Exploration and mining in the Skeena Region, British Columbia

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1. Introduction

Mineral exploration continued in the Skeena Region (Fig. 1) despite challenging market conditions, and about 80 projects were active (Fig. 2). Some major programs continued to drill, expand, and define deposits, but most projects focused on relatively inexpensive work such as soil sampling, prospecting, and geological mapping. Total exploration expenditures decreased 20% from 2013 levels to $161 million (Fig. 3). Similarly, exploration drilling decreased by 39% to 151,204 metres (Fig. 4). Mine development expenditures totalled about $208 million. At least $300 million was spent on infrastructure projects directly related to the mining and exploration industry including hydro transmission lines and port expansions in Stewart and Prince Rupert. In 2014,

- Red Chris Development Company Ltd. (Imperial Metals Corporation) crushed and stockpiled ore taken from the Main and East zones of the **Red Chris** copper-gold project (Fig. 5) and continued final stages of construction
- Banks Island Gold Ltd. began producing at the **Yellow Giant** gold project
- Avanti Mining Inc. began construction activities at their **Kitsault** molybdenum-silver project
- Seabridge Gold Inc. received their Environmental approval and initial construction permits for their **KSM** gold-copper project
- the Northwest Transmission line to Bob Quinn Lake and extension to Red Chris was commissioned
- Pretium Resources Inc. delivered a feasibility study for their high-grade gold **Brucejack** project
- Gold Reach Resources Ltd. expanded resources at **Ootsa** by 87%
- Colorado Resources Ltd. released a maiden resource at the **North ROK** copper-gold project and completed an exploration program at the **KSP** gold project
- Kaizen Discovery Inc. confirmed porphyry-style copper mineralization at **Tanzilla**
- A new copper-gold system, **Pyramid**, was discovered 50 km north of Dease Lake by Gold Jubilee Capital Corp.
- Doubleview Capital Corp. drilled 404 m grading 0.25% Cu and 0.25 g/t Au at the **Hat** project

Industry activities are summarized herein by geographic area (Fig. 1, inset) and deposit stage.

2. Regional geology

The Skeena Region is underlain by autochthonous rocks of ancestral North America, parautochthonous terranes with North American affinities (Slide Mountain, Yukon-Tanana) and exotic terranes (Quesnel, Cache Creek, Stikine, Alexander) that were accreted to the western North American margin (Fig. 1, Nelson et al., 2013). Metal prospects span a spectrum of deposit types including porphyry and intrusion-related, volcanogenic massive sulphides, precious metal veins, skarns, sedimentary exhalite, Carlin-type gold, and manto replacement. The most economically significant deposits are porphyry and precious metal veins in Stikinia and Quesnellia. In the Skeena Region, most occurrences are in Stikinia; an island arc terrane analogous to the Philippines (Marsden and Thokelson, 1992). Successions in Stikinia record three arc-building episodes: Paleozoic (Stikine assemblage); Triassic (Stuhini Group); and Late Triassic-Jurassic (Hazelton Group). Most porphyry copper-gold mineralization in Stikinia formed between 220 Ma to 195 Ma (Logan and Mihalynuk, 2014).

3. Operating mines

The **Huckleberry** copper-gold-silver-molybdenum mine (Fig. 6; Table 1) is a porphyry deposit spatially related to the Bulkley intrusions (late Cretaceous). In the Main zone, mineralization is in hornfelsed and fractured Hazelton Group volcanic rocks adjacent to a 500 m-diameter granodiorite stock. The mined-out East zone is centred on a 40 m-wide granodiorite dike. Ore in both zones is in a stockwork of quartz, pyrite and chalcopyrite, crosscut by gypsum-filled fractures. The mine is operated by Huckleberry Mines Ltd. Ownership is divided between Imperial Metals Corporation (50%) and the Japan Group (50%) comprising of Mitsubishi Materials Corporation, Dowa Mining Co. Ltd., and Furakawa. Co. Higher grades and better recovery during 2013 resulted in a metal production increase of 17%. Total output was 18,693 tonnes copper, 92.8 kilograms gold, and 7403.5 kilograms silver from 5,895,193 tonnes of ore mined from the Main Zone Extension pit. Grades averaged 0.346% Cu with copper recoveries averaging 91.6%. Concentrate is trucked to the Port of Stewart and loaded onto marine vessels destined for Asia.

Milling operations were temporarily shut down in late February after the mill was damaged. Short-term repairs allowed milling to resume in early April and permanent repairs were completed

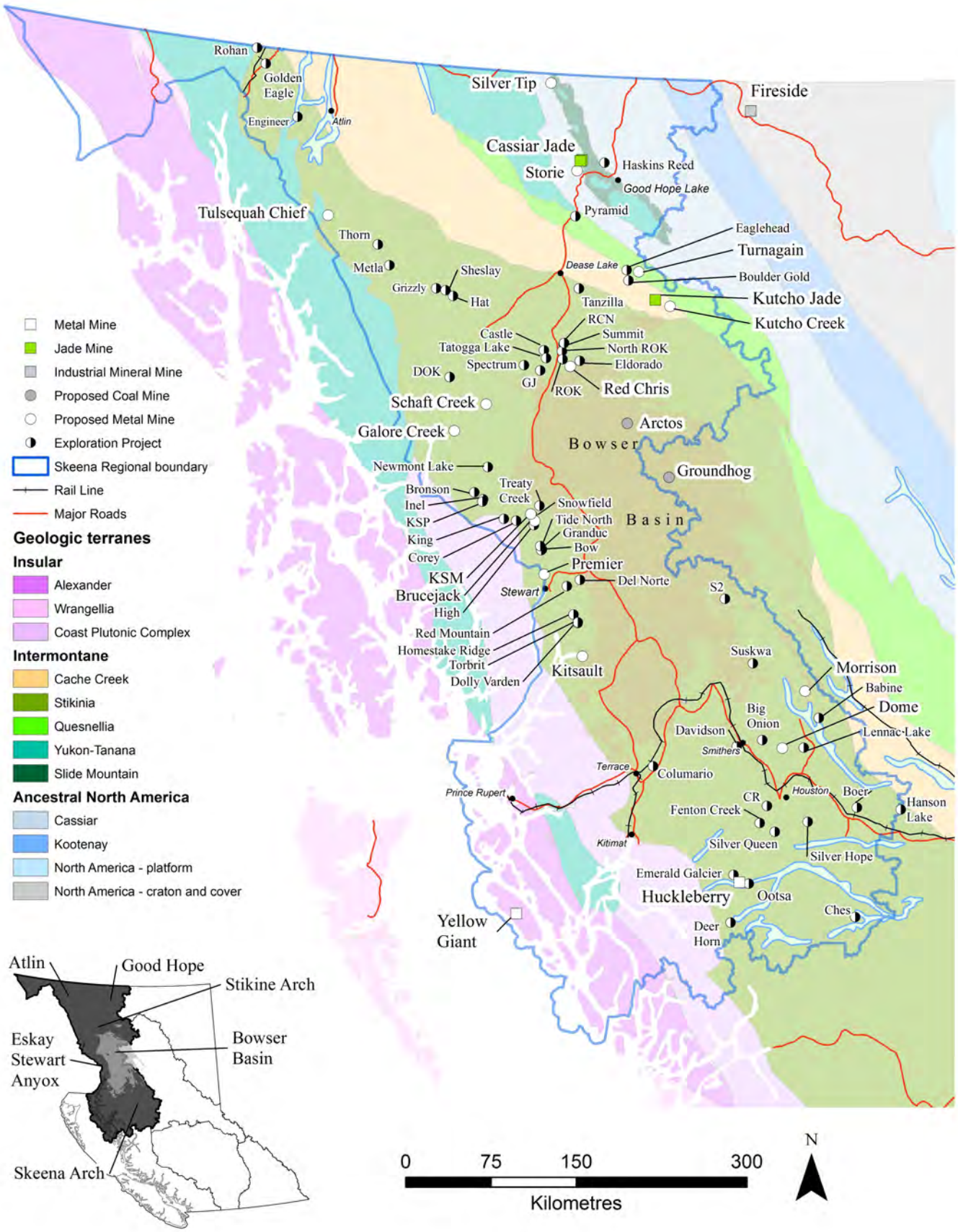

Fig. 1. Active mining and exploration projects Skeena Region, 2014. Cordilleran terranes after Nelson et al. (2013). Inset shows geographic areas discussed herein. Although the Fireside and Groundhog projects are not in the Skeena Region, they are reported on in this paper.

Table 1. Operating mines in the Skeena Region, 2014.

