Toughnut</b> : 0.7 m grading 7.3 g/t, 1.0 m grading 25 g/t Au, and 2.0 m grading 5.58 g/t Au. 2018 drilling (3386 m, 20 DDH) at Toughnut; results include 4.37 g/t Au over 6.0 m and 14.3 g/t Au over 0.84 m.
<b>Koot</b>	Southeast	<b>MGX Minerals Inc.</b>	Si; silica sandstone; 082JSW025	na	Mapping, sampling, drilling (782 m, 10 DDH); 97.61 to 99.9% SiO <sub>2</sub> .
<b>LH</b>	Southeast	<b>Magnum Goldcorp Inc.</b>	Cu-Ag-Au; subvolcanic, skarn, Au-veins; 082FNW212	na	Drone-survey magnetics; released 2017 drill results including 8.5 m grading 7.10 g/t Au; gold mineralization appears to be associated with pyrrhotite+/- arsenopyrite; drone magnetic survey and orthophotos.
<b>Sheep Creek</b>	Southeast	<b>Margaux Resources Ltd.</b>	Au+/-Ag, Pb, Zn; Au- quartz veins, polymetallic veins; 082FSW040, 48, 50, 51, 52, 53, 082FSE030, 31, 34, 25	na	<b>Bayonne</b> : mapping; drilling (3308 m, 13 DDH); drill intersections of 1.40 m grading 39.43 g/t Au, and 131.2 g/t Ag; 0.88 m grading 16.88 g/t Au, and 60.2 g/t Ag; and 1.14 m grading 10.85 g/t Au, 23.7 g/t Ag; drilling targeted areas below historic mining and step-out. <b>Sheep Creek</b> : mapping; sampling; compilation of historic data into 3D model using lidar acquired in 2017; sampling of historic Reno and Nugget mine dumps (historic grades of 19.2 g/t Au); dump samples sent to research facility to test ore sorting method.

Table 7. Continued.

<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 grading 0.88 g/t Au, 187 g/t Ag, 0.14% Cu, 0.51% Pb, and 3.51% Zn Inf: 424,000 t grading 0.98 g/t Au, 176 g/t Ag, 0.14% Cu, 2.26% Pb and 3.2% Zn (2013)	Drilling (1983 m; 30 DDH); downhole magnetics; ground geophysics, including resistivity, magnetics, and VLF; processed a 600 t sample using a pilot test mill, with recoveries of ~25.3% of the Au; extension of SIF gold zone.
<b>Tungsten Tailings</b>	Southeast	<b>Margaux Resources Ltd.</b>	W; tailings; 082FSW010, 9	Estimated: 1.4 Mt grading 0.11% WO <sub>3</sub> (non-compliant)	Evaluating economic viability to reprocess tailings from historic Emerald mine; 3500 kg sample sent to CRONIMET for testing; 84 samples tested 0.11% WO <sub>3</sub> ; environmental baseline studies; permitting for 10,000 t bulk sample.
<b>Vine</b>	Southeast	<b>PJX Resources Inc.</b>	Pb-Zn-Ag+/-Au; polymetallic vein, SEDEX; 082GSW050, 49, 35	1.3 Mt grading 2.2 g/t Au, 3.12% Pb, 36.3 g/t Ag, 3.12% Zn (1990; non-compliant)	Drilling (6000 m; 15 DDH); magnetotelluric survey; geophysical and geological modeling; focus on East gravity anomaly; infilled gravity survey grid; detailed geophysical and geological model; drilling intersected sulphides (pyrite, pyrrhotite, sphalerite) near Moyie fault zone.
<b>Jasper</b>	Southwest	<b>Nitinat Minerals Corporation</b>	Cu, Zn, Au, Ag; Noranda/Kuroko massive sulphide; 092C 080, 37, 81, 88	na	Geophysical interpretation.
<b>Ladner Gold</b>	Southwest	<b>New Carolin Gold Corp.</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	Drilling; planned 3400 m underground.

Table 7. Continued.

<b>Pemberton Hills</b>	Southwest	<b>Northisle Copper and Gold Inc. (Freeport-McMoRan Mineral Properties Canada Inc.)</b>	Cu, Mo; porphyry Cu $\pm$ Mo $\pm$ Au; 092L 131, 308	na	Drilling 3400 m in 6 holes. IP, geochemistry.
<b>Surespan Gold</b>	Southwest	<b>640895 B.C. Ltd.</b>	Au, Ag; Au-quartz veins; 092L 008, 311, 155	Privateer historical: 122,475 t 17 g/t Au	Drilling 6700 m in 34 holes.

M = Measured; I = Indicated; Inf = Inferred

Drilling highlights included 40.89 m of 9.55 g/t Au. Saddle South, discovered in 2017, is the project's first high-grade epithermal vein occurrence.

Tudor Gold Corp. (80%) and Teuton Resources Corp. (20%) drilled 7200 m in nine holes at their **Treaty Creek** project. The target was the Copper Belle zone and highlight results included 121.8 m of 1.04 g/t Au with a high-grade interval of 26.6 g/t Au over 1.5 m.

### 8.1.2. North Central Region

In 2018, Benchmark Metals Inc. completed a 30 hole, 4116 m exploration drilling program at their **Lawyers** project. The company also relogged and sent for assay 1051 m of historic mineralized core, collected 1041 soil and 312 rock samples for assay, and completed an airborne VTEM survey. Highlight results from new core include 4.36 m at 6.15 g/t Au and 124.37 g/t Ag and 3.05 m at 5.62 g/t Au and 292.31 g/t Ag. The company plans a large-scale drilling program for 2019, targeting the Marmot occurrence. A 2016 technical report posted an Inferred resource for the Cliff Creek North zone of 550,000 t at 4.51 g/t of Au and 2019.15 g/t of Ag, and for the Duke's Ridge zone of 58,000 t at 4.30 g/t of Au and 139.13 g/t of Ag, both with a 4.0 g/t AuEq cutoff.

