

Exploration and Mining in British Columbia, 2017: A summary



Gordon Clarke^{1, a}, Bruce Northcote¹, Fiona Katay², and John R. DeGrace³

¹ British Columbia Geological Survey, Ministry of Energy, Mines and Petroleum Resources, Vancouver, BC, V6Z 2G3

² British Columbia Ministry of Energy, Mines and Petroleum Resources, 100 N Cranbrook Street, Cranbrook, BC, V1C 7G1

³ British Columbia Ministry of Energy, Mines and Petroleum Resources, Fourth Avenue, Prince George, BC, V2L 3H9

^a corresponding author: Gordon.Clarke@gov.bc.ca

Recommended citation: Clarke, G., Northcote, B., Katay, F., and DeGrace, J.R., 2018. Exploration and Mining in British Columbia, 2017: A summary. In: Provincial Overview of Exploration and Mining in British Columbia, 2017. British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Information Circular 2018-1, pp. 1-33.

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 over 30 industrial minerals including gypsum, magnesite, limestone, and dimension stone. Numerous quarries produce sand and gravel or crushed aggregate. An increase in commodity prices and an improved venture capital market meant numerous mineral exploration projects remained active in 2017 (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 2018-2) and incorporates reports, presented in this volume, from Regional Geologists. 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 2017 at \$9.82 billion (Fig. 3) including coal, copper, industrial minerals, aggregate, gold, molybdenum, and silver. This is an increase of \$3.19 billion over the 2016 preliminary NRCan estimate of \$6.63 billion (Fig. 4). The increase is due to three coal mines reopening and higher commodity prices, particularly for coal and, to a lesser degree, copper and gold. As in previous years, coal was the highest value mine product (61%) followed by copper (23%).

In 2017, ten metal mines operated during at least part of

the year (Table 2). Coal was produced at five large open-pit operations in the southeastern part of the province, two open-pit operations in the northeastern part of the province and one underground mine on Vancouver Island (Table 3). About 30 industrial mineral mines and more than 1000 aggregate mines/quarries were in operation.

3. Mining highlights

3.1. Metal mines

Metal mines accounted for \$3.07 billion (forecast) of all mine production in 2017, representing about 31% of total output (Fig. 3). Eight metal mines were producing at the start of 2017 but, by the end of the year, one had ceased production (Silvertip) and two had started up (Brucejack and Bonanza Ledge).

In the Northwest Region commercial production was announced for the **Brucejack** mine in July. For the third quarter, ending September 30th, the process plant averaged 2840 tpd and mill feed averaged 10.5 g/t Au. The mill feed grade is expected to increase as processing switches from low-grade stockpiles and development muck to stope ore. Also in the Northwest Region, Imperial Metals Corporation's **Red Chris** copper-gold mine had a 2017 production target of 76-80 million pounds of copper and 33-37,000 ounces of gold. In the North Central Region, the **Mt. Milligan** open-pit copper-gold mine was in its fifth year of production. Feed throughput in 2017 was forecast to be 59,600 tpd, and for 2018 to be 60,700 tpd.

In the South Central Region, operating mines included **Bonanza Ledge**, **Copper Mountain**, **Gibraltar**, **Highland Valley**, **Mount Polley** and **New Afton**. Barkerville Gold Mines Ltd. restarted the **Bonanza Ledge** mine. They expect to mine about 30,000 t in 2017 and 150,000 tpy thereafter. Initial life of mine is a planned 3.5 years, but exploration potential remains. Ore is trucked to Barkerville's QR mill. Copper Mountain Mining Corporation reported mill throughput for the **Copper Mountain** mine averaged more than 38,000 tpd, with feed grade 0.31% Cu and about 78% recovery for the first nine months of the year. A multi-year exploration program resumed at the mine site to extend Pit 2 westward and test mineralization below the

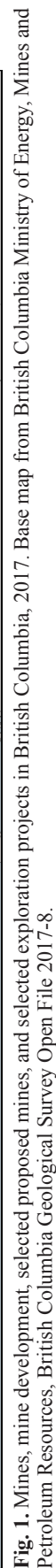
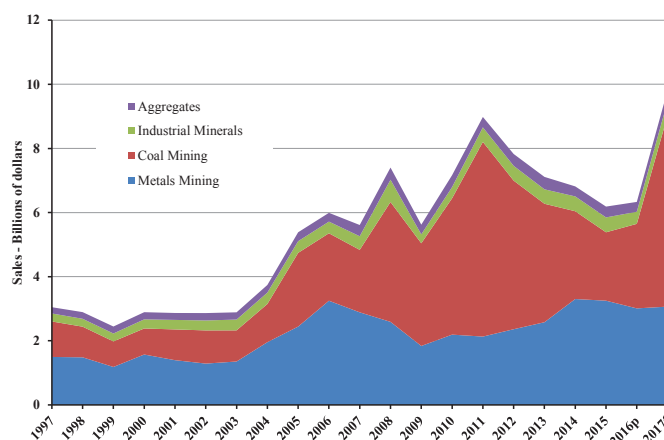
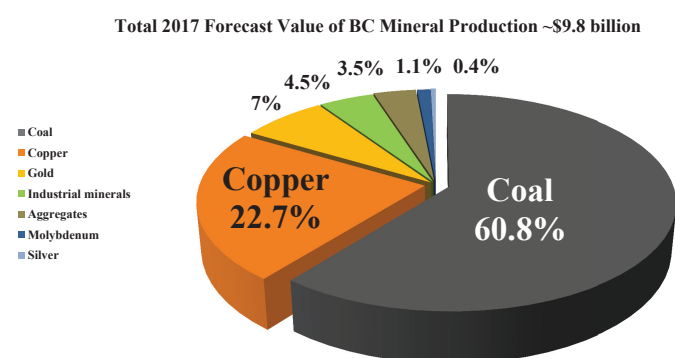


Table 1. Regional Geologists contact information.

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. 2.** Geographic regions and Regional Geologist offices.**Fig. 4.** Value of British Columbia mineral production by year 1996-2017.**Fig. 3.** Estimated value of British Columbia mineral production for 2017.

pit with 8900 m of drilling. Drilling then moved to the New Ingerbelle deposit with a 5000 m program to confirm historical resources and, potentially, extend mine life by 10 years. At the **Gibraltar** mine 22 Mtons was milled in the first nine months of 2017 at grades of about 0.3% Cu and 86% recovery. Operations were affected by wildfires in July, preventing personnel from travelling to the mine site and temporarily stopping rail traffic and the ability to ship concentrate. In the first nine months

of 2017, Teck Resources Ltd's **Highland Valley** mine milled 38,525 Mt at a copper grade of 0.22% and recovery of 73.5% as it processed low-grade ore from the Lornex pit. A project to install an additional ball mill that began in September is projected to increase mill throughput by 5% and copper recovery by 2%. Imperial Metals Corporation's **Mount Polley** mine reported that ore milled was just over 18,000 tpd in the first nine months of 2017, for 4.9 Mt at 0.207% Cu, 0.337 g/t Au and recoveries of 67% and 71%. Imperial anticipates producing 22-24 million lb Cu and 51-55 thousand oz. Au in 2017, an 8-9% decrease due to operations being suspended in the second half of July because of forest fires. New Gold Inc. reported that ore processed at their **New Afton** mine was just over 4.5 Mt at 0.55 g/t Au and 0.82% Cu (80% and 81% recovery) for the first nine months of 2017.

3.2. Coal mines

Eight operating coal mines (Table 3) accounted for a forecast \$5.96 billion of production for 2017, up sharply relative to \$2.63 billion (preliminary estimate) in 2016. This is due to an increase in the coal price and increased production. Production represents about 61% of all total mineral output in the province. Coal was produced at five large open-pit operations of Teck

Table 2. Operating metal mines, 2017, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2017 Production (based on Q1-Q3)	Reserves	Resource	Comments
Brucejack	Northwest	Pretium Resources Inc.	Au, Ag; Au-quartz veins; Quartz stockwork breccia; Epithermal; 104B 193	na	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	Mine declared official production in July.
Red Chris	Northwest	Red Chris Development Company Ltd.	Cu, Au, Ag; Porphyry Cu-Au; 104H 005	68.5 Mlbs Cu and 27,000 oz Au	na	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 achieved in 2016. Resource figures are for combined open pit and planned underground operations and do not take into account any mining since start- up.
Silvertip	Northwest	JDS Silver Inc./ Coeur Mining Inc.	Ag, Pb, Zn, Au; Polymetallic manto; 104O 038	na	na	2.35 Mt at 352 g/t Ag, 6.73% Pb, 9.41% Zn	Operations suspended in April. Purchased by Coeur Mining Inc. in October for approximately \$250 million.
Mt. Milligan	Northeast	Centerra Gold Inc. (Centerra B.C. Holdings)	Cu, Au, Ag; Alkalic porphyry Cu- Au; 093N 194, 093N 191	55-65 Mlbs Cu; 235,000- 255,000 oz Au	P: 256.8 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. Over 350 employees.
Bonanza Ledge	South Central	Barkerville Gold Mines Ltd.	Au; Au- quartz veins; 093H 140	30,000 t (2017 target)	na	M: 248,000 t 8.07 g/t Au I: 436,700 t 6.72 g/t Au Inf: 108,100 t 5.34 g/t Au	Mining began last week of August 2017. Planned 150,000 tpy 6.5 g/t Au diluted for 3.5 years.
Copper Mountain	South Central	Copper Mountain Mining Corporation 75%, (Mitsubishi Materials Corporation 25%)	Cu, Au, Ag; alkalic porphyry; 092HSE001	53.6 Mt mined, 10.4 Mt milled Q1-Q3	P: 53 Mt 0.36% Cu, 1.43 g/t Ag, 0.11 g/t Au Pr: 69 Mt 0.30% Cu, 1.15 g/t Ag, 0.11 g/t Au	M+I: 221 Mt 0.33% Cu, 1.3 g/t Ag, 0.10 g/t Au Inf: 228 Mt 0.27% Cu, 1.01 g/t Ag, 0.14 g/t Au	Resources inclusive of reserves. Company projects 36,287 t Cu production 2017.

Table 2. Continued.

Gibraltar	South Central	Taseko Mines Limited 75%, (Sojitz Corp. 12.5%, Dowa Holdings Co. Ltd. 6.25%, Furukawa Co. Ltd. 6.25%)	Cu, Mo; porphyry; 093B 012	66.2 Mtons mined, 22.0 Mtons milled Q1-Q3	P+Pr: 688 Mtons 0.26% Cu, 0.008% Mo	M+I: 1031 Mtons 0.25% Cu, 0.008% Mo	Resources inclusive of reserves.
Highland Valley	South Central	Teck Resources Limited	Cu, Mo; porphyry; 092ISW012, 045	87.4 Mt mined, 38.525 Mt milled Q1-Q3	P: 334.7 Mt 0.31% Cu, 0.007% Mo Pr: 211.9 Mt 0.26% Cu, 0.010% Mo	M: 517.4 Mt 0.31% Cu, 0.008% Mo I: 953.7 Mt 0.23% Cu, 0.010% Mo Inf: 501.2 Mt 0.24% Cu, 0.008% Mo	Resources exclusive of reserves. 2017 copper production projected 275,000-290,000 t, molybdenum 7.5-8.0 Mlb.
Mount Polley	South Central	Imperial Metals Corporation	Cu, Au, Ag; alkalic porphyry; 093A 008	4.917 Mt milled Q1-Q3	P+Pr: 73.613 Mt 0.274% Cu, 0.293 g/t Au, 0.562 g/t Ag	M+I: 180.5 Mt 0.26% Cu, 0.251 g/t Au, 0.904 g/t Ag Inf: 14.7 Mt 0.21% Cu, 0.188 g/t Au, 0.904 g/t Ag	Reserves in 5 zones, effective Jan. 1, 2016. Resources (excluding reserves) are as of Aug. 14, 2017 including updated Martel zone. 2017 production targets 20-22 Mlb Cu, 51-55,000 oz Au.
New Afton	South Central	New Gold Inc.	Au, Ag, Cu; alkalic porphyry; 092INE023	4.596 Mt mined, 4.510 Mt milled Q1-Q3	Pr: 60.336 Mt 0.6 g/t Au, 2.0 g/t Ag, 0.78% Cu	M+I: 56.592 Mt 0.64 g/t Au, 2.1 g/t Ag, 0.76% Cu Inf: 15.219 Mt 0.41 g/t Au, 1.3 g/t Ag, 0.41% Cu	2017 targets 70,000-80,000 oz Au, 85-95 Mlb Cu. Resources exclusive of reserves.

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

Coal Limited in southeastern British Columbia, two open-pit operations of Conuma Coal Resources Limited in northeastern British Columbia, and one underground operation of Quinsam Coal Corporation on Vancouver Island. Wolverine restarted in January and Quinsam restarted in September.

At the start of 2017, global coal prices were at the high levels reached in late 2016, which followed five years of low prices. Prices dropped slightly, but then spiked again to more than US\$300 per t for premium coking coal in late March, when Cyclone Debbie struck the coal-producing regions of Australia. Prices stabilized over the summer to about US\$150 per t. The average prices for the year (as of mid-November 2017) were US\$178 for hard coking coal and US\$141 for PCI coal.

3.3. Industrial minerals, aggregates, and jade

About 30 industrial mineral mines and more than 1000 aggregate operations are active in British Columbia (Table 4).

With forecast production figures for industrial minerals of \$443 million (4.5% of total mineral production) and for aggregates of \$343 million (3.5% 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. mined veins of massive white barite. Mined barite is crushed and bagged on site and trucked to Fort St. John, British Columbia 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. Northern Silica Corporation

Table 3. Operating coal mines, 2017, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2017 Production (based on Q1- Q3)	Reserves	Resource	Comments
Brule	Northeast	Conuma Coal Resources Limited	PCI; Bituminous coal; 093P 007	2.33 Mt	P: 16.3 Mt	na	Restart activities began in Sept. 2016, ramp-up complete June 2017. About 550 employees, Brule and Perry Creek combined.
Wolverine (Perry Creek)	Northeast	Conuma Coal Resources Limited	HCC; Bituminous coal; 093P 025	1.14 Mt	P: 8.8 Mt	na	Placed on care and maintenance in 2014. Restart process began Jan. 2017, ramp-up complete June 2017.
Coal Mountain	Southeast	Teck Coal Limited	PCI; Bituminous coal; 082GNE001	2.7 Mt	PCI P: 2.7 Mt	M: 56.1 Mt, I: 23.1 Mt, Inf: 4.9 Mt	Mineable resource is nearing depletion and expected mine shut down in early 2018, reclamation begun, facilities to be placed on Care and Maintenance.
Elkview	Southeast	Teck Coal Limited (95%); Nippon Steel & Sumitomo Metal Corp. (2.5%), POSCO (2.5%)	HCC Bituminous coal; 082GNE017	6.3 Mt	HCC P: 11.2 Mt Pr: 254.8 Mt	HCC M: 432.5 Mt, I: 157.5 Mt, Inf: 246 Mt	Baldy Ridge Extension (BRE) approved in 2016, pre- stripping at BRE, exploration drilling in active pits, development progressing in new approved mining areas.