Mine	Operator	Commodity; deposit type; MINFILE	Forecast 2014 Production (based on Q1-Q3)	Reserves	Near-mine exploration	Website
Huckleberry	Huckleberry Mines Ltd.	copper, gold, silver, molybdenum 093E 037	16,329.3 tonnes (36 M lbs) copper, 90 kg (2900 oz) gold, 5443 kg (175,000 oz) silver	42.7 Mt at 0.330% copper and 0.009% molybdenum (December 31, 2013)	soil sampling, claim expansion	http://www.imperialmetals.com/s/HuckleberryMine.asp
Fireside	Fireside Minerals Ltd.	barite 094M 003	35,000 tonnes	550,000 tonnes (non 43-101 compliant)	drilling	http://www.firesideminerals.com/
Yellow Giant	Banks Island Gold Ltd.	gold, silver 103G 024, 26	373 kg (12,002 oz) gold, 1005 kg (32,321 oz) silver	35,718 t at 19 g/t gold and 45 g/t silver (non 43-101 compliant)	drilling	http://www.banksislandgold.com/s/Home.asp

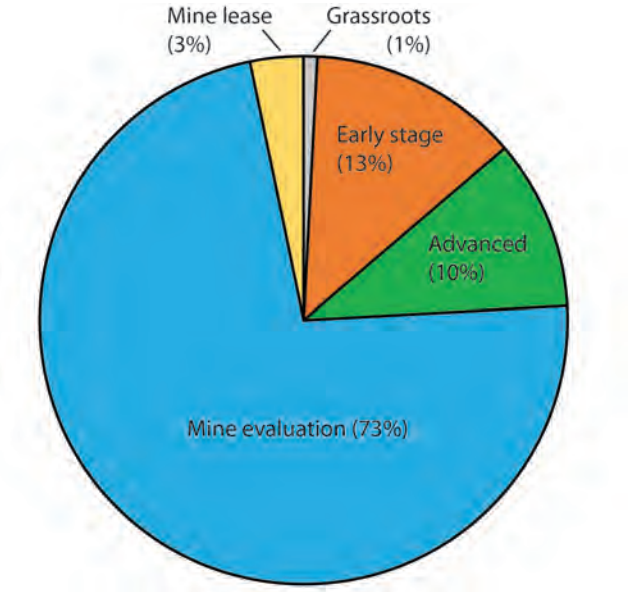

Fig. 2. Exploration expenditures in 2014 by exploration stage for the Skeena Region.

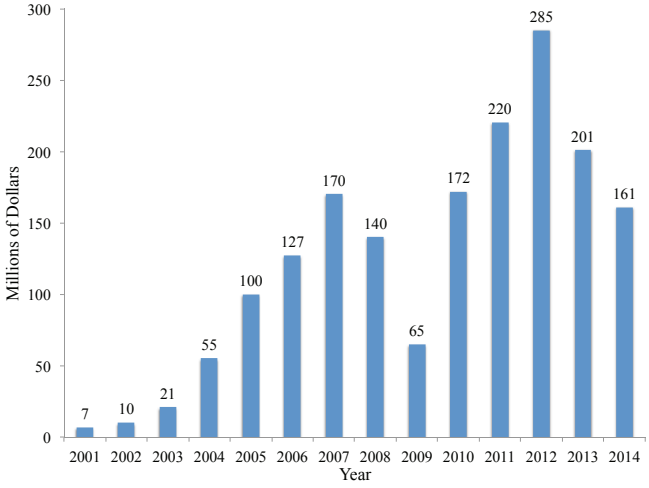

Fig. 3. Annual exploration spending estimates for the Skeena Region from 2001-2014.

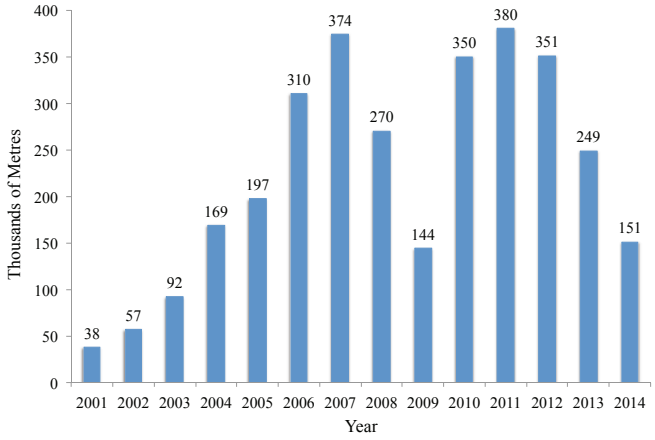

Fig. 4. Annual exploration drilling estimates for the Skeena Region from 2001-2014.

in November. Onsite infrastructure developments included commissioning and ongoing construction of the tailings storage facility and production of cyclone sands for incremental lifts of dam material. The Main Zone Optimization project to remove legacy tailings and waste rock from the former Main Zone Pit (Fig. 6) continued for the third year. The project extends the mine life to 2021 with reserves totalling approximately 33.8 Mt grading 0.343% Cu and 0.009% Mo at a 0.20% Cu cut-off grade. Exploration was limited to reconnaissance-scale surveys at the nearby Whiting Creek prospect.

Fireside Minerals Ltd. continued to mine barite (Fig. 7) from the **Fireside** mine. Barite is in steeply dipping veins in Kechika Group sedimentary rocks near a Paleozoic (?) gabbro dike (Wojdak, 2008). In 2014, production increased 30% from 2013 levels to approximately 32,000 tonnes from 36,000 tonnes mined. Increased production was partly due to commissioning of a second Raymond roller mill and packing system. A non NI-43-101 compliant reserve estimate totals 550,000 tonnes. Exploration drilling at the Moose Pit identified sufficient barite resources to justify plans for its reactivation. Barite ore is crushed, milled, and bagged onsite. It is sold mainly as a heavy

Fig. 5. Overview of the Red Chris copper-gold deposit.

Fig. 6. Mining at Huckleberry Mines Main zone extension pit.

Fig. 7. Barite mining at Fireside Minerals Bear Pit. Photo by Andrew Allan.

Fig. 8. Overlooking Banks Island Gold processing plant at Yellow Giant.

drilling fluid additive.

Banks Island Gold Ltd. received Mines Act and Environmental Management Act permits for their **Yellow Giant** gold-silver mine on Banks Island, about 105 km south of Prince Rupert. By the end of 2014, underground mining was well underway from the Bob and Tel portals. The processing facility (Fig. 8) was fully operational in early August. As of early June, the company reported producing 222.2 kg of gold (7,145 ounces) and 577.3 kg silver (18,559 ounces) from the Bob zone (Fig. 9). Exploration defined a 600 m-long gold-in-soil anomaly. Follow-up drilling identified a new zone of gold mineralization at Quartz Hill, where drill hole QH-14-01 returned 14.5 m grading 2.5 g/t Au including 2.25 m grading 14.0 g/t Au. Further drilling is planned.

Nephrite jade is found in deformed serpentinites of the Cache Creek terrane (east of Dease Lake) and of the Slide Mountain terrane (at Cassier). It was mined from at least four quarries in the Dease Lake area: **Provencher Lake, Kutcho, Cassiar, and Dynasty.** Jade sales are by private arrangement, and range from small, highly polished pendants to multi-tonne rough boulders. Jade is generally mined from placer tenures, except at Dynasty, where it is mined from outcrops.

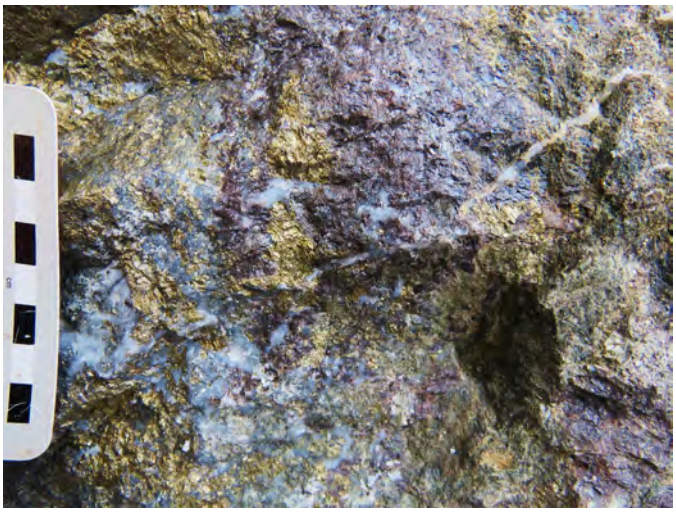

Fig. 9. Gold-bearing chalcopyrite and interstitial sphalerite from the Bob zone at Banks Island Gold's Yellow Giant gold project.

4. Eskay-Stewart-Anyox area

The Eskay-Stewart-Anyox area, in western Stkinia, is bounded by the Iskut River, Bowser Basin, Nass River and the Alaskan border. The area contains significant porphyry, volcanogenic massive sulphide, and precious metal vein deposits (Fig. 1; Table 2).

4.1. Proposed mines

The KSM gold-copper porphyry project (Seabride Gold Inc.) received provincial approval of an Environmental Assessment application in late July and federal approval in mid-December. Significant pre-construction permits were also granted in September, allowing building of roads, construction camps, and rights-of-way to the Mitchell-Treaty tunnels, and site preparations at the mine site and tailing management facility. Ground-breaking activities are expected in 2015.

Exploration activities included mapping and drilling at Deep Kerr, MacQuillan and Iron Cap. Drilling followed up 2013 results and totalled 29,508 m in 29 holes (Table 3). Thirteen holes totalling 12,900 m targeted Deep Kerr and are expected to increase the Inferred Resource estimate of 514 Mt grading 0.53% Cu and 0.36 g/t Au (in addition to known reserves) generated from 2013 drilling. Results expanded the deposit by 400 m along strike and 300 m at depth. An updated resource estimate is expected in early 2015. The bottom of known mineralization is now understood to be at a similar elevation as the Sulphurets valley floor, allowing for potential underground access.

Approximately 10,429 m in 10 drill holes targeted the Lower Zone of the Iron Cap deposit, which is mostly below known Iron Cap deposit reserves. Iron Cap now measures approximately 750 m along strike. Limits at depth and to the north have not yet been defined. Drilling toward the proposed Mitchell-Treaty tunnel to the north returned strong gold-copper grades. A maiden resource estimate for the Lower Zone is expected in early 2015.