### 8.1.3. South Central Region

Ximen Mining Corp. completed a gold recovery batch test of stockpiled material for their **Brett** project. The sample (34 kg) returned a weighted average grade of 4.20 g/t Au. They are working toward permitting of underground work, starting with re-opening a portal.

Barkerville Gold's multi-target **Cariboo Gold** project was the largest in the region, as it has been for several years. The project included 123,000 m of drilling in 439 holes and an updated resource estimate with 1.6 Moz Au in the Measured and Indicated categories and more than 2 Moz Inferred. They described orogenic gold mineralization, both vein and replacement.

Kore Mining Ltd. carried out 940 m of diamond drilling (four

holes) at the Camp zone on their **Gold Creek** property; assays included 9.0 m grading 5.8 g/t Au including 1.5 m grading 32.2 g/t Au.

Westhaven Ventures Inc. completed 16 holes and more than 5000 m of drilling at their **Shovelnose** project. Results of the first 10 holes included 17.77 m grading 24.50 g/t Au in the South zone, a 2018 discovery. The 2018 intersections are the first to confirm high grade at depth. Follow up drilling at the end of the year tested vertical and strike extents of the vein system. In addition to drilling, Westhaven conducted a ground magnetic survey and passive seismic survey. The South zone target originally appeared as a linear magnetic low in 2017. The seismic survey was to estimate overburden thickness in targets areas. Following results at **Shovelnose**, a subsidiary of Sable Resources Ltd. staked virtually all open ground in the Spences Bridge belt and formed an alliance with Westhaven. Targets are additional mineralized epithermal veins.

### 8.1.4. Southeast Region

GGX Gold Corp. continued drilling and trenching at their **Gold Drop** property. The property hosts numerous north-trending, easterly dipping gold-bearing veins that are 10 cm to 2 m thick. Drilling (14,500 m, 71 DDH) targeted infill locations and extensions of the C.O.D. and Everest veins. Drill results include 2.05 m grading 50.1 g/t Au; 1.47 m grading 54.9 g/t Au; and 16.03 m grading 4.59 g/t Au. The company also mapped, sampled, and trenched at the Silent Friend and Ken veins, to follow up on grab sample results of 6.98 g/t Au and 38.6 g/t Ag, and 4.47 g/t Au and 23.0 g/t Ag from the historic workings. They also trenched extensions of the Gold Drop vein.

Golden Dawn Minerals Inc. has been evaluating several historic mineralized areas at their **Greenwood** project, including the May Mac, Golden Crown, and Lexington. Drilling that began late in 2017 at Golden Crown (3121 m, 33 DDH), continued in 2018. Drill intersections included: 1.74 m grading 11.11 g/t Au, 0.23% Cu, 7 g/t Ag; 1.66 m grading 15.20 g/t Au, 1.37% Cu, and 20.1 g/t Ag; 12.3 m grading 3.53 g/t Au, 0.11% Cu; and 6.95 m grading 6.77 g/t Au, 1.18% Cu. Surface

mapping and sampling identified mineralization 3 km along strike at the JD zone, with chip sample results ranging between 1.8 and 15.8 g/t Au. At the historic Lexington mine, ventilation was installed and rehabilitation of some of the workings began. Mapping and sampling of underground workings to develop a 3D model and characterize the mineralization was carried out. Rock chip sample results included: 3.9 m grading 13.41 g/t Au, 2.08% Cu; 2.3 m grading 26.67 g/t Au, 1.77% Cu; 1.8 m grading 30.18 g/t Au, 4.93% Cu; 1.4 m grading 22.2 g/t Au, 4.32% Cu; and 2.6 m grading 17.04 g/t Au, 3.42% Cu. Surface mapping and chip sampling along strike west of the underground workings yielded results including 4.5 m grading 14.5 g/t Au.

Magnum Goldcorp Inc. released results from drilling (659 m, 5 DDH) that began in late 2017 for their **LH** property. Intersections included 8.5 m grading 7.10 g/t Au. In 2018, the company expanded magnetic survey coverage and obtained orthophotos using drones.

Margaux Resources Ltd.'s **Sheep Creek Gold District** project includes the Bayonne and Sheep Creek properties. The company carried out mapping, rock sampling, and drilling on the Bayonne property, which hosts several high-grade, steeply dipping gold-bearing orogenic quartz veins in a granodiorite. Drilling in 2018 (3308 m, 13 DDH) followed up on results from 2017, and focussed on the Main and A veins in areas beneath the historic workings, and step-out areas. Vein intersections included 1.40 m grading 39.43 g/t Au, and 131.2 g/t Ag; 0.88 m grading 16.88 g/t Au, and 60.2 g/t Ag; and 1.14 m grading 10.85 g/t Au, 23.7 g/t Ag. At the Sheep Creek property, Margaux compiled historic data into a 3D model using lidar. Surface workings identified on the lidar survey were used to register the locations of historic workings, and also identified new workings that had no information. The property includes 60 known veins and 34 past producers. Samples from the Reno and Nugget mine dumps were sent for sensor-based sorting testing to determine if waste rock grades could be upgraded and processed. Their planned drill program was delayed due to forest fires until 2019.

### 8.1.5. Southwest Region

New Caroling Gold Corp.'s **Ladner Gold** project includes the former Carolin mine site. The planned exploration program for 2018 was 3400 m in 28 holes. First-phase drilling on the Main zone included a highlight of 93 m averaging 1.39 g/t Au including 7 m of 5.75 g/t Au. Before recent surface and underground drilling, the company had resource estimates at the past-producing Carolin mine for an open-pit operation of Inferred at 0.5 g/t Au cutoff of 12,352,124 t grading 1.53 g/t Au and for an underground operation of Inferred at 2.0 g/t Au cutoff of 2,588,376 t grading 3.34 g/t Au. The McMaster zone has an Inferred resource of 3,575,000 t grading 0.69 g/t Au at a 0.5 g/t Au cut off. The Carolin mine tailings estimate has 445,378 t at 1.83 g/t Au in the Indicated category and 93,304 t grading 1.85 g/t Au in the Inferred category.