Table 3. Continued.

Fording River	Southeast	Teck Coal Limited	HCC Bituminous coal; 082JSE012	9.1 Mt	HCC P: 169 Mt Pr: 220.5 Mt	HCC M: 486.7 Mt I: 945.8 Mt Inf: 789 Mt	EA approval of Swift expansion (2015), permit amendments to align mine design with improved efficiencies, exploration drilling in active pits, coal quality testing in expansion areas.
Greenhills	Southeast	Teck Coal Limited (80%); POSCAN (20%)	HCC Bituminous coal; 082JSE007	6.2 Mt	HCC P: 25.4 Mt Pr: 147.9 Mt	HCC M: 220.1 Mt I: 269.5 Mt Inf: 182.6 Mt	Cougar Pit Expansion (CPX) approved in 2016, coal quality testing.
Line Creek	Southeast	Teck Coal Limited	HCC, TC Bituminous coal; 082GNE020	3.7 Mt	HCC P: 3 Mt Pr: 61.7 Mt TC P: 1.2 Mt Pr: 9.5 Mt	HCC M: 320.6 Mt I: 419.4 Mt Inf: 413.4 Mt TC M: 4.8 Mt I: 4 Mt Inf: 2.7 Mt	Burnt Ridge Extension (BRX) approved in 2016, pre-stripping on Mount Michael begun (Line Creek Phase II expansion), Commissioning of West Line Creek water treatment facility (February, 2016), with process and design optimization underway. Annual production records set in 2016.
Quinsam	Southwest	Quinsam Coal Corporation (ERP Compliant Fuels LLC)	TC; Bituminous coal; 092F 319	Approximately 50,000 t clean coal	na	na	Resources and reserves are unpublished. Resumed operations Sept. 2017.

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

Table 4. Selected operating industrial mineral mines and quarries, 2017, forecast mine production, reserves, and resources.

Mine	Region	Operator (partner)	Commodity; deposit type; MINFILE	Forecast 2017 Production (based on Q1- Q3)	Reserves	Resource	Comments
Burning Daylight	Northwest	Stone Ridge Quarries Ltd.	Columnar Basalt; dimension stone	unknown	na	na	Basalt quarrying.
Cassiar Jade	Northwest	Dynasty Jade Ltd.	Nephrite Jade; Gems and semi-precious stones; 104P 005	unknown	na	na	Trenching, quarrying, placer production.
Jade Valley	Northwest	United Oriental Mining Ltd.	Nephrite Jade; Gems and semi-precious stones; 104I 048	unknown	na	na	Trenching, quarrying, placer production.
Kalum	Northwest	Kalum Quarry Ltd. Partnership	Industrial rock; crushed rock	unknown	na	na	Drilling, blasting, crushing, production for CN railway bed.
Kutcho Creek Jade	Northwest	Continental Jade Ltd.	Nephrite Jade; Gems and semi-precious stones; 104I 078	unknown	na	na	Mining, trenching.
Letain	Northwest	Cassiar Jade Contracting Inc.	Nephrite Jade; Gems and semi-precious stones; 104I 079	unknown	na	na	Mining, trenching
Provencher	Northwest	Glenpark Enterprises Ltd.	Nephrite Jade; Gems and semi-precious stones; 104I 092	unknown	na	na	Mining, trenching.
Wolverine	Northwest	Cassiar Jade Contracting Inc.	Nephrite Jade; Gems and semi-precious stones	unknown	na	na	Mining, trenching.
Fireside	Northeast	Fireside Minerals Ltd.	Barite, Vein barite; 094M 003, 094M 019	38,800 t	P+Pr: 475,000 t (non-NI 43-101 compliant)	na	Mined from the Moose Pit. With possible extension to north.
Ogden Mountain	North Central	Green Mountain Jade Inc.	Nephrite Jade; Gems and semi-precious stones; 093N 156, 093N 157, 093N 165	20 t	na	na	Exploration placer and open pit mining of alluvial jade boulders, excavation of in situ jade.
Ashcroft	South Central	IG Machine and Fibers Ltd. (IKO Industries Ltd.)	Basalt (roofing granules); 092INW104	250,000 t	na	Approximately 13.3 Mt in 2002	10 days lost to wildfire related causes.

Table 4. Continued.

Bromley Creek (Zeotech)	South Central	Canadian Zeolite Corp.	Zeolite; Open system zeolites; 092HSE243	na	na	M+I: (as of 2013-06-30): 550,000 t	Producing in 2017.
Bud	South Central	Absorbent Products Ltd.	Bentonite; 092HSE162	na	na	na	Operating, but volumes not published.
Decor	South Central	Pacific Bentonite Ltd.	Alumina, landscape rock; 092INW084	na	na	na	
Falkland	South Central	Lafarge Canada Inc.	Gypsum; 082LNW001	na	na	na	Production affected by shut down of Lafarge's Kamloops Cement Plant, however, alternative markets found for 2017-2018.
Kettle Valley Quarries	South Central	Kelowna Sand and Gravel Ltd./Kettle Valley Stone Company	Ashlar, flagstone, thin veneer; 082ENW109, 111, 112	na	na	na	
Klinker	South Central	Opal Resources Canada Inc.	Opal; 082LSW125	Intermittent operation	na	na	
Lady King Basalt	South Central	Opal Resources Canada Inc.	Basalt columns; na	Intermittent operation	na	na	
Nazko	South Central	Can Lava Mining Corporation	Lava Rock; Cinder cone; 093B 060	na	na	Historical 45 Mt	Product shipped from quarry in 2017. 1998 resource estimate.
Red Lake	South Central	Absorbent Products Ltd.	Diatomaceous earth; Lacustrine diatomite; 092INE081	na	na	na	Operating, but volumes not published.
Z-1	South Central	ZMM Canada Minerals Corp.	Zeolite; Open system zeolites; 092INW095	9000 t	na	Approximately 800,000 t	Historical resource.
4J	Southeast	Georgia-Pacific Canada Limited	Gypsum; evaporitic bedded gypsum; 082JSW009	na; Processing stockpiled ore	na	Estimated 20 Mt	Processing stockpiles; updating mine expansion plans.

Table 4. Continued.

Elkhorn	Southeast	CertainTeed Gypsum Canada Inc.	Gypsum; evaporitic bedded gypsum; 082JSW021	400,000 t	na	na	3 years mine-life remaining; the company will replace production by developing the Kootenay West mine (EA review period).
Grand Forks Slag	Southeast	Granby River Mining Company Inc.	Slag/Silica; tailings from Grand Forks smelter dumps; 082ESE264	Quarrying for abrasives and roofing granules	na	na	Crushing, screening, environmental.
Horse Creek Silica	Southeast	HiTest Sand Inc.	Silica, industrial use, aggregate; 082N 043	na	na	Estimated: 3 Mt at 99.5% Silica (1987)	Variety of aggregate and industrial use products.
Moberly Silica	Southeast	Northern Silica Corporation	Silica; industrial use silica, frac sand; 082N 001	78,000 t	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): 37.5 Mt at 70% frac sand + 11.3 Mt silica as frac sand residues (2016)	USD \$25M capital cost for Phase I plant construction and upgrades to existing facility (for frac sand operation); 300,000 tpy capacity; Phase II expansion to 600,000 tpy will cost an additional USD \$15M; Construction started on frac sand processing plant in 2015, commissioned in 2017.
Mount Brussilof	Southeast	Baymag Inc.	Magnesite; hydrothermal sparry magnesite; 082JNW001	230,000 t	P: 50 Mt	na	MgO, and MgOH; sediment-hosted sparry magnesite.
Winner; Friday Quarry	Southeast	Roxul Inc.	Gabbro/basalt; crushed rock for mineral wool; 082ESE265	Quarrying to supply feed stock for mineral wool plant	na	na	Crushing, screening, stockpiling; environmental.
Blubber Bay	Southwest	Ash Grove Cement Company	Limestone, dolostone; Limestone; 092F 479	24,500 t	na	100+ years	Care and maintenance, continues to ship dolomite on contract.

Table 4. Continued.

Garibaldi Pumice	Southwest	Garibaldi Pumice Ltd.	Pumice; Volcanic ash; 092JW 039	15,000 m ³	na	11,396,000 m ³ Pumice 4,990,000 m ³ pumicite (fines)	2014 resource. Additional exploration 2015. Future work proposed and permitted.
Imperial Limestone	Southwest	Imperial Limestone Co. Ltd.	Limestone; Limestone; 092F 394	263,000 t	na	50+ years	Production number is their high quality product. Resource estimated at roughly 200 Mt.
K2	Southwest	K2 Stone Quarries Inc.	Dimension stone, flagstone; Flagstone; 092C 159	19,662 t	na	na	Number represents material extracted.
Mount Meager Pumice	Southwest	Great Pacific Pumice Inc.	Pumice; Volcanic ash; 092JW 039	2100 t	na	na	Sales about 1600 t.
Sumas Shale	Southwest	Sumas Shale Ltd. (Lafarge Canada Inc., Clayburn Industrial Group)	Shale, clay, sandstone; Residual kaolin; 092GSE024	Approximately 500,000 t	na	50+ years	Approximately 55% shale, 45% sandstone for cement production.
Texada Quarry	Southwest	Texada Quarrying Ltd. (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

commissioned their frac sand processing plant in 2017. 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 project’ 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 2017, **Brucejack** was the only mine considered a development project, until it declared commercial production in July.

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 5) discussed below are grouped by region.

5.1. Northwest Region

5.1.1. Proposed metal mines

The Northwest Region has a number of proposed metal mine projects. Gavin Mines Inc. continues to work towards restarting the historic **Dome Mountain** gold and silver mine. The project has 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 their

Table 5. Selected proposed mine projects.

Project	Region	Operator (partner)	Commodity; deposit type; MINFILE	Reserves	Resource	Comments
Dome Mountain	Northwest	Dome Mountain Resources of Canada Inc.	Au, Ag; Vein breccia and stockwork; 093L 022	na	M+I: 144,144 t grading 17.7 g/t Au	Announced plans to negotiate processing ore at Nicola Mining Inc.'s custom mill.
Galore Creek	Northwest	Galore Creek Mining Corp.	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: 814.7 Mt at 0.50% Cu, 0.31 g/t Au, 5.2 g/t Ag	Baseline monitoring.
Kitsault	Northwest	Alloycorp Mining Inc.	Mo, Ag, Pb; Porphyry Mo (low F type); 103P 120	P+Pr: 228.2 Mt at 0.083% Mo, 5.0 g/t Ag	M+I: 321.8 Mt at 0.071% Mo, 4.8 g/t Ag	Baseline monitoring.
KSM	Northwest	Seabridge Gold Inc.	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 g/t Ag, 0.00426% Mo	M+I: 2.902 Bt at 0.54 g/t Au, 0.21% Cu, 2.7 g/t Ag, 0.0044% Mo	Updated resource estimate in May. 10,383 m of drilling in 11 holes at Iron Cap deposit. Highlights include 858 m of 0.86 g/t Au and 0.51% Cu including 113 m of 2.98 g/t Au and 1.56% Cu.
Morrison	Northwest	Pacific Booker Minerals Inc.	Cu, Mo; Calc-alkalic porphyry; 093M 007	na	M+I: 208.3 Mt at 0.39% Cu, 0.19 g/t Au, 0.005% Mo (at a 0.30% Cu Eq cut-off)	Baseline monitoring, EA ongoing. Resource information from 2009 NI 43-101 technical report.
Red Mountain	Northwest	IDM Mining Ltd.	Au, Ag; Porphyry related gold; 103P 086	na	M+I: 2.075 Mt at 8.75 g/t Au, 25.00 g/t Ag	Positive feasibility study completed. Resource updated. Drilling in 2017 expanded mineralization to north, south and down dip. EA application submitted. Construction start planned for 2018.
Schaft Creek	Northwest	Teck Resources Limited (75%), Copper Fox Metals Inc. (25%)	Cu, Au; Calc-alkalic porphyry; 104G 015	P+P: 940.8 Mt at 0.27% Cu, 0.018% Mo, 0.019 g/t Au, 1.72 g/t Ag	1.229 Bt at 0.26% Cu, 0.017% Mo, 0.19g/t Au, 1.69 g/t Ag	Resource re-modelling in progress. Environmental baseline data collection, permitting.
Murray River	Northeast	HD Mining International Ltd.	HCC; bituminous coal; 093I 010	P: 261.6 Mt mineable	M+I: 314.2 Mt in situ	Proposed underground longwall mine with average annual production of 4.8 Mt of saleable coal over 25-year mine life. Provincial EA Certificate issued 2015; Federal EA Decision Statement issued December 2017.

Table 5. Continued.