KSM consists of four deposits: Kerr, Sulphurets, Mitchell, and Iron Cap. Proven plus Probable reserves total over 2.1 billion tonnes averaging 0.55 g/t Au and 0.21% Cu, forming one of the largest undeveloped gold-copper porphyry resources in North America. Measured plus Indicated resources (inclusive of reserves) total 2,780 Mt grading 0.55 g/t Au, 0.21% Cu, 2.9 g/t Ag and 55 ppm Mo. Inferred resources total 1,127 Mt grading 0.41 g/t Au, 0.17% Cu, 3.0 g/t Ag and 50 ppm Mo. Recent exploration has found deeper zones and higher grades that remain to be added to the mineral reserves and mine plan; an updated resource estimate is expected in early 2015.

The KSM project is planned to operate over a 55 year mine life with an estimated capital cost of $5.3 billion. The initial 25 years would be an open pit mining operation processing 130,000 t/d decreased to 90,000 t/d for the remaining 30 years. Ore would be fed to a floatation mill, produce a gold-copper-silver concentrate, and then trucked to the Stewart port facility. Metallurgical testing indicates that a clean 25% copper concentrate can be produced, as well as a separate molybdenum concentrate and gold-silver dore.

The KSM deposits are spatially and genetically related to high-level diorite to monzonite plugs and dikes (Mitchell intrusions) that that intrude Stuhini Group and Hazelton Group rocks (Nelson and Kyba, 2014). The Mitchell zone (Febbo et al., 2015) is exposed in an erosional window below the Mitchell thrust fault and consists of schistose rocks with abundant sericite, disseminated pyrite and a deformed quartz-pyrite-chalcopyrite stockwork containing remarkably uniform copper and gold grades. Iron Cap is in the hanging wall of the Mitchell thrust fault, and below the Sulphurets thrust. Chalcopyrite occurs as fine disseminations and in quartz-pyrite veins. Epithermal-style mineralization in quartz stockwork and breccias containing higher gold and silver grades are also present at Iron Cap. Original lithologic textures are commonly obliterated by intense, pervasive silicification. However, in windows of weaker alteration, primary textures are preserved including porphyritic intrusions and screens of pebble conglomerate. Quartz-rich arkose, granulestone, pebble conglomerate, mudrocks, and andesitic volcanic rocks at Iron Cap are considered part of the Jack Formation, the basal unit of the Hazelton Group, and are interpreted to have been deposited adjacent to syndepositional faults that controlled late Triassic-Early Jurassic porphyry systems (Nelson and Kyba, 2014).

Pretium Resources Inc. continued exploration and development activities at the **Brucejack-Snowfield** high-grade gold (Fig. 10) project, 65 km north of Stewart and 6 km from the KSM project. Efforts during 2014 were largely focused on corporate initiatives to ensure that project financing and permitting remained on schedule. The company's Environmental Assessment application was formally accepted in mid-August. Surface drilling totalled 9,325 m in 7 drill holes and 14 wedges. Results confirmed high-grade gold mineralization at the Valley of the Kings below the present Mineral Resource estimate (Table 4).

An updated feasibility study released in June adjusted project

Table 2. Proposed mines and exploration projects, Eskay-Stewart-Anyox area.

Property	Proponent	MINFILE	Deposit Type	Commodities	2014 Activities	Website
Bow	Decade Resources Ltd.	104B 132	Porphyry	Au	Diamond drilling (15 holes)	www.decaderesources.ca
Bronson	Snip Gold Corp.	104B 077	Porphyry	Au, Cu, Ag	Geology, Corporate	www.snipgoldcorp.com
Brucejack	Pretium Resources Inc.	104B 193	Porphyry	Au, Ag	Diamond drilling (9,325 m, 7 holes, 14 wedges) Geology, Geochemistry, Corporate, Underground development, environmental	www.pretivm.com
Columario	Argonaut Exploration Inc.	103I 077	Vein/Breccia	Au	Geochecmistry (rock chips)	www.argonautexploration.com
Corey	Kenrich-Eskay Mining Corp.	104B 240	porphyry	Au, Ag, Cu	Geology, Geochemistry	www.eskaymining.com
Del Norte	Teuton Resources Corp.	104A 176	Vein/Breccia	Au	Diamond drilling (2 holes) Geoology Geochemistry, Corporate	www.teuton.com
Dolly Varden	Dolly Varden Silver Corporation Hecla Mining Company	103P 188	Vein/Breccia	Ag	Diamond drilling (5,280 m, 12 holes) Geology, Geochemistry (2,500 soils), Geophysics (IP + EM, 10.9 line km, 2 borehole IP + EM)	www.dollyvarensilver.com
Granduc	Castle Resources Inc.	104B 021	Massive Sulphide	Cu, Ag, Au	Corporate	www.castleresources.com
High	Teuton Resources Corporation		Vein/Breccia	Au	Diamond drilling	www.teuton.com
Homestake Ridge	Homestake Resource Corporation	103P 216	Vein/Breccia	Au, Ag, Zn	Diamond drilling (2,972 m, 6 holes), Geology, Geochemistry	www.agnicoeagle.com
Inel	Colorado Resources Ltd./ Snip Gold Corp.	104B 113	Vein/Breccia	Au, Ag, Zn, Cu	see KSP below	www.coloradoresources.com www.skylinegold.com
King	Metallis Resources Inc.	104B 079	Porphyry	Cu, Au, Mo	Geology, Geochemistry	www.metallisresources.com
KSM	Seabridge Gold Inc.	104B 103	Porphyry	Au, Cu, Ag, Mo	Diamond drilling (29,508 m, 29 holes), Geology, Geochemistry, Geophysics, Corporate	www.seabridgegold.net
KSP	Colorado Resources Ltd.	104B 138	Porphyry	Au, Cu	Diamond drilling (791 m, 6 holes) Geophysics (mag, 600 line km), Geology, Geochemistry (soils, rock chips)	www.coloradoresources.com
Premier	Ascot Resources Ltd.	104B 054	Vein/Breccia	Au	Diamond drilling (36,672 m, 169 holes), Geology, Geochemistry	www.ascotresources.ca
Red Mountain	IDM Mining Ltd.	103P 086	Vein/Breccia	Au	Diamond drilling (3,630 m, 12 holes), Geology, Geochemistry, Corporate	www.idmmining.com
Snowfield	Pretium Resources Inc.	104B 179	Porphyry	Au, Cu, Mo	Corporate	www.pretivm.com
Tide North	Auramex Resources Corp.	104B 252	Massive Sulphide	Au	Diamond drilling (501 m, 1 hole), Geology	www.auramex.com
Torbrit	Dolly Varden Silver Corporation	103P 191	Sedimentary Replacement	Ag, Pb, Zn, Cu, Au	see Dolly Varden	www.dollyvarensilver.com
Treaty Creek	American Creek Resources Ltd.	104B 078	Vein/Breccia	Au, Ag, Cu	Corporate	www.americancreek.com

Table 3. Highlight drilling results from KSM.

Zone	Hole ID	From (m)	To (m)	Width (m)	Au (g/t)	Cu (%)	Ag (g/t)
Iron cap Lower Zone	IC-14-053	488.4	1002.4	514	0.68	0.3	5.2
	IC-14-054A	322.4	832.5	510.1	0.41	0.28	10.5
	IC-14-054A	604.4	872	267.6	0.39	0.23	4.8
	IC-14-055	257.5	624.3	366.8	0.59	0.17	2.5
	IC-14-057	176	600.2	424.2	0.4	0.22	4
	IC-14-058	5.9	802	796.1	0.39	0.22	4
	IC-14-059	178.7	771.4	592.7	1.14	0.37	3.7
	IC-14-060	124	525.3	401.3	0.47	0.17	8
	IC-14-061	431.4	794.4	363	0.38	0.28	6.8
Deep Kerr	K-14-28C	900	1257.4	357.4	0.5	0.63	1.9
	K-14-34A	871.4	1608.4	737	0.36	0.59	1.1
	K-14-39	945.4	1197.4	252	0.55	0.69	1.4
	K-14-45	400.4	1123	722.6	0.36	0.59	2.6

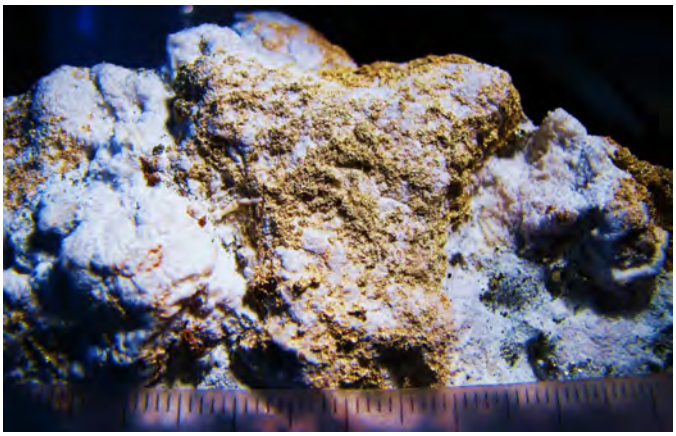

Fig. 10. Fine-grained electrum and pyrite in quartz-carbonate matrix from the Brucejack Cleopatra vein.

specifics including gold price, increased reserves, and higher gold grades. Results remained positive for the proposed 2,700 tonne per day milling operation forecasted to operate for 18 years and produce 226 tonnes (7.27 million ounces) of gold.