The **Surespan Gold** project is operated by a numbered

company (640895 B.C. Ltd.), which is privately funded, and results from 6700 m of drilling have not been made public. The area hosted 19 gold producers from the 1930s to the late 1990s, mainly from quartz veins. The Privateer mine was the most productive of these, with 170,463 oz of gold recovered. Between 1934 and 1975, the Zeballos camp produced approximately 300,000 oz gold from veins, mostly at the Privateer and Spud Valley mines. Before recent work that began in 2017, the last significant exploration was in the early 2000s.

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

### 8.2.1. Northwest Region

Amarc Resources Ltd.'s **Duke** property straddles the Northwest and North Central regions. The property includes a porphyry Cu +/-Mo deposit that was the subject of an historic (NI 43-101 non-compliant) inferred resource estimated at 40.8 Mtons at 0.25% Cu and 0.01% Mo. Amarc drilled six holes, totalling 3060 m to follow up on 2017 results. Seven of the eight holes drilled in 2017 and 2018 intersected porphyry Cu-Mo-Ag mineralization. Highlight results from 2018 included 348 m grading 0.23 % Cu, 0.013% Mo, 1.1 g/t Ag, 0.05 g/t Au. Results to date suggest currently defined mineralization is open in all directions.

Golden Ridge Resources Ltd. announced discovering a new porphyry Cu-Au occurrence at the Williams zone of their **Hank** project. The first drill hole intersected 327 m grading 0.31% Cu, 0.35 g/t Au and 1.94 g/t Ag. Additional drilling returned similar grades, and the company expanded induced polarization survey coverage.

The **Hat** project, contains the Lisle alkali porphyry Au-Cu zone. In 2018 Doubleview Capital Corp. optioned the project to Hudbay Minerals Inc. Hudbay will be the operator and has the right to earn up to 65% interest by fulfilling the terms of a three-stage agreement, which includes expenditures of \$40 million and costs for a feasibility study. In the summer, a 40 line-km, deep-penetrating induced polarization survey was carried out to target the depth, shape, structure, and dimensions of gold-copper mineralization and to delineate drilling targets.

Surge Copper Corp.'s (formerly Gold Reach Resources Ltd.) **Ootsa** project is adjacent to the past-producing Huckleberry mine and mill complex. In 2018 Surge Copper discovered a new copper zone 500 m northeast of their East Seel deposit. The discovery hole intersected 202 m of continuous mineralization and assayed 0.26% Cu, 0.31 g/t Au and 1.32 g/t Ag. A later hole intersected 22 m of 0.5% Cu, 0.10 g/t Au, 17.6 g/t Ag, 0.65% Zn and 0.14% Pb. Drilling an uplifted fault block between the East Seel and Damascus deposits intersected a new gold zone, returning a 2 m intersection grading 9.4 g/t Au.

The **Schaft Creek** porphyry Cu-Au-Mo is an advanced-stage project owned by Teck Resources Limited (75%) and Copper Fox Metals Inc. (25%). In 2018, the companies continued environmental base line studies and First Nations consultations. The project consists of three deposits: the Main (Liard) zone, The Paramount zone and the West Breccia zone. A 2013 feasibility study defined a Proven and Probable reserve



of 940.8 Mt grading 0.27% Cu, 0.19 g/t Au, 0.018% Mo and 1.72 g/t Ag. Measured and Indicated resources were listed as 1,228.6 Mt grading 0.26% Cu, 0.017% Mo, 0.19 g/t Au and 1.69 g/t Ag and a 597.2 Mt Inferred resource grading 0.22% Cu, 0.016% Mo, 0.17 g/t Au and 1.65 g/t Ag. Proven and Probable reserves are included within the stated Measured and Indicated resources.

ML Gold Corp. reported that drilling at two new targets on their **Stars** project intersected mineralized porphyry. In February, they announced 204 m assayed 0.45% Cu, 0.045 g/t Au, 1.64 g/t Ag, 0.0048% Mo. In August, they announced 405 m assayed 0.20% Cu, 0.0082% Mo, 0.754 g/t Ag and 24 ppb Au.

GT Gold Corp.'s **Tatogga** project has two target areas, Saddle South and Saddle North. Saddle South is a high-grade gold discovery made in 2017. In 2018, GT Gold reported discovering a new Cu-Au-Ag porphyry at the Saddle North target, approximately 1.5 kilometres east-northeast of the Saddle South gold discovery. Initial drilling highlights included 430 m of 0.67 g/t Au, 0.41% Cu and 0.89 g/t Ag. A later hole, approximately 200 m to the northwest, returned 363 m of 1.02 g/t Au, 0.51% Cu and 1.72 g/t Ag in 904 m of 0.51 g/t Au, 0.30% Cu and 0.93 g/t Ag.

### 8.2.2. North Central Region

Centerra Gold Inc.'s **Kemess East** project is about 1 km east of the Kemess Underground project. A 2017 report identified an Indicated resource of 113.12 Mt grading 0.38% Cu, 0.46 g/t Au, and 1.94 g/t Ag. In 2018 Centerra carried out 27 line-km of induced-polarization surveys on the Nugget, Hilda South, Oriobn, Kemess South extension targets, relogged historic core and revised their deposit model.

Kwanika Copper Corporation (65% Serengeti Resources Inc., 35% Daewoo Minerals Canada Corp.) was formed in 2017 to continue exploration on the **Kwanika** property. In 2018, the company completed a 21-hole, 7411 m drill program targeting the Central zone. Three of these were to test the foundation characteristics for a potential tailings storage facility. Nine of them were also to be used for ongoing hydrogeological monitoring to support detailed engineering design. The program was part of a new NI 43-101 report expected to be released in mid-2019.

### 8.2.3. South Central Region

Evrin Resources Corp. and partner Antofagasta Plc. carried out a 3000 m drill program, including diamond drilling and reverse circulation drilling on the **Axe** project.