Wapiti East	Northeast	Fertoz International Inc.	P ₂ O ₅ ; Sedimentary phosphate deposits; 093I 039, 093I 022, 093I 008	na	I: 0.81 Mt at 22.3% P ₂ O ₅ ; Indicated	Mines Act permit application, bulk sample (17,500 t permitted), temporary road (2.2 km). Proposed seasonal shallow open-pit mine with average annual production of less than 75,000 t phosphate rock over a 20+ year mine life; organic certification obtained.
Aley	North Central	Taseko Mines Limited (Aley Corporation)	Nb; carbonatite hosted deposit; 094B 027	P+Pr: 83.8 Mt at 0.50% Nb ₂ O ₅ ; containing 293 Kt* Nb *calculated by Jago, 2017	285.8 Mt at 0.37% Nb ₂ O ₅ ; containing 739.2 Kt* Nb (including reserves) *calculated by Jago, 2017	Environmental Assessment (pre-application), geochemical characterization studies, environmental baseline monitoring. 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.
Blackwater	North Central	New Gold Inc.	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, Pr: 169.7 Mt at 0.68 g/t Au, 4.1 g/t Ag	M: 117 Mt at 1.04 g/t Au, 5.6 g/t Ag I: 189 Mt at 0.78 g/t Au, 6.0 g/t 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.
Giscome	North Central	Graymont Western Canada Inc.	CaCO ₃ ; Limestone; 093J 041, 093J 025	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.
Kemess Underground (KUG)	North Central	Centerra Gold Inc.	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	I: 246.4 Mt at 0.22% Cu, 0.42 g/t Au, 1.75 g/t Ag inclusive of reserves	New NI 43-101 report, EA certificate granted, engineering and environmental studies ongoing. Major Mine permit application submitted Aug. 31. 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. Centerra Gold Inc. acquired Aurico Metals Inc. on Jan. 8, 2018.
Ajax	South Central	KGHM Ajax Mining Inc.	Cu, Au; Alkalic porphyry; 092INE012, 013	P+Pr: NSR cutoff US\$7.10/t; 426 Mt grading 0.29% Cu, 0.19 g/t Au, 0.39 g/t Ag	(M+I: NSR cutoff US\$7.10/t); 568 Mt grading 0.26% Cu, 0.18 g/t Au, 0.35 g/t Ag	In December, the project was denied certification by the British Columbia Ministries of Environment and Climate Change Strategy and Energy, Mines and Petroleum Resources. The company has not yet announced a response.

Table 5. Continued.

Bethlehem	South Central	Teck Resources Limited	Cu, Mo; Porphyry; 092ISE001	na	na	Project at application review stage. Resource informally stated as 100 Mt, but without grades.
Harper Creek	South Central	Yellowhead Mining Inc.	Cu, Au, Ag; Noranda/Kuroko; 082M 008, 009	(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 grading 0.28% Cu, 0.030 g/t Au, 1.3 g/t Ag	Project at application review stage. Company suspended review in October 2015 for economic reasons.
New Prosperity	South Central	Taseko Mines Ltd.	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 certificate but denied federal approval.
Ruddock Creek	South Central	Ruddock Creek Mining Corporation	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 pre-application stage.
Spanish Mountain	South Central	Spanish Mountain Gold Ltd.	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	Project at pre-application stage.
Bingay Main	Southeast	Centermount Coal Ltd.	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 Mtpy.
Coal Mountain Phase II (Marten Wheeler)	Southeast	Teck Coal Limited	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.
Crown Mountain	Southeast	NWP Coal Canada Ltd. (Jameson Resources Limited)	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)	Pre-application of EA (2014); nearing end of comment period for Application Information Requirements (AIR); 16-year mine life; 1.7 Mtpy; review of pre-feasibility study identified upside in lower capital costs for contract mining and additional resources in Southern extension.

Table 5. Continued.

Driftwood Magnesite	Southeast	MGX Minerals Inc.	Magnesite; hydrothermal sparry magnesite; quarry; 082KNE068	na	M+I: 8.028 Mt grading 43.3% MgO (2016; using cutoff grade of 42.5% MgO)	Preliminary Economic Assessment; 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.
Kootenay West	Southeast	CertainTeed Gypsum Canada Inc.	Gypsum; evaporitic bedded gypsum; quarry; 082JSW005, 082JSW020	na	North and South Quarries: Total 15 Mt (at average quality of 83-85%)	Entered 180-day review period of Environmental Assessment in March (2017); temporarily suspended the review in order to respond to comments and submit additional information; 400,000 tpy; 43-year mine life; blended product to market specifications.
Michel Creek (Loop Ridge)	Southeast	North Coal Limited (formerly CanAus Coal Limited)	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 (5212 m, 38 holes); 7 large diameter core holes for coal quality testing; environmental and baseline work; mine design and permitting. Coal quality testing indicates coal has similar characteristics to Elk Valley hard coking coal; drilling has identified 20 coal seams with cumulative thickness of 70 m (14% of a 504 m section in the Mist Mountain Fm). EA pre-application submitted in 2015.
Black Bear	Southwest	Polaris Materials Corporation	Aggregate; n/a	na	na	Orca environmental certificate amendment for an adjacent quarry applied for.
BURNCO Aggregate	Southwest	BURNCO Rock Products Ltd.	Aggregate; Sand and Gravel	na	Approx. 20 Mt	Late in environmental assessment review.
Sechelt Carbonate	Southwest	Ballinteer Management Inc.	Limestone, dolostone, aggregate; Limestone, Dolomite, Crushed rock; 093GNW031	na	Carbonate Rock: 76.1 Mt Gabbro: >700 Mt	Environmental assessment pre-application stage.
Tahsis	Southwest	Callache Stone Quarries Inc.	Marble; Dimension stone; 092E 020	na	na	Quarry permit and lease application for commercial production.

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

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

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. In 2017, they announced plans to negotiate processing ore at Nicola Mining Inc.'s custom mill.

Seabridge Gold Inc. continued work on their **KSM** copper-gold porphyry deposit. Seabridge received federal and provincial approval of the project environmental assessment in 2014 and is actively seeking partnership to advance into construction. 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. An updated Measured plus Indicated resource estimate (inclusive of reserves) completed in May totals 2.903 Bt grading 0.55 g/t Au, 0.21% Cu, 2.6 g/t Ag and 46.6 ppm Mo. In 2017, Seabridge completed 10,383 m of drilling in 11 holes at the Iron Cap deposit. Highlights include 858 m of 0.86 g/t Au and 0.51% Cu including 113 m of 2.98 g/t Au and 1.56% Cu. Seabridge reported that Iron Cap is approaching parity in size with other deposits in the project, but with zones of considerably higher metal values. KSM considers the early development of Iron Cap a high priority for further study due to its grade, location, and size. Results may result in a revision of the project's mine plan and enhance KSM's projected economics.

Pacific Booker Minerals Inc.'s **Morrison** copper-gold-molybdenum-silver porphyry 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 Polley 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 concerns still remained regarding the project design. The project continues to undergo review.

In 2017, IDM Mining Ltd. continued work on their **Red Mountain** gold project with step-out drilling, a feasibility study, and a project application and an environmental impact statement, which were submitted to regulators and stakeholders. A total of 29,312 m of drilling was completed, consisting of 104 underground, eight surface, and three geotechnical core holes. Drilling highlights include 25.0 m grading 13.7 g/t Au and 30.9 g/t Ag and their highest grade intersection to date: 1400 g/t Au and 437 g/t Ag over 0.5 m, in an interval of 149.24 g/t Au and 59.88 g/t Ag over 4.88 m. Current Proven plus Probable reserves are 1.953 Mt at 7.53 g/t Au and 21.86 g/t Ag. IDM is targeting production for the first quarter of 2020.

The **Galore Creek** copper-gold-silver project is owned by the Galore Creek Partnership, in which a wholly owned subsidiary of Novagold Resources Inc. and Teck Resources Ltd. are equal partners. In 2017, work was limited to baseline monitoring. Alloycorp Mining Inc.'s past producing **Kitsault** molybdenum-silver mine is fully permitted, but requires project financing.

Work at the **Schaft Creek** copper-molybdenum-gold-silver porphyry project, owned by Teck Resources Ltd. (75%) and

Copper Fox Metals Inc. (25%), included updating resource models, collecting environmental baseline data, and continuing First Nations consultations.

5.2. Northeast Region

5.2.1. Proposed coal mines

HD Mining International Limited's **Murray River** project is a proposed underground mine that would produce 4.8 Mt of saleable coal annually during a 25-year mine life. Proven mineable reserves are 261.6 Mt, and Measured plus Indicated resources are 314.2 Mt. In December 2017, the Government of Canada issued an Environmental Assessment Decision Statement that approved the project, subject to legally binding conditions. These included: consulting with First Nations on implementing the conditions; avoiding, mitigating or offsetting impacts on caribou habitat; and limiting methane emissions to less than 500,000 t of equivalent CO₂ annually. The provincial Environmental Assessment Certificate had been issued in October 2015.

5.2.2. Proposed industrial mineral mines or quarries

Fertoz International Inc. continued progress on its Mines Act permit for the **Wapiti East** phosphate project. In 2017, the company focused on completing infrastructure. Once permit and infrastructure are in place, Fertoz would mine from a seasonal, shallow open pit, with a 20-year mine life, producing up to 75,000 tpy of phosphate-bearing rock.

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 processing 10,000 tpd to produce ferroniobium. Reserves stand at 84 Mt grading 0.5% Nb₂O₅. The projected mine life is 24 years and environmental assessment is underway.

In 2017, 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 from the Province of British Columbia, and a Decision Statement from the federal Minister of the Environment. 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.

AuRico Metals Inc. continued to advance its proposed **Kemess Underground** (KUG) copper-gold-silver block cave mine project. In early January of 2018, it was announced that AuRico Metals had been purchased by Centerra Gold Inc. 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. On 1 September, 2017, AuRico Metals Inc. applied to the Major Mines Permitting Office, with all applications to be reviewed concurrently. The

Canadian Environmental Assessment Agency had already issued a positive decision statement, and the Environmental Assessment Office had granted an Environmental Assessment Certificate. On 2 November 2017, KUG's permit applications passed screening and were accepted for review by the Mine Review Committee.

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 is in place, and the Mines Act Permit process is underway. The company anticipates starting construction in 2019 or 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 tonne-per-day open-pit mine with a projected 18-year life. In December, the project was denied certification by the British Columbia Ministries of Environment and Climate Change Strategy and Energy, Mines and Petroleum Resources. The company has not yet announced a response.

Teck Resources Ltd. may reopen the past-producing **Bethlehem** mine, which is 2 km east of its Highland Valley Copper operations. During the past few years, Teck has defined 100 Mt of new ore at Bethlehem. If approved, the mine would produce additional feed for its 140,000 tpd mill. A Mine Development Review Committee commenced formal review of the Bethlehem Phase 1 proposal in 2016.

The **Harper Creek** copper-gold-silver project is owned by Yellowhead Mining Inc. Proven and Probable mineral reserves stand at 716 Mt grading 0.26% Cu; 0.029 g/t Au and 1.2 g/t Ag. The feasibility study proposed a 70,000 tpd operation with a mine life of 28 years. Initial capital costs would exceed \$1 billion. The environmental assessment review remains on hold while the company evaluates if financing can be secured to complete the review.

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 reject 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. However, the

Canadian Environmental Assessment Agency warned Taseko that they would consider the proposed work in violation of federal law and the company did not proceed.

Ruddock Creek Mining Corporation, owned by Imperial Metals Corporation (50%) and joint venture partners Mitsui Mining and Smelting Co. Ltd. (30%) and Itochu Corporation (20%), continued environmental baseline studies at its **Ruddock Creek** zinc-lead project. A mineral resource estimate, released in March 2012, reported 4.65 million tonnes grading 6.77% Zn and 1.38% Pb (Indicated) and 5.38 million tonnes grading 6.69% Zn and 1.31% Pb (Inferred), using a 4.0% combined Pb+Zn cut-off. 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. In April 2017, the company released the results of an updated preliminary economic assessment. The study was based on a 20,000 tpd, 24-year operation focused on a pit-delineated higher grade core (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 oz/y. The company acquired a permit for future mineral exploration and archaeological studies.

5.5. Southeast Region

5.5.1. Proposed coal mines

Centermount Coal Ltd. proposes an open pit and underground coal mine for its **Bingay Creek** project. The mine would produce approximately 1 Mt/year 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 is now scheduled to shut down in early 2018.

The **Crown Mountain** property of NWP Coal Canada Ltd., (a wholly owned subsidiary of Jameson Resources Ltd.) is in the pre-application stage of environmental assessment and is currently nearing the last round of comments for the application information requirements. The proposal is for 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. In 2017, the company began preliminary engineering design, continued environmental baseline studies, and worked on updating the mine plan.

The **Michel Creek (Loop Ridge)** project of North Coal Limited (formerly CanAus Coal Ltd.), a wholly owned subsidiary of CoalMont Pty Ltd., is in the pre-application stage of environmental assessment. The project consists of

coal licenses at Loop Ridge, Loop South, Tent Mountain, and Michel Head. In 2017, work included testing for waste rock and developing water management strategies, and preparing an updated project description. The project will use new techniques for managing waste rock to mitigate selenium, and ensure that targets identified in the Elk Valley Water Quality Plan can be met. The company is focused on optimizing all coal deposits for development and will be issuing an amended application in 2018.

5.5.2. Proposed industrial mineral mines or quarries

The **Driftwood Magnesite** project is owned by MGX Minerals Inc. In 2016, a NI 43-101 compliant 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 2017, the company focused work on a preliminary economic assessment and continued environmental baseline studies for their quarry application. CertainTeed Gypsum Canada Inc. continued to advance their **Kootenay West** project. The mine will have an average production rate of 400,000 t per year, over a 43-year mine life. The total mineral reserve is estimated at 18.7 Mt, and product will be blended to a product specification of 83-85% gypsum for market. The project entered the 180-day review period of environmental assessment in March, 2017. The company temporarily suspended the review to submit additional technical information, and address comments from the Environmental Assessment Office, the Working Group, and First Nations. A decision is expected in June, 2018.

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. BURNCO Rock Products Ltd. continues to undergo Environmental Assessment for the **BURNCO Aggregate** project. The proposed sand and gravel mine would ramp up to a 1.5 Mt per year operation, initially barging product to BURNCO Rock Products Ltd.'s ready-mix concrete plants in South Burnaby and Port Kells. BURNCO submitted its application for environmental assessment with both provincial and federal agencies in 2016. The British Columbia Environmental Assessment Office issued a draft Summary Assessment Report in October 2017 and a public comment period on the report followed.

Ballinteer Management Inc. now holds 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. Callache Stone Quarries Inc. is applying for a quarry permit and lease near Tahsis for their **Tahsis marble** quarry and intend to enter production. Meanwhile they continue with surface preparation, bulk sampling, testing, and marketing.

6. Exploration expenditures

In 2017, 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 (www.ey.com/ca/bcminingsurvey).