Brucejack is on the eastern limb of the northerly trending McTagg anticlinorium, a regional scale, mid-Cretaceous structural culmination in the western Skeena fold belt (e.g., Nelson and Kyba, 2014). The Brucejack property is underlain by volcanosedimentary rocks of the Stuhini Group (Triassic) that are unconformably overlain by the Hazleton Group (Late Triassic-Jurassic, Fig. 11) and Bowser Lake Group cover rocks. These rocks are cut by the Brucejack fault, which is interpreted to have had a long history of reactivation (Nelson and Kyba, 2014). Alteration is mainly pervasive quartz-sericite-pyrite replacement in zones several hundred metres wide and several kilometres long. Most of the five mineral resources (West Zone, Valley of the Kings, Bridge Zone, Gossan Hill, and Shore Zone) are in the intensely altered zones and associated with vein-stockworks. High-grade zones are either on the margins or contained in a zone of bulk low-grade mineralization up to several grams per tonne gold. Bulk low-grade mineralization tends to be associated with disseminated anhedral pyrite. High-grade gold-silver electrum mineralization is hosted in deformed transitional epithermal stockwork veins up stratigraphy from several large and slightly older porphyry deposits; the multi-phase Mitchell intrusions (Pretium Resources, 2015).

Ascot Resources Ltd. continued drilling at the **Premier** and **Big Missouri** gold projects 20 km north-northwest of Stewart. Drilling of a multiphase program completed in 2014 (36,672 m in 169 holes) identified a new area of mineralization at Big Missouri before focusing on zones around Premier. Broad zones of elevated (>1 g/t eAu) mineralization support the resource estimate released in March. Indicated Resources total 93.5 Mt grading 0.82 g/t Au and 6.9 g/t Ag. Additional Inferred Resources total 79.2 Mt grading 0.59 g/t Au and 7.2 g/t Ag. Both estimates used a 0.3 eAu cut-off and include the **Dilworth, Martha Ellen** and **Big Missouri** deposits. The Premier and surrounding deposits are hosted in Hazelton Group andesite tuffs, lapilli tuffs, and flows. Dikes of Premier porphyry are spatially associated with most mineralized zones and are interpreted to be ring dikes to a vent flanking a larger volcanic center in the Big Missouri area (Alldrick, 1993).

In April, the **Red Mountain** gold project (Fig. 12) was optioned from Seabridge Gold Inc. to Revolution Resources Corp. who changed their name to IDM Mining Ltd. An updated resource estimate and Preliminary Economic Assessment completed in July indicated favorable economics to pursue a 1,000 tonne per day seasonal underground mine. A Project Description was submitted to the British Columbia Environment Assessment office for review. IDM completed 12 drill holes (3,630 m) testing mineralization beyond known resources at the Marc, AV, and JW zones. Drilling and surface results confirm gold mineralization, most notably 138 m grading 1.41 g/t Au from 64 m depth in drill hole MC14-03. Retreat of the Bitter Creek

Table 4. Highlight drilling results from Brucejack.

Zone	Hole ID	From (m)	To (m)	Width (m)	Au (g/t)	Ag (g/t)
Valley of the Kings	SU-632-W4	78.76	80.86	2.1	2415.17	353.43
	SU-644-W1	113	135.1	22.1	26.14	10.59
	SU-644-W2	169.75	174.2	4.45	515.24	90.48

Fig. 11. Looking north, Hazelton Group conglomerate (left) unconformably overlying folded Stuhini Group argillite and sandstone. Unconformity is marked by white dashed line. Gossanous backdrop is Sulpurets ridge, foreground drops off to Brucejack Creek.

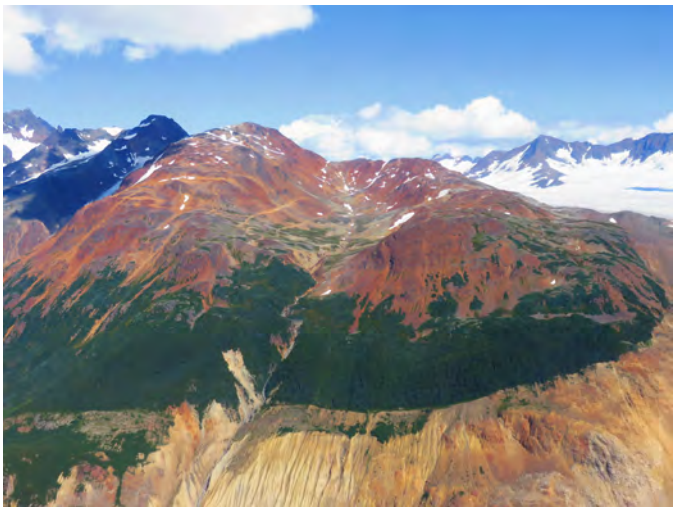

Fig. 12. Looking northeast over IDM Mining's Red Mountain gold project. Photo courtesy of IDM Mining.

glacier and Cambria ice fields revealed new showings up to 500 m away from historic workings.

4.2. Exploration projects

Dolly Varden Silver Corporation partnered with Hecla Mining Company to complete multiple surveys and 5,280 m of drilling near the past producing **Dolly Varden**, **Torbrit** and **Wolf** high-grade silver mines 45 km southeast of Stewart. Exploration concepts focused on intersections of prospective stratigraphy with altered and mineralized structures. Twelve drill holes spaced over 2 km tested multi-element geochemical and geophysical anomalies along the north-northwest regional structural trend hosting the Torbrit mine. Seven of the twelve drill holes returned intersections including 9.01 m grading 1,496 g/t Ag from hole DV14010 from the Kitsol vein. Drilling results also confirmed a direct correlation between silver mineralization and a 7.2 km-long potassium anomaly, which will be used to guide 2015 exploration.

Homestake Resource Corporation resumed 100% ownership of the **Homestake Ridge** silver-gold project. Agnico Eagle Mines Limited returned the project after their second year of exploration focussed on the Slide target. Drilling totalled 2,972 m in six holes which extended the Slide zone to a strike length of 800 m. Best results include 4.5 m grading 144 g/t Ag from drill hole HR14-264. Metal zonation patterns at the Slide zone appear analogous to the neighboring Main Homestake Silver deposit, which contains a deeper, gold enriched zone. Future drilling aims to test this deeper target at the Slide zone. The company also continued target generation work on their optioned Kinskuch Property. The cumulative 625 km^2 mineral claims host 58 MINFILE occurrences and have been divided into four target areas: Esperenza, FH, Illiance and Kitgold.

Teuton Resources Corp. completed five drill holes at their **Del Norte** property, 25 km east-northeast of Stewart. Results indicate porphyry copper-gold mineralization (Fig. 13) with a highlight intercept from drill hole D14-03 returning 12.19 m grading 0.92 g/t Au, 0.15% Cu and 3.07 g/t Ag. Teuton also completed sixteen drill holes at their **High** project, immediately south of Pretium Resources Brucejack project. Results confirmed gold-silver mineralization over widths up to 15 m.

Teuton and American Creek Resources Ltd. continued a legal dispute over ownership of the **Treaty Creek** project area

Fig. 13. Chalcopyrite-bearing drill core from Teuton Resources Del Norte project. Photo courtesy of Teuton Resources.

northeast of Seabridge Gold's KSM project. Compilation of geotechnical drilling and geophysics completed by Seabridge for the Mitchell-Treaty twin tunnel access to KSM has highlighted areas for further testing.

Decade Resources Ltd. completed drill testing at the **Bow** property 35 km north-northwest of Stewart and adjacent to the past producing Scottie Gold mine. Early season grab sampling returned gold values up to 3,418 g/t Au and led to follow-up drilling. Best results were returned from drill-hole DDH-14-Bow-1; 49.6 m grading 15.25 g/t Au and DDH-14-Bow-2: 12.66 m grading 38.43 g/t Au. Fifteen drill holes were completed to test high-grade gold mineralization hosted in the Blueberry vein structure and the Sixties zone.

Auromex Resource Corp. and Pretium Resources Inc. completed a single 500 m hole at the **Tide North** prospect. The hole tested a deep conductivity target interpreted to be in the same stratigraphic units as Eskay Creek. Results found a thick succession of foliated carbonaceous sedimentary rocks with minor sulphides.

Metallis Resources Inc. completed a reconnaissance program at the **King** property, immediately west of the KSM project. Exploration aimed to ground truth the King VTEM geophysical anomaly identified in 2013. Groundwork included geochemical sampling, prospecting, and geological mapping.

Eskay Mining Corp. conducted reconnaissance scale prospecting and mapping at their **Corey** property between Eskay Creek and KSM.

Colorado Resources Ltd. partnered with SnipGold Corporation to explore their **KSP (**Khyber, Sericite and Pins) property in the Bronson trend (Fig. 14; Metcalfe and Moors, 1992), which includes the past-producing Snip and Johnny Mountain gold mines. Extensive visible alteration (Fig. 14) led company geologists to compile legacy data and consolidate a ground position amenable to testing kilometre-scale deposit models. Analysis of 684 rock and 1,247 soil samples and 600 line km of airborne magnetic surveys led to further sampling and late-season drilling, including 791 m in six holes. Best results include 101.4 m grading 1.16 g/t Au (drill hole KSP14-003) and a 34 m interval grading 2.98 g/t Au. New geological mapping now covers over 50 square kilometres and indicates several untested zones. British Columbia Geological Survey mapping indicates that the structural and stratigraphic framework may be analogous to the KSM mineralized system (Kyba and Nelson, 2015).