Hudbay Minerals Inc. (60%) and Amarc Resources Ltd. (40%) drilled five widely spaced holes on the **Ike** project with Amarc as operator. Results included 138 m grading 0.28% Cu, 0.024% Mo, 2.1 g/t Ag; 222 m grading 0.35% Cu, 0.022% Mo, 2.4 g/t Ag and 147 m grading 0.26% Cu, 0.042% Mo, 1.9 g/t Ag. The mineralization remains open.

Sego Resources Inc. had two phases of drilling, with mapping following the first phase, at their **Miner Mountain**

project. Highlights of the first phase include 57 m grading 0.26% Cu and 18 m grading 0.56% Cu. Miner Mountain is an alkalic porphyry Cu prospect with numerous targets in an area of limited exposure about 18 km northeast of the Copper Mountain mine.

Tower Resources Ltd. drilled 760 m in two holes at their **Rabbit North** project in 2018. A highlight was 53 m grading 0.32% Cu and 0.22 g/t Au within a larger interval of 288 m grading 0.18% Cu and 0.12 g/t Au.

### 8.2.4. Southwest Region

The **Pemberton Hills** project is divided from Northisle Copper and Gold Inc.'s North Island project as part of an arrangement with Freeport McMoRan (Northisle Copper and Gold Inc. 35%; Freeport-McMoRan Mineral Properties Canada Inc. 65%). The greater property includes several porphyry copper and epithermal gold targets extending along a 40 km west-northwest trend from Island Copper. Hushamu, a porphyry Cu-Mo-Au prospect, is the most advanced, with Indicated 304.4 Mt of 0.21% Cu, 0.29 g/t Au, 0.010% Mo, and 0.56 ppm Re and Inferred 205.6 Mt 0.18% Cu, 0.26 g/t Au, 0.008% Mo and 0.38 ppm Re. In 2015, Northisle Copper and Gold Inc. acquired an option on the Red Dog property, approximately 7.5 km west-north-west of the Hushamu deposit. In 2016, they drilled to verify an historical resource estimate. At a 0.20% Cu cut off, the updated Red Dog estimate has 23.6 Mt at 0.32% Cu, 0.46 g/t Au and 0.007% Mo Indicated and 848,000 t at 0.23% Cu, 0.33 g/t Au and 0.003% Mo Inferred.

Work in 2018 focussed on the earlier stage Pemberton Hills area, under option to Freeport McMoRan. In addition to an IP survey, they drilled 3,400 m in 6 holes. The target is a 1.5 x 3.5 km area of advanced argillic alteration. Historically, drilling encountered anomalous copper at depths of about 200 m, suggesting possible blind mineralization.

## 8.3. Selected polymetallic base and precious metal projects

### 8.3.1. Northwest Region

Pretium Resources Inc. continued to evaluate their 1250 km<sup>2</sup> of mineral claims that surround the Brucejack mine. The **Brucejack Regional** project includes the American Creek, Bluffy, and Koopa zones, along with the newly discovered Upper Kirkham zone. The company drilled 8000 m, mapped and prospected. At the American Creek zone, highlight drilling results included 1.5 m grading 10.15 g/t Au and 25.5 m grading 41.54 g/t Ag, 2.12% Zn and 0.56% Pb. Prospecting sample results located the new Upper Kirkham zone. Samples returned assays as high as 3.55 g/t Au, greater than 10,000 g/t Ag, 4.71% Cu, greater than 20% Pb and 3.81% Zn.

At the **Clone Gold** project, Sunvest Minerals Corp. carried out geochemical rock, silt, and soil sampling, and packsack drilling in 2018. Recent ice retreat has resulted in new bedrock exposure and the company carried out detailed geological mapping. Sampling at the Port 19 showing returned Cu values of 0.52%, 0.99%, 1.02% and 1.64% and a Ag assay of 220 g/t. Sampling at the Outbound showing returned multiple rock

samples returning in excess of 0.10% Cu (up to 0.56% Cu), and up to 132 g/t Ag, and soil samples with up to 1.04 g/t Au.

At the Clone prospect, sampling returned values including 10.9 g/t Au, and 0.64% Cu in rock samples, and peak values of 1.26 g/t Au and 1.66 g/t Au from soil samples. A new mineralized vein (Southern Glory prospect) was also announced. A quartz vein, up to 1.25 m wide, was mapped along a strike length of about 70 m. Results included a 1 m chip sample returning 4.11% Cu, 160 g/t Ag, 0.52 g/t Au.

Dolly Varden Silver's **Dolly Varden** project consists of the Torbrit, Dolly Varden, Wolf, and North Star deposits and a number of mineralized zones. In 2018, Dolly Varden drilled 29,108 m in 84 holes and discovered a new zone (Bonus). Drilling results included 15.50 m grading 161.4 g/t Ag, 0.25% Pb and 0.20% Zn. Drilling on known zones included 24.0 m grading 287.5 g/t Ag, 0.29% Pb, and 0.11% Zn at Torbrit East and 29.15 m grading 226.0 g/t Ag, 0.09% Pb, and 0.13% Zn at the Moose-Lamb zone.

The **Eskay Creek** project was acquired in late 2017 by Skeena Resources from Barrick Gold Inc. and includes the past-producing Eskay Creek mine. In 2018, Skeena carried out diamond drilling, compiled and reviewed 20 years of exploration and production information, and completed a geologic model and resource estimate. The pit-constrained Indicated resource estimate is 1.08 Mt at 4.9 g/t Au, 72 g/t Ag, and the Inferred resource is 4.26 Mt at 3.3 g/t Au, 72 g/t Ag. The underground Indicated resource is 2.51 Mt at 7.2 g/t Au, 215 g/t Ag, and the underground Inferred resource is 0.81 Mt at 7.2 g/t Au, 214 g/t Ag. Lead, copper, zinc and antimony are potential by-products.

Drilling highlights from 2018 include 14.55 m grading 7.36 g/t Au, 1189 g/t Ag and 31.50 m grading 10.16 g/t Au, 331 g/t Ag and 42.65 m grading 9.49 g/t Au, 111 g/t Ag.