Total metal, industrial mineral and coal exploration expenditures are estimated at \$246.6 million for 2017, up \$41.6 million from the 2016 survey total of \$205 million. Of this, \$31.8 million was contributed by coal projects and \$214.8 million by metal and industrial mineral projects (Fig. 5). Exploration expenditures by region for 2017 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 2017 survey is 34.7%. The total reported metres drilled

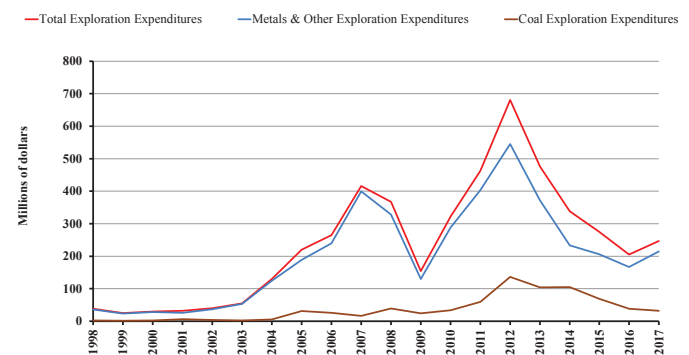


Fig. 5. Total exploration expenditures, metals plus other expenditures, and coal expenditures by year.

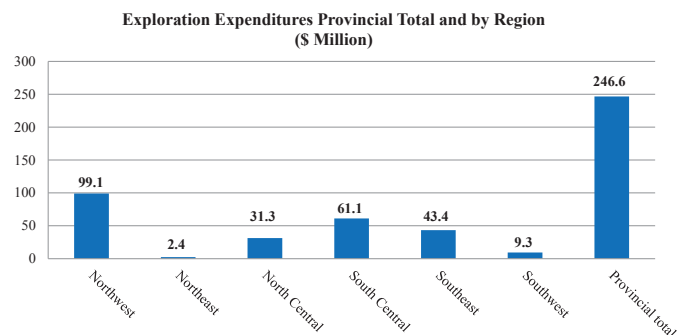


Fig. 6. Exploration expenditures, provincial total and by region.

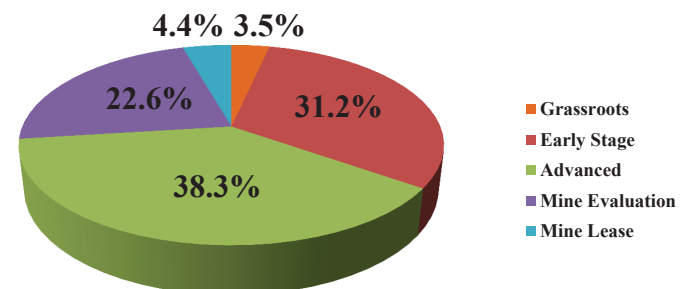


Fig. 7. Provincial exploration expenditures by exploration category.

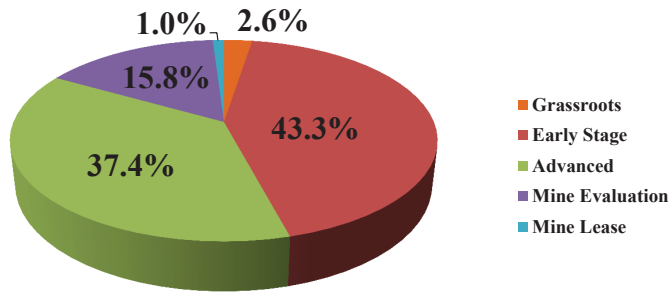


Fig. 8. Northwest Region exploration expenditures by exploration category.

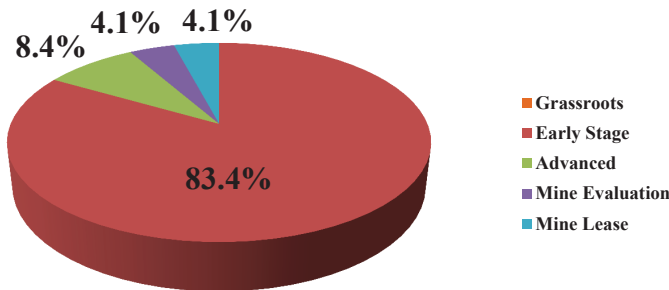


Fig. 9. Northeast Region exploration expenditures by exploration category.

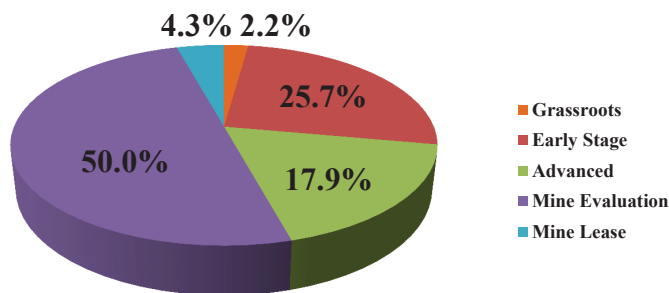


Fig. 10. North Central Region exploration expenditures by exploration category.

for the province was 626,897 up significantly from the 2016 total of 290,702 (see Fig. 14 for regional breakdown).

7. Exploration land tenure

Acquisition of new mineral claims in 2017 was up significantly compared to 2016 (Fig. 15). The total for 2017 was 1,613,486 hectares vs. 1,167,303 hectares for the previous year. New coal licenses issued in 2017 totalled 48,118 hectares, down from the 2016 total of 105,991 hectares (Fig. 16).

8. Selected exploration project highlights

For the first time since 2012 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 suggest that grassroots and early stage projects may have increased. Below, selected exploration projects are grouped by project type and region (Table 6). Project locations are illustrated on Figure 1. A more comprehensive list of selected exploration projects active in 2017 are described in the individual regional sections of this volume.

8.1. Selected precious metal projects

8.1.1. Northwest Region

In 2017, the price of gold increased interest in gold exploration in the Northwest Region.

In the Atlin area, Brixton Metals Corporation collected 200 rock samples, 120 soil samples and flew 4571 line-km of airborne magnetic survey at a line spacing of 200 m at their **Atlin Gold** project. One sample returned Au values greater than 100 g/t (293 g/t), six greater than 10 g/t, and eight greater than 1 g/t.

Outside of the Brucejack mine area, evaluation of the surrounding 1250 km² of mineral claims continued (**Brucejack Regional**). Work in previous years included airborne geophysical surveys, regional sampling, mapping, prospecting, ground geophysics and diamond drilling. To date three zones have been identified with potential to host epithermal mineralization (American Creek, Koopa and Boulder). In 2017, new work included prospecting, mapping, and ground geophysics. Data analysis will define targets for drilling in spring 2018.

At their **Forest Kerr** project, Aben Resources Ltd. diamond drilled nine holes totalling 2445 m. Highlight results from the newly discovery Boundary North zone included 1.2 g/t Au, 1.8 g/t Ag and 0.21% Cu over 122 m that includes 10.9 g/t Au, 14.6 g/t Ag and 1.5% Cu over 12 m with a high grade core of 21.5 g/t Au, 28.5 g/t Ag and 3.1% Cu over 6 m.

Auryn Resources Inc. diamond drilled 37 holes (total, 14,850 m) at their **Homestake Ridge** project. Drill result highlights include 30 m of 2.00 g/t Au (including 4 m of 6.03 g/t Au and 2 m of 11.80 g/t Au), 10 m of 4.12 g/t Au (including 2 m of 18.01 g/t Au), 18 m of 1.29 g/t Au (including 4 m of 4.18 g/t Au), 8 m of 2.67 g/t Au (including 2 m of 7.4 g/t), and 14 m of 1.23 g/t Au.

The **Silver Coin** project is owned by Jayden Resources (Canada) Inc. (80%) and Mountain Boy Minerals Ltd. (20%). In 2017, a 2225 m, 14 hole diamond drill program was carried out in a new zone 550 m to the northeast of the main Silver Coin deposit. Drilling intersected altered andesite with a quartz-sericite-chlorite altered breccia zone exhibiting quartz stringers with visible gold grains, 5-6% sphalerite, up to 1% galena and 7-8% pyrite. Assay results for this altered andesite included 8.63 g/t Au over 7.7 m including several higher-grade intervals up to 37.1 g/t Au. Additional zones of siliceous breccia returned 6.5 g/t Au over 1.5 m and 8.25 g/t Au over 1.0 m. These results are from a new zone 550 m to the northeast of

Table 6. Selected exploration projects.

Project	Region	Operator (partner)	Commodity; Deposit type MINFILE	Resource (NI 43-101 compliant unless indicated otherwise)	Comments
Atlin Gold Project	Northwest	Brixton Metals Corporation	Au; precious metal veins	na	Rock and soil sampling. Gold values for rock samples returned up to 293 g/t Au. One sample returned Au values greater than 100 g/t, six greater than 10 g/t, and eight greater than 1 g/t.
Ball Creek	Northwest	Evrin Resources Corp.	Cu-Au-Ag±Mo; porphyry, Au-Ag epithermal veins	na	Definitive agreement with a wholly owned subsidiary of Antofagasta Plc by which Antofagasta can earn up to a 70% interest in the Ball Creek property by spending up to an aggregate of US\$31 million or delivering a prefeasibility study.
Brucejack Regional	Northwest	Pretium Resources Inc.	Au, Ag; epithermal vein	na	Prospecting, mapping, and ground geophysics.
Dolly Varden	Northwest	Dolly Varden Silver Corporation	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	12,000 m diamond drilling program. New discoveries include the Central zone returning 16.10 m (13.19 m true thickness) grading 269.0 g/t Ag, 0.30% Pb, and 0.21% Zn and an eastern fault offset of the Torbit deposit (Torbit East), returning assays including 13.00 m (9.96 m true thickness) grading 244.8 g/t Ag, 0.14% Pb, 0.09% Zn.
Duke	Northwest/ Northeast	Amarc Resources Ltd.	Cu, Mo, Au; porphyry Cu-Au; 093M 009 093M 121 093M 163	historic non-NI 43-101 compliant I: 41 Mt at 0.25% Cu, 0.01% Mo	2 holes, total 1045.5 m, with several intersections over 1.1 g/t.
E&L	Northwest	Garibaldi Resources Corp.	Ni, Cu, Pt, Ag; Tholeiitic intrusion; 104B 006	na	Diamond drilling program intersected a sequence of mafic and ultramafic rocks and highlight results included 8.3% Ni and 4.2% Cu over 16.75 m.
Forest Kerr	Northwest	Aben Resources Ltd.	Au, Ag, Cu; Precious metal veins	na	Diamond drilling, nine holes, 2445 m. Highlight results from the newly discovery Boundary North zone included 1.2 g/t Au, 1.8 g/t Ag and 0.21% Cu over 122 m that includes 10.9 g/t Au, 14.6 g/t Ag and 1.5% Cu over 12 m with a high grade core of 21.5 g/t Au, 28.5 g/t Ag and 3.1% Cu over 6 m.
GJ	Northwest	Skeena Resources Limited	Cu, Au; calc-alkalic – porphyry; 104G 034	M+I: 133.67 Mt at 0.32% Cu, 0.36 g/t Au; Inf: 53.69 Mt at 0.26% Cu, 0.330 g/t Au	One of two deposits that form the Spectrum-GJ project. Updated mineral resource estimate and a preliminary economic assessment.
Hank	Northwest	Golden Ridge Resources Ltd.	Au, Ag; Epithermal veins, Cu, Au porphyry	na	Announced a 9000 m diamond drilling program. Final meterage not reported but results included 4.13 m of 19.74 g/t Au, 193.9 g/t Ag, 0.77% Pb, 1.97% Zn and 60.27 m of 2.14 g/t Au, 6.9 g/t Ag, 0.11% Pb, 0.45% Zn.

Table 6. Continued.

Homestake Ridge	Northwest	Auryn Resources Inc.	Au, Ag, Cu; epithermal veins	I: 0.624 Mt at 6.25 g/t Au, 47.9 g/t Ag, 0.18% Cu Inf: 7.245 Mt at 4.00 g/t Au, 90.9 g/t Ag, 0.11% Cu. Resources at a 2.0 g/t AuEq cut-off)	Produced a new mineral resource estimate. A 37 hole, 14,850 m diamond drilling program. Drill result highlights include 30 m of 2.00 g/t Au (including 4 m of 6.03 g/t Au and 2 m of 11.80 g/t Au), 10 m of 4.12 g/t Au (including 2 m of 18.01 g/t Au), 18 m of 1.29 g/t Au (including 4 m of 4.18 g/t Au), 8 m of 2.67 g/t Au (including 2 m of 7.4 g/t), and 14 m of 1.23 g/t Au.
Kutcho	Northwest	Kutcho Copper Corp.	Cu, Pb, Zn; VMS; 104I 060	M+I: 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)	Kutcho (formerly Desert Star Resources Ltd.) signed an agreement to acquire 100% interest in the project from Capstone Mining Corp. for \$28.8 million. Announced a positive prefeasibility study with updated resource figures.
Premier/Dilworth	Northwest	Ascot Resources Ltd.	Au, Ag; Au in quartz veins; 104B 044	na	A 379 hole, 118,800 m diamond drilling program. Drilling discovered a new high-grade subzone (Ben) of the Northern Lights zone in the Premier mine area. Numerous high-grade intersections were reported, including 36.31 g/t Au over 16.15 m.
Red Cliff	Northwest	Decade Resources Ltd. (65%), (Mountain Boy Minerals Ltd. (35%))	Cu, Au, Ag, Zn; polymetallic veins; 104A 037	na	Chip sampling results of 19.9 g/t over 4 m for the Waterpump zone and 390 g/t Au over 5 m for the Lower Montrose zone. Reported drilling results for the Montrose zone include 14.93 g/t Au over 8.38 m and 9.5 g/t Au over 10.98m.
Silver Coin	Northwest	Jayden Resources (Canada Inc.) (80%), (Mountain Boy Minerals Ltd. (20%))	Ag, Zn, Pb, Cu; Intrusion related Au pyrrhotite veins, Subaqueous hot spring Ag, Au, Polymetallic veins; 104B 095	na	A 14 hole, 2225 m diamond drilling program. Assay results included 8.63 g/t Au over 7.7 m, 6.5 g/t Au over 1.5 m and 8.25 g/t Au over 1.0 m.
Silver Queen	Northwest	New Nadina Explorations Ltd.	Ag, Cu, Au, Zn, Pb; Polymetallic veins; 093L 002	na	A 3 hole, 2158 m diamond drill program. Results included 0.4 m of 120 g/t Ag, 1.29 g/t Au, 1.41% Cu and 3 m of 120 g/t Ag, 0.24 g/t Au and 0.5% Cu.
Snip	Northwest	Skeena Resources Limited	Au, Ag; Mineralized quartz veins; 104B 250	na	A 72 hole, 9000 m underground diamond drill program. Highlight results included 341.00 g/t Au over 1.50 m, 67.68 g/t Au over 2.03 m and 10.76 g/t Au over 4.30 m including 14.80 g/t Au over 1.49 m and 9.47 g/t Au over 1.50 m.
Spectrum	Northwest	Skeena Resources Limited	Au, Cu; mineralized quartz veins, high K calc-alkalic porphyry 104G 036	I: 8.59 Mt at 1.04 g/t Au, 6.58 g/t Ag, 0.11% Cu Inf: 22.63 Mt at 1.03 g/t Au, 3.85 g/t Ag, 0.11% Cu (0.50 g/t eAu cut-off)	One of two deposits that form the Spectrum-GJ project. Updated mineral resource estimate and a preliminary economic assessment.