5. Stikine Arch

The Stikine Arch includes parts of the Stikine, Cache Creek, and Quesnel terranes and is cut by regional east-west trending faults (Fig. 1). The most common metal prospects are high-potassium, calc-alkalic porphyry style deposits similar to Red Chris (Table 5). Late Triassic to Early Jurassic copper-gold bearing stocks intrude Stuhini and Hazelton Group rocks.

5.1. Mine development

Red Chris Development Company Ltd. (Imperial Metals Corporation) is in the final stages of construction at the **Red**

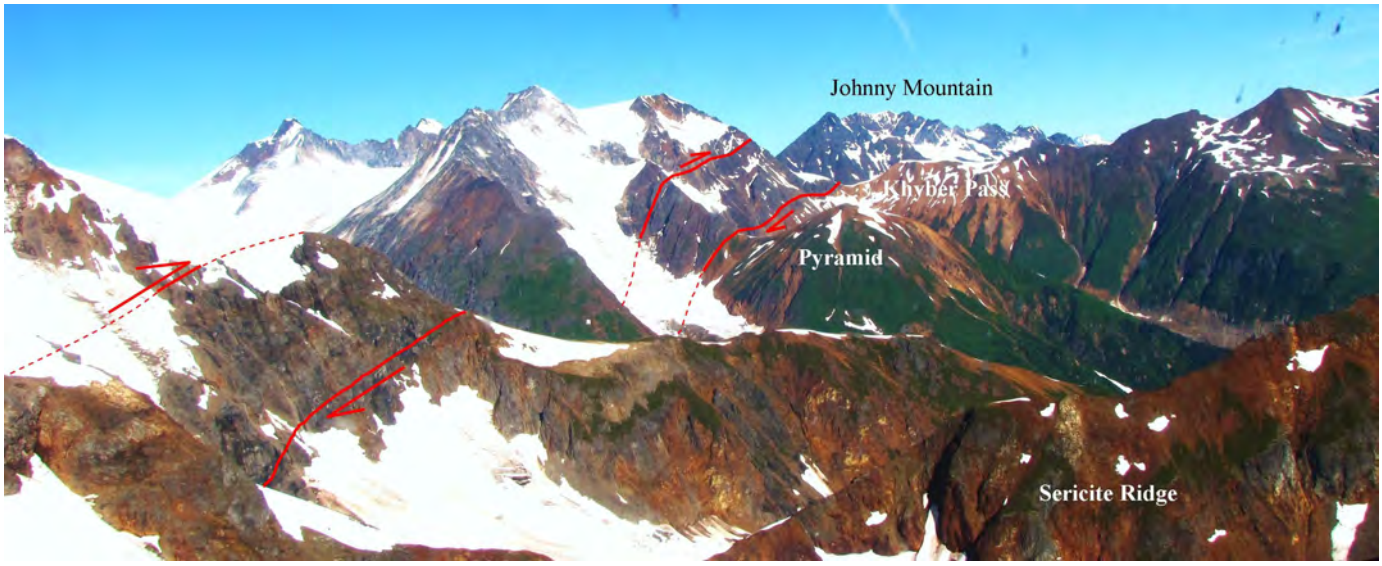

Fig. 14. Looking northwest along the Sky fault system (Kyba and Nelson, 2015) from Sericite ridge towards Pyramid, Khyber Pass and Johnny Mountain at Colorado Resources KSP project.

Table 5. Mine development, proposed mines, and exploration projects, Stikine Arch.

Property	Proponent	MINFILE	Deposit Type	Commodities	2014 Activities	Website
Boulder Gold	Pacific Bay Minerals Ltd.	104I 004	Vein/Breccia	Au	Diamond drilling (246 m, 1 hole), Geology,Geochemistryorporate	www.pacificbayminerlas.com
Castle	Kaizen Discovery Inc.	104G 076	Porphyry	Au, Cu, Mo, Ag	Geology, Corporate	www.kaizendiscovery.com
DOK	Boxxer Gold Corp.	104G 043	Porphyry	Cu, Au	Diamond drilling (834.9 m, 2 holes), Geology, Geochemistry	www.boxxergold.com
Eaglehead	Carmax Explorations Ltd.	104I 008	Porphyry	Cu, Mo	Diamond drilling (2264.22 m, 4 holes), Geology, Geochemistry	www.carmaxex.com
Eldorado	Colorado Resources Ltd.	104H 026	Porphyry	Au, Cu	Diamond drilling (892 m, 4 holes), Geology, Geochemistry	coloradoresources.com
Galore Creek	Galore Creek Mining Corporation (Teck Resources Limited/ NOVAGOLD Resources Inc.	104G 090	Porphyry	Cu, Au	Corporate, Environmental	www.gcmc.ca
GJ	Teck Resources Limited	104G 034	Porphyry	Cu, Au	Corporate, Geology, Geochemistry	www.ngexresources.com
Grizzly	Garibaldi Resources Inc.	104G 079	Porphyry	Cu, Au	Geology, Geochemistry, Corporate	www.garibaldiresources.com
Hat	Doubleview Capital Corp.	104J 015	Porphyry	Cu, Au	Diamond drilling (2,831, m, 7 holes), Geology, Geophysics	www.doubleview.ca
Kutcho Creek	Capstone Mining Corp.	104I 060	Massive Sulphide	Cu, Zn, Ag, Au	Corporate	www.capstonemining.com
Kutcho Jade	Continental Jade Ltd.	104I 078	IM_Rock	Jade	Mining	www.jademine.com
Metla	Clive Aspinall	104K 113	Porphyry	Au	Corporate	
Newmont Lake	Romios Gold Resources Inc.	104B 281	Skarn	Au, Ag, Zn	Geophysics (ZTEM, 372 line km) Geology, Geochemistry (314 Rock chips)	www.romios.com
North ROK	Colorado Resources Ltd.	104H 035	Porphyry	Cu, Au	Diamond drilling (2,191 m, 5 holes), Geology,	www.coloradoresources.com
Pyramid	Gold Jubilee apital Corp.		Porphyry	Cu, Au	Geophysics (IP), Geology, Geochemistry	
RCN	Serengeti Resources Inc.		Porphyry	Cu, Au	Geology, Geochemistry, Geophysics (IP)	www.serengetiresources.com
Red Chris	Red Chris Development Company Ltd. (Imperial Metals Corporation)	104H 005	Porphyry	Cu, Au	Mine Construction, Environmental	www.imperialmetals.com
ROK	Oz Minerals optioned from Firesteel Resources Inc.	104H 012	Porphyry	Mo, Cu	Diamond drilling (842.15 m, 2 holes), IP (44.85 line km), Geology	www.firesteelresources.com
Schaft Creek	Teck Resources Limited	104G 015	Porphyry	Cu, Mo, Au, Ag	Geology	www.teck .com
Sheslay	Prosper Gold Corp.	104J 035	Porphyry	Cu, Au	Diamond drilling (6,221.5 m, 19 holes), Geology, Geochemistry	www.prospergoldcorp.com
Spectrum	Skeena Resources Limited	104G 036	Vein/Breccia	Au	Diamond drilling (1,940 m, 9 holes), Geology, Geochemistry	www.skeenaresources.com
Summit	Pistol Bay Mining Inc./ Vega Mining Inc.	104H 015	Porphyry	Cu, Au	Geology, Geochemistry,	www.vegamininginc.com
Tanzilla	Kaizen Discovery Inc.	104I 023	Porphyry	Cu, Mo	Diamond drilling (1,386 m, 5 holes), Geology, Geochemistry, Corporate	www.kaizendiscovery.com
Tatogga Lake	New Chris Minerals Ltd.	104G 166	Porphyry	Cu, Mo	Geology, Geochemistry, Geophysics (IP)	
Turnagain	Hard Creek Nickel Corp.	104I 119	Magmatic	Ni, Co, Pt, Pd	Corporate	www.hardcreeknickel.com/

Chris copper-gold project 80 km south of Dease Lake. The Northwest Transmission line (Fig. 15) now connects the project to a 287 KV grid-based power originating near Terrace. Imperial constructed the 93 km extension from Bob Quinn to the project and sold it to BC Hydro in late December for $52 million. Ore taken from the Main and East zones (Fig. 16), is being crushed and stockpiled in preparation for mill equipment being commissioned. Before milling can proceed, Red Chris needs an Environmental Management Act permit to discharge tailings. Because of the tailings dam breach and resulting flood at the Mount Polley mine, also owned by Imperial, a third party review of the tailings impoundment area made recommendations to be integrated into the design. Capital costs have increased to total $643M for the completion of the 30,000 tonne per day mine. The expected mine life is 28 years.

5.2. Proposed mines

Teck Resources Limited re-logged over 16,867 m of historic drill core at the **Schaft Creek** copper-gold-silver molybdenum deposit. Ongoing metallurgical, geotechnical, and environmental studies will enhance the 2013 feasibility report. Teck owns 75% of the project and Copper Fox Metals Inc. retains 25%. Teck and Novagold Resources Inc. completed little more than basic monitoring and maintenance at the **Galore Creek** gold-copper deposit. Capstone Mining Corp. continued to maintain an airstrip and camp at their **Kutcho Creek** massive sulphide project, 100 km east of Dease Lake.

Fig. 15. Northwest Transmission Line near Bell 2.

Fig. 16. The first bench at the East Zone, Red Chris copper-gold mine.