Goliath Resources Limited reported discovering multiple breccias, stockworks, and veins containing high-grade gold and polymetallic mineralization at the **Golddigger** project. A 0.55 m channel sample graded 29.70 g/t Au and 14.30 g/t Ag, a 0.50 m chip sample graded 47.50 g/t Au and 272.00 g/t Ag and grab samples graded up to 113.50 g/t Au and 249.00 g/t Ag. This new gold-enriched polymetallic discovery is in an extensive area where glacier retreat and snow pack loss has increased bedrock exposure.

Hecla Mining Company reported that 2018 drilling at the **Kinskuch** project defined silver-enriched base metal mineralization along a strike length of 4.8 km and that high-grade zones appear to have continuity. These zones may represent two parallel structures or the limbs of a folded body. Although assay results were not mentioned, Hecla reported that they plan to produce a preliminary resource model.

Kutcho Copper Corp.'s **Kutcho** project is at an advanced stage. A preliminary feasibility study from 2017 reported a Probable reserve of 10.4 Mt at 2.01% Cu, 3.19% Zn, 34.61 g/t Ag, and 0.37 g/t Au. At a 1.0% Cu cut off, combined Measured and Indicated resources are estimated at 16.853 Mt of 1.89% Cu, 2.87% Zn, 0.36 g/t Au and 32.8 g/t Ag. In 2018, Kutcho

carried out a comprehensive review of historic data to identify targets for drilling. Results of this drilling included 28 m of 2.09% Cu, 6.1% Zn, 65.8 g/t Ag, 0.82 g/t Au and 5.4 m of 2.48% Cu, 1.0% Zn, 114.0 g/t Ag, 0.24 g/t Au. A bench-scale metallurgical study is underway and a feasibility study is scheduled for 2019.

In 2018, Colorado Resources Ltd. diamond drilled 7847 m in 35 holes at the KSP property. Drilling tested step out targets near the historic Inel basin area, including the Big Rock Deformation zone (BRDZ) to the east, and the Inel zone to the north. Results included 32 m grading 0.32 g/t Au and 1.64% Zn and 50 m grading 2.28 g/t Au, including 6 m grading 7.36 g/t Au.

In 2018, Gitenes Exploration Inc. carried out reconnaissance prospecting and sampling at the **Maroon** project, and found several polymetallic quartz-sulphide veins. Sampling focussed on historical workings and returned results up to 50 g/t Au, 11.5% Zn and 13.9% Pb.

Casa Minerals Inc.'s **Pitman** project includes previously known target areas including Gold Dome and Pitman, and 2018 discoveries, Golden Dragon, Dragon Tale. Rock chip sampling at Golden Dragon returned 0.6 m assaying 574.42 g/t Au, 109 g/t Ag, 0.1% Cu, 1.56% Pb, 0.23% Zn and 0.9 m assaying 268.86 g/t Au, 127 g/t Ag, 0.2% Cu, 2.95% Pb, 0.04% Zn. The Dragon Tale showing is about 1 km from Golden Dragon and rock sampling returned assays as high as 231 g/t Ag and 6.15% Zn.

StrikePoint Gold Inc.'s **Porter** project is within 4 km of Stewart and contains the historic Silverado mine, the historic Handsome Jack workings, the Porter historic resource area, the Big Nunatak showing and the Glacier Creek property. Having acquired the property from Skeena Resources Limited in July, StrikePoint Gold carried out diamond drilling (4800 m), prospecting, and sampling. Glacier retreat has exposed a new mineralized vein along a 275 m strike length near the historic Porter resource. Thirty-two samples were collected, with assays ranging from trace to 43.6 oz/t Ag, trace to 0.54 oz/t Au and trace Zn to 28.8%. Sampling at Big Nunatak returned up to 427 g/t Ag and 0.78% Cu. At the Glacier Creek property, 5.5 km northeast of the Porter mine site, a new mineralized vein was discovered with a 205 m strike length and widths of up to 2 m. Samples graded up to 876 g/t Ag and 10.8 g/t Au.

Decade Resources Ltd. carried out rock sampling on its **Premier East** project, adjacent to the historic Premier gold-silver mine. Results returned anomalous values for precious and base metals, including one sample that graded 5.72 g/t Au, 716 g/t Ag and 11.60% Cu.

### 8.3.2. North Central Region

ZincX Resources Corp. continued exploration on its **Akie** SEDEX project. In August, the company released a new Preliminary Economic Assessment which proposed a 4000 tpd underground mine feeding a 3000 tpd concentrator over a mine life of at least 18 years. In 2018, the company completed five drill holes totalling 2013 m, on the Southeast, North Lead

and Sitka, and Sitka extension zones. The most encouraging results came from the Sitka zone, a Zn-Pb massive barite unit about 4 km east of the Cardiac Creek deposit. Hole A-18-144 intersected 5.08 m at 3.78% of Zn and 1 m at 11.33% of Zn. Hole A-18-145 intersected 3.5 m at 3.72% of Zn, which included 0.86 m at 11.09% of Zn. In the 'Sitka extension, about 400 m along strike southeast of the Sitka zone, hole A-18-149 encountered 12.98 m grading 1.10% of Zn, including 2.18 m at 3.47%.

InZinc Mining Ltd.'s **Indy** project has been of exploration interest since the early 1980s. Hosted by carbonate rocks, it has generally been categorized as a Mississippi Valley-type (MVT) deposit, although SEDEX affinities have long-been recognized. In 2018, InZinc completed 11 holes totalling 1271 m. Drilling encountered mineralization in all holes, mostly at shallow depths. For example, hole IB18-008 intersected 5.76% of Zn, 0.48% of Pb and 3.41 g/t of Ag over 6.73 m at 56 m depth. Hole IB18-009 intersected 12.33% of Zn, 2.98% of Pb, and 24.46 g/t of Ag over 6.29 m at 60 m depth. The company now considers **Indy** to be a vent-proximal SEDEX deposit equivalent in age to others in north-central British Columbia.

### 8.3.3. Southeast Region

Rokmaster Resources Corp.'s **Duncan** property has been explored intermittently since the 1950s.