Table 6. Continued.

Tatogga	Northwest	GT Gold Corp.	Au, Ag, Cu; polymetallic veins, porphyry	na	Two new grassroots exploration discoveries; the high grade Saddle South gold discovery and the Saddle North copper-gold-silver porphyry discovery. Saddle South results include 51.53 g/t Au over 6.95 m and 5.10 g/t Au over 23.66 m. Saddle North results include 210.3 m of 0.14 g/t Au, 0.28 g/t Ag and 0.16% Cu including 0.22 g/t Au, 0.36 g/t Ag and 0.24% Cu over the last 33.73 m of the hole. The Saddle North discovery also included epithermal veins that assayed 13.55 g/t Au over 2.58 m including 61.10 g/t Au and 30.90 g/t Ag over 0.61 m. In 2018, drilling programs will continue on all the current target discoveries.
Telkwa Coal	Northwest	Telkwa Coal Limited	Bituminous coal; 093L 156	M: 89.113 Mt I: 42.037 Mt Inf: 33.412 Mt	In 2017, a favourable pre-feasibility study was released and plans for a feasibility study and permit applications were announced. Telkwa Coal Limited is a wholly owned subsidiary of Allegiance Coal Limited.
Treaty Creek	Northwest	Tudor Gold Corp. (80%), (Teuton Resources Corp. (20%), American Creek Resources Ltd. (20%))	Au, Ag; Epithermal high sulphidation; 104B 078	na	A 27 hole, 13,722 m diamond drill program. The target was the Copper Belle zone and highlight results from five holes included 115.1 m of 1.31 g/t Au, 4.4 g/t Ag, 0.022% Cu including 39 m of 2.38 g/t Au, 8.3 g/t Ag, 0.026% Cu. Assays for the remaining 22 holes are pending.
Flatbed	Northeast	Colonial Coal International Corp.	Coal; Bituminous; 093I 049	Inf: 298 Mt	5 vertical holes on approximately 1800 m centres, total 2832 m. Flat-lying Gates Formation coal at about 700 m depth.
Huguenot	Northeast	Colonial Coal International Corp.	Coal; Bituminous	M: 96.2 Mt surface, 18.9 Mt underground. I: 35.8 Mt surface, 126.9 Mt underground	Continued environmental monitoring.
Akie	North Central	Canada Zinc Metals Corp.	Zn, Pb, Ag; Sedimentary exhalative Zn-Pb-Ag; 094F 031	I: 19.6 Mt at 8.17% Zn, 1.58% Pb, 13.6 g/t Ag	Structural reinterpretation of satellite imagery. Eight diamond drill holes on Cardiac Creek zone, 4700 m total. 1100 samples taken. All holes intersected mineralization; final two expanded indicated resource.
CAP Claims	North Central	Arctic Star Exploration Corp.	Nb ₃ O ₅ ; Carbonatite hosted deposits	na	4 diamond drill holes, totalling 647.5 m, prospecting. Discovered a new carbonatite deposit. Drilling highlights include 0.63% Nb ₂ O ₅ over 2.26 m.
Decar	North Central	FPX Nickel Corp.	Ni; Ultramafic-hosted; 093K 039, 093K 072	2013 I: 1160 Mt at 0.124% Ni Inf: 870 Mt at 0.125% Ni	8 holes total 1197 m, along strike from previous drilling. Results support expansion of Baptiste deposit 650 m to SE. 2017 and previous drilling in the southeast portion of the Baptiste deposit defined a zone approximately 1000 m long east-west by 200 to 600 m wide of near-surface mineralization.

Table 6. Continued.

Duke	North Central	Amarc Resources Ltd.	Cu, Mo, Au; Porphyry Cu-Au; 093M 009, 093M 121, 163	Historic non-NI 43-101 compliant I: 41 Mt at 0.25% Cu, 0.01% Mo	2 holes, totalling 1045.5 m, with several intersections over 1.1 g/t Au.
Joy	North Central	Amarc Resources Ltd.	Cu, Mo, Au; Porphyry Cu-Mo-Au; 094E 106	na	Completed 3 holes totalling 1527 m to test coincident IP and geochem anomalies. Airborne mag, 49 line km IP, 638 talus fines samples for analysis, mapping. Farm-in agreement with Hudbay Mining (Amarc was 2017 operator).
Kemess East	North Central	Centerra Gold Inc.	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	New NI 43-101 Technical Report, July 2017. 10 diamond drill holes (8 on Kemess East and 2 on “offset zone,” totalling 13,923 m. Centerra Gold Inc. finalized purchase of AurRico Metals Inc. in January 2018.
Kwanika	North Central	Kwanika Copper Corp. (65%) Serengeti Resources Inc. (35%) Daewoo Minerals Canada Corp.	Cu, Au, Ag; Porphyry Cu±Mo±Au; 093N 073	I: Central Zone pit: 101.5 Mt at 0.31% Cu, 0.32 g/t Au, 0.96 g/t Ag Central Zone UG: 29.7 Mt at 0.34% Cu, 0.36 g/t Au, 1.05 g/t Ag	New NI 43-101 released April 2017. Serengeti and Daewoo formed joint venture company, Kwanika Copper Corp., agreement completed October 2017.
Panorama North	North Central	Atrum Coal Ltd. (JOGMEC (Japan Oil, Gas, and Metals National Corporation))	Coal; Anthracite; 104A 085, 104A 089	na	5 wide-spaced drill holes, total 227.5 m, extensive surface mapping, core studies and interpretation. JOGMEC entered a farm-in agreement in 2016.
Snowbird	North Central	Omineca Gold Ltd.	Au; epithermal in quartz veins; 093K 036	na	10 diamond drill holes, focus on Main and North zones, total 1212 m. 50 line km ground mag, mapping, soil (139) and rock (111) sampling. 8 holes showed multi-gram Au intervals. Deposit open below 50 m.
Stardust	North Central	Sun Metals Corp.	Ag, Pb, Zn; Skarn Ag-Pb-Zn; 093N 009	na	3 diamond drill holes totalling 500 m, 28 line km IP and Mag surveys, 744 soil samples, ZTEM heli survey reinterpretation. June 2017, optioned by Lorraine Copper Corp. to 1124245 BC Ltd. Nov. 2017, acquired by Sun Metals Corp.
BC Sugar	South Central	Lithium Corporation	Graphite	na	Permitting, sampling, geophysics.
Cariboo Gold	South Central	Barkerville Gold Mines Ltd.	Au; Au-quartz veins; 093H 006, 140, 139, 019	(Cow Mountain at 0.5 g/t Au cut off) I: 35.8 Mt 2.4 g/t Au Inf: 27.5 Mt 2.3 g/t Au	Up to 160,000 m diamond drilling in 3 areas with recent focus on Island Mountain area. Barkerville Mountain and Cow Mountain also drilled. Regional target generative program in addition. Resource here is 2015 estimate for Cow Mountain. See table 2 for Bonanza Ledge.

Table 6. Continued.

Fox	South Central	Happy Creek Minerals Ltd.	W; W skarn; 093A 259, 260, 258	I: 486,000 t 0.818% WO ₃ Inf: 361,000 t 1.568% WO ₃	Diamond drilling (11,249 m in 66 holes), geological mapping. Resource estimate precedes 2017 drilling. Combined underground and surface. Indicated is Ridley Creek, Ridley creek and BN zone included in inferred.
Gold Creek	South Central	Eureka Resources Inc.	Au, Ag; Au-quartz veins; 093A 127	na	Drilling 331 m in 3 holes.
Ike	South Central	Amarc Resources Ltd. (Hudbay Minerals Inc.)	Cu, Mo; Porphyry Cu±Mo±Au; 092O 025, 067	na	Geological mapping; IP (82 line km), diamond drilling 2702 m in 9 holes.
Lac La Hache	South Central	Engold Mines Ltd.	Cu, Au, Ag, Fe; Cu skarn; 092P 120, 108, 002	I: 7.6 Mt 0.28% Cu, 0.05 g/t Au, 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	Approximately 20,000 m diamond drilling, gravity, magnetic and airborne geophysics. 2017 drilling focused on a recent skarn discovery. Resource estimate is for Spout deposit (2012), which is mineralogically similar. Property also hosts a porphyry prospect and hydrothermal Au-Ag-Cu.
Miner Mountain	South Central	Sego Resources Inc.	Cu, Au; Alkalic porphyry Cu-Au; 092HSE203, 078	na	Diamond drilling 600 m in 2 holes.
Rabbit North	South Central	Tower Resources Ltd.	Cu, Au; Alkalic porphyry Cu-Au	na	Diamond drilling (approximately 3400 m, 11 holes).
Rateria	South Central	Happy Creek Minerals Ltd.	Cu, Mo, Ag; Porphyry Cu±Mo±Au; 092ISE199	na	Diamond drilling 1764 m in 6 holes.
Shovelnose	South Central	Westhaven Ventures Inc.	Au; Epithermal Au-Ag-Cu; 092HNE309, 308	na	Geological mapping, geochemistry, core drilling (3269 m in 7 holes).
Trans Canada	South Central	ZMM Canada Minerals Corp.	Zeolite; Open-system zeolites; 082LNW096	na	Bulk sample started.
Alpine	Southeast	Braveheart Resources Inc.	Au-Ag-Pb-Zn; mesothermal Au and polymetallic veins; 082FNW127, 257, 292	na	Mapping, rock sampling, re-sampling of historic core, diamond drilling (1600 m in 11 holes). Drill program results included 1.7 m grading 19.1 g/t Au, 1.5 m grading 11.8 g/t Au, and 1.4 m grading 38.0 g/t Au.
Bayonne	Southeast	Margaux Resources Ltd.	Au+/-Ag-Pb-Zn-Cu; Au-quartz veins, polymetallic veins; 082FSE030, 031, 034, 025	na	LiDAR, mapping, grab and chip sampling, diamond drilling (2089 m in 13 holes). Grab sample results included 27.5, 23.3, 18.1, 15.0 and 10.6 g/t Au. A 1.0 m chip sample of the Main vein assayed 24.6 g/t Au. Grab samples from the Maggie Aikens vein assayed 51.6, 46.6 and 41.1 g/t Au. Drill results included 1.85 m grading 15.31 g/t Au, 1.0 m grading 12.7 g/t Au, and 0.32 m grading 18.2 g/t Au.

Table 6. Continued.

Frances Creek	Southeast	Voyageur Minerals Ltd.	Ag-Pb-Zn-Ba; Mississippi valley type, polymetallic vein breccia; 082KNE061	53,856 to 215,422 t grading 95.86% to 99.26% BaSO ₄	Mapping, sampling, diamond drilling (>1200 m in >17 holes). Drill results included (true width) 36.03 m 19.47% BaSO ₄ , 11.86 m at 60.32% BaSO ₄ , 23.88 m at 27.05% BaSO ₄ , 18.7 m at 37.39% BaSO ₄ , 22.88 m at 23.94% BaSO ₄ , 14 m at 38.41% BaSO ₄ , 15.22 m at 37.65% BaSO ₄ .
Gold Drop	Southeast	GGX Gold Corp.	Au; Alkalic intrusion associated Au; 082ESE055, 150, 152, 153, 285, 286, 287	na	Prospecting, rock sampling, trenching, channel sampling, soil sampling and diamond drilling (1449 m in 27 holes). Drilling results included 0.3 m of 10.8 g/t Au, 123 g/t Ag and 16.3 m of 4.59 g/t Au, 38.64 g/t Ag.
Greenwood Precious Metals	Southeast	Golden Dawn Minerals Inc.	Au-Ag-Pb-Zn+/-Cu; Cu-Au-Ag skarns, polymetallic veins, epithermal Au-veins, Porphyry; 082ESE041, 042, 032, 045, 020, 130, 116	Golden Crown: M+I: 163,000 t grading 11.09 g/t Au, 0.56% Cu (2016)	At the Golden Crown property as of Dec. 4th, 31 holes totalling 2954 m were drilled. Highlight assays include 12.3 m of 3.53 g/t Au, 0.11% Cu, including 4.6 m of 7.60 g/t Au, 0.13% Cu. At the May Mac property 22 underground holes totalled 3018 m and eight surface holes totalled 1886 m. Results include 2.57 m grading 252.6 g/t Ag, 0.93 g/t Au, 9.9% Pb, 4.3% Zn, 3.71 m grading 246.0 g/t Ag, 2.69 g/t Au, 1.3% Pb, 0.9% Zn, 1.20 m grading 174.3 g/t Ag, 8.2 g/t Au, 3.7% Pb, 2.6% Zn.
Jackpot	Southeast	Margaux Resources Ltd.	Pb-Zn-Ag+/-W, Au, Mo, Bi; Stratiform replacement; 082FSW012, 013, 014, 015, 255, 256	na	LiDAR, rock and chip sampling, compilation of historical data into 3D model, diamond drilling (1394 m in 9 holes); mineralization exists along a 600 m strike length; grab sample results up to 30% Zn, with associated Pb, Ag, and Cd. Chip sampling results included 3.4 m grading 13.35% Zn, 2 m grading 15.58% Zn, and 3 m grading 8.97% Zn. Drilling results included 61.1 m grading 1.01% Zn, 49.2 m grading 1.04% Zn, 8.5 m grading 6.66% Zn, and 36.3 m grading 1.48% Zn.
Jersey-Emerald	Southeast	Margaux Resources Ltd.	Pb-Zn-Ag+/-W, Au, Mo, Bi; stratiform replacement, skarn; 082FSW010, 009	Emerald-Dodger Tungsten: M+I: 3.071 Mt grading 0.34% WO ₃ , 0.028 Mt grading 0.1% Mo; Inf: 5.48 Mt grading 0.27% WO ₃ , 0.481 Mt grading 0.1% Mo (2006-2015) Jersey: I: 1.9 Mt grading 4.1% Zn, 1.96% Pb; Inf: 4.98 Mt grading 3.37% Zn, 1.95% Pb (2010)	Results from 2016 diamond drilling released in 2017 included 10.2 m grading 24.98 g/t Au, 0.65 m grading 68.3 g/t Au, and 0.25 m grading 59.1 g/t Au. Work in 2017, dewatering of underground workings at Emerald, rock and silt sampling, LiDAR surveys, data compilation and 3D geological modeling, re-logging of historic core, diamond drilling (1121 m in 6 holes). Drilling results included 6.1 m grading 2.61% Pb, 0.44% Zn, and 3.11 m grading 2.02% Pb, 0.48% Zn. Rock sampling from the Comet and Tungsten King showings returned results of 32.8% Zn, 1.2% Pb; and 2.69% Zn, 0.65% Pb, with elevated gold and bismuth. A 3500 kg sample of historic Emerald mine tailings was collected. A partnership agreement with CRONIMET Mining Group is in place to evaluate the economic viability to re-process historic tailings.