5.3. Exploration projects

Oz Minerals Limited returned the **ROK-Coyote** copper-gold project to Firesteel Resources Inc. after the exploration program was interrupted by protests. Drill targets generated from overlapping IP and magnetic anomalies were tested with two holes totalling 842.15 m. Best results were returned from drill hole DD14RK006; 109.1 m grading 0.11 g/t Au and 0.05% Cu from 383 m depth. Colorado Resources Ltd. grew their **North ROK** copper gold project from a single rock chip sample collected during a British Columbia Geological Survey regional mapping project (Ash, 1997) to a 142.3 Mt Inferred Resource estimate grading 0.22% Cu and 0.26 g/t Au in nine months. The company returned in early 2014 and demonstrated continuity at depth and a new zone, West Mabon. Drilling totalled 2,191 m in five holes. Colorado also completed 892 m of drilling at the **Eldorado** prospect northeast along trend from the Red Chris deposit. Despite broad intersections of weak copper-gold mineralization, Colorado returned the property to Sunrise Resources Ltd.

New Chris Minerals Ltd. completed reconnaissance surveys at their **Tatogga Lake** project area. Over one thousand combined soil and rock samples were collected in conjunction with a ground IP survey and geological mapping. New showings were discovered along the 'Northern Lights' shear zone (Fig. 17). Skeena Resources Ltd. completed a late-season drill program at the **Spectrum** gold project 85 km south of Dease Lake, on the eastern flank of Mt Edziza. Nine drill holes totalling 1,950 m confirmed historical gold values and proved depth continuity well below historical drilling. The best intersection returned 27 m grading 10.63 g/t Au from 106 m depth in drill hole 14-SP-

Fig. 17. Chlorite shear hosted quartz-carbonate-chalcopyrite-malachite-azurite veining at the Northern Lights showing, New Chris Mineral's Tatogga Lake project.

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Serengeti Resources Inc. completed a program at their **RCN** property to follow up 2013 results. Groundwork included an IP survey and geochemical rock and soil sampling. Results of the 2014 program included outcrop samples up to 0.97% Cu and 1.38 g/t Au and open-ended chargeability highs.

Kaizen Discovery Inc. (formerly West Cirque Resources) proved porphyry and high-sulphidation style copper-gold-molybdenum mineralization at **Tanzilla**, 23 km southeast of Dease Lake (Fig. 18). The 2 x 1.5 km changeability anomaly underlying Silica ridge was tested this year with three diamond drill holes, which returned copper-gold grades of up to 0.13% Mo and 0.148 g/t Au. Drill hole TZ 14-05 targeted the central chargeability high and intersected strong pervasive, silica and advanced argillic altered hydrothermal breccias containing disseminated and vein hosted covellite, chalcopyrite, enargite, and molybdenite.

Carmax Mining Corp. resumed exploration at the **Eaglehead** copper-molybdenum-gold-silver porphyry. Ground work

Fig. 18. Traversing across the strongly QSP altered Silica Ridge. Detailed studies of the clay alteration mineralogy helped define drill targets, which led to the discovery of a copper-gold-molybdenite bearing porphyry and high sulphidation system.

included four drill holes totalling 2,264 m and a TITAN 24 geophysical survey. Results of the 18-line km geophysical survey identified two areas of high chargeability over a 5.6 km strike length. Drilling targeted both the East zone and Bornite zone and intersected copper-molybdenum-gold-mineralization (Fig. 19) reflecting similar grades to those in a 2012 resource estimate. Drilling proved the mineralized system extends deeper than previously known.

Pacific Bay Minerals Ltd. completed a single 246 m drill hole at **Boulder Gold** 60 km east of Dease Lake. Boulder City has a rich placer gold history but a bedrock source has never been fully investigated. Drilling results have returned visual sulphide mineralization with assays pending.

Gold Jubilee Capital Corp. discovered a new copper-gold-

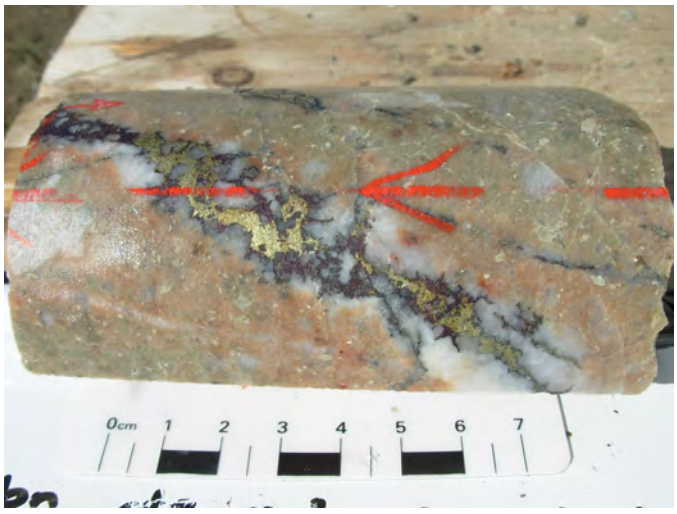

Fig. 19. Chalcopyrite- and bornite-bearing quartz vein in phyllic altered granodiorite at Carmax Mining's Eaglehead project. Photo by Bev Quist.

silver showing at **Pyramid** (Fig. 20) 50 km north of Dease Lake. The 2014 work program included a 32.3 line km Volterra 3D IP survey and 722 combined geochemical soil, silt, and rock samples. Widespread anomalous gold and copper values in soils coincident with IP chargeability and resistivity anomalies are guiding follow up work. The best hand sample returned 11.5 g/t Au, 7.0 g/t Ag and 0.08% Cu.

About 105 km west of Dease Lake, Prosper Gold Corp. completed a drilling program at the **Sheslay** copper-gold project, which was optioned from Firesteel Resources Inc. Drilling totalled 6,221 m in twenty holes and aimed to expand known mineralization. Results were consistent with historical copper gold values (Fig. 21). The best results were from drill hole S045: 106.98 m grading 0.77% Cu, 0.407 g/t Au and 1.02 g/t Ag.

Doubleview Capital Corp. continues exploration work through the winter at the nearby **Hat** gold-copper porphyry project 95 km west of Dease Lake. Over 7,000 m of drilling in 22 holes was completed in 2013-2014. The Lisle zone has received most of the drilling and returned the best intersections (drill hole HAT-022; 404.2 m grading 0.25% Cu and 0.255 g/t Au from 43.4 m depth including 118.4 m grading 0.55% Cu and 0.41 g/t Au). The deposit now extends along a strike length of 962 m, and to a depth of 400 m.

About 40 km northwest of Schaft Creek and 50 km southwest of Telegraph Creek, Boxxer Gold Corp. completed two drill holes totalling 834.9 m, on the **DOK** copper-gold-molybdenum-silver project. Visible chalcopyrite has been reported but not validated by analytical results.

Fig. 20. Fracture-controlled mineralization in quartz-sericite-pyrite altered diorite at Pyramid. Photo by Dustin Perry.

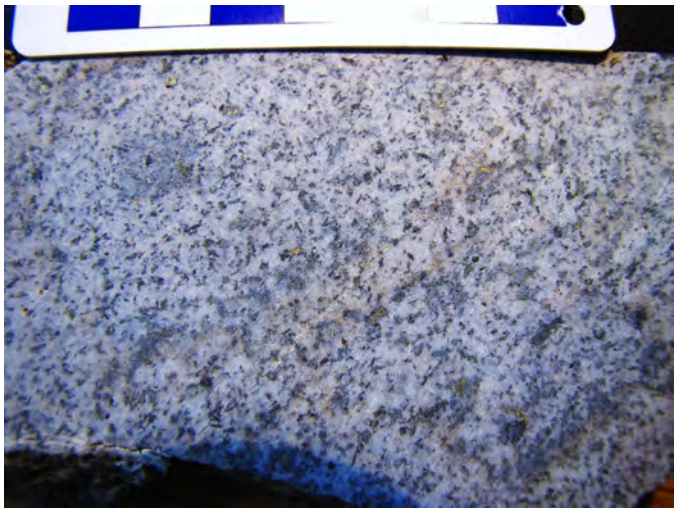

Fig. 21. Outcrop sample of the chalcopyrite-bearing Sheslay diorite.

Romios Gold Resources Inc. followed up on their 2013 copper-gold-silver porphyry related skarn discovery at **Burgundy Ridge** with sampling and prospecting in the larger **Newmont Lake** project area. Rock chip samples (Fig. 22) were collected of which 173 targeted Burgundy Ridge. The average from Burgundy Ridge returned 0.40% Cu, 0.48 g/t Au and 4.78 g/t Ag; the highest grades were in excess of 9% Cu, 52 g/t Au and 171 g/t Ag. Prospecting nearly 2 km beyond Burgundy ridge identified several zones of porphyry-related copper-gold bearing skarns. Mineralization appears to be related to megacrystic potassium feldspar syenite porphyry and diorite porphyry dikes intruded into dolomitic limestones.

6. Skeena Arch

The Skeena Arch forms a topographic high separating the Bowser and Netchako basins. The district contains numerous Cretaceous and younger faults whose enveloping trend is northeast, at a high angle to the general northwest Cordilleran

Fig. 22. Systematic sampling at Burgundy Ridge. Photo courtesy of Romios Gold.

trend. Mineral deposits in the area include calc-alkalic porphyries, precious metal veins, and minor coal (Fig.1; Table 6).