Drilling by Cominco between 1989 and 1997 outlined zinc-lead mineralization along a 650 m strike length. Several zones of mineralization exist on the property as steeply dipping, stratiform, tabular bodies, separated by high-angle fault zones. Mapping, soil geochemistry and rock sampling was done on the property in 2018. Elevated grab sample results up to 23 g/t Ag, 12.5% Pb, and 21.4% Zn were returned from an area of recent logging. The company also conducted environmental baseline work; drill permits were received late in the year.

Prize Mining Corporation's **Kena-Daylight** project includes an 80% interest in the Kena and Daylight gold-copper properties (20% owned by Apex Resources Inc.), and 100% of the adjoining Toughnut claims. Results from late 2017 drilling were released in early 2018.

Results from Daylight included high-grade intersections of 0.9 m grading 62.7 g/t Au, 0.5 m grading 20.9 g/t Au, 0.5 m grading 7.36 g/t Au, and low-grade intervals of up to 74.28 m grading 1.09 g/t. At Toughnut, results included 0.7 m grading 7.3 g/t, 1.0 m grading 25 g/t Au, and 2.0 m grading 5.58 g/t Au. The company followed up in 2018 with further drilling at the Toughnut (3386 m, 20 DDH) across an area of 1000 x 450 m in the Silver King shear system targeting the Gold Eagle showing and the Toughnut Crown Grant workings. Results from the 2018 drilling include 4.37 g/t Au over 6.0 m and 14.3 g/t Au over 0.84 m.

Taranis Resources Inc. continued work at their **Thor** property, which has several targets, including the True Fissure, Great Northern, Broadview, and Blue Bell past-producing mines. In 2018, the company continued drilling (1983 m, 30 DDH) southeast of the Great Northern zone, as a follow up to 2016

drilling, which encountered stacked zones of mineralization, and step out mineralization. Results included 2.38 m grading 0.24 g/t Au, 149.1 g/t Ag, 2.32% Pb, 3.40% Zn, 0.08% Cu and 2.35 m grading 3.88 g/t Au, 5.20 g/t Ag. They also conducted resistivity, ground magnetics, and VLF surveys over portions of the property to better define structures and identify new targets. The company also processed a 600 t sample from the SIF zone using a pilot plant to test gold grades and recovery methods. In the field, it was estimated that the plant was only able to recover 25.3% of the gold because finer fractions were lost and using a hammer mill was inefficient. Future work would include the use of a ball mill to obtain a finer grind size and improve recoveries by liberating more gold. The company has applied for a 10,000 t bulk sample permit, and began collecting environmental baseline data and information required for permitting.

## 8.4. Selected skarn projects

### 8.4.1. North Central Region

The **Stardust** property was acquired by Sun Metals Corp. in 2017. Historically regarded as a skarn deposit, it was explored intermittently for many years. In 2018, the company extended previous mapping and prospecting, collected more than 2800 soil samples, completed an airborne lidar with photogrammetry survey, and a 1103 line-km VTEM and magnetic survey on a 100 m line spacing. Twenty-two drill holes were completed, totalling 6838 m, and a post-drilling downhole EM survey was undertaken. Hole DDH18-SD-421 returned a 100 m intersection grading 2.51% of Cu, 3.03 g/t of Au, 52.5 g/t of Ag. The company considers that this mineralization represents the distal part of a larger skarn.

### 8.4.2. South Central Region

At the **Fox** tungsten skarn property, Happy Creek Minerals Ltd. reported results of surface sampling at a previously untested area at the southern part of the Ridley Creek resource area. One sample graded 7.43% WO<sub>3</sub> across 0.35 m. Since 2005, work has identified seven, near-surface mineralized zones in a system extending across a 3 x 10 km area. In February, Happy Creek reported an update to the resource estimate with an Indicated 582,400 t 0.826 WO<sub>3</sub> and Inferred 565,400 t 1.231% WO<sub>3</sub>.

Engold Mines Ltd.'s **Lac La Hache** project comprises several target areas including skarn, porphyry, vein and breccia mineralization. Work included diamond drilling and IP surveys at Cu-Au-Ag-Fe skarn targets (e.g., Spout North, Spout, G-1, Gap) and also a gold vein target in the southeastern part of the property (Aurizon). Highlight intersections include 8.8 m grading 3.26% Cu, 0.88 g/t Au, 16.88 g/t Ag, 26.7% Fe at Spout North; 31 m grading 1.14% Cu, 0.28 g/t Au, 6.89 g/t Ag, 24.31% Fe at G1 and 58.5 m grading 0.47% Cu, 0.06 g/t Au, 2.18 g/t Ag, 6.07% Fe at Gap. They obtained up to 25.6 g/t Au in grab samples near the Aurizon and Au in soil anomalies. Drilling continued into late 2018.

Nicola Mining Inc.'s **New Craigmont** project includes the past-producing Craigmont mine and surrounding area. Nicola



is exploring for additional copper-iron skarn near the mine and evaluating historical waste dumps as potential ore by using reverse circulation drilling. Exploration included diamond drilling, and IP surveys at several zones. An intersection in a hole north of the Craigmont pit returned 73.6 m grading 1.05% Cu. Early in the year, they reported 100.6 m grading 1.33% Cu at the Craigmont West zone. Target mineralization is copper-gold skarn in calcareous Nicola Group rocks cut by a southern border phase of the Giuchon Creek batholith.

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

### 8.5.1. Northwest Region

At their **Nickel Mountain** project Garibaldi Resources Corp. carried out a 32-hole 11,573 m diamond drilling program. Highlight results for 10 holes include 30.5 m of 3.10% Ni, 1.86% Cu, 0.081% Co, 0.863 g/t Pt, 1.776 g/t Pd, 0.739 g/t Au, 7.3 g/t Ag and 5.6 m of 7.60% Ni, 3.36% Cu, 0.198% Co, 0.668 g/t Pt, 0.814 g/t Pd, 0.466 g/t Au, 9.0 g/t Ag. Results for the remaining 22 holes are pending. Additional drilling in 2019 is planned.