Table 6. Continued.

Kena-Daylight	Southeast	Prize Mining Corporation (Apex Resources Inc.)	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	Option agreement to acquire 80% in Kena-Daylight (Apex Resources Inc. owns 20%) and option to acquire 100% of Toughnut property. Mapping, soil geochem, rock sampling, ground magnetics and VLF surveying, trenching and historical data compilation. Rock sample results at Toughnut included 20.6 g/t Au, 188 g/t Ag and 9.05 g/t Au, 8.6 g/t Ag. Diamond drilling at Kena-Daylight, 18 holes (2695 m) and at Toughnut, 11 holes (1730 m).
Swift Katie	Southeast	Valterra Resource Corporation	Cu-Au+/-Pb-Zn-Ag-Mo; 082FSW290, 291, 350	na	Rock sampling and diamond drilling (1392 m in 8 holes). Drilling tested surface mineralization along a 1000 m strike length; results include 2.5 m grading 11.5 g/t Au and 6.7 g/t Ag, including 0.8 m grading 30.9 g/t Au and 17.8 g/t Ag and 8.6 m grading 3.1 g/t Au and 2.0 g/t Ag.
Thor	Southeast	Taranis Resources Inc.	Ag-Pb-Zn+/-Au; polymetallic veins and breccia, stratiform volcanogenic massive sulphide; 082KNW030, 031, 060, 061	I: 640,000 t grading 0.88 g/t Au, 187 g/t Ag, 0.14% Cu, 2.51% Pb, and 3.51% Zn Inf: 424,000 t grading 0.98% Au, 176 g/t Ag, 0.14% Cu, 2.26% Pb, and 3.2% Zn (2013)	VLF surveying, trenching and channel sampling, test milling. Channel sample results include 2.04 m grading 26.6 g/t Au, 1246 g/t Ag, 3.1% Pb, 4.3% Zn, and 0.55% Cu.
Goldstar	Southwest	DSM Syndicate	Au, Ag, Zn, Cu	na	Prospecting, sampling. Discovery of gold mineralization.
Ladner Gold	Southwest	New Carolin Gold Corp.	Au, Ag; Au quartz veins; 092HWN003 092HWN007 092HWN018 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	Underground rehabilitation and preparation for drilling.
OK	Southwest	Lorraine Copper Corp.	Cu, Mo; Porphyry Cu±Mo±Au; 092K 008 092K 057 092K 168	Inf: 86,800,000 t 0.31% Cu, 0.014% Mo	Induced polarization survey started.

Table 6. Continued.

North Island	Southwest	Northisle Copper and Gold Inc.	Cu, Au, Mo; Porphyry Cu±Mo± Au; 092L 240 092L 200	Red Dog I: 23.6 Mt 0.32% Cu, 0.46 g/t Au Hushamu I: 304 Mt 0.21% Cu, 0.29 g/t Au, 0.01% Mo Inf: 205.6 Mt 0.18% Cu, 0.26 g/t Au, 0.008% Mo	Diamond drilling (1800 m in 6 holes), preliminary economic assessment.
--------------	-----------	--------------------------------	---------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------

M = Measured; I = Indicated; Inf = Inferred

the main Silver Coin deposit. Assays are still pending for four holes.

In July 2017, Skeena Resources Limited acquired 100% interest in the **Snip** past-producing gold mine from Barrick Gold Corporation. The Snip mine operated from 1991 to 1999 and produced over 1.1 million ounces of Au. Exploration in 2017 included a 72 hole, 9000 m underground diamond drill program. Highlight results included 341.00 g/t Au over 1.50 m, 67.68 g/t Au over 2.03 m and 10.76 g/t Au over 4.30 m including 14.80 g/t Au over 1.49 m and 9.47 g/t Au over 1.50 m. Skeena reported that drilling verified historical data. For 2018, they plan to expand the known mineralized zones and to examine previously overlooked areas.

GT Gold Corp.'s **Tatogga** project is approximately 14 km west of the Red Chris copper-gold mine, less than 1 km west of Iskut, and close to a paved road (Highway 37). The project has two new grassroots discoveries, Saddle South (high-grade gold) and Saddle North (porphyry copper-gold-silver). The initial discovery was Saddle South, which was drilled to follow up on anomalous soil sample results. The 2017 work program included 28 reverse circulation drill holes (1527 m) on Saddle South, 32 line km of induced polarization surveying, 165 line km of helicopter-borne magnetic surveying, 86 diamond drill holes (15,998 m) on Saddle South and six diamond drill holes (1713 m) on Saddle North. The Saddle south discovery won the prestigious Mines and Money "Exploration Discovery Award".

Drilling on Saddle South returned a high density of high-grade intersections. Highlight results include 51.53 g/t Au over 6.95 m and 5.10 g/t Au over 23.66 m. Drilling on Saddle North was designed to test a large-scale, high-intensity, coincident IP-magnetic anomaly. Drilling results included a new porphyry discovery and the intersection of high-grade epithermal veins (on the western end of the Saddle North trend). The porphyry mineralization discovery hole returned 210.3 m of 0.14 g/t Au, 0.28 g/t Ag and 0.16% Cu. Grades improved downhole and the hole ended in mineralization. The last sample interval of 33.73 m returned 0.22 g/t Au, 0.36 g/t Ag and 0.24% Cu. Highlight intersections for the epithermal vein discovery

included 13.55 g/t Au over 2.58 m including 61.10 g/t Au and 30.90 g/t Ag over 0.61 m. In 2018, drilling programs will continue on all the current target discoveries.

8.1.2. North Central Region

Gitennes Exploration Inc. has an option with a private company to earn a 100% interest in the **Snowbird** project. Gold occurs in quartz veins and stringer zones associated with the Sowchea fault zone. Gitennes carried out ground geophysics, and rock and soil sampling. Ten boreholes were completed, totalling approximately 1212 m. Eight of these intersected multi-gram gold intervals, including Hole SB14-04 (16.20 g/t Au over 1.0 m), Hole SB17-02 (9.73 g/t Au over 1.0 m), and Hole SB17-08 (8.24 g/t Au over 0.52 m).

8.1.3. South Central Region

Barkerville Gold Mines planned to drill up to 160,000 m in 2017 on their **Cariboo Gold** project and came close by December. Most drilling was in the Island Mountain area, northwest of Cow Mountain and Barkerville Mountain, which were also target areas. All are sites of past producers. Results include high-grade intersection of typically 10s of g/t Au over 5 m or more.

Eureka Resources Inc. drilled three diamond drill holes at their **Gold Creek** property. Results included 33.20 g/t Au over 1.25 m and 17.95 g/t Au over 1.5 m. Targets are orogenic gold veins in Mesozoic phyllites and greywackes.

In October, Westhaven Ventures Inc. began a 3269 m drill program at their **Shovelnose** project. Five holes focused on the Tower zone and two on the Alpine zone 0.5 km to the east. Other 2017 work included a ground magnetic survey, geological mapping, prospecting, soil sampling, and a clay mineralogical study. Shovelnose hosts epithermal style mineralization in Spences Bridge Group volcanic rocks (Cretaceous).

8.1.4. Southeast Region

Margaux Resources Ltd. began work on their **Bayonne** property in 2017 with mapping, rock sampling, LiDAR

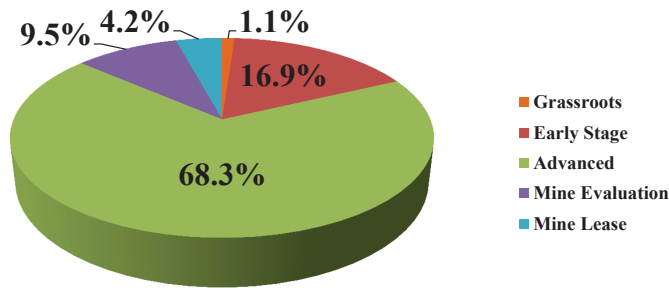


Fig. 11. South Central Region exploration expenditures by exploration category.

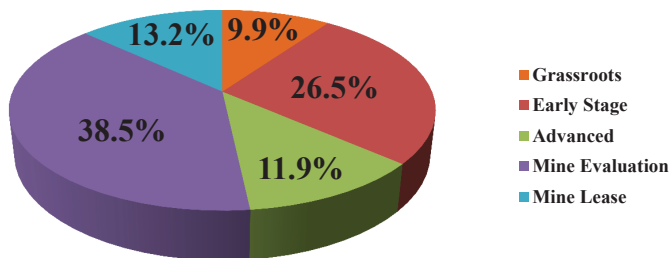


Fig. 12. Southeast Region exploration expenditures by exploration category.

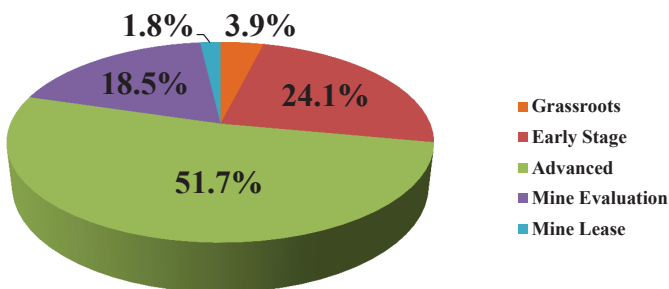


Fig. 13. Southwest Region exploration expenditures by exploration category.

surveying, and diamond drilling. Historic production on the property (1936-1942) was mainly from the Main vein and a splay known as the A vein. The company drill tested three main targets (2089 m, 13 diamond drill holes) to test below the limits of historic mining, and previous undrilled areas. Results include 1.85 m grading 15.31 g/t Au, 1.0 m grading 12.7 g/t Au, and 0.32 m grading 18.2 g/t Au.

GGX Gold Corp. conducted prospecting, rock sampling, trenching, channel sampling, soil sampling and diamond drilling (1449 m, 27 holes) on their **Gold Drop** project. Drilling results included 0.3 m of 10.8 g/t Au, 123 g/t Ag and 16.3 m of 4.59 g/t Au, 38.64 g/t Ag.

Golden Dawn Minerals Inc. diamond drilled on their Golden Crown and May Mac properties, part of their **Greenwood Precious Metals** project. At Golden Crown, 31 holes totalling 2954 m were drilled. Highlight assays include 12.3 m of 3.53 g/t Au, 0.11% Cu, including 4.6 m of 7.60 g/t Au, 0.13%

Cu. At May Mac, 22 underground holes totalled 3028 m and eight surface holes totalled 1886 m. Results include 2.57 m grading 252.6 g/t Ag, 0.93 g/t Au, 9.9% Pb, 4.3% Zn, 3.71 m grading 246.0 g/t Ag, 2.69 g/t Au, 1.3% Pb, 0.9% Zn, 1.20 m grading 174.3 g/t Ag, 8.2 g/t Au, 3.7% Pb, 2.6% Zn.

8.1.5. Southwest Region

DMS Syndicate prospected and sampled on their **Goldstar** project south of Bella Coola. Out of 16 samples, four returned more than 10 g/t Au with Ag, Cu and Pb values. This area has no record of previous exploration. New Carolin Gold Corp. carried out underground rehabilitation, channel sampling, and geological mapping on their **Ladner Gold** project.

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

8.2.1. Northwest Region

Evrin Resources Corp. signed an agreement with a wholly owned subsidiary of Antofagasta Plc by which Antofagasta can earn up to a 70% interest in their **Ball Creek** property by spending up to an aggregate of US\$31 million or delivering a prefeasibility study.

Skeena Resources Limited filed a mineral resource update and a preliminary economic assessment for their **Spectrum-GJ** project. The project consists of two deposits, separated by about 14 km, one porphyry copper-gold deposit (Donnelly, at GJ), the other porphyry gold-copper deposit (Spectrum).

8.2.2. North Central Region

Amarc Resources Ltd.'s **Duke** property straddles the Northwest and North Central regions. The property includes a copper+-molybdenum porphyry deposit that was the subject of an historic (NI 43-101 non-compliant) inferred resource estimated at 40.8 million tons at 0.25% Cu and 0.01% Mo. In late autumn 2017, the company diamond drilled two holes (1045 m) and reported several intersections with more than 1.1 g/t Au.

Amarc's **Joy** project is a copper+-molybdenum+-gold porphyry target. Amarc completed a farm-in agreement with Hudbay Minerals, with Hudbay to spend \$15 million on the property by the end of 2020, including \$1.9 million in 2017. Drilling consisted of three boreholes totalling 1527 m to test coincident IP and geochemical anomalies. Amarc also completed an airborne magnetometer survey, 49 line km of IP, geological mapping, and a geochemical survey.