6.1. Mine development

Avanti Mining Inc. (Alloy Corp Mining Inc. as of December 1st) is working to reopen the past-producing **Kitsault** molybdenum- silver mine, 115 km north of Terrace. In June, the project received an amendment to an existing Mines Act permit and federal approval of their Environmental Assessment application. These approvals allowed the company to begin road and camp construction and infrastructure upgrades. Also in June, the Nisga'a First Nation and the company successfully negotiated a Mine Benefits Agreement. Details of the agreement include a net smelter royalty of up to 2% (based on prevailing molybdenum prices) and a resolution to all outstanding litigation. A memorandum of understanding with the Wilp Luuxhon First Nation was also signed. Construction activities are scheduled to continue throughout the winter, focusing on upgrading the Nass River Bridge and a 150 bed construction camp. The mine plan outlines a 45,000 tonne per day mill to be active for at least 14 years. Current Proven plus Probable reserves total 226.3 Mt grading 0.083% Mo + 5.3 g/t Ag. The company plans to truck concentrate to Prince Rupert or Vancouver. Kitsault operated from 1967 to 1972 and again from 1981 to 1982, milling 13.4 Mt grading 0.101% Mo. Molybdenite mineralization (Fig. 23) is primarily hosted in aplite dikes and banded quartz-molybdenite veins related to diorite-quartz diorites of the Lime Creek intrusive complex (Eocene) that cut Jurassic greywackes and argillites of Bowser Basin (Carter, 1974).

6.2. Proposed mines

In February, Metal Mountain Resources Inc. submitted an application for an amendment to their existing Mines Act Permit to build a 250 tonne per day onsite mill at their **Dome Mountain** gold mine, 35 km east of Smithers. An Environmental Assessment application of the **Morrison** copper-gold project was referred to the Minister of Environment in mid-July but was suspended in mid-August pending the outcome of the Independent Expert Engineering Investigation and Review Panel, which is investigating the tailings dam breach at Mt. Polley.

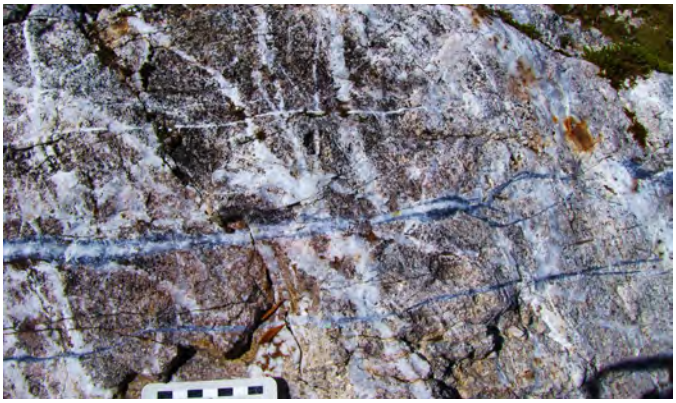

Fig. 23. Sheeted quartz-molybdenite veins cutting Lime Creek intrusive complex quartz monzodiorite at Kitsault.

6.3. Exploration projects

Goldreach Resources Ltd. continued drilling at their **Ootsa** copper-gold-silver molybdenum porphyry project about 6 km south of the producing Huckleberry copper mine. Measured and Indicated Resources increased from 2013 results and now total 153.9 Mt grading 0.21% Cu using a 0.20 eCu cut-off. Drilling in 2014 totalled 9,795 m in 20 drill holes (11 targeted known resource areas and 9 tested step out exploration targets). Goldreach also expanded their mineral claim holdings totalling over 71 km^2 and added several known prospects to their exploration inventory, including the Troitsa Peak gold-silver prospect and the past-producing Captain silver mine.

About 32 km southwest of Houston, Similco Mines Ltd. tested the **Fenton Creek** prospect with about 3,000 m of diamond drilling in nine holes. Targets were generated from 1,600 m of percussion drilling in 53 holes and deep penetrating IP geophysics. Finlay Minerals Ltd. completed about 1,000 m of drilling in 3 holes at their **Silver Hope** project, 35 km southeast of Houston and surrounding the past producing Equity Silver Mine. Northern Abitibi Mining Corporation completed seven trenches and 274 geochemical rock chip samples at the **Ches** porphyry project 80 km south of Burns Lake. Results indicate a variably mineralized zinc-copper-tungsten skarn system over an area 1.5 x 0.5 km. A 1.5 m rockchip sample returned 1.25% Zn, 0.16% Cu and 0.12% WO_3 (tungsten trioxide). KGE Management Ltd. completed biogeochemical bark sampling at the **Boer** property, a company completed an IP geophysical survey at the **CR** prospect and Astorious Resources Ltd. reported results of an IP survey at **Babine.**

7. Atlin area

The Atlin Area area, in the northwestern part of the Skeena Region, is underlain by the Cache Creek, Stikine, and Yukon-Tanana terranes (Fig. 1). The Stikine terrane hosts almost all of the active projects (Table 7), although the Cache Creek terrane hosts some economic mineral deposits, most significantly placer gold mined east of the community of Atlin. Deposit types include Kuroko-type massive sulphides (e.g., Tulsequah Chief), precious metal breccia pipes and porphyry (e.g., Thorn) and epithermal veins (e.g., Engineer).

7.1. Proposed mines

In early December, Chieftain Metals Corp. filed an updated feasibility study for their **Tulsequah Chief** high-grade copper-lead-zinc-gold-silver VMS deposit about 100 km south of Atlin. Rather than building a road between Atlin and the deposit, the plan calls for conventional barging during five months of the year, eliminating $125 million of pre-production capital costs. The 1,100 tonne per day underground mine would operate for at least 11 years on 4.4 Mt of reserves.

Table 6. Mine development, proposed mines, and exploration projects, Skeena Arch.

Property	Proponent	MINFILE	Deposit Type	Commodities	2014 Activities	Website
Babine	Astorius Resources Ltd.	093L 209	Porphyry	Cu, Au	Geophysics (IP)	www.astoriusresources.com
Big Onion	Eagle Peak Resources Inc.	093L 124	Porphyry	Cu, Mo, Au, Ag	Geology, Geochemistry	www.eaglepeakresources.com
Boer	KGE Management Ltd.		Porphyry	Cu	Geochemistry (biogeochem, till), Geology	
Ches	Northern Abitibi Mining Corp.	093F 042	Porphyry	Mo, Cu, Zn, W	7 trenches, Geochecmistry (274 rock chips)	www.naminco.ca
CR	Wes Moll	093L 007	Porphyry	Cu	Geophysics (IP), Geology	
Davidson	Don Davidson	093L 110	Porphyry	Mo	Corporate	
Deer Horn	Deer Horn Metals Inc.	093E 019	Vein/Breccia	Au, Ag, Te	Corporate	www.deerhornmetals.com
Dome	Metal Mountain Resources Inc./ Gavin Mines Ltd.	093L 022	Vein/Breccia	Au, Ag	Corporate	www.metalmountainresources.com
Emerald Glacier	Lowprofile Ventures Ltd.	093E 001	Vein/Breccia	Zn, Ag, Pb, Cu, Au	Geology, Geochemistry	
Fenton	Similco Mines Ltd.	093L 248	Vein/Breccia	Cu, Ag, Zn	Diamond drilling (3,000 m, 9 holes), Percussion Drilling (1,600 m, 53 holes) Geology, Geochemistry, Geophysics (IP, 9 line km)	
Fireweed	Shamrock Resources Inc.	093M 151	Sedimentary Replacement	Ag	Corporate	www.shamrockresources.com
Hanson Lake	John Chapman/ Gerry Carlson	093K 078	Porphyry	Mo, Cu	Geology, Geochemistry	
Huckleberry	Huckleberry Mines Ltd.	093E 037	Porphyry	Cu, Mo	Geology, Geochemistry (soils)	www.imperialmetals.com
Kitsault	Avanti Mining Inc./Alloy Corp. Mining Inc.	103P 120	Porphyry	Mo, Ag	Corporate	www.avantimining.com
Lennac Lake	Don MacIntyre	093L 190	Porphyry	Cu, Mo	Corporate	
Morrison	Pacific Booker Minerals Inc.	093M 007	Porphyry	Cu	Corporate	www.pacificbooker.com
Ootsa	Goldreach Resources Ltd.	093E 105	Porphyry	Cu, Au	Diamond drilling, (9,795 m, 20 holes), Geology, Geochemistry (soils)	www.goldreachresources.com
S2	Vale		Porphyry	Cu, Mo, Ag	Geophysics, Geology, Geochemistry	www.vale.com
Silver Hope	Finlay Minerals Ltd.	093L 256	Vein/Breccia	Ag, Cu	Diamond drilling	www.finlayminerals.com
Silver Queeen	New Nadina Explorations Limited	093L 002	Porphyry	Cu, Mo	Corporate	www.nadina.com
Suskwa	Xander Resources Inc.	093M 027	Porphyry	Cu, Au	Geophysics (EM + Mag, 937 line km)	
Yellow Giant	Banks Island Gold Ltd.	103G 021	Vein/Breccia	Au, Ag	Diamond drilling	www.banksislandgold.com

Table 7. Proposed mines and exploration projects, Atlin area.