Giga Metals Corp. diamond drilled 10,835 m (40 holes) at their **Turnagain** project to test new targets, provide infill, collect samples for metallurgical testing, and yield geotechnical information for pre-feasibility studies. The project has Measured and Indicated resources of 865 Mt at 0.21% Ni, 0.013% Co, and an additional Inferred resource of 976 Mt at 0.2% Ni, 0.013% Co.

### 8.5.2. Northeast Region

FPX Nickel Corp. filed a resource update for the Baptiste deposit at their **Decar** project. The deposit is reported to have a pit-constrained resource of Indicated 1.84 Bt grading 0.123% Ni and Inferred 390.8 Mt grading 0.115% Ni. In the fall, the company announced starting a metallurgical study.

## 8.6. Selected specialty metal projects

### 8.6.1. North Central Region

Ethos Gold Corp. began work on its **Pine Pass** black shale-hosted vanadium prospect. In 2018, the company completed five hand-dug trenches and continuous rock chip samples in a road cut along Highway 97. Trench 1 returned grades averaging 0.27% of  $V_2O_5$  over 255 m across strike, and Trench 2 gave grades averaging 0.43% of  $V_2O_5$  over 155 m across strike. The company's immediate plan is to conduct a deep IP survey and continue trenching in an effort to define a drill program.

Spectrum Mining Corporation announced in late 2018 that a 30 t bulk sample would be collected from historic trenches and a drilling program at up to 51 sites would be started at their **Widheeda** 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. A non-NI 43-101 compliant resource estimate concluded that, at an LREE cutoff of 1.00%, the deposit contained an indicated resource of 11.26 Mt grading 1.95% LREE (1.16% cerium, 0.54% lanthanum, 0.24% neodymium, 0.03% niobium, and 0.01% samarium).

### 8.6.2. South Central Region

Blackstone Minerals Limited acquired the **Little Gem** cobalt-gold prospect in 2017. The property includes the Jewel prospect approximately 1 km to the north. Jewel was a minor producer of gold, silver and copper in 1938-1940. Work in 2018 included drilling, an IP survey, rock, soil, and stream-sediment geochemistry and prospecting. Since acquiring the project, Blackstone reported additional targets, including Roxey, a gold-copper showing, and Erebor, which returned cobalt, gold, nickel and copper assays from rock samples. Some initial drill results include 4.3 m grading 1.0% Co and 15 g/t Au and 3.2 m grading 0.8% Co and 4 g/t Au. The Little Gem hosts vein-type cobalt- gold mineralization with anomalous Ag, Ni, Bi, U and As.

## 8.7. Selected coal projects

### 8.7.1. Northwest Region

In 2018, Allegiance Coal Limited continued to move the **Tenas** project forward through their wholly owned subsidiary Telkwa Coal Limited. Eight PQ diameter holes were drilled, three for the installation of water monitoring wells and five to collect rock samples for geochemical studies and coal testing. Twelve sonic holes were drilled for geotechnical information. Fourteen large diameter (150 mm) holes were drilled, recovering 1400 kg of coal. The coal was sent for sizing, washability, and comprehensive coal quality analyses and to generate samples for coke oven tests. In November it was announced that Itochu Corporation of Japan (Itochu) was investing in the project. A definitive feasibility study was expected in early 2019.

### 8.7.2. Northeast Region

Colonial Coal International Corp. released a preliminary economic assessment on its **Huguenot** project. As a combined open-pit and underground operation, Huguenot was estimated to have an NPV of \$US1.166 million in metallurgical coal based on \$US172.00 per t, with break-even at \$US 120.00 per t. Measured plus Indicated surface mining resources across three resource blocks were reported as 132.0 Mt, and underground as 145.7 Mt. Mine life was projected at 31 years.

### 8.7.3. North Central

Atrum Coal's **Panorama** project is a joint venture of Atrum Coal Limited (65%) and Japan Oil, Gas and Metals National Corporation (JOGMEC) (35%). In 2018, Atrum conducted drilling on the Panorama North deposit, targeting PCI anthracite coal in an open syncline for blending to produce metallurgical coal. Eight holes were completed, totalling 1979 m, and seam thicknesses of up to about 4 m were identified.

#### 8.7.4. Southeast Region

Pacific American Coal Limited drilled on their **Elko** project in 2018 (8 RC, 1 large-diameter core; 3451 m). Coal quality results are pending, but correlation of geophysical drill logs suggest seam continuity, and will be used to update the geological model. The company began working on the project in 2015, and compiled all the historical data into a model to outline the drill locations. The company also has conducted extensive environmental baseline work, and engagement with the First Nations to receive the necessary permits for exploration.

### 8.8. Selected industrial mineral projects

#### 8.8.1. Southeast Region

MGX Minerals Inc., continued to explore on their **Koot**, **Gibraltar** and **Wonah** projects. At **Koot**, the company drilled (782 m, 10 DDH), reporting intersections of quartzite 36 to 105 m thick with 97.9 to 99.0% SiO<sub>2</sub>. At **Gibraltar**, MGX collected a one-ton sample and testing indicated that the material could be suitable as medium quality feedstock for metallurgical-grade silicon metal production. They also mapped and sampled on the property, reporting assay results between 97.8 and 99.9% SiO<sub>2</sub>, and began an eight-hole drill program late in the year. At **Wonah** geological mapping and sampling was done; 11 chip samples were assayed between 98.9 and 99.9% SiO<sub>2</sub>. The company received drill permits and began road construction, and plans to drill in 2019.

### 9. Publically funded geoscience

#### 9.1. The British Columbia Geological Survey

Founded in 1895, the British Columbia Geological Survey (BCGS) is the oldest scientific agency in the province. The Survey conducts research to establish the geological evolution and mineral resources of the province. Drawing on continuously advancing concepts and technologies, the Survey creates knowledge to guide societal decisions centred on the Earth sciences. The information provided by the Survey is used for effective mineral exploration, sound land use management, and responsible governance. This information benefits decisions that balance the economy, the environment, and community interests. The Mineral Development Office is the Vancouver base of the British Columbia Geological Survey. It provides investment intelligence to government and global business, connecting the national and international investment community to the Survey and to the province's geology and mineral resources.