Centerra Gold Inc.'s **Kemess East** project is about 1 km east of the Kemess Underground project. In July, a NI 43-101 report was released identifying an Indicated resource of 113.12 Mt grading 0.38% Cu, 0.46 g/t Au, and 1.94 g/t Ag. In 2017, ten diamond drill holes totalling 13,923 m were completed. Highlight intersections included 338 m of 0.64 g/t Au, 0.45% Cu, including 120 m of 1.05 g/t Au, 0.60% Cu, 846.5 m of 0.25 g/t Au, 0.28% Cu, including 208 m of 0.37 g/t Au, 0.41% Cu, 853.8 m of 0.24 g/t Au, 0.25% Cu, including 147.5 m of 0.40 g/t Au, 0.42% Cu and 461.9 m of 0.27 g/t Au, 0.22% Cu, including 75 m of 0.61 g/t Au, 0.41% Cu.

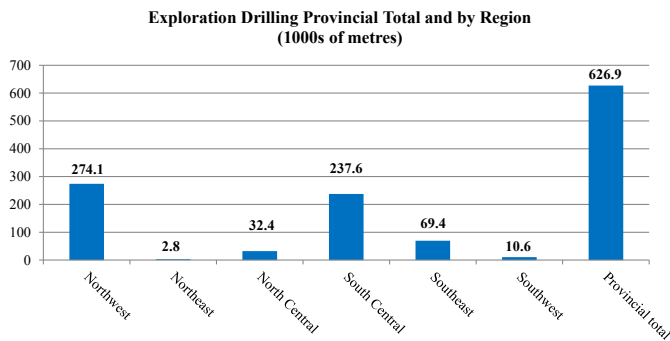


Fig. 14. Exploration drilling metres, provincial total and by region.

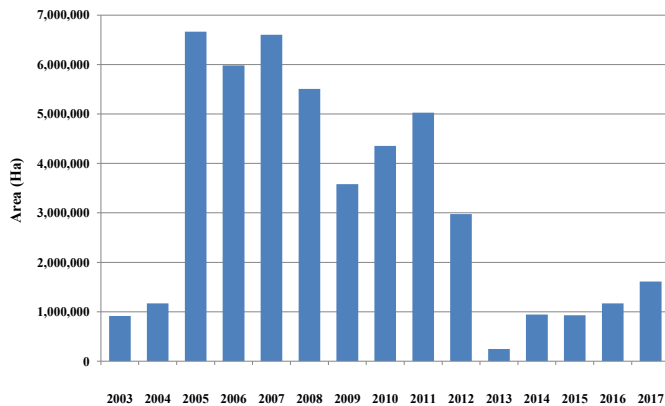


Fig. 15. Tenure, new mineral claims (area Ha) by year.

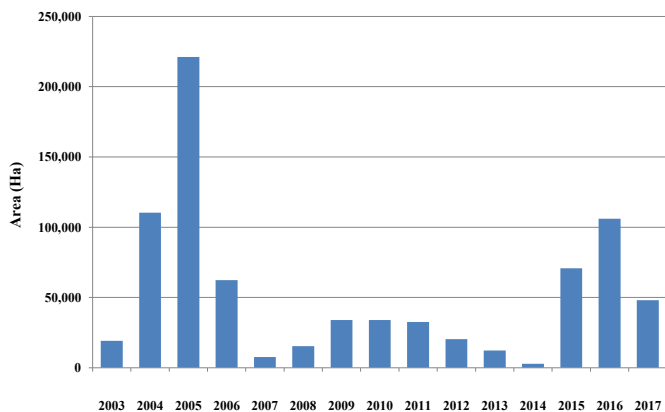


Fig. 16. Tenure, new coal license issuances (area Ha) by year.

In April 2017, Serengeti Resources Inc. released a NI 43-101 report and preliminary economic assessment for the **Kwanika** project. The report proposes a combined open pit and underground operation with an estimated mineral resource of 131.2 Mt Measured and Indicated, and 73.1 Mt Inferred. The projected mine life is 15 years, with a milling rate of 15,000 tpd. In October, Serengeti completed an agreement with POSCO Daewoo and Daewoo Minerals Canada (DMC) to form a joint venture company, the Kwanika Copper Corporation (65% Serengeti, 35% Daewoo), to pursue development.

The **Stardust** project was acquired by Sun Metals Corp. from Lorraine Copper Corp. in November. Earlier in 2017 Lorraine collected 744 soil samples to extend existing grids, ran 28 line-km of IP and magnetic surveys, reinterpreted a 2011 ZTEM survey, and completed a 3 borehole drilling program.

8.2.3. South Central

The **Ike** Cu-Mo-Ag project is owned by Hudbay Minerals Inc., (60%) and Amarc Resources Ltd., (40%). In 2017, work included 2702 m in nine diamond drill holes, 82 line km of induced polarization, 20 km² of geological mapping and fine-grained talus sampling. Hudbay was a new partner in the project in 2017. Amarc remains the operator. Between 2014 and 2016 they drilled approximately 12,000 m in 21 widely spaced holes.

Sego Resources Inc. began an initial 600 m, 2-hole drill program in mid-October at their **Miner Mountain** project, an alkalic Cu-Au porphyry prospect. The new drilling follows 2012 percussion and core drilling which returned high copper assays and gold, including 100.4 m of 0.946% Cu, 0.55 g/t Au and 3.473 g/t Ag.

Tower Resources Ltd. drilled about 3400 m in 11 holes at their **Rabbit North** project in 2017. They reported porphyry-style mineralized intersections, including 247 m 0.51% Cu and 0.34 g/t Au, and 88 m of 0.35% Cu and 0.27 g/t Au in the Western Magnetite zone. They also reported 133 m of 0.19% Cu and 0.31 g/t Au in the Chrysocolla zone to the south.

Happy Creek Minerals Ltd. drilled at their **Rateria** project in 2017 (1754 m in 6 holes). Step-out holes expanded Zone 2, including 105.5 m of 0.37% Cu and 0.14 g/t Au. Rateria is an early-stage project without a current resource estimate.

8.2.4. Southeast Region

In 2017, Valterra Resource Corporation released results of their 2016 drill program (1954 m, 6 DDH), and continued drilling on their **Swift Katie** project (1392 m, 8 DDH). Results included 2.5 m grading 11.5 g/t Au and 6.7 g/t Ag, (including 0.8 m grading 30.9 g/t Au and 17.8 g/t Ag); and 8.6 m grading 3.1 g/t Au and 2.0 g/t Ag. One of the holes is offsetting a 2014 hole that assayed 3.5 m grading 13.3 g/t Au, 201 g/t Ag and 0.33% Cu. Drilling tested three areas along a 1000 m strike length that has been traced on surface by rock and soil sampling, and historical trenching.

8.2.5. Southwest Region

Lorraine Copper Corp. acquired 100% of the **OK** copper molybdenum prospect north of Powell River in 2016. Late in 2017, they began an induced polarization survey. Known mineral occurrences extend along a roughly 5 km north northwest trend. The northernmost, North Lake Zone, has an Inferred resource of 86.8 million tonnes grading 0.31% Cu and 0.014% Mo. The mineralization is open with untested step-out geophysical and geochemical drill targets.

Northisle Copper and Gold Inc.'s **North Island** project has two deposits, Hushamu and Red Dog. Hushamu, a copper-molybdenum-gold porphyry prospect, is the most advanced,

with Indicated 304,000,000 t of 0.21% Cu, 0.29 g/t Au, 0.010% Mo, and 0.56 ppm Re and Inferred 205,600,000 t of 0.18% Cu, 0.26 g/t Au, 0.008% Mo and 0.38 ppm Re. The Red Dog deposit is 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 23,633,000 t 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. The Red Dog and Hushamu resources together were subject of a 2017 preliminary economic assessment, which modelled a 75,000 tpd open-pit operation with a 22-year life. Drilling in 2017 (1800 m in 6 holes) included testing a southeastern extension of the Hushamu deposit, testing an area in the Hushamu deposit previously considered occupied by late- or post-mineral breccia and barren, and testing for deep mineralization at Red Dog. Mineralization at Hushamu does appear to be open to the southeast and north and the infill drilling encountered mineralization above cut off. The hole at Red Dog was lost before reaching target depth but did encounter porphyry style alteration and increasing mineralization at depth.

8.3. Selected polymetallic base and precious metal projects

8.3.1. Northwest Region

In 2017, Dolly Varden Silver Corporation announced plans for 12,000 m of diamond drilling at the **Dolly Varden** silver project. The project consists of the Torbrit, Dolly Varden, Wolf, and North Star deposits. Drilling between the Torbrit and Wolf deposits resulted in a new discovery (Central zone), with results that included 16.10 m (13.19 m true thickness) grading 269.0 g/t Ag, 0.30% Pb, and 0.21% Zn. Follow-up drilling confirmed this discovery, returning results of 7.15 m (6.72 m true thickness) grading 1180.7 g/t Ag, 1.83% Pb and 0.26% Zn. Drilling also discovered an eastern fault offset of the Torbrit deposit (Torbrit East), with assays including 13.00 m (9.96 m true thickness) grading 244.8 g/t Ag, 0.14% Pb, 0.09% Zn. Within this interval was 5.00 m (3.83 m true thickness) grading 481.9 g/t Ag, 0.21% Pb, 0.12% Zn.

In 2017, Golden Ridge Resources Ltd. announced plans for 9000 m of diamond drilling at the **Hank** project. Results reported to date include 4.13 m of 19.74 g/t Au, 193.9 g/t Ag, 0.77% Pb, 1.97% Zn and 60.27 m of 2.14 g/t Au, 6.9 g/t Ag, 0.11% Pb, 0.45% Zn.

In June of 2017, Kutcho (formerly Desert Star Resources Ltd.) announced signing an agreement to acquire 100% interest in the **Kutcho** project from Capstone Mining Corp. for \$28.8 million. In July, they announced a prefeasibility study with updated resource figures. At a 1.0% copper 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. Kutcho plans to advance the project to a completed feasibility study and permitted for construction within 2.5 years.

In 2017, Ascot Resources Ltd. carried out a 379 hole, 118,800 m diamond drilling program at the **Premier/Dilworth** project, which includes the past-producing Premier gold mine. Until operations were suspended in 1996, the Premier mine

produced 2 million ounces of gold and 42.8 million ounces of silver. Target areas include Big Missouri, Northern Lights, and Premier. The drilling discovered a new high-grade subzone (Ben) of the Northern Lights zone in the Premier mine area. Numerous high-grade intersections were reported, including 36.31 g/t Au over 16.15 m. Plans for 2018 include continued drilling and a new NI 43-101 resource calculation.

Decade Resources Ltd. reported rock sampling results of 19.9 g/t over 4 m for the Waterpump zone at the **Red Cliff** gold-copper project. Drill core from the Waterpump zone is described as having sphalerite-galena-chalcopryrite veins in the wall of a breccia that contains quartz, pyrite, and minor chalcopryrite over 15-20 m true width. Visible gold has been observed in sphalerite-galena-chalcopryrite veinlets and in quartz-pyrite veinlets. Drill result highlights for the Montrose zone include 14.93 g/t Au over 8.38 m and 9.5 g/t Au over 10.98 m.

In 2017, New Nadina Explorations Ltd. diamond drilled a total of 2158.5 m in three holes at their **Silver Queen** project. Results included 0.4 m of 120 g/t Ag, 1.29 g/t Au, 1.41% Cu and 3 m of 120 g/t Ag, 0.24 g/t Au and 0.5% Cu.

The **Treaty Creek** project is owned by Tudor Gold Corp. (80%), Teuton Resources Corp. (20%), and American Creek Resources Ltd. (20%). The project is adjacent to Seabridge's KSM project and Pretium's Brucejack mine. In 2017, Tudor carried out a 27 hole, 13,722 m diamond drill program. The target was the Copper Belle zone and highlight results from five holes included 115.1 m of 1.31 g/t Au, 4.4 g/t Ag, 0.022% Cu including 39 m of 2.38 g/t Au, 8.3 g/t Ag, 0.026% Cu.

8.3.2. North Central Region

Canada Zinc Metals Corp.'s **Akie** property contains the Cardiac Creek SEDEX deposit. In 2016, the company issued a NI 43-101 report on Akie that defined an Indicated resource of 19.6 Mt grading 8.2% Zn, 1.6% Pb and 13.6 g/t Ag (at a 5% zinc cut-off grade) and an Inferred resource of 8.1 Mt grading 6.8% Zn, 1.2% Pb and 11.2 g/t Ag (at a 5% Zn cut-off grade). In 2017, the company conducted a drilling program on the Cardiac Creek deposit, aimed at extending the resource, completing eight holes totalling 4700 m. All holes intersected the mineralized zone and two expanded the indicated resource. Noteworthy results included 67.79 m grading 11.79% Zn+Pb and 19.1 g/t Ag, including 15.44 m grading 22.61% Zn+Pb and 36.1 g/t Ag.

8.3.3. Southeast Region

At their **Alpine** property, Braveheart Resources Inc. mapped, sampled, and diamond drilled (1600 m, 11 holes) to test the extension and continuity of mineralization in quartz veins. Drill results included 1.7 m grading 19.1 g/t Au, 1.5 m grading 11.8 g/t and 1.4 m grading 38.0 g/t Au.

In 2017, Margaux Resources Ltd. compiled all historical data into a 3D model, conducted a LiDAR survey, resampled historic drill core, chip sampled, and diamond drilled at their **Jackpot** property. Results of chip sampling included 3.4 m

grading 13.35% Zn, 2 m grading 15.58% Zn, and 3 m grading 8.97% Zn. Diamond drilling (1397 m, 9 holes) targeted an area 500 x 1000 m and 3 main zones (Jackpot Main, Lerwick, and Jackpot East) and included results of 61.1 m grading 1.01% Zn, 49.2 m grading 1.04% Zn, 8.5 m grading 6.66% Zn, and 36.3 m grading 1.48% Zn. Margaux Resources Ltd. also continued work at their **Jersey-Emerald** project. Results of 2016 drilling were released early in 2017, with 10.2 m grading 24.98 g/t Au, 0.65 m grading 68.3 g/t Au, and 0.25 m grading 59.1 g/t Au. Gold is strongly associated with bismuth and tellurium. Further diamond drilling in 2017 (1121 m, 6 holes) followed up on gold, and lead-zinc targets, with 6.1 m grading 2.61% Pb, 0.44% Zn, and 3.11 m grading 2.02% Pb, 0.48% Zn.

Taranis Resources Inc. continued work at the **Thor** property, which has several targets including past-producing mines (True Fissure, Great Northern, Broadview, and Blue Bell). Work included VLF surveying and channel sampling. Channel sample results include 2.04 m grading 26.6 g/t Au, 1246 g/t Ag, 3.1% Pb, 4.3% Zn, and 0.55% Cu.

Prize Mining Corporation's **Kena-Daylight** project includes the Kena, Daylight and Toughnut properties. Prize Mining entered into two separate option agreements in 2017, to acquire an 80% interest in the Kena and Daylight gold-copper properties (20% owned by Apex Resources Inc.), and 100% of the adjoining Toughnut property. At Toughnut, rock sampling highlight results included 20.6 g/t Au, 188 g/t Ag and 9.05 g/t Au, 8.6 g/t Ag. At the Toughnut property, 11 diamond drill holes were completed totalling 1730 m. At the Daylight property 18 diamond drill holes were completed totalling 2695 m.

8.4. Selected skarn projects

8.4.1. South Central Region

At the **Fox** tungsten skarn property, Happy Creek Minerals Ltd. continued to define the extent, grade, and continuity of scheelite mineralization. From north to south, seven known mineralized zones are: North; BK; Ridley Creek; BN; 708; Nightcrawler-Discovery; and South Grid. In January 2017, the company updated its resource estimate for the Ridley Creek zone. Resources stand at an Indicated 486,000 t grading 0.817% WO₃ and Inferred 361,000 t grading 1.568 WO₃ with a 0.2% WO₃ cut-off for material potentially amenable to open-pit extraction and 0.55% for underground resources. The initial resource for the BN zone, approximately 1 km south of the RC zone, is an Inferred 245,000 t of 1.892% WO₃ at a 0.55% cut off. The resource is 20-80 m below surface. Drilling in 2017 focused on the BN zone (4336.3 m in 38 holes). Significant results included 5.05 m 2.980% WO₃ in a step out to the east and 7.81 m 1.36% WO₃ in a step out to the southwest.

Engold Mines Ltd.'s **Lac La Hache** property hosts several prospects including the Aurizon (Au-Ag-Cu vein and breccia), the Spout (magnetite-Cu skarn), the Berkey (porphyry), and a recent Fe-Cu-Ag-Au discovery at their G1 gravity anomaly target. Their first hole of 2017 drilled this anomaly and intersected skarn-type mineralization with 26.57 m 1.76% Cu, 0.27 g/t Au, 10.29 g/t Ag and 35.8% Fe. This led to an additional

ground gravity survey and an airborne gravity and magnetic survey (274 line-km at 50 m line spacing) and substantial drilling (~20,000 m). Drilling continued into December. The company is also working on a resource estimate for the Aurizon zone.

8.5. Selected mafic- and ultramafic-hosted projects

8.5.1. Northwest Region

Diamond drilling at the **E&L** property in 2017 intersected a sequence of mafic and ultramafic rocks. Highlight results included 8.3% Ni and 4.2% Cu over 16.75 m.

8.5.2. Northeast Region

FPX Nickel Corp. (formerly First Point Minerals Corp.) continued exploration on their **Decar** project, with the technical support of Equity Exploration Consultants. The host rocks are tectonically emplaced serpentinized ultramafic rocks that are mineralized by disseminated awaruite (Ni₃Fe). In 2017, the company drilled eight boreholes totalling 1197 m at the Baptiste deposit. Near-surface mineralization was extended 500 m beyond previous drill coverage, and supported possible extension of the mineralized zone by 650 m to the southeast. Highlights included 96 m grading 0.167% Ni, which represents the second-highest grade, near-surface interval intersected at the deposit.

8.6. Selected specialty metal projects

8.6.1. North Central Region

In 2017, Arctic Star Exploration Corp. drilled four holes totalling 647.5 m to test coincident geochemical and geophysical anomalies on its **CAP** (formerly Carbo) property. A carbonatite-syenite was discovered in outcrop and in one of the boreholes. Between surface exposures and drilling, the deposit has a strike length of up to 3 km. In the borehole, at least 138.5 m of carbonatite was intersected: 0.35% Nb₂O₅ across 10.42 m (including 2.26 m of 0.63% Nb₂O₅); 19.63 m of 9.94% P₂O₅ (including 2.55 m of 20.97% P₂O₅); and 2.4 m of 0.81% TREOs (total rare earth element oxides).

8.7. Selected coal projects

8.7.1. Northwest Region

Telkwa Coal Limited is a wholly owned subsidiary of Allegiance Coal Limited. A technical report for the **Telkwa** coal project filed in February of 2015 reported a total resource estimate of 165 Mt of semi-soft coking coal including 131.2 Mt of Measured plus Indicated resources and 33.4 Mt of Inferred resources. In 2017, a favourable pre-feasibility study was released and plans for a feasibility study and permit applications were announced.

8.7.2. Northeast Region

Colonial Coal International Corp. worked on their **Flatbed and Huguenot** projects. The Flatbed project is adjacent to Anglo American's Trend mine. In 2017, the company drilled five vertical holes on 1800 m centres totalling 2830 m. The

holes encountered flat-lying coal units, with common shaly interbeds, at depths of about 700 m. Downhole geophysical logs were completed, and core sampled. A NI 43-101 report on the project released in late November outlined an underground mineable Inferred resource of 298 Mt of bituminous coal that were referred to as having “coking properties after beneficiation.” Colonial continued environmental monitoring studies on its **Huguenot** project south of the Trend Mine. The property contains combined Measured and Indicated surface resources of 131.95 Mt, and combined underground resources of 145.73 Mt.

8.7.3. North Central

The **Panorama North** project is about 15 km west of the Groundhog coalfield and, similar to Groundhog, it hosts anthracitic coal seams. In 2016, Atrum Coal Ltd. entered a farm-in agreement in which JOGMEC agreed to contribute \$5 million in cash or in-kind support for three years to earn a 35% interest in the project. In 2017, extensive surface mapping was undertaken to identify and trace coal seams, and five wide-spaced boreholes were completed, totalling 1227 m.

8.8. Selected industrial mineral projects

8.8.1. South Central Region

Lithium Corporation received a permit for trenching at their **BC Sugar** graphite property. The work planned for 2017 was deferred due to forest fires. They collected a small bulk sample late in the year, and submitted it for metallurgical study. ZMM Minerals Canada Corp. is collecting a bulk sample at their **Trans Canada** property. They describe the target as a suite of iron bearing zeolites. Currently, zeolites are widely used for water filtration and soil amelioration and as catalysts, biological growth media, pozzolans in cement, and additives to detergent; other uses are being explored.

8.8.2. Southeast Region

At their **Frances Creek** property Voyageur Minerals Ltd. continued drilling late into the year (more than 17 diamond drill holes) targeting barite in a brecciated vein to test mineralization to a depth of about 60 m and extend the strike length. Drill results indicate barite mineralization extends over a 20.4 m width, for 60 m along strike, averaging 30.57% BaSO₄. Purity testing indicates that the barite, in addition to being used for drilling in the oil and gas industry, may qualify for the pharmaceutical market. The company plans bulk sampling.

9. Publically funded geoscience

9.1. The British Columbia Geological Survey

Established in 1895, the British Columbia Geological Survey (BCGS) links government, the minerals industry, and British Columbians to the province’s geology and mineral resources. The key roles of the Survey are to: 1) create, maintain, and deliver geoscience knowledge to lead informed decision making; 2) attract exploration for new mineral and coal resources; 3) act as the public steward of mineral and coal

resources; and 4) guide public policy by providing assessments on mineral exploration and mining activities. The activities of the Survey and its geoscience products are profiled annually at the AMEBC’s Mineral Exploration Roundup in Vancouver, and at regional, national, and international geoscience conferences.

Headquartered in Victoria, the BCGS is a branch in the Mines and Mineral Resources Division of the Ministry of Energy, Mines and Petroleum Resources. The Cordilleran Geoscience Section is responsible for generating new geoscience knowledge, largely through field-based studies and surveys. The Resource Information Section maintains and develops the provincial geoscience databases and disseminates geoscience data online. The Section is also responsible for evaluating, approving, and archiving mineral and coal exploration assessment reports filed by the exploration and mining industry. From a satellite office in Vancouver, the Mineral Development Office links the province’s mineral and coal resources to the investment community, distributes and promotes BCGS technical data, and coordinates the technical outputs of the Regional Geologists Program.

The Survey supports the minerals industry through many of the projects that it undertakes. In 2017, field projects focused on the northwestern part of British Columbia, in the famed Golden Triangle. Mapping continued in the Atlin and Dease Lake areas, collaborating with the Geological Survey of Canada (GSC) under the second iteration of the Geo-mapping for Energy and Minerals (GEM) program. A joint BCGS-GSC-Geological Survey of Japan collaboration is investigating specialty metals under the Targeted Geoscience Initiative (TGI4) program. Another project is directed at understanding the Upper Fir rare earth element deposit, near Blue River, that will be featured in a field trip at the Resources for Future Generations conference being held in Vancouver, June 2018. Also part of the TGI4, BCGS has partnered with the GSC to assess gold deposits near the Llewellyn fault in BC and its possible extension with the Tally Ho shear zone in Yukon. BCGS, Geoscience BC, and the Mineral Deposits Research Unit (MDRU) at the University of British Columbia are working to deliver a new geological map near Terrace, part of the SeArch project area. Multi-year studies to unravel the architecture of the Nicola arc (Quesnel terrane) continue in central BC. These rocks host some of BC’s most prolific porphyry deposits. Other studies examined Ni-Cu-PGE ore-forming processes in mafic-ultramafic systems at Tulameen, and mapping of the Trembleur ultramafic rocks of Cache Creek terrane, host to the nickel-iron alloy bearing awaruite at the Decar property. Other projects are developing new exploration methods, emphasizing indicator minerals from till. The results of Survey projects are published annually in Geological Fieldwork (Fig. 17) and in publications by partners including Current Research (GSC), and Summary of Field Activities (Geoscience BC).

The BCGS continues to update its databases, including MINFILE, COALFILE, Property File, the Assessment Reports Indexing System (ARIS), digital bedrock geology map, and regional geochemical surveys. BCGS databases are available

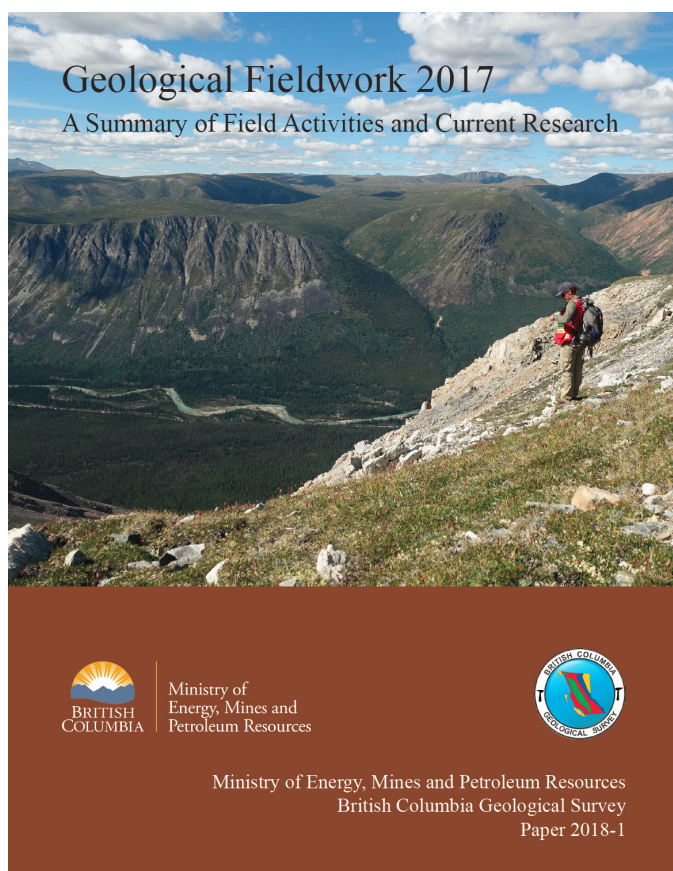


Fig.17. Geological Fieldwork contains peer-reviewed papers that summarize field activities and current research by the British Columbia Geological Survey.

through MapPlace 2. MINFILE documents more than 14,600 metallic mineral, industrial mineral, and coal occurrences. ARIS has over 35,600 mineral exploration reports representing about \$2.5 billion of reported exploration expenditures. Property File now has more than 65,500 reports and maps, documenting exploration activity in British Columbia since the late 1800s. BC's lithogeochemical (nearly 11,000 samples), till geochemical (nearly 10,500 samples), and regional geochemical survey (nearly 65,000 samples with about 5 million determinations) databases were updated in 2017. The province-wide bedrock compilation map (BC Digital Geology) saw substantial updates.

9.2. The Geological Survey of Canada

The BCGS and the Geological Survey of Canada (GSC) continue to collaborate on large and small geoscience projects. The second phase of the Geo-mapping for Energy and Minerals program (GEM-2) commenced in 2014 and the program will run until 2020. The BCGS is participating in the Cordilleran Regional project that is a collaboration between the geological surveys of Yukon, Alaska, British Columbia, and the Canadian government. Multidisciplinary field-based studies in poorly understood areas focus on bedrock geology, crustal architecture,

Cordilleran tectonics, and metallogeny. The TGI-5 projects are targeted topical studies directed at understanding ore systems from metals source to deposit emplacement. Together, these efforts help drive the discovery of new mineral deposits and increase known resources. In addition, surficial geology and glacial history studies will provide vital knowledge for mineral exploration in covered regions.

9.3. Geoscience BC

Geoscience BC is a not-for profit, non-governmental, geoscience organization established in 2005 with grants from the provincial government. Geoscience BC has a board of directors and technical advisors largely drawn from industry. It is mandated to promote mineral, oil and gas, and geothermal exploration in British Columbia by generating and distributing geoscience data. Open and targeted requests for proposals generate geoscience projects and work is done by contractors, consultants, and other providers of public geoscience.

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 first time since 2012 and exciting new discoveries were being made. Explorationists continued to 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.

Eight metal mines were in production at the start of 2017. During the year the Silvertip mine was shut down but production started up at the Brucejack and Bonanza Ledge operations, bringing the total of operating metal mines at the end of the year to nine. Seven open-pit coal mines were in production at the start of the year, five in the Southeast Region and two in the Northeast Region. In the fall, the Quinsam underground mine on Vancouver Island re-started production.

Acknowledgment

We thank George Owsicki of Total Earth Science Services (Victoria) for desktop publishing of this volume.