Property	Proponent	MINFILE	Deposit Type	Commodities	2014 Activities	Website
Engineer	BC Gold Corp.	104M 014	Vein/Breccia	Au	Geology, Corporate	www.bcgoldcorp.com
Golden Eagle	Troymet Exploration Corp.	104M 044	Vein/Breccia	Au	Geology, Corporate, Feasibility	www.troymet.com
Tulsequah Chief	Chieftain Metals Inc.	104K 002	Massive Sulphide	Cu, Zn, Ag, Au	Corporate	www.chieftainmetals.com
Rohan	Eagle Plains Resources Ltd./ Rosedale Resources Ltd.	104M 032	Vein/Breccia	Au	Geology	www.eagleplains.ca
Thorn	Brixton Metals Corp.	104K 031	Vein/Breccia	Au, Cu	Diamond drilling (1,287 m, 8 holes), Geology, Geochemistry, Corporate	www.brixtonmetals.com

7.2. Exploration projects

Brixton Metals Corporation continued exploration at the **Thorn** project 125 km south-southeast of Atlin. The project contains multiple targets including high-grade silver-gold-lead-zinc diatreme breccias, high-grade veins, porphyry copper-gold, and intrusion-related sediment-hosted gold. In 2014 the company completed eight drill holes totalling 1,287 m divided between the Glenfiddich zone (464 m in 4 holes) and the Outlaw zone (823 m in 4 holes). Results from the Outlaw zone discovered 59.65 m grading 1.15 g/t Au and 5.64 g/t Ag from 76 m depth in drill hole THN14-128. Mineralization is hosted in siltstone but is thought to be intrusion related. Brixton filed a maiden Inferred Resource estimate for the combined Oban, Talisker and Glenfiddich zones. Total estimated in-pit and underground inferred resources total 7.4 Mt grading 35.54 g/t Ag, 0.51 g/t Au, 0.13 % Cu, 0.32 % Pb and 0.59% Zn. Grades and cut offs vary between deposits. Grassroots prospecting, mapping, and geochemical sampling programs were completed by Eagle Plains Resources Ltd. at the **Rohan** property and by Troymet Exploration Corp. at the **Golden Eagle.** BCGold Corp. completed limited corporate activities to source financing for their **Engineer** gold mine 31 km west-southwest of Atlin. Discussions were unsuccessful to source financing for a 4,000 tonne bulk sample.

8. Good Hope area

The Good Hope area, in the northeastern part of the Skeena Region, is underlain by the Qusenell, Yukon-Tanana, and Slide Mountain terranes and the Cassiar platform of ancestral North America (Fig. 1). Economic mineral deposits include manto replacement at Silvertip, porphyry molybdenum at Storie, and nephrite jade at Cassiar (Table 8).

8.1. Proposed mines

JDS Silver Inc. has repaired the 26 km access road to the **Silvertip** high-grade silver manto deposit about 95 km west of Watson Lake. A concentrator has been purchased and is currently being stored in Watson Lake. The mine is proposed to be a 74,000 tonne per year underground operation. Limited mine site preparation work was completed in 2014 and the Mines Act Permit review began in November.

8.2. Exploration projects

BC Moly Ltd., formerly Columbia Yukon Exploration Inc., filed an updated resource estimate for their **Storie** molybdenum project 85 km north of Dease Lake. Measured plus Indicated estimates total 117 Mt grading 0.068 % Mo using a 0.03 % Mo cut off. Pacific Bay Minerals Ltd. completed a 409 m diamond drilling program at the **Haskins-Reed** polymetallic skarn

Table 8. Proposed mines and exploration projects, Good Hope area.

Property	Proponent	MINFILE	Deposit Type	Commodities	2014 Activities	Website
Cassiar Jade	Cassiar Mountain Jade		IM_Rock	Jade	Mining	www.jadecity.com
Cassiar Jade	Cassiar Jade Contracting	104P 005	IM_Rock	Jade	Mining	www.cassiarjadecontracting.com
Haskins Reed	Pacific Bay Minerals Ltd.	104P 021	Skarn	Zn, Pb, Ag, Mo	Diamond drilling (409 m, 6 holes), Geology, Geochemistry	www.pacificbayminerals.com
Silvertip	JDS Silver Inc.	104O 038	Sedimentary Replacement	Ag, Pb, Zn, Au	Access road repair, corporate	www.jdsmining.ca
Storie	BC Moly Ltd.	104P 069	Porphyry	Mo	Corporate	www.columbiayukon.com
Fireside	Fireside Minerals Ltd.	094M 003	IM_Rock	Barite	Diamond drilling (2242 m), mining	www.firesideminerals.com

Table 9. Proposed mines, Bowser Basin.

Property	Proponent	MINFILE	Deposit Type	Commodities	2014 Activities	Website
Arctos	Fortune Minerals Limited	104H 022	Metallurgical coal	Anthracite	Environmental	www.fortuneminerals.com
Groundhog	Atrum Coal	104A 078	Metallurgical coal	Anthracite	Diamond drilling, (10,084 m, 51 holes), Geophysics (seismic)	www.atrumcoal.com

project 5 km north of Highway 37 and 105 km north of Dease Lake. Results returned up to 48.6 m grading 2.31 % Zn from drillhole 14-02 targeting the Brett zone.

9. Bowser Basin

Jurassic to Cretaceous deltaic deposits of Bowser Basin host the only significant anthracite deposits in Canada in the Groundhog-Klappan Coalfield which, including Arctos and Groundhog, extends across the boundary between the Skeena and Omineca regions (Fig. 1; Table 9; British Columbia Geological Survey, 2015). The Government of British Columbia has extended the deferral of issuing new coal licences in the Klappan area for an additional year, ending in December 2015. Existing coal licences are not affected.

9.1. Proposed mines

Atrum Coal continued advancing the **Groundhog** ultra-high rank anthracite coal project toward an underground bulk sample. The project area is 150 km northeast of Stewart. Drilling in 2014 included 41 exploration holes and 10 hydrological monitoring holes totalling 10,084 m. Trenching, environmental baseline monitoring, and site planning have positioned the project to excavate a bulk sample in early 2015. A supplementary Pre-Feasibility Study details a 5.4 Mt/ year run-of-mine underground operation for 38 years for the Groundhog North deposit, which contains an estimated 609 Mt. The feasibility also proposes a multi-mine plan once the initial Groundhog North mine is operational. A project-wide JORC compliant Measured + Indicated + Inferred resource estimate totals 1,567 Mt. Fortune Minerals Limited completed minimal groundwork on the **Arctos** anthracite project jointly owned with POSCAN. Plans to conduct baseline work were put on hold as no new permits were issued in the Klappan Strategic Initiative Area.

Acknowledgments

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References cited

Alldrick, D.J., 1993. Geology and metallogeny of the Stewart mining camp, northwestern B.C. British Columbia Ministry of Energy and Mines and Petroleum Resources, British Columbia Geological Survey Bulletin 85.

Ash, C.H., MacDonald, R.J.W., and Friedman, R.M., 1997. Stratigraphy of the Tatogga Lake area, northwestern British Columbia (NTS 104H, 12, 13; 104G/9, 16. In: Geological Fieldwork 1996, British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Paper 1997-1, pp. 283-290.

British Columbia Geological Survey, 2015. British Columbia coal industry overview 2014. British Columbia Geological Survey Information Circular 2015-3, 14 p.

Carter, N.C., 1974. Geology and Geochronology of Porphyry Copper and Molybdenum Deposits in West-Central British Columbia: Unpublished PhD thesis, University of British Columbia.

Febbo, G.E., Kennedy, L.A., Savell, M., Creaser, R.A., Friedman, R.M., 2015. Geology of the Mitchell Au-Cu-Ag-Mo porphyry deposit, Northwestern British Columbia. In: Geological Fieldwork 2014, British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Paper 2015-1, in press.

Kyba, J. and Nelson, J.L., 2015. Stratigraphic and tectonic framework of the Khyber-Sericite-Pins mineralized trend, lower Iskut River, northwest British Columbia. In: Geological Fieldwork 2014, British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Paper 2015-1, in press.

Logan, J.M., and Mihalynuk, M.G., 2014. Tectonic controls on Early Mesozoic paired alkaline porphyry deposit belts (Cu-Au ± Ag-Pt-Pd-Mo) within the Canadian Cordillera. Economic Geology, 109, 827-858.

Marsden, H., and Thorkelson, D.J. 1992. Geology of the Hazelton Volcanic Belt in British Columbia: Implications for the Early to Middle Jurassic Evolution of Stikinia. Tectonics, 11, 1266 – 1287.

Metcalfe, P. and Moors, J.G. 1993. Refinement and local correlation of the upper Snippaker Ridge section, Iskut River area, B.C. (104B/10W and 11E). In: Geological Fieldwork 1992, British Columbia Ministry of Energy, Mines and Petroleum Resources, Paper 1993-1, pp. 335-340.

Nelson, J.L., Colpron, M., and Israel, S.K., 2013. The Cordillera of British Columbia, Yukon, and Alaska: tectonics and metallogeny. In: Colpron, M., Bissig, T., Rusk, B., and Thompson, J.F.H., (Editors), Tectonics, Metallogeny, and Discovery - the North American Cordillera and similar Accretionary settings. Society of Economic Geologists, Special Publication 17, pp. 53-109.

Nelson, J., and Kyba, J., 2014. Structural and stratigraphic control of porphyry and related mineralization in the Treaty Glacier – KSM – Brucejack – Stewart trend of western Stikinia. In: Geological Fieldwork 2013, British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Paper 2014-1, pp. 111-140.

Pretium Resources, 2015, Brucejack Geology Summary, www.

pretvm.com/projects/brucejack/brucejack-geology-summary/; January, 2015.

Wojdak, P., 2008. Fireside deposit: Diagenetic barite in strata of the Ketchika trough, northwestern British Columbia (NTS 094M/14). In: Geological Fieldwork 2007, British Columbia Ministry of Energy and Mines, British Columbia Geological Survey Paper 2008-1, pp. 219-225.