In 2018, the BCGS had field projects throughout the province. The BCGS leverages its resources by partnering with federal, provincial and territorial governments, and with other national and international organizations. In the northwest, the BCGS partnered with the Geological Survey of Canada (GSC) in the final year of a Targeted Geoscience Initiative (TGI 4) project assessing gold deposits near the Llewellyn fault and its possible extension into Yukon as the Tally Ho shear zone. Work continued on a major regional program focussed on

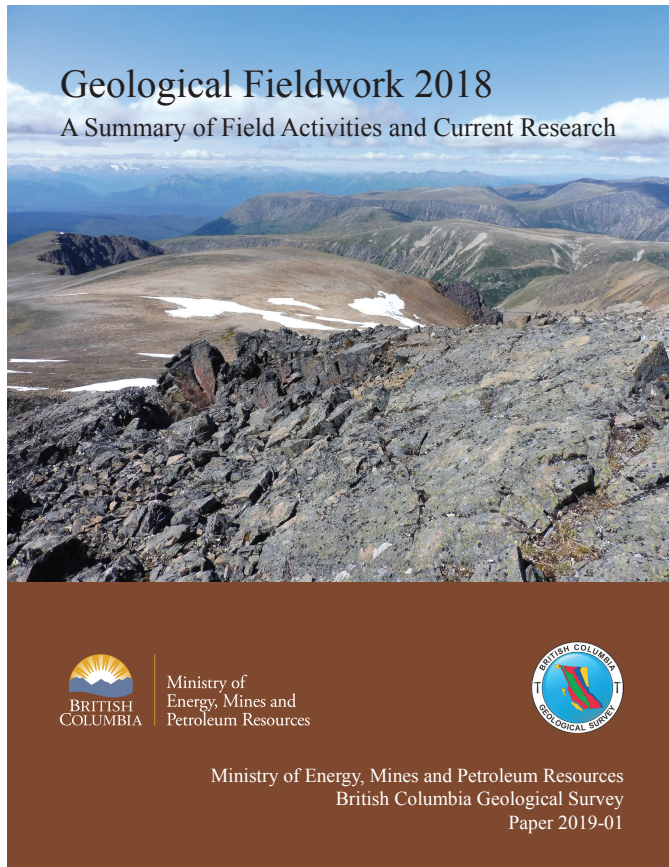
the 'Golden Triangle', including a study near Iskut and a BCGS-GSC collaboration under TGI 5 looking at geodynamic controls on porphyry and epithermal-style mineralization near Stewart. In central British Columbia, a new multi-year mapping project was initiated focussed on northern Hogem batholith. The new mapping will provide a modern understanding on the controls of diverse mineralization types in the region, particularly porphyry deposits. North of the Hogem batholith, another BCGS-GSC TGI 5 project was initiated to examine the geological framework of the Polaris intrusion. This project builds on ongoing work of the Tulameen ultramafic body, and is designed to further refine our understanding of Ni-Cu-PGE ore-forming processes in these Alaskan-type intrusions. In southern British Columbia, multi-year projects re-defining the stratigraphic framework of the Nicola arc entered their final field seasons, and a new project targeting Co-rich volcanogenic massive sulphide deposits in the Kootenay arc started. Work continued on the Upper Fir rare Earth element deposit and will incorporate data gathered from the Ice River carbonatite body. Also part of TGI 5, is a joint BCGS-GSC-Geological Survey of Japan collaboration examining specialty metals. BCGS continues to develop new exploration methods, including indicator minerals from till. Program results are presented each year at an Open House held in Victoria and at annual meetings such as Roundup, the PDAC, KEG, Minerals North, and Minerals South, and are published in *Geological Fieldwork*, a volume of papers released each January (Fig. 17), and by GSC and Geoscience BC partners.

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. As 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, and publications catalogue. MapPlace, the BCGS geospatial web service, provides open geoscience data and custom map-making tools to help decision-makers from diverse disciplines reduce the costs of accessing and analyzing information.

#### 9.2. The Geological Survey of Canada

The BCGS and the Geological Survey of Canada (GSC) continue to deliver projects through the second iteration of the Geo-mapping for Energy and Minerals (GEM 2) program, which is aimed at advancing geological knowledge and further developing modern geological maps and data sets and will run until 2020, and through the Targeted Geoscience Initiative 5 (TGI 5) program. The TGI5 program is directed at building knowledge and developing methods to better target buried mineral deposits. It aims to understand the geological processes responsible for deriving, transporting, and depositing





**Fig. 17.** Geological Fieldwork contains peer-reviewed papers that summarize field activities and current research by the British Columbia Geological Survey.

ore metals. In addition, surficial geology and glacial history studies will provide vital knowledge for mineral exploration in covered regions.

### 9.3. Geoscience BC

Geoscience BC, a not-for-profit, non-government geoscience organization funded by provincial government grants, also provides provincial geoscience information. Geoscience BC awards contracts for large geophysical and geochemical programs and provides grants to universities and consultants for targeted geoscience projects typically generated through requests for proposals. Geoscience BC is governed by a volunteer board of directors and receives technical direction from volunteer technical advisory committees (mineral exploration, oil and gas and geothermal) whose membership is largely drawn from the exploration industry.

### 10. 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.

### 11. Concluding remarks

Exploration expenditures were up for the second year in a row and new discoveries were made. Explorationists continued to define, and expand porphyry and porphyry-related Cu-Au and Cu-Mo deposits, gold deposits of various types, and stratiform base-metal, specialty metals, industrial minerals, and coal deposits.

At the end of 2018, eleven metal mines were in production. In early 2019, it was announced that the Mount Polley mine was suspending operations. Six open-pit coal mines were in production at the start of the year, five in the Southeast Region and two in the Northeast Region. As well, one underground mine produced on Vancouver Island. The Willow Creek mine restarted in July, bringing the total number of operating coal mines in the Northeast Region to three. In the fall, the Coal Mountain mine in the Southeast Region suspended mining operations.